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CLINICAL SURGERY
BY CASE HISTORIES
VOL. I
CLINICAL SURGERY

BY

CASE HISTORIES

BY

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VOL. I
HEAD, NECK, THORAX, AND EXTREMITIES

WITH TWO HUNDRED EIGHTY-FOUR ORIGINAL ILLUSTRATIONS

ST. LOUIS
C. V. MOSBY COMPANY
1921
These case reports represent, with few exceptions, patients observed at the Halstead Hospital. Each has been selected because of some outstanding point of interest. Since usually those experiences which have been unfortunate most impress us, these records almost unwittingly have been made up of cases in which some one has been in error wholly or in part. They represent, not achievement on parade, but rather the sober afterthought. They are presented in too brief a form to convey much information, but they are intended to remind the reader of possible errors rather than to teach him how to avoid them, for most likely he already possesses such information if he but thinks of the possibility at the right moment.

In harmony with this plan, those things have been emphasized which have to do with diagnosis and indications for treatment. Irrelevant matters have been eliminated. In order that these points might be presented clearly and concisely, the clinical records have been rewritten in order to eliminate as much as possible the jerky, incomplete sentences incident to history-taking at the bedside.

A topographic classification, according to the chief complaint, has been adopted because the examiner must always begin with the symptom that brings doctor and patient together, however little it may relate to the actual pathologic process that lies at the basis of the trouble.

The pathology has been presented with the greatest possible brevity. In most instances it amounts to little more than a statement of opinion. In the course of time, however, the surgeon who examines each bit of tissue he removes is very likely to form opinions that are reasonably accurate in simple problems. In those cases in which a difference of opinion might be expected, a photomicrograph has been appended, which will permit the reader to judge for himself.

Photographs have been used wherever possible, because they eliminate the personal equation inseparable from drawings. It is the belief of the author that these represent the most valuable feature of the work.

A. E. H.

Kansas City, Missouri.
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CLINICAL SURGERY
BY CASE HISTORIES

VOL. I.

CHAPTER I
ON THE GENERAL PRINCIPLES UNDERLYING THE STUDY
OF SURGICAL DISEASE

In times past medical practitioners were wont to examine the various functions of the body and attempt by various means to remedy the disorders of each separate function. For instance, in tonsillitis the patient was given aconite for fever, calomel for constipation, and nitre for his kidneys. No attempt was made, in most instances, to name the disease or to determine the etiologic factors. After bacteriologic investigation began to bear fruit it was possible to seek a definite etiology and the physician could then arrive at a specific diagnosis of disease. In tonsillitis, the variety of bacteria present was determined and the fever allowed to take its course under the serene confidence that the patient would recover spontaneously in a few days. When the active era of surgery began, the regional diagnosis of disease became necessary in order that manual attack might be possible. For purposes of medical treatment in general abdominal inflammations a diagnosis of peritonitis was sufficient, but when operation became in order, the offending organ which supplied the noxious bacteria had to be designated.

Because of this necessity the surgeon has greatly advanced the knowledge of anatomic lesions. However, he was content with the discovery of lesions he was able to combat. He was oblivious to the associated or subsidiary lesions, and the conditions that antedated the surgical disease. If the removal of the lesion did not cure, another was sought. For this reason various organs were successively
removed. The appendix, the gall bladder, and in former years the ovaries, were often required to do penance for the most varied diseases.

Fortunately the advance of other branches of medical science has tended to disturb his composure. In order to gauge properly the range of safety of his therapeutic activities he has had to take cognizance of some of the newer developments of the physiologist and internist. For instance, in diseases of the endocrine system the surgeon must be as well acquainted with the physiology of the various organs, and the pathologic changes to which they are subject, as is the internist. If he is not, his untimely interference may become embarrassing. Physiology, not anatomy, becomes the guiding science. The surgeon can intuitively diagnose the presence of goiter, for instance, but intuition will not indicate the time when it is safe to operate. In other cases he can save himself much embarrassment if he emulates the skill of the internist in general diagnosis. A patient may suffer from a myoma of the uterus, but she also may suffer impairment of renal function which makes a surgical operation hazardous. If there be profuse hemorrhage, however, operation may be demanded to combat the more pressing of the two diseases.

It is desirable that the entire state of the patient be known before the surgeon proceeds with the treatment of even the more simple maladies. If a lesion is demonstrable, the question must be answered whether or not the lesion is capable of causing the symptoms complained of, in whole or in part. If in part only, it must be decided if that part is likely to be relieved of which the patient most complains. For instance, a woman may complain of headache and have pelvic lacerations. If the headache be migrainous, operation will not relieve her. No matter how skilfully the operation of repair may be performed, the headache will not be relieved, and in her mind the operation will have failed.

Surgical problems may be roughly divided into three categories: First, lesions entirely visible to the naked eye in which any history or questioning is academic and in which matters essential for record only need be noted. Many tumors such as those of the lip, face, breast, etc., may be diagnosed by a single glance. A second group includes those which require and admit of an extensive study. This includes most intrathoracic and intraabdominal dis-
GENERAL PRINCIPLES

cases as well as those of the endocrine system, and all others in which a diagnosis can be arrived at only by a study of perverted physiology. The deliberation permits and usually demands that he work together with his internist colleague, and that both work together in the laboratory either in person or by proxy. A third group of diseases is of such a nature that time for deliberate study is not permitted, and the surgeon must act at once with such information as may be available, depending more or less upon his intuition as to the general problems involved, and upon his judgment to guide him aright as he proceeds. This group includes many abdominal disasters, such as perforations and gut obstructions. In such cases the state of the blood and of the excretory organs can not be allowed to weigh in the plan of procedure even if their state be known. In fact, these factors are so often perverted by the grave disaster that their state at one examination would give evidence of but little value.

The surgeon, therefore, must have a "change of pace" as the baseball pitchers say. He must be deliberate when deliberation is permitted, but he must act with boldness and dispatch when time is more important than detailed knowledge. The degree in which he has this change of pace declares his abilities as a surgeon. The man who depends on speed alone is dangerous. The habitual procrastinator may allow the golden opportunity to pass by. It can not be too much emphasized, however, that the besetting sin of the surgical profession is undue speed. This may be due to lack of knowledge which makes careful study impossible, or it may be due to plain laziness, he having formed the habit of completing the diagnosis as the operation proceeds, or finally, it may be due to an innate tendency which finds satisfaction only in slashing and the spattering of blood.

In the first group of surgical problems the surgeon is vastly improved by experience. The eye learns to group lesions in an instant which formerly it could encompass only after painful reasoning. Even in these cases careful consideration of each patient is required in order to avoid the danger of falling into slothful habits, and to catch up those cases which are not quite what they at first seem. There are always details not at once apparent that require record for the sake of science. These may not be important in the naming of the disease but may be of vast importance in estimating the se-
riousness of the problem to the patient and for the conduct of like procedures in the case of other patients. In this group love of science only can impel the surgeon to a complete study of each case. He must be imbued with the desire to achieve exactness for the sake of science in the hope that he may extend the sum total of knowledge as well as perfect his own skill in diagnosis.

In the second group exact diagnosis is absolutely necessary if he is to be other than a mere mechanic to act at the dictation of his more learned colleagues. Surgery of the endocrine system, for instance, demands careful personal study. Surgery of the cranial and thoracic cavities demands the most careful localization, for if the surgeon selects the wrong site his efforts must fail. Unfortunately for the surgeon's own good the abdominal cavity being one continuous space does not require such definite localization; and once having made his incision he can often escape in a measure the sin of his error. It may seem useless labor to make an elaborate examination in order to anticipate only by hours or days the revelations of the operating room. However, such detailed consideration prepares the mind of the surgeon for all the possibilities, and should the unusual be found at operation, he is better fortified if he has already foreseen it. It is the things we have not anticipated that frighten us. There is a vast difference between an exploratory and a confirmatory laparotomy.

The third group can be solved only if the surgeon has a thorough working knowledge of the less urgent diseases. If a pain is not a gallstone colic it may be a perforation. It is only by knowing the less urgent malady in all its phases that he quickly comprehends the more serious one. The vast majority of ill-advised operations, which end disastrously, are due to mistaking lesions of minor importance for grave ones. Many a woman with menstrual pain has been operated upon under the diagnosis of extrauterine pregnancy, or acute appendicitis. Or grave lesions are operated on at inopportune times, as hemorrhages from gastric ulcer. There are really very few real emergencies in surgery. If two questions can be answered in the negative—"Is there perforation?" and "Is there hemorrhage?"—the surgeon will do well to think carefully before he acts.

Senn pictured the ideal surgeon as one who knows as much of diseases as the internist and has in addition the technical skill
which belongs to surgery. That is to say, he should be a physician who can operate. The late Joseph Eastman was wont to say that no one should attempt to practice gynecology who is not himself a good neurologist. He must, indeed, often carefully ponder how much of the picture is due to the manifestation of impaired nervous balance and how much to objective disease. It is only by properly evaluating the various factors that he can hope to determine beforehand how much improvement will follow the correction of obvious anatomic impairment. He must even go further and properly estimate the social relations of the patient, for an unfavorable environment may be the determining element. The surgeon should utilize the internist and other trained specialists to the highest degree as factors in his education, but should depend on them as little as possible in a specific case. The more he can do this, the better is he fortified against the multitude of complications that constantly confront the surgeon at the operating table. It is such considerations as these that make the broadest possible education of paramount importance to the surgeon.

Responsibility rests much more heavily upon the surgeon than upon the internist. His acts are for better or for worse and he must be able to determine beforehand which it will be. The internist has the consolation of knowing that if his therapeutic endeavors do no good they will do no considerable harm. Most of the disasters that confront the surgeon are of his own making. With all the advances of our science none can live up to the ideal it presents. The surgeon’s own limitations are his only handicap.

These considerations make it imperative that the surgeon establish a routine of procedure which must be followed, in so far as it is possible, in each case. So important is this that many hospitals, in the protection of their own good name, demand that the surgeon produce a careful history and a working diagnosis before they extend to him the privileges of their operating room service. It is very satisfying to notice that this outside stimulus, to whip the laggards, comes from within the surgical profession itself. The American College of Surgeons, in order to aid surgeons in perfecting their records, has attempted to present a model by which the surgeon may be guided. The chief importance that can be attached to this endeavor is the fact that this body recognizes the importance of the utmost care in forming an opinion. In so far as their con-
crete plan goes it must be declared far from ideal; and at best can but serve as a point of departure from which each surgeon may work out his own more complete plan.

The essential thing is that there should be some routine. The precise nature of it is relatively less important. It must be one that can be carried out in all cases. There is a difference between completeness and verbosity, however, which must be clearly appreciated. The beginner must be more prolix than the expert, for in his inexperience he must include much that is irrelevant lest he overlook something of importance. Simplicity is the handmaid of efficiency. An artist with a few skillful strokes expresses an attitude of thought, while those lacking artistic skill produce but an expressionless object after the most laborious application of strokes and colors. So the expert clinician in a few short sentences may record exactly the history of the disease.

There is a minimum, however, that can not be reduced. Every scheme should include the following headings: (1) History. (2) Examination, including laboratory findings. (3) Diagnosis. (4) Treatment. (5) Pathology. (6) Aftercourse.

By following such a scheme, clinical study becomes the determination of the physical state of the individual and not merely the naming of this chief complaint. The subdivisions above enumerated must all be taken together. Diagnosis becomes only an estimate of present state, and treatment but an attempt to influence temporarily the course of events. If we view it so the importance of the element of subsequent course becomes at once apparent. Unless this is determined, the diagnosis and treatment are often but speculation and fall short of their greatest good because the influence is but temporary.

**HISTORY**

The history must give account of the essential happenings in the patient’s life up to the point where the surgeon’s observation begins. Wide latitude may be allowed in the taking of the history. It may be very simple if the surgeon wishes to limit his interests to the needs of the patient with regard to the particular ailment, or it may be of any degree of detail which particular scientific requirements may demand. In general, however, records should have a broader purpose than the benefit of the individual. They should regard matters
of general benefit. Furthermore, a history complete for today may be incomplete for tomorrow, when we have learned to look at the affection from a wider angle. A history should, therefore, be complete at least in all diseases, the whole scope of which we do not fully comprehend. Albert states that when a man falls from a house and breaks a leg, the state of the grandfather's health is not important. Yet one must remember that there are instances in which both family and past history is of importance in cases of fracture. Therefore, while one must not insist that every case be represented by a certain number of written pages, at the same time there is no disease so simple but that elaborate inquiry may not at times be of importance. It is such considerations as these that make a wide knowledge so important in the taking of a history. While this task is usually relegated to the interne as assistant, it is in many instances the most important of the procedures.

As a matter of convenience, the history is divided into several heads. There is the account of the antecedents of the patient as an individual—the family history. This is the first in chronologic order, but it is usually of least importance. Then there follows the account of diseases and accidents he has already had to contend with prior to his present affection—that is to say, his past history. Finally there is the account of the condition that brings the patient and surgeon together—the present disease.

While the order in which the various phases chronologically follow is as above enumerated, it is much more subservient to efficiency to reverse the order; that is, present complaint, past diseases, family history. It is only after one has some notion as to the present ailment, that the other two phases can be intelligently followed. If the chronologic order is followed, family and personal history are apt to be put down in the most perfunctory manner. One has but to look over the average interne's chart to convince himself that this is so. General statements abound in them which remind one of the familiar court room platitude, "incompetent, irrelevant and immaterial and tending to call for the conclusions of the witness." For instance, we find that the father died of inflammation of the bowels or of lung trouble. If this information is germane to the case in hand further information should be sought which may permit the examiner to form a conclusion of his own as to the nature of the disease which caused the demise of the ancestor. One can
not follow out all these clues in all cases, else a history would be
drawn out into endless confusion. The same applies to the personal
history. Perhaps the patient states that he had typhoid fever.
Questioning may indicate that it was an attack of appendicitis. One
would not care to follow out this detail if the patient had a frac-
tured thigh, but if the present complaint involves the question of
some obscure abdominal complaint, such detailed information might
be of use. Since to be of any use history of past conditions must
contain definite information, it is best, therefore, not to consider
the past history until a presumptive diagnosis of the present ailment
has been made. Then those factors in past history, both family and
personal, which may have a bearing on the present complaint may
be followed out as far as possible. The facts regarding the past
affection should in that case be as carefully catalogued as though
the ailment were now present.

HISTORY OF THE PRESENT DISEASE

The preferable course, therefore, is to begin at once to enter into
the matter that brings the patient. He is primed for his present
complaints and has no interest in past family or personal afflictions.
If we begin with the present ailment, what then shall be the first
question to be put when we confront the patient? It is well to be as
brief in the social amenities as possible. If the patient becomes im-
pressed at once that the surgeon has the single matter in mind of
determining his ailment he is less apt to be discursive. A fool-
proof initial question has not yet been devised. There seems to be
no plan that will prevent the question being parried. If one asks
the direct question, "What brings you here?" "To find out what
is the matter with me" is likely to be the answer. If one asks,
"What is the chief complaint?" he may be told that it is catarrh of
the stomach or some such reply which gives the conclusion of the
patient or of his physician. Possibly the question most likely to
elicit a reply that will serve as a basis for further questions is,
"How long have you been sick?" A few will make evasive replies
such as "a long time," or "always." These replies are valuable
in a way, for they give a clue to the character of the patient. If
one gets such a reply, he is safe in marking down then and there,
"prognosis bad" for they are all descendants of the old lady, who,
when interrogated by her pastor regarding the state of her health,
replied, "Poorly, thank God, poorly." Throughout the preliminaries the examiner must be alert in order to determine the sort of patient with whom he has to deal. It will be of vast importance after the real complaints are once reached.

Throughout the history the nature of the reply often gives a clue to the real nature of the complaint. After the time of beginning of the complaint has been fixed by the patient, it is often of importance to inquire especially in order to determine whether that is actually the beginning of the trouble. On examination the surgeon may discover the time given by the patient can not be correct, and in reply to a pointed question, the patient is apt to express the opinion that the supposed previous illness was some irrelevant disease which had nothing to do with the present trouble. For instance, one may be told that the patient has been suffering from obstruction in the rectum for three weeks. If the examiner finds a constricting carcinoma of evident longer standing, the patient may admit on further questioning that he has suffered from piles for a year.

Each symptom should be recorded in the words of the patient if possible. The understanding of the meaning of words differs among different individuals. Certain persons habitually employ the superlative degree in their descriptions. An "awful pain" may mean a slight colic or it may mean a perforated ulcer. The difference is expressed in the manner of speaking, and the actual words used may have to be qualified by a record of the surgeon's impressions.

As a matter of fact, of all symptoms, pain is the most important; and it is described with greater variability than any other symptom. One must determine its intensity. If a patient has really had severe pain he is very likely to lead off with this fact. If, on the other hand, the patient comes to the point of pain after touching discursively on other things, one may be sure that there has been little real pain no matter what the qualifying adjective employed may be. Usually if the pain has been severe, patients at once suggest the character of it. A gallstone colic, a renal crisis or a perforating ulcer is at once described with the necessary superlative adjectives. In the minor degrees only of pain is it necessary to follow with other questions in order to determine the character. Did the pain radiate or stay in the same spot? was it an ache? a sharp lancing or cutting pain? or was it a cramp? Such questions may elicit other information.
The site of pain also must be actually determined. The patient's words must be recorded. His ideas of topographic anatomy may not agree with ours, and an agreement on this matter between doctor and patient must be reached before a proper understanding may be had. There is nothing more exasperating than to read in the history that the patient has pain in the epigastrium, and when one goes to the patient one finds the patient said stomach, meaning thereby the lower abdomen, the recorder having taken on himself the liberty of substituting the more professional term. My earliest lesson in this wide divergence in the meaning of terms was obtained while listening to the discourses of a portly Methodist elder. He would rub the overhanging cliff of his more than generous paunch, expatiating on how his heart went out for small boys who persisted in fishing on Sunday. I was familiar with Steele's physiology, and I learned then and there that even the inspired may mistake the pains of incipient starvation for a yearning for the safety of small boys.

It is important for many reasons to use the patient's terms. If he says he has pain in the stomach and he indicates the lower abdomen, put it down so. It gives an index of the man's intelligence. If he says pit of the stomach, say so, and if he says epigastrium put that down. It is expression of character of pain one is after at this stage and not the exact location. Location is properly a task of physical examination.

Other symptoms must be studied with equal care, such as bloating, headache, and dizziness. One need not have a lawyer to aid him in finding out whether the patient who complains of headache is a victim of migraine. In such cases when the subject of headache is broached he proceeds without further urging to parade his vocabulary of superlative adjectives. The same is true of syphilitic and pressure headaches. If the patient is indefinite as to the character and frequency of headache, it obviously is not a matter of paramount importance.

It is the purpose of a history to determine whether a symptom must be evaluated on the statement of the patient or whether physical examination is likely to elicit additional evidence. For instance, if a patient complains of headache one should find out from the history, if possible, whether it is toxic, functional or due to sinus trouble. If one gets the impression that there is an organic basis
he will search the nose closely, or will follow up the possibility of syphilis even if the Wassermann reaction is negative. If it is frontal and is preceded by photophobia or muscae volitantes one will have little hope of finding an organic basis and will proceed with every care to establish the diagnosis by history alone. History must furnish some clue, let it be repeated, of the nature of the disease in order that the examiner may be direct, specific and persistent in his questions. If it fails to do so it must be gone over again and again. Often the most careful search is required to furnish the clue. Every effort should be made to find a guide for further examination. Routine examinations are valuable, no doubt, but if perfunctorily done, become mere travesty on exact clinical method. There is small chance, for instance, to find tubercle bacilli in the urine in the routine examination when made by a laboratory attendant who has no idea of the importance of the examination. It is only when one suspects renal tuberculosis that he is likely to find acid-fast bacilli in the urine.

The beginner sometimes allows the facts of the history to influence his physical findings. For instance, if the history points to a possible appendicitis, he may be more apt to find a muscular rigidity, whether it is present or not. This tendency can not be considered as a valid objection against the preliminary consideration of the history. If the examiner has not the power of concentration or the ability to suspend judgment until the facts are all collected he lacks the first requirements of a good diagnostician.

**HISTORY OF PAST DISEASES**

Fine maneuvering is needed to make this of value. I once heard an interne glibly read from his chart "Patient had measles, chicken pox, scarlet fever, gonorrhea, and other diseases of childhood." One often reads "patient had typhoid fever, pneumonia, and malaria," without qualifying information. If the history of the present complaint makes it important to determine whether he had a disease indicated in the history, such statements must be amplified by more detailed information. If he had typhoid, how long was he in bed? What were the symptoms in the beginning? What were the duration and disturbances of convalescence? In following such detail one must be sure that the patient understands the meaning of the questions asked him. If the patient had an irrelevant disease, such
as a broken leg, then the past history is of little importance (since the passage of the eighteenth amendment). If he has a varicocele on the right side, the determination of past urinary disturbance is of the greatest importance, but if it is on the left side, one may be pardoned if one omits such details.

There can be no unvarying method of seeking history. If one suspects syphilis one may proceed tactfully by inquiring whether the patient has ever had a rash, whether the hair has ever fallen out, and the like. Or one may pointedly inquire whether he ever had syphilis; or if the clinical evidence is strong, and one wants to be bombastic, one may inquire when he had it. Usually patients appreciate tact in such cases. If one speaks of a spade as an agricultural implement the euphemism often relieves the patient of embarrassment. The question of abortions requires tact; whether they were spontaneous or induced requires still more. Often history is deliberately falsified. It is not uncommon to find a patient who denies pregnancy, yet one finds that she has a bilateral laceration. Is this due to childbirth or to the too brisk use of the dilator? The condition of the perineum may indicate the truth.

The purpose of investigating the past history is to throw light on the disease, that is, to secure confirmatory evidence and not to satisfy curiosity. One should constantly keep this fact before the patient’s mind. He will be much more apt to make an effort to present accurate and complete replies.

The requirements of science must not be overlooked. In cases in which there is obviously gall bladder trouble, it is a matter of interest to know whether there has been an antecedent typhoid fever or appendiceal attack. If from the account of the disease a diagnosis is evident, the history of past diseases has for its chief purpose the discovery of an antecedent which may have an etiologic relationship.

**FAMILY HISTORY**

The account of the family antecedents usually occupies the top of the history sheet. It rarely gives information of value, except that it indicates in a general way the fecundity of the family. The account usually reads something like this: “Father died of stomach trouble; mother living and well; four brothers living and well. One died in infancy. Three sisters living and well; one died of malaria
at the age of fifteen." Nothing is more calculated to irritate than the tautological expression "living and well."

Rarely does a family history aid in the diagnosis of a surgical lesion, yet one must not pass it as wholly useless. A history of tuberculosis may put us on guard but the appearance of the patient usually is a more potent warning. A few diseases have a familial relationship and while the family history may not be of importance in the diagnosis, information of interest to eugenics may be elicited.

If family history is to be of any use at all, names of diseases should never be accepted at par. Each disease in the ancestor must be searched as carefully as if it were a past disease of the patient. It is because such information is seldom forthcoming that the family history even with the exercise of the greatest care is of so little value. It must be insisted again and again that the name of a disease standing alone means nothing, whether it refers to past or present diseases of the patient before us, or to those of his ancestors. To say the patient has cancer means little; to say he had cancer means less; to say an ancestor had cancer means nothing at all unless the statement is amplified by details that make an adequate comprehension possible. The investigation of each disease responsible for an ancestor’s demise should be followed out as carefully as if we stood beside the bed of the departed person and were responsible for the rendition of a proper diagnosis. It is only by going into each factor carefully that the family history can be made of use. As usually written it is worse than useless.

EXAMINATION

The objective signs of disease are perceived by unaided senses of touch, sight or hearing, or by means of some method or instrument of precision. The former we designate as physical examination pure and simple, while the latter we may regard as laboratory examination. Laboratory aids range from tests for albumin to serum reactions.

PHYSICAL EXAMINATIONS

The evidence obtained by our own investigations may be divided into the routine and the specific. After we have the history we have an idea as to where we may find the trouble. Examination of organs probably not involved is then properly defined as routine. Routine
examinations, so far as they go, must be reliable, though they need not be so complete as if some disease of the organ examined were anticipated. Pupillary reactions, muscular coordination and reflexes should always be recorded by a trustworthy examiner. It will save one from cutting down on the stomach of a tabetic at some time. The condition of the nose, the mouth, and particularly the teeth and tonsils, may be noted. The state of the heart and lungs, likewise, must be recorded. Examination of the urine, blood, and now frequently the Wassermann reaction, are regarded as routine. Because they are routine, these matters too often are left wholly to inadequately trained assistants. This is particularly true of the examination of the urine and the Wassermann test. Routine examinations rarely detect more than the grosser lesions. A careful history will as a rule find more accessory lesions than will the routine examination. For this reason divided examinations lose much of their value. The one who writes the history gains more impressions than he can possibly commit to paper. When the patient is passed along to someone else for further examination, unless that examiner has carefully studied the history, he is apt to overlook the important points for investigation. The otherwise commendable "group" examination loses its value unless very closely coordinated. After all the evidence is obtained it requires the analysis of a man of broad knowledge to use the various bits of evidence to advantage. If care is not exercised the value of a group examination will not rise above the capacity of the weakest member of the group.

The examiner of the main problem supplies the most important element in the diagnosis. If a good history does not point to a localized lesion there likely isn't any. However, it must be sought for assiduously just the same. In using the history as a guide to the place to search one must have care lest one be prejudiced by such information. Many an innocent appendix has been removed because the patient said he had sensitiveness below the Mason and Dixon line. The diagnosis may depend on whether the tenderness is deep or superficial, and if the latter, whether it is ephemeral or permanent. Superficial tenderness due to visceral disease can be read in the expression of the patient's face. Often irrelevant details give aid in the interpretation of findings. Rouge and wrinkles equal the given age plus ten. So rouge, plus abdominal pain usually mean superficial pain. In walking the corridors if one sees powder
rag or pipe on the bedside table one may safely leave the patient to the care of the interne. The surgeon must constantly keep in mind that he has first of all to deal with a personality which may emphasize or obscure vital things.

One must not take accessory or neurotic complaints for more than they are worth. It seems sometimes as though neurotics never die. But even with these we should have faith in the general law of the perishability of all organic matter and hold our minds open to the possible coexistence of an organic disease. In fact in persons of labile nervous system the finer organic lesions may have a double importance and these should be sought for with redoubled sympathy and care.

After the discursive inventory has been made, a careful examination of the organ likely to be the seat of the disease as determined by the history, must be made. It is well to do this before the patient has been tired and irritated by probably irrelevant examinations. If examinations likely to test the modesty of the patient are required it is often well to defer these until the last. Those examinations which involve functional tests require a visit to the laboratory and may properly be postponed to the last or be consigned to some one particularly skilled in such work.

If the physical findings and the history do not correspond, the whole problem must be gone over again. No diagnosis is safe unless all the various phases are in harmony. Most errors come from diagnosing conditions that never exist. A predilection for diagnosing rare affections indicates immaturity. In irremovable doubt as to the nature of the disease the wise man has an eye out for the law of probability. The gnawing feeling that impels the politician, according to his statement, to activity in behalf of his fellow-man, experience teaches, is more apt to be due to an instinct of self-preservation. So, also, a lesion of the ileocecal region is more likely to be a pus microbial infection than an actinomycotic one. We learn from experience that the one is common while the other is rare. We anticipate the one and maintain a receptive but skeptical attitude toward the other.

Generally speaking, the methods common to physical diagnosis in general as employed by the internist are employed by the surgeon. That is to say, inspection, palpation, auscultation and percussion. The various maneuvers receive a different value, however. While
the internist employs largely auscultation and percussion, the surgeon relies chiefly on inspection and palpation. This is readily understood when one remembers that usually there is some localized lesion in surgical diseases. Before he can remove it, it must in his mind's eye have length, breadth and thickness. Therefore, he endeavors to establish boundaries by means of sight and touch.

Too often, however, surgeons are prone to begin too soon to apply the hands. Inspection often reveals much which can be learned by comparing the supposedly affected region with the supposedly normal. Often differences in contour not at first apparent become so after careful observation. The general topography should first be carefully noted. Often anatomic landmarks are discernible to the eye and any deviation becomes at once apparent. Such points are particularly likely to be found where the skin is in close relation to the more deeply lying parts.

It is only after all the evidence available by inspection has been obtained that the sense of touch should be invoked. Touch verifies the location of landmarks and in this way defines the anatomic limits of the disease. Once this is done the actual field of disease must be more closely investigated.

The examiner first takes cognizance of the relation of the diseased area to known fixed points. If it is unattached, its relation to more movable structures, such as fascia and skin, are determined. After these factors have been noted then the physical characters of the lesion itself are observed. The nature of the surface and the consistency of the lesion are the chief matters of record. If lesions are not directly visible or palpable, the nature of the disease must be determined by inference. In such instances the reaction of the disease on surrounding structures must be taken into account. Does it influence the general economy? Instruments of precision and the laboratory often play a prominent role but often the sensitiveness and the secondary reactions, such as rigidity, must be taken into account. Percussion and auscultation often must be invoked in order to determine the extent of change in the surrounding tissues.

In conducting the physical examination the surgeon should seek as much independence from the statements of the patient as possible. Having obtained a history of pain in a given region he should seek to elicit pain by manipulation unaided by question as to whether the manipulation causes pain or not. To ask the patient whether
a given area is sensitive to the pressure he is making, after having been told by the patient that the area is sensitive, is to cause the patient to give an affirmative answer. If pain is caused by the manipulation the patient will make it known by sign or sound. Expression of pain during examination must be carefully evaluated, however. Loud laments without the usual physical signs of pain should be accepted with caution. Repetition of the manipulation may fail to elicit the alleged pain. The neurotic is willing to exclaim a few times but this grows monotonous and manipulations once complained of, later are accepted without comment, particularly if the patient at that time is allowed to talk about a new symptom.

THE LABORATORY EXAMINATIONS

The relation of the surgeon to the diagnostic laboratory is variously interpreted. One must make up his mind to one of two attitudes—either he must take what is told him or he must see for himself. If the laboratory man could always comply with the biblical injunction and reply "yea, yea" or "nay, nay" the management of a case in absentia from the laboratory would be feasible and operable. Unfortunately answers are not always to be made without equivocation, and unless we are familiar with the difficulties the laboratory man contends with, we can not properly evaluate his reports.

Those not familiar with the limits and difficulties of the laboratory worker are apt to overestimate the value of the laboratory report. No one should listen to the laboratory man until he has made the clinical investigation and has arrived at a tentative diagnosis. After this has been done the laboratory findings can be fitted into their proper place and given their right value. If the laboratory report is considered before this is done, one may proceed on wholly erroneous lines. The laboratory findings may be positive for some minor pathologic condition, and may lead the surgeon from the cause of the chief complaint. This minor condition may be fundamental and directly related or it may be independent of the disease and not concern the patient in so far as the relief of the chief complaint is concerned. This tendency to overestimate the value of the laboratory report is emphasized by the common attitude toward the Wassermann reaction. No matter what the
clinical findings may be the report from the laboratory is allowed to dictate the treatment. The Wassermann reaction is never infallible. Many clinical signs of syphilis are infallible. When the clinical signs are positive the Wassermann reaction is interesting but not important. It is altogether common to meet patients who have cancer and who because they presented a positive Wassermann reaction have been vigorously subjected to intensive antisyphilitic treatment while the malignant disease progressed unhindered. In doubtful cases the Wassermann reaction may present the first clue of the nature of the disease. It is only in those cases where the history and physical findings fail to give any clue to the nature of the disease that the laboratory should be looked to for the first hint as to the correct diagnosis.

If the laboratory is to be of the greatest use there must be close contact between the surgeon and the laboratory worker. In order that the laboratory work be sufficiently intensive, some idea of the direction it should take should be had from the clinical examination. It is not possible to carry out in full detail all the possible laboratory tests in all cases. In an obscure kidney lesion for instance, the routine examination of the urine is not sufficient. In a supposed tuberculosis the technician must have some encouragement lest he desist in his search for bacilli before sufficient trial has been made. The surgeon should know that the examination for tuberele bacilli is difficult and that one or two negative slides are of little value. A negative examination at one time may be replaced by a positive one at a later date. The surgeon must know how persistent he must be in the search for evidence. The same persistence and care at times is required in every disease that has a distinctly known etiologic factor and no matter how positive the clinical findings, we can not rest until the laboratory has produced the confirmatory findings. If the surgeon demands needless detail from the laboratory he will soon lose the respect of the pathologist and when careful detail work is really needed his requests will go unheeded. I once had an obstetrician bring in a placenta that had lain in formalin solution six months and ask that a culture for tubercle bacilli be made. Many surgeons are wholly unaware how ridiculous their requests sometimes appear to the laboratory worker. It is only by making intelligent demands that intelligent cooperation can be expected. Wholly reprehensible is the disposition of some surgeons to demand
all sorts of needless examinations in order to impress the patient with his thoroughness. They may or may not accomplish this purpose, but most certainly merit and receive the contempt of the laboratory man. Too often the laboratory man is regarded by the surgeon as a sort of servant who does laboratory work because he can not practice surgery. As a matter of fact the laboratory man more often turns to laboratory work because it represents the most exact phase of the subject and he chooses his field because the slipshod work of the average surgeon is repellent to him.

If the surgeon does not himself choose to acquire laboratory skill, he must at least learn so much of it that he can converse with and understand the qualifying phrases the laboratory man must employ. In addition he must appreciate that when he is in the laboratory he is in the presence of a man who is his superior in knowledge in so far at least as it pertains to the matter in hand. So approached the laboratory can render a service more equivocal perhaps, but certainly more reliable than is usually rendered.

Close contact with laboratory affairs is essential for another reason. The pathologist, be he ever so skillful, can only diagnosticate what the surgeon presents for his consideration. The importance of this is often seen in so-called diagnostic section. If the surgeon does not know malignant tissue when he sees it, how shall he know what to cut for the pathologist to examine? And if he knows malignant tissue when he sees it, why bother about the pathologist? He may as well go on and complete the operation. The pathologist might be invited to do the operation. He could tell more by fingering the whole tissue than by a hurried slide examination. The section may lead to wrong conclusions because proper tissue was not examined and the pathologist may be blamed for the error. In fact, it seems that the chief purpose of inviting the pathologist is to have some one to receive the blame in case of error. Some pathologists in doubtful cases diagnosticate malignancy in order to protect themselves, rather than demand more evidence. If benign a radical operation will cure; if malignant the operation should be done, they argue. The attitude of both pathologist and surgeon is attested by the advice of some surgeons to do the radical operation in all cases of doubt. Many women have needlessly lost their breasts because of this travesty on science. There are also not lack-
ing surgeons who demand of their pathologists diagnoses that will harmonize with their clinical conclusions. Others again expect diagnoses that will permit them to perform a contemplated operation. I have more than once been berated by a surgeon for returning a diagnosis of nonmalignancy in a clipping from the cervix in cases in which he desired to do a radical operation.

There is one situation when such cooperation is of value. A good pathologist can bolster up a poor surgeon. If the opinion of the pathologist is needed, he should be taken in full confidence. He then not only sees the slide, but hears something of the history and perchance sees the area from which the tissue was cut and possibly the area from which the tissue was not cut. The pathologist must be regarded as a coworker and not as a servant or underling, and should be accorded all the courtesies of any other consultant. It is only by acquainting him with all the facts that he is able to render the best service. Generally speaking, the pathologist must first diagnosticate the doctor before he proceeds to diagnosticate the patient's disease. It is only by following this sequence that he can know how much importance to place on the observation of the attendant.

The microscope is an instrument of precision, the proper use of which for any purpose requires time. It can educate the surgeon, but it can not supply in a moment the information it could transmit to him at leisure. In order that the surgeon may comprehend the scope of usefulness and the limitations of the laboratory he must make himself a part of it just the same as he educates his sense of touch in palpation. The palpating finger in fact can not reach its maximum of sensitiveness unless the comprehension is sensitized by contact with the microscopic pictures of like lesions. It would be far more rational for the pathologist to take charge of the surgical wards and employ an artizan to do the operating than for a surgeon to attempt to practice surgery without a comprehension of the scope of usefulness and limitations of the laboratory. A technician may be trained in a few years; a lifetime is insufficient to equip a laboratory worker to the maximum. The young man can not do better than to heed the advice of the late Dr. Christian Fenger, "If you want to learn surgery you must beat a path between the operating room and the laboratory.'"
THE DIAGNOSIS

When the evidence obtained from the history and physical examination has been assimilated the real task of diagnosis begins. True, in order to take a proper history one must have an eye to possibilities, and to make a proper physical examination he must have an eye to probabilities, yet one should not allow himself to formulate working conclusions until all evidence from both these sources has been weighed. When the presumptive diagnosis has been arrived at, then the laboratory report must be considered. It may confirm or negate the preliminary conclusion. It may indicate that the clinical conclusion may be correct as to the chief complaint but wrong as to the chief menace to the patient. For instance, clinical examinations may correctly determine an enlarged prostate but the laboratory examination may reveal an impending uremia or a pyelonephritis. Should one consider first the laboratory findings, he might fix his eye on the kidney lesion and fail to search for the causative enlargement of the prostate. A most common cause of error is that of ignoring minor discrepancies in the evidence. The main picture may indicate a certain disease while one point refuses to harmonize. For instance, a patient who had a history indicating a gastric ulcer was seen to limp when he walked. He ascribed this to pain in the hip. He had a retrocecal appendicitis, the removal of which relieved his stomach trouble. A patient may suffer from uterine hemorrhage and the presence of a uterine myoma may be easily recognized. But the real cause of hemorrhage may be a primary pernicious anemia and the presence of the myoma be wholly incidental. The location of the tumor and the blood picture must be the guide.

Only experience and a training in the logic of diagnosis can indicate to the surgeon the degree of positiveness with which the diagnosis may be stated. Even with the most unequivocal evidence one should remember that diagnoses never exceed the superlative degree of probability. If this attitude is maintained one leaves his mind open for the reception of new facts.

Generally speaking, error in diagnosis is not due to a lack of evidence but to improper conclusions based on the evidence. This is often due to a preconceived impression rather than to a lack of knowledge. If one is not on the alert the conclusions of a fellow-practitioner are apt to influence the diagnosis. Sometimes the op-
posite is true; one instinctively disputes the findings of a rival. There is but one safeguard; have no friend but truth, no enemy but error.

A large experience in associations which force an orderly habit of thought is the best guarantee of accurate conclusions. The largeness of the experience, however, is dependent on the clarity of vision rather than the number of cases he has seen. I once did six autopsies within a few weeks for a surgeon who explored six bellies for generalized carcinosis. He called all of them tuberculosis and learned nothing from any of them. I learned more from the first one than he did from all six. Large statistics overawe the uninitiated but do not necessarily broaden the mind of the observer. The tapping of a drum produces sound, but it never rivals the peal of thunder. It is a question of intensity not repetition. A clarified vision alone advances the precision of our logic.

Once the surgeon has diagnosed the disease he must diagnose his patient. If such and such a diagnosis is made, then the problem comes to determine the risk. Risk of life from the operation must be less than the risk from the disease. The personal equation must enter here. This personal equation is made up of the sum of acquired skill and honest introspection. The first we obtain by toil, the second the gods give us—or deny us. The proposed operation must be capable of influencing the symptoms of which the patient desires to be rid. The repair of the cervix will not cure a migraine, neither will the removal of the appendix transform a petulant child. There are conditions simulating these that may be relieved by removing such causes. Too little regard for the niceties of diagnosis has led to much unnecessary operating. The modern problem of the person who "suffered much from many physicians" is too often the product of operating for nonmalignant conditions.

The proper diagnosis of the chief and subsidiary lesions often indicates lines along which we may reduce some of the latter before attacking the main lesion. A myoma may produce a grave secondary anemia. The treatment of the secondary condition may make the prognosis of the primary lesion better. We need constantly to supplement our technical skill by extra precautions. We get the patient into the best possible condition. We lessen the risk by awaiting the proper time, by using the least injurious anesthetic, by selecting the proper environment, per chance the division of the
operation into several stages. All of these things imply the most minute diagnosis, not only of the patient's major disease but also of the minor ones. All these factors, while they do not pertain to the naming of the disease, do contribute enormously to the success and safety of the operation.

The diagnosis is never complete until all the evidence is assembled for the formulation of the prognosis. This must encompass the risk of life and the probabilities of a relief from his symptoms. The patient wants not only to live, but to be well. This applies also to the operations that are defacing. The prognosis must be made up from a knowledge of the state of the patient and the abstract knowledge of the disease in general. Other diseases which may afflict the patient also must be taken into account in the final summary.

**TREATMENT**

With the completion of the diagnosis the site and length of the incision is determined. In deciding the direction of his incision the surgeon must consider the rules of operative technic, but it is often better to disregard these rules than to operate under unnecessary difficulties while observing them. The proper length of an incision is one which permits one to work skillfully and expeditiously. Not infrequently surgeons lengthen the incision from time to time during the operation. This is a sign of incomplete diagnosis even after the incision has been made. Once this is made the surgeon must seek the lesion and determine its relation to his preconceived notion of how it would look. If the diagnosis encompasses the lesion, the matter becomes one of manual dexterity only; if, however, lesions more or less extensive than foreseen are found, a rapid readjustment is in order. If no lesion is found, other areas capable of giving rise to such symptoms must be sought out. If the lesion is capable of explaining only a part of the symptoms, further search is in order. If the diagnosis and findings coincide, further search is not warranted. More than the necessary handling of tissue is detrimental to the patient.

In operating on malignant diseases or suspicious lesions it is often necessary during the course of the operation to incise the tissue. The feel as the tissue divides under the knife and the appearance of the cut surface become a part of the diagnostic procedure. The surgeon pauses in his treatment, in fact, in order to supplement the evi-
dence for diagnosis. A simple or a radical operation may be indicated, depending on whether the tissue is found to be benign or malignant.

In carrying out the technic he must first see with the eye of the pathologist the extent the operation must take. This determined, he must see with the eye of the anatomist the best way of accomplishing its removal. If the disease is an extensive one the requirements of the pathology may be greater than the anatomic possibilities; that is, the removal of tissues necessary to life may be indicated by the extent of the disease. An operation may be theoretically and technically feasible from both the pathologic and the anatomic point of view, and yet the results, as proved by experience, may be such that the additional burden produced by the operation is not warranted. Many late malignancies, such as carcinomas of the uterus and stomach, often fall into this category. In such cases the surgeon should not hesitate to abandon the attempt.

The style of operating is more or less in the hands of the operator. Some operate rapidly, one might say uproariously. I once heard a Scotchman say that the real test of a gentleman is whether or not he remains such when he is drunk; so the test of the surgeon is the mental poise he displays when serious difficulties arise. If he can not control his temper, he can not control any other of the mental processes. A display of temper at the operating table is an infallible sign of mental obfuscation. A steady hand must have to guide it a clear, calm mind.

The object to be secured in an operation is to relieve the patient of his disease with the least injury to himself. Injury is inflicted rapidly or slowly. A gentle though slow operator may employ more time yet injure his patient less than the rapid operator. A deft operator may combine both speed and gentleness. Most operators consume time not because of manual but because of mental clumsiness. Thought waves travel rapidly if they have a familiar road to travel and a well-tried landing place. When they travel slowly, it is because of an unfamiliar road and untried terminals.

Operations are long because of the uncertainty the surgeon feels as to how he should go. Murphy truly said, "The tyro may know when to get in but only the expert knows when to get out." This uncertainty is due frequently to a lack of a clear comprehension of the pathologic state and less often to technical difficulties of the operation.
PATHOLOGIC FINDINGS

The study of the tissue in the laboratory has a dual purpose; to rectify and extend the diagnosis and to complete and expand his education. The primary purpose of the clinical laboratory is to diagnose the case at hand. The primary purpose of the pathologic laboratory is to extend the range of information of the surgeon and of science in general. Usually both these ends are best served in the completion of the records. Close contact with this phase can not be too often urged. It is said mother can attend church for the whole family. This may be true, but certainly no surgeon can attain scientific salvation by having a proxy do penance in the laboratory.

It is certain that surgeons who know full well that a diagnosis which states that the patient had appendicitis indicates but little, are often perfectly satisfied with a report from the laboratory that a tumor is "cancer." There are many more kinds of cancer than there are appendicitides. Unless the surgeon familiarize himself with the tissues first hand, he must remain ignorant of the finer distinctions. In a diagnostic study the laboratory worker can add much by a simple laboratory report, but the study of the tissue he has removed can best be done by the surgeon himself. If he is to recognize like tissue at a subsequent meeting, he must know its minute structures. The chief value of the study of the slide consists in the fact that the more we familiarize ourselves with it the more we are independent of it. It is only by the constant working with the gross tissues and comparing them with the slides made from them, with our own or other hands, that we become able to view the gross with the microscopic eye.

A good pathologist is able to "call" an ever increasing percentage of the tissues he sees in the gross, but never all. The most skillful meets his surprises. The great pistol shot, Captain Lee, says the fascination in shooting is in the fact that "you can't get them all in the 10 ring." The fascination in the study of tissue is in the fact that there are always surprises of various kinds and degrees. Properly viewed, the laboratory appeals to the instinct of the sportsman, and once he has learned the joy of it, he turns as instinctively to it for recreation. The sporting instinct is aroused because there are tissues no one can diagnose.
The findings of the pathologic laboratory must be constantly compared with the clinical complex that produced them. And who but the surgeon shall form the connecting link? Neither does his trouble end when he has faithfully studied his tissues in gross and in the slide. They must be always available along with the history sheet when demanded for comparison with like or similar cases. What was observed in his youth may become clear when experience has supplied similar cases. As vision grows, slides will need relabeling just as old clinical charts require revision, if their author be progressive.

Because of the perishability of tissue, it is desirable that whenever feasible they be photographed. This has the double purpose of preserving the record for himself and also of making it available for those who shall come after him. Often looking over an old picture will contribute as much to our education as the examination of a new case. At the first look the eye may not get all details but the camera is impartial and unprejudiced. Those more expert will read more from the picture than from our description, and what is more important, do it with vastly greater speed. There is no greater evidence of honesty than the presentation of pictures, gross and microscopic, along with the case histories. The study of pathologic tissue is but the completion of the diagnosis. Without it the clinical determination must often be problematic and incomplete and it is as vital to the final completion of the record as any other procedure.

**AFTER-COURSE**

After all this has been done the surgeon feels he has finished his study. He may rightly feel that he has done his work faithfully and well; how well time alone can tell. He may record the history with ever so much care, make his examination with every attention to detail, reason with the skill of a master logician, study carefully the lesion at operation, and finally study carefully the tissue in the laboratory, but the real trial is yet to come. The patient has the final word. If the patient is not recovered, all our fine reasoning is of no avail. If he is not well, we must find out why. If we diagnosticate a tumor as benign, what does it avail if the patient dies of recurrence? In order to finally determine the correctness or falsity of our diagnosis, we must know the ultimate state of the patient.
Inquiry after operation must follow several channels. The immediate operative recovery and complications, if any, must all be noted. This phase of the problem is the most precise of all. It can be recorded in positive terms. Too often if operative recovery is satisfactory no further effort to amplify the record is made. The operative recovery testifies only to the surgeon’s skill in the art of surgery. The greater test of skill in the science of surgery is yet to come.

The real problem is whether or not the patient has been relieved of what he complained. If he is not relieved, then the surgeon has failed in the eyes of the patient and must begin his investigations anew. Possibly the diagnosis was wrong. We may have removed the appendix when the patient had a renal stone. Perhaps the disease was not the only one from which he suffered. Perhaps he is suffering from a new disease acquired after we applied treatment to a previous one. The patient may ascribe these symptoms to the disease for which we treated him. Perhaps the patient has been relieved and feigns symptoms for reasons of his own.

All these factors must be closely checked up for our own protection and still more for our own education, for it is only when we know our errors that we can hope to correct them. There is no stimulus to exact diagnosis equal to a study of after results. Results that are wholly satisfactory are perhaps in the minority. Careful study will often disclose something that we would like changed. It is only by painfully considering them that we can engender the desire to avoid their repetition in the future. The greatest stimulus to effort is humiliation; and the creator of humiliation is the realization of our shortcomings, and the trumpet of our shortcomings is the voice of the after-course.
CHAPTER II

DISEASES OF THE CRANIUM AND CONTENTS

The diseases of the head, exclusive of the face, are conveniently divided, for diagnostic purposes, into those of the enveloping cranium, and the contained brain. Not infrequently the one may involve the other and sometimes it may be difficult to determine which is chiefly affected. Therefore, the disease of both must always be kept in mind even when one alone seems to be at fault.

DISEASES OF THE CRANIUM

The majority of the diseases and injuries of the scalp are of a minor nature and belong to the earliest chapter in the young surgeon's experience. The removal of wens and the closure of scalp wounds are the first tasks assigned to the junior interne. There are a few diseases that belong to the mature surgeon, and some that transcend any surgical attack—such as metastatic tumors and the like. In determining these problems a broad general knowledge is necessary in order to properly interpret them. One must always keep in mind what relation a cranial disease may bear to the more important organ beneath.

CASE 1.—An infant three months old was brought because of a tumor above its ear.

History.—It was noticed when the baby was two weeks old that there was a red spot above its left ear. This soon began to enlarge, and became elevated above the surface. It gradually increased in size until the past two weeks when the increase has been more rapid. Otherwise the child seems normal.

Examination.—An area 2 cm. in diameter and 8 to 9 mm. high is located above the left ear. It is bluish red in color being mottled with these colors in some regions. It is partly compressible, but when completely compressed, there is still some substance of the tumor palpable.
Diagnosis.—The lesion is obviously a cavernous hemangioma. The diagnostic problem consists in determining its tendency. The history indicates that it is developing more rapidly than the child. The palpatory findings bear this out. A pure cavernoma should completely disappear on pressure; the fact that it does not indicates some inter-cavernous proliferation. In such cases the destruction of the lesion should be attempted. In the more rapidly growing type, the line of demarcation between normal skin and the angioma is more clearly marked than in the stationary ones (Fig. 1).

Treatment.—Loops of catgut were passed through the healthy skin so as to include the subcutaneous tissue beneath. After a ring

![Fig. 1.—Angioma of the temple region showing the sharp line of demarcation between the skin and the top of the tumor.](image)

of these was formed about the mass the ether mask was removed and a wet towel placed over the baby's face. An electric cautery point was then thrust into the tumor, and the growth was thoroughly destroyed. The central portion of the growth was obtained for examination.

Pathology.—The tissue is made up of large vessels with fairly thick cellular walls (Fig. 2). In the tissue between the vessels are many large cells with large ovoid nuclei. These are evidently developing cells.

After-course.—The defect left from the cauterization rapidly granulated in and was soon obliterated.
Comment.—When these congenital angiomas do not develop except to keep pace with the development of the child they may be ignored. Occasionally they disappear spontaneously. When they show active development they should be destroyed by active measures lest they attain a size too large for surgery to manage. The simple nonproliferative type may be destroyed by the use of the x-ray. I have sometimes wondered whether the x-ray, in obliterating these growths, might at the same time induce deleterious changes in the brain substance beneath. My disposition is to recommend the use of the x-ray only in growths situated on the face.

CASE 2.—A baby of three months old was brought to the hospital because of a small tumor on the top of the head.

History.—This child is the seventh of the family. The preceding children are all healthy and without defect. This child, save for the tumor in question, seems perfect. The tumor was noticed soon after birth, and has not grown much faster than the child. It has been noted that the tumor becomes markedly larger when the child cries.

Examination.—A tumor \( \frac{1}{2} \times \frac{3}{4} \) inch is situated directly over the great fontanelle (Fig. 3). It is ovoid in outline and about half as high as broad. The skin over it is unchanged but less freely mov-
able over it than over the cranial bones. It is pulsating, soft and compressible, permitting the fontanelle to be palpated as though no tumor existed. When the child cries the tumor becomes more tense and then appears bluish in color. The degree of blueness varies in different parts of the tumor so that a mottling appears.

Diagnosis.—At first sight the suggestion was of a meningocele but this could be excluded because meningocele does not occur over the great fontanelle. Dermoids and angiomas alone appear here. Dermoids sometimes extend to the dura. This tumor, unlike a dermoid, expands in all directions when the child cries. It becomes a mottled blue when tense, which a dermoid could not do. The conclusion remains that it must be a hemangioma.

Treatment.—Inasmuch as this lay over the brain, I feared to recommend the use of x-rays. Therefore, the patient was allowed to reach an age of three years, when, after an anesthetic had been administered, a solution of adrenalin, 10 minims to an ounce of water, was injected about the tumor in order to constrict the small vessels so that the important areas could be more readily seen. The vessels were exposed and caught up singly and ligated. Because of the close association with the large sinus I feared to use the cauterity lest a clot extend to the larger pool of blood.

Pathology.—The sections showed a typical hemangioma.

After-course.—The late scar is scarcely visible.

Comment.—I was of the opinion that a spontaneous cure might occur when the fontanelle closed but this did not take place. Con-
genital tumors located over the inion or glabella must be approached with great caution for they most likely are meningeal.

**CASE 3.—A boy aged eleven was brought for advice regarding treatment for a large boggy tumor of the right temple and forehead.**

*History.*—The patient had a birthmark covering the side and front of his scalp at birth. This has continued to develop until it has reached its present dimensions. Otherwise he has always been well.

*Examination.*—The frontoparietal region is occupied by a soft, compressible tumor (Fig. 4). Large, bluish channels can be seen through the skin, particularly at the posterior border of the mass. There is no pulsation, but the tumor can be made to disappear by compression.

*Diagnosis.*—The compressibility, together with the outlines of the channels, obvious on inspection, make the diagnosis easy. The relation of the mass to the interior of the cranium is less obvious. The whole mass seems fairly freely movable over the skull which makes it likely that there are no large vessels connecting the tumor with the interior of the skull. The x-ray shows no obvious openings in the cranial vault. It is assumed, therefore, that there are few or no large vessels extending between the mass and the vascular sinuses within the cranium.
Treatment.—Because of the apparent absence of intracranial communications I recommended that the surgeon who asked my advice make an incision posterior to the mass, carefully elevate it from the skull, and pack the space so made between tumor and skull with gauze until the venous channels should become obliterated. The advice was not good. Large channels passed from the venous si-

Fig. 5.—Large foramina showing the site of the perforating veins.

nuses to the interior of the skull. When one of these was opened air entered and the patient died suddenly.

Pathology.—The large openings in the skull are seen in the cut (Fig. 5). There were no other anomalies.

Comment.—The x-ray should have shown these openings, though in a lateral view only, this was not to be expected. Had their presence been known I should not have advised this plan of treatment. The error in judgment occurred because attention was not paid to the point where connecting vessels were most to be ex-
pected, over the great fontanelle. The tumor mass was movable over the tempoparietal region and the relation over the vertex was not sufficiently noted. If during the course of such an operation a large vein is seen to enter the skull, the vessels should be gently packed against and the operation suspended. With care such vessels may be isolated, ligated and then cut. They are exceedingly thin walled, and great delicacy of manipulation must be practiced. Fractional obliteration by means of hot water would have been safer, possibly in conjunction with ligation of some of the larger channels at the periphery. The water boiling hot must be injected between and not into the vessels. It is desirable to secure obliteration by the production of a phlebitis and not by an intravenous clot. Bevan has recently recommended the ligation of the common carotid artery and jugular vein in such cases. This is in itself a somewhat formidable procedure.

CASE 4.—A matron of forty-four came to the hospital because of a large sloughing ulcer on the right side of the forehead.

History.—About nine years ago she noticed a small red spot on the right side of the forehead just above her eye. This would become crusted, clean off smooth for a time, but never entirely disappeared. It gave no pain but became somewhat larger in the nine years. About ten weeks ago she began to be treated by a local doctor. He gave her tablets to dissolve in water to use as a wash every half hour for 4 or 5 days. He then started to treat her with the x-ray. He gave her an x-ray treatment every other day for seven weeks. At the end of that time, about two weeks ago, a black spot appeared in the center of the exposed area. The x-ray treatment was stopped, but the black area increased in size until its present dimensions were reached. It causes her some pain and the right eye feels very sore. She has lost 50 pounds in the last eight weeks. Her general health has always been good.

Examination.—There is a sloughing area on the right side of the forehead almost circular in outline, 5½ cm. by 7 cm. in size. Its edges are sharply defined as though cut out by a punch (Fig. 6A). In the center is a black sloughing crust which is very hard. Around its edges is a circle of foul-smelling pus. The ulcer edge is sharply defined, coming to within a quarter of an inch from the black sloughing center. The skin around the ulcer is inflamed for about one-
half inch. Because of the dried incrustation it is impossible to
determine the condition of the underlying bone. General condition
is entirely without interest.

Diagnosis.—The patient brings the diagnosis with her. It is quite
unusual to see an x-ray burn with such a sharply defined border. The
redden area of skin about the ulcer is no more than would be ex-
pected from the neighboring suppurative process. Because of the
unusual features of the ease it seems best to play for a time the role
of the innocent bystander.

Treatment.—The patient was, therefore, kept in the hospital for
eight days for observation in order to note any change that might
take place. In the time she was in the hospital no change could
be observed in the area or around the edge. The skin maintained
its dull red inflamed look and no granulations started around the
edge of the slough. The patient was then dismissed and given a
10 per cent Balsam of Peru ointment with instructions to return for
observation every two weeks.

Re-entry.—The patient returned to the hospital in two weeks as re-
quested. The black slough above mentioned separated about a week
ago leaving an area of bone exposed. There are a few granulations
around the edges of the exposed area but for the most part the entire
surface shows no effort at healing. The surrounding skin seems pos-
sessed of a good circulation and the inner table of the skull seems not to be affected. It is proposed, therefore, to remove the dead bone down to the diploë and cover the defect with grafts. The skull was dry and white in appearance. After the outer table was chiseled off the diploë bled rather profusely showing normal bone tissue beneath. Instead of grafting the exposed bone direct it seemed best to shift a flap from the temporal region and fill in the defect so produced in the temporal region with Thiersch grafts.

After-course.— Practically no postoperative pain or other disturbance. Six days after operation the Thiersch grafts seemed to be growing (Fig. 6). The skin flap was healing in place and the circulation to this part seemed sufficient.

Comment.—The interest in this case centers in two points. It was subsequently learned that while the x-rays were used, as stated, the agency that produced the slough was a plaster in the hands of a cancer quack. We learned this indirectly from another patient who received a similar lesion at the same time. The wholly atypical x-ray burn turns out not to be such. The other point of interest has to do with the nature of the flap. As the head lay ready for the operation to begin, the nice smooth skin of the temporal region seemed the logical material for filling in the defect in the forehead. The hair could then be so arranged to cover the hairless region in the temple it was argued. Much to my discomfort, it was noted later that the flap in its new position over the eye was growing hair. This possibility had entirely escaped me in my preoperative cogitations. Some means must now be employed to destroy the hair.

CASE 5.—A boy of fourteen was brought to the hospital because of a disfiguring tumor of the forehead.

History.—Since birth the patient has had a flat, bluish tumor on his forehead. It has caused him no inconvenience save for the embarrassment of its appearance.

Examination.—A mass two inches in diameter occupies the forehead just below the hair line. It is elevated half an inch. It is easily compressible, but returns instantly when the pressure is removed. The skin over the summit of the tumor is intimately attached to it. This area is bluish, but it becomes bleached when the tumor is compressed with a glass slide.
Diagnosis.—The discoloration on pressure just mentioned proves that the blueness of the tumor is due to contents of cavities which are emptied by the pressure exerted. This is sufficient to stamp it as a venous cavernoma or angioma.

Treatment.—In order to avoid the scarring produced by excision a technic illustrated in the following figures was devised and followed.

An incision was made along the hair line and curving about the margin of the tumor. The skin was carefully incised until the veins were exposed (Fig. 7A). These were caught up each by two forceps and cut across and both ends ligated. The incision was then extended down to the bone. The tumor, together with the skin, was
elevated from the bone until the lower border of the tumor was reached. The veins were here again carefully ligated (Fig. 7B). The tumor was then dissected from the skin (Fig. 7C). After this is accomplished the skin is replaced and sutured (Fig. 7D).

Pathology.—The tumor (Fig. 8) consists of a conglomerate mass of dilated vessels and connective tissue.

After-course.—Healing was prompt. The sutures were removed on the third day. This patient is now a grown man. The scar is so fine that close inspection is required in order to discover its presence.

Comment.—When a really competent roentgenologist is available the smaller of these growths are best referred to him. In larger ones, particularly in older persons, the method here described may be advantageously employed. It has the advantage of being certain of results and of requiring but one sitting. It is easiest performed under local anesthesia. Even when a general anesthetic is required, as in children, it is advantageous to edematize the tissue mildly with an adrenalin solution of eight minims to the ounce of normal salt solution in order to constrict the smaller vessels. This technic is particu-
larly applicable in those cases in which the overlying skin is fairly well preserved.

**CASE 6.**—A matron aged sixty-five came to the hospital because of a tumor on the back of her head.

*History.*—For six months she has noticed a tumor developing in the scalp. It is causing some pain and is very much in the way, since she is unable to lie on her back with comfort. Her general health is good. The patient has had four children all of whom she nursed without incident. She passed the menopause seventeen years ago and has been free from pelvic symptoms since.

*Examination.*—A tumor the size of an unhulled walnut occupies a site near the external occipital protuberance. It is somewhat bosselated, very hard, with pseudoencapsulations. It is somewhat fixed to the skin but not a part of it. It is obviously a carcinoma, and since it is not a part of the skin, has not developed from this site. Search for a primary tumor discloses a marked shriveling of the breast with retraction of the nipple and marked puckering of the skin over an area the size of a dollar. This shriveling of the breast she admits has been present a number of years, but regards it as of no consequence.

*Diagnosis.*—As a secondary carcinoma this tumor must be differentiated from benign epithelioma. The latter do not grow as large in six months as this one now is, and the skin is intimately attached to them. Sarcomas have intimate attachment to the fascia and may invade the skin, but do not become attached to it. Wens sometimes become malignant, but they do so only after years of innocent existence, and when they do so, it is about the base and not throughout the whole tumor that the malignant changes occur. The laboratory findings indicate a mild interstitial nephritis. With the discovery of the lesion of the breast the naming of the tumor in the scalp offers no difficulties. Since the patient desires the removal of the tumor, her wish may be gratified purely as a temporary relief from a minor consideration.

*Treatment.*—The patient was told that cure was impossible, but she desires the tumor removed as a temporary convenience. This was done.
Pathology.—A dense mass showing many fine, intermingled whitish-grey dots, which on section showed a carcinoma simplex (Fig. 9).

After-course.—There were no recurrences on her head; and the breast remained unchanged. Some time after the operation many tumors developed in the skin on the back. She died a year and a half later of exhaustion.

Comment.—Schirrus breast cancers not infrequently give rise to distant metastases. When carcinomas, particularly dense ones, are discovered in unusual situations in the body, the breast is the first organ to be interrogated.

CASE 7.—A saleswoman aged thirty-two came to me because of ulcers on her forehead.

History.—Four months ago she noticed a lump on her forehead. It was hard and painful as though due to a bump. Though she did not remember having bumped herself she accepted an accident as a probable cause which may have a poetic truth. Some weeks later other bumps appeared. Two months ago the first one softened and, in a week or two, ulcerated. Then others ran a similar course. She was treated with various salves and the two first formed have started to heal. She has painful menstruation and occasionally severe pains.

Fig. 9.—Carcinoma of the scalp from a breast tumor.
half way between the menstrual periods. She had bladder irritation some years ago, but now, save for getting up once at night, she has no trouble. She has had no throat or skin diseases.

Examination.—The patient has a sallow, muddy complexion, and a weary look in otherwise intelligent eyes. Above the root of the nose there are two ulcers partly healed, and to the left, just above the eyes are two others which have soft, undermined edges and a dirty, moist, granular floor. In the depth of these the bone is exposed. The outline of the larger and more recent one is definitely reniform (Fig. 10—a photograph could not be used for the purposes of illustration for obvious reasons). There is but little pain on pressure. The blood examination shows a slight general anemia and the urine a good many pus cells.

Diagnosis.—The question of diagnosis involves only syphilis and tuberculosis. The patient has the general aspect of a vigorous constitution with no evidence of tuberculosis elsewhere. The lesions are multiple, cranial tuberculosis is usually single. Tuberculosis usually involves the bone over a wider area than the soft parts would indicate. Here the bone seems merely exposed and not actively diseased. Tuberculous lesions are never reniform; syphilitic ones usually are; syphilis is painful in the beginning, tuberculosis is not. The form of
the larger lesion is distinctive of syphilis without further evidence. No Wassermann is needed when so labeled.

*Treatment.*—Mercurial ointment was used locally, and potassium iodide internally for three weeks, then mercury.

*After-course.*—The local lesion healed promptly.

*Comment.*—Syphilitic lesions of the scalp are relatively rare, and when solitary, may offer some difficulty in diagnosis. In such cases the Wassermann reaction would, of course, be in order. To employ it in such a case as this would be putting the reaction on trial and not the disease. When positive, the clinical features of syphilis are more to be depended on than the Wassermann reaction. Laboratory men sometimes overlook this very obvious fact.

**CASE 8.**—A girl of eighteen, an employee of a candy factory, came to me because of a swelling on her forehead.

*History.*—For a number of months she has noticed a swelling on her forehead. It has not caused pain, but has gradually enlarged. Recently it has developed quite rapidly and the surface has become discolored. The plant physician diagnosed a wen and advised its removal. She has had numerous diseases of childhood, including whooping cough, diphtheria and scarlet fever. She has had frequent attacks of tonsillitis. Her father is unable to work because of lung trouble.

*Examination.*—The patient has a waxen pale complexion. She seems emaciated but states she weighs 97 pounds, which is about all she has ever weighed. She has a hemispherical tumor situated just to the left of the median line and below the hair margin. The sides are slanting, coming to the apex at a low angle. The apex is reddish blue in color over an area 1 cm. across. The surrounding skin is unaffected. The tumor is soft and fluctuating. The border seems more indurated than does the margin of the tumor. She has a chain of lymphatic glands on either side of the neck. The tonsils are enlarged. Physical examination otherwise is negative.

*Diagnosis.*—The gradual onset, its painless course and the patient's general appearance suggests cranial tuberculosis. From syphilis it is distinguished by its painless course and by the length of time required for its development. From wens it is distinguished by the form, its course of development, and by the character of the contents as manifest on palpation. Wens may break down and give the gen-
eral appearance of tuberculosis, but usually there is the history of a long existing tumor and usually too, the wen can be moved about over the underlying bone while tuberculosis is intimately attached to it. Because the skin is near the point of rupture it seems best to open freely and remove as much of the disease as possible.

Treatment.—The skin was freely incised which allowed a thin pus containing many greyish flocculi to escape. The bone was exposed and the curette readily elevated many particles, leaving a granular place with a bony base, probably the inner table of the skull. An area as large as half a dollar was so exposed with slight effort with a mastoid curette. When thoroughly cleaned out, it was treated with carbolic acid and alcohol.

Pathology.—The material removed consisted of granulation tissue with many particles of bone. These bone particles were more or less globular or cuboidal and were surrounded by granulation tissue. On inspection they appeared as masses of granulation tissue and only when pressed between the fingers did the bony content make itself manifest.

After-course.—Healing took place promptly and remained permanently.

Comment.—Had the skin been uninvolved, I should have aspirated and injected iodoform glycerine. Active treatment is apt to produce an extension of the process to previously unaffected areas. Otherwise surgical treatment is preferable because recovery is very much expedited. Usually the process begins in the diploe and simultaneously destroys both tables. Therefore when the disease is attacked, the dura is reached at once. In some instances new bone may have formed over the dura, it is said.

CASE 9.—A man aged thirty-three entered the hospital because of a tumor on the back of his head.

History.—For a year or more the patient has had a tumor back of his left ear. It grew gradually, until two months ago it had attained the size of a walnut. His doctor diagnosticated a wen and proceeded to remove it under local anesthesia. He was surprised to find a solid tumor surrounded by several very large blood vessels. He made a strategic retreat. In the two months which have intervened, the tumor has attained the size of a small orange.
Examination.—A tumor occupies the region between the mastoid process and the external occipital protuberance (Fig. 11). The skin is movable over the lower half of the tumor while the half toward the summit is incorporated in the growth. The tumor is movable upon the skull. The postcervical lymph glands are enlarged to the size of butter beans. Those lying more deeply are barely palpable.

Diagnosis.—The solid tumors of the scalp are usually endotheliomas. They have a sarcomatous arrangement, tend persistently to return, and metastasize by way of the lymphatics. The skin over their surface is often thinned, resembling that of spina bifida. This tumor seems to fit this category. This type of tumor usually is intimately attached to the skin, a fact often made evident by a fine capillary network. Those who depend on this sign to identify wens are often mislead. These tumors are more dense than wens and are not so completely encapsulated.

Treatment.—The upper cervical lymph glands were blocked out, and the incision extended upward to circumscribe the tumor. The incision made to expose the lymph glands was used for the anterior

Fig. 11.—Sarcoma of the scalp.
line in making a flap to cover the defect made in the removal of the tumor. The defect left by dislocating the flap was covered by skin grafts.

**Pathology.**—The tumor is made up of large round cells. Only in the older parts of the tumor is the spindleform shown. The lymph glands also show the large round cells. The cells usually are arranged in groups and this together with their close association with

![Fig. 12.—Section from case shown in Fig. 11 showing arrangement of cells about a blood vessel.](image)

the skin suggests a relationship to the chromatophore group of tumors. Their disposition to spread by way of the lymphatics also harmonizes with such an assumption. The arrangement about the vessels (Fig. 12) suggests a perithelioma.

**After-course.**—In two months recurrences appeared in the skin of the occiput above the incision and more lymph glands were palpable. These recurrences were excised with the result of stimulating the tumor to renewed growth. He died six months after the first operation.
Comment.—These tumors are often but of moderate malignancy and offer a fair prognosis by radical operation. Despite the presence of metastasis, a trial seemed worth while. When I saw the type of cell, I realized the hopelessness of the task. Notwithstanding this, I attempted to remove the recurrences, inspired beyond my better knowledge by the magnificent courage of the man. Lowly in life and simple at heart, but lofty of purpose, he asked for a chance in a thousand. If such a case is undertaken at all, a complete block dissection of the neck from clavicle to mastoid should be done as the first act and the removal of the tumor deferred to a second operation. It is rarely that a patient is rescued once the cervical lymphatics are affected by a malignant growth, but I have several times succeeded in curing this type of tumor after the lymph glands had become involved, in one instance after seven operations.

DISEASES OF THE CRANIAL CONTENTS

Unless the surgeon be an expert in brain diseases, he should confine his diagnostic efforts to the recognition of the emergencies. In these cases he must be prepared to act or fail to act, with promptness and decision, for they are often but a part of a number of surgical lesions as in the case of accidents. In cases of chronic disease he will do well to place the burden of localization on the neurologist. It is highly desirable, however, that the surgeon be so trained as to enable his mind to go along with that of his consultant in order that he may have a clear conception of the technical difficulties involved and the anatomic results to be obtained. Besides the fact that the neurologist possesses a greater diagnostic skill, the after care is such as to require the constant care of a neurologist; also, since the lesions are usually incurable, the neurologist, being inured to the management of the incurable, is temperamentally better fitted to conduct the unfortunate patient to the inevitable end.

CASE 1.—A farmer aged thirty-seven years was brought to the hospital in an unconscious state.

History.—One week ago the patient fractured his thigh by being pinched between two wagons. It was set three hours later. For this 2 ounces of chloroform were given. Deep anesthesia did not last over ten minutes, and he was fully conscious 30 minutes later. During the
following day he received two 1/8 grain morphine tablets seven hours apart. He had been nauseated at intervals. On the second day he became drowsy, but answered questions. On the third day urine was passed involuntarily. His pulse and temperature were recorded by his physician as normal. Though he could be roused but little if at all, his eyes would follow movements of attendants about the room. He took some food when urged to do so. He had attacks of hiccoughs at intervals. This condition remained unchanged until he was brought to the hospital.

Examination.—The patient lies apparently oblivious to his environment and does not respond to questions. He seems to follow the
movements of the examiner, however. The skin is slightly jaundiced, the pupils react feebly to light. The pupils are equal and about 4 mm. in diameter. The mouth contains much mucus and the odor of the breath is fetid. The tongue is covered with a dark, dry crust. He breathes through his mouth entirely. There is no evidence of trauma. The left thigh is encased in a cast. No reflexes can be obtained from the sound leg and Babinski is negative. Bp. 100-80, urine negative. Respiration 48, pulse 145, temperature 100°.

Fig. 14.—Section through the pons in delayed chloroform poisoning showing petechial hemorrhage and perivascular degeneration.

Diagnosis.—When a patient becomes unconscious following a fracture, particularly a fracture of the femur, fat embolism is probable. However, the onset is sudden, the pulse very rapid, and usually there is dyspnea. In this case the onset was slow and his doctor states his pulse and temperature were normal after the condition was well developed. The icteric tinge of the skin and sclera recalls that he got two ounces of chloroform before the onset of the mental hebetude. The rapid respiration and pulse is evidently that of impending dissolution. The slow onset with the partial or recurrent unconscious-
ness corresponds to chloroform poisoning. The onset on the second day with threatening dissolution at the end of a week is in harmony with this theory. The urine gives no reason to suspect uremia.

_Treatment._—General care, no medication except strychnine.

_After-course._—The hebetude continued to increase and he died eighteen hours after entering the hospital.

_Autopsy._—Bases of the lungs are congested but float. The liver is small, the surface is mottled yellowish grey (Fig. 13). The dura

![Fig. 15.—Degeneration of the liver in delayed chloroform poisoning.](image)

shows no changes, but the cut surface of the brain shows many petechia (Fig. 14). The slides show congestion in the bases of the lungs and many of the alveoli contain blood. A slide of the liver shows distinct central changes, fat and pigment deposition and marked necrosis of the parenchyma cells in many regions (Fig. 15). The brain shows numerous small petechial hemorrhages and areas of perivascular degeneration which are particularly marked in the medulla (Fig. 16). In none of the vessels could fat be demonstrated.

_Comment._—This represents a typical delayed chloroform poisoning, now fortunately rare, since this anesthetic is so little used.
The changes in the liver are typical. There is little known of the brain changes in this condition. The hemorrhages observed in this case are strikingly like those observed after death from puerperal eclampsia. The chief changes, however, are degenerative, and the hemorrhagic areas likely are only secondary hemorrhages into the degenerated areas.

**CASE 2.—A railway brakeman aged twenty-six was brought to the hospital because of a fracture of the thigh.**

*History.*—The patient was thrown from a moving train and was picked up unconscious. It was observed that his right thigh was broken. When he reached the hospital, four hours after the accident, he was mentally clear and there was no evidence of cranial injury. There was a comminuted fracture of the femur with a detached fragment of bone lying at nearly right angles to the bone above and below. He was in a degree of shock, but had recovered by the time an x-ray plate of the injury could be prepared.

*Examination.*—About eighteen hours after the injury he rather suddenly became dyspneic, the respiration reaching 38 and the pulse 136. He was delirious and was restrained with difficulty. The urine
showed a trace of albumin, but no blood and the specific gravity was 1.026. There were 16,000 leucocytes. The pulse was quick, hard, and wiry. The respiration was labored; there was some evidence of cyanosis and there were moist rales over the greater portion of both lungs. The pupils were moderately dilated and reacted to light. The site of injury showed a comminuted fracture with one piece 3 inches long displaced from contact with the ends of the bones. Numerous small pieces occupied various relations to the larger fragment.

Diagnosis.—The extent and nature of the leg injury was clearly apparent from the x-ray. The general condition was not so clear. There was early mental disturbance which cleared in a few hours and no fracture of the skull was apparent by the x-ray. The subsequent mental disturbance was regarded by the medical consultant as due to secondary hemorrhage. This seemed unlikely, for he was delirious from the beginning and remained so. Early mental restlessness is sometimes observed in late hemorrhage, but it subsides when the hemorrhage increases. The pulse rate was rapid from the beginning. In hemorrhage it is slow at first and becomes rapid only late in the disease. When a rapid pulse appears in hemorrhage, the patient is in profound coma. The respiration became rapid at once and remained the dominant feature. The sudden dyspnea and the rapid pulse coming on eighteen hours after an extensive fracture suggested a fat embolism.

Treatment.—The fractured member was placed in a temporary support. General stimulative measures were employed. He received 15 minims of tr. of strophanthus when the pulse became uncountable.

Subsequent Course.—He regained consciousness on the fourth day and the dyspnea rapidly lessened and the temperature returned to normal. At the end of the second week the fragments were replaced by open operation. In order to reduce the duration of ether anesthesia, known to be particularly injurious to those suffering from fat embolism, no mechanical means were employed to retain the fragments in position. The operation lasted only a few minutes. He stood the operation well, but in six hours his pulse became rapid, dyspnea was extreme, and he became delirious—an exact replica of his attack following the injury. This condition rapidly increased and he died in twenty-four hours following the operation.
Autopsy.—The meninges were injected and there were many pinpoint hemorrhages just beneath the cortex. The basal ganglia were not involved. The lungs were congested, contained a bloody froth, but all portions floated. The solid parenchymatous organs showed a general congestion. The sections showed multiple fat thrombi in the lungs (Fig. 17) but were not demonstrated in the brain. There was some cloudy swelling of the kidneys.

Comment.—A number of errors were committed in the management of the case. He was transported a long distance so that he reached the hospital only after four hours. No adequate temporary splint had been applied. The operation was done without an Esmarch constrictor. There is evidence that placing a constrictor and allowing it to remain two hours lessens the likelihood of renewed embolism. Ether was used as an anesthetic. Spinal anesthesia should by all odds have been used. Two weeks were allowed to elapse before the operation was undertaken. In the interest of bone repair it did not seem well to defer the replacement of the fragments longer. Whether or not in such cases it is worth while to ligate the thoracic duct as Wilms advises is a question. I should fear the prolonged operation would do more harm than the ligation would do good.
CASE 3.—A teamster aged 42 was brought to the hospital because of delirium following injury to the skull.

History.—Two weeks ago he was struck in the side of the head. This caused an injury to the scalp and temporary unconsciousness followed. He was taken to a hospital where the wound was laid open and some pieces of loose bone were removed. He improved following this for a week, but since then he has had fever and some headache. For the past twenty-four hours he has been delirious at times.

Examination.—The patient lies comatose for the most part, but rouses at intervals as if in pain. During these restless periods he uses the right hand less than the left. The pupils are wide, but react to light, the left less than the right. The temperature is 103.4°, W.B.C. 28,000. The wound in the scalp contains pus.

Diagnosis.—The local injury, the mental distress since, and the leucocytosis suggest a suppurative process in that region. Its location and extent must be determined as the treatment progresses.

Treatment.—The scalp wound was enlarged, which permitted several loose fragments of bone to be discovered. The exposed dura was deep red, and covered with granulations and fibrin. The bone was removed until an area of dura the size of half a dollar was exposed. It bulged into the wound, was tense and pulseless. An aspirator discovered pus at the depth of half an inch. The area was packed off with iodized gauze and the dura opened. Pus flowed freely when the brain substance was parted half an inch deep. A soft rubber drainage tube was introduced.

Pathology.—The culture showed staphylooeceus, while the smear showed in addition a rod which did not develop on the culture.

After-course.—Within a few hours after the operation the patient declared himself as feeling well. In two days he desired to leave the hospital. Despite warning his physician removed the protecting pack at the end of forty-eight hours. A violent septie meningitis developed, and in a day he was dead.

Comment.—In the drainage of brain abscesses or in operating an infected fracture of the skull, the great danger is in producing a meningitis. Had the pack been allowed to remain a week or ten days, a different result would have been obtained.
CASE 4.—I was called to see a man, aged forty-five, because he had persistent pain in the left side of his head and neck following a mastoid operation.

History.—Ten years ago he had a mastoiditis on the left side and was operated on. The wound healed, but the discharge from the ear did not stop. In the ten years that followed he was never sick and had no pain in the head or ears. However, about four months ago he began to have pains in the left ear similar to that of ten years before. Two days later he was operated on by a competent specialist, and a radical mastoid operation was done. The pain was not relieved but continued, extending over the left side of his head and radiating to his neck. Since the radical operation was done, now four months ago, he has been operated three times in attempts to locate the source of the pain. The scalp of the parieto-occipital region was edematous and it was concluded that the pain was due to a cranial periostitis his surgeon states. The operative efforts consisted in opening the swelling at various points on the left side of the head. Each incision resulted in an increased drainage of pus. He has dull pains continually, and every few hours he has an almost unbearable paroxysm of pain which lasts one-half to one hour and is quieted only by opiates. During the several days just past he has developed a temperature of 100-102.5°, and has been stuporous and sleeps heavily except when aroused by paroxysms of pain.

Examination.—He now has an open wound over the squamous part of the temporal bone which is draining pus. His greatest point of tenderness is just back of, and at the upper extremity of, the lobe of the ear. His pulse is 100 and his temperature 101°. The pupils are equal, normal in size, and react sluggishly to light. He is somewhat stuporous and begs for relief. There are no sensory or motor symptoms, save a general increase of the reflexes.

Diagnosis.—The continued pain following the mastoid operation, with temperature, makes it likely that there is a dural involvement and the increasing hebetude suggests an abscess. Obviously the pain could not be due to periostitis, since because of the looseness of the pericranium, pain would not be produced. Since, however, pus escaped following the incisions through the scalp, an associated, deep-seated, suppurating process is suggested. It was deemed wise to open the cranium. He was, therefore, ordered sent to the hospital.
Treatment.—An incision was made over the squamous portion of the temporal bone. The scalp was found to be almost completely separated from an area of necrotic bone. An area 3 x 4 cm. was completely separated, and was removed by lifting it out with an elevator. A needle was passed into the brain in several directions, but no pus was found. It was concluded that we had to do with a suppurrative meningitis only. Two tubes and one gauze drain were left.

After-course.—The pains were severe all the week following and required opiates for their relief, but he had none of the severe paroxysms that he had before the operation. The pains gradually lessened after this time and after four weeks he was free. The wounds were healed and the edema of the scalp had lessened. He was allowed to return home. The ear was discharging freely, and there was pain on pressure over the anterior left parietal region.

Two weeks later the patient was seen for the first time since leaving the hospital. The relatives called on account of the patient’s having convulsions. The relatives reported that the patient had felt pretty well since coming home except for occasional pain in the head. Two days before he had been dull and at times stuporous. About noon of that day he got up and started to dress but laid over the bed and went to sleep half dressed. That night at nine o’clock he had his first convolution. When seen at 10:30 a.m. he had had four or five convulsions. The patient was lying on his back, staring around in a confused manner. He could not be aroused by questioning. His face was flushed and he was sweating profusely. The temperature was 102°, the pulse 110, full and bounding. The right arm and leg were limp, the left arm and leg were partially flexed. The reflexes were exaggerated on both sides, and no Babinski could be definitely elicited. The pupils were moderately dilated, of equal size, and responded to light. Two convulsions were observed about fifteen minutes apart. They came on as follows: the eyes would first deviate to the right. The right side of the face began twitching, pulling the mouth to the right. Then clonic convulsions started, first in the right arm and from here the whole body became involved. These convulsions kept up for about two minutes, when the convulsions became tonic for about a minute with gradual relaxation. The breathing was stertorous during the convolution, the face becoming cyanotic. After the convolution he broke out in a profuse sweat. Because the convulsions started in the right arm, an attempt to find a fecal lesion was decided
An incision was made along the line of his previous operation. The dura was exposed, and a needle passed into the temporal and frontal lobes. No pus was found. The temperature continued to rise from this time and he died two days later.

**Autopsy.**—The cranial cavity only was examined. Necrotic bone in the left parietal region was found. Pus covered the frontal lobes and on both sides of the cerebrum and extended back over the parietal and down to the temporal lobes on the left side. Two superficial abscesses 1 cm. in diameter were found in the frontal lobe well anterior to the motor centers. A larger one 2 cm. in diameter was located deep in the left frontal lobe near the median fissure (Fig. 18).

**Comment.**—It is not possible to calculate the date when the brain infection took place. He probably harbored necrotic bone four months after the mastoid operation was done. Possibly the removal of these might have prevented the brain infection. This is purely a conjecture, for brain abscesses may lie quiet for indefinite periods, but usually they do not.
CASE 5.—A machinist aged thirty-two was brought to the hospital in an unconscious state.

History.—He had been at a neighboring town attending to some business for several days previous. He attended to this in a normal manner. It is not known at what hour he retired to his room. The hotel attendant found him unconscious at 10 o’clock in the morning. He was brought to the hospital thirty-six hours later. I was able to add to the history that his wife had been operated on for pyosalpinx nine months before. His own health previously seemed good.

Examination.—The patient is unconscious, the pupils are unequal, and react but feebly. The right arm is flaccid, while the left shows normal tonus. There are no marks of violence. The heart and circulation show no abnormalities.

Diagnosis.—A hemiplegia in a man of thirty-two without a source for an embolic process may be regarded as being due to a syphilitic thrombosis.

Treatment.—Mercurial injections were begun at once and pushed to the limit.

After-course.—He regained consciousness at the end of a week. The hemiplegia improved for two months and then remained stationary. The patient admitted that he had had a chancre eighteen months before and was cured in six weeks after the eruption appeared. He was placed on potassium iodide which was increased to 480 grains a day. This produced no results in three weeks, and the attempt was abandoned. One of my assistants then took charge and increased the dose to 750 grains a day. He continued this for three weeks, and the motor disturbance entirely disappeared. The patient died of general paresis five years later, however.

Comment.—At the present time one could give salvarsan to secure quick results. But it should still be remembered, however, that the old remedies sometimes secure results after the newer remedy fails.

CASE 6.—I was called to see a man aged fifty-six who was found unconscious at the foot of a stairs.

History.—A recluse who lived in a second story room was found at the foot of a stairs at six in the morning. Nothing definite is known of him, save that he prepared his own meals and drank alcoholies to excess. There is no evidence about the stairs to indicate how the patient reached the foot and no evidence of vomiting.
Examination.—The patient is a heavy man of florid complexion. He lies wholly comatose, the breathing being slow, deep, and regular, but labored. The cheeks puff equally. The pupils are of medium size and respond feebly to light. The extremities fall heavily when lifted, being alike on the two sides. The breath carries a heavy odor of whiskey. There are no marks of injury anywhere on the body. There is no discharge from the ears or mouth and no suggillation about the eyes. The pulse is 60, respiration 14, temperature 100°.

Diagnosis.—There is no evidence of a fractured skull. Had he a skull fracture there should be some evidence of the point of impact. Were it merely a drunk, he should be capable of being aroused. His habits and habitus suggest a cerebral hemorrhage. There is no evidence of the location, since all extremities seem equally affected and both cheeks seem flaccid. By exclusion under the conditions which limit the means of diagnosis, apoplexy seems the best diagnosis.

Treatment.—He was given enemas and general stimulation by his attending physician.

After-course.—He was catheterized at intervals but only 7 ounces of urine were obtained during the three days he lived. This contained albumin and many granular casts. His hebetude continued, and he died three days after examination.

Autopsy.—There is no fracture of the skull, and the brain shows no abnormalities. There is congestion at the base of both lungs. The aorta shows extensive atheromatous changes. The kidneys are very small, the surface is granular and the capsule closely adherent. The slides show extensive interstitial increase and extensive cloudy swelling, particularly in the collecting tubules.

Comment.—This patient evidently died of uremic coma. This possibility was not thought of at the time of the original examination.

CASE 7.—A young farmer was brought to the hospital because he was found unconscious beside an overturned automobile.

History.—The patient was brought to the hospital in an unconscious state.

Examination.—The patient has an excoriatioon over his left parietal region and on his left shoulder. Blood is escaping from the ear, and there is a subeutaneous induration an inch above and anterior to the meatus. There is no bleeding from the nose or mouth. The pupils are equal and react to light. The left lower lid seems a little swollen.
There are no paralyses. The urine shows some albumin and many epithelial cells.

**Diagnosis.**—The escape of blood from the external meatus without evidence of local injury, together with the loss of consciousness, is in itself diagnostic of cerebral fracture. The x-ray shows a fissure,
however, extending obliquely upward and backward from the middle fossa over the parietal eminence (Fig. 19).

_Treatment._—The external ear was carefully cleaned out with boric acid solution and alcohol and kept plugged with cotton.

_After-course._—After the patient regained consciousness he complained of seeing double. On the third day the left lower lid showed a suggillation. Cerebrospinal fluid drained from the ear in large quantities for ten days. After this time the flow ceased at intervals. When the flow ceased, he complained of headache and of feeling bad in general. When the flow would start again he was relieved at once. When the flow ceased permanently, he had a very severe headache and his temperature rose to 103° and the pulse dropped from 80 to 65. Within a day, however, the equilibrium was restored again.

_Comment._—The puffiness of the lower lid showed several days before the evidence of deep hemorrhage appeared. In the absence of hemorrhage from the ear and before an x-ray can be had this evidence is worth looking for. It means a deep hemorrhage which has not yet had time to reach the surface. The significance of orbital suggillation appearing several days after a cranial injury is well recognized. The swelling above noted anticipates its appearance. The temporary headache and rise in temperature evidently were due to an increase of intracranial pressure, as indicated by the fall in the pulse rate.

**CASE 9.**—A farmer aged forty-six was brought to the hospital because of headaches, inability to speak, and partial paralysis.

_History._—The patient dates the beginning of his trouble, according to a relative, from sunstroke six years ago. The first evidence of his trouble came one morning while seated at the breakfast table; he had a feeling of excitement and instinctively ran to the door for air. While in this state he made several unsuccessful efforts to speak. The attack lasted only a few minutes and he is not sure whether he lost consciousness or not. He was able to walk in an hour, and continued with his farm work. He had a similar spell six months later. Since then they have increased in frequency. During a spell two years ago there was weakness in the right arm and shoulder, and a year later the leg was affected. In the past two years all these symptoms have increased. He has had severe occipital headache recently, although he has had some for sixteen years.
Examination.—The patient is bedridden and can not lift his right arm. Poor power in right leg. Frontal lobe asthenia. Left side deep reflexes present, mild Babinski. Right brisker than left, but no clonus. Marked right Babinski. Movements of defense increased on right. Left abdominal brisk, right absent. Right cremasteric brisker than left. Sensation could not be tested well on account of mental state. Sphincteric control impaired. Hearing probably normal, right facial paralysis. Ophthalmoscopic examination showed slight blurring of discs, retinal vessels congested. Did not talk, except to say “yes” and “no.” Obeyed commands and apparently understood everything. Cried and showed other evidence of emotional disturbance. Spinal pressure 360 mm. which fell to 180 after 33 c.c. were removed. Cell count 1.2. Wassermann and gold negative.

Diagnosis.—The nature of the motor disturbances makes the location in the Rolandic region certain. Its relation to a sunstroke seems unlikely. As a matter of fact the alleged sunstroke likely was the earliest manifestation of the disease. The apparently sudden onset by no means indicates a sudden origin of the lesion.

Treatment.—A large bone flap was turned down, exposing the pre-Rolandic region. There was apparently a marked increase of intracranial pressure at the site of operation and the pial vessels were much congested. A large needle was introduced at the central point and at a depth of half an inch a clear straw-colored fluid was obtained. In all 250 c.c. were removed.

After-course.—Three weeks after operation he returned home. He walked with only a little limp. His speech was good, being only a little slow. Reflexes about normal, right slightly greater. Babinski gone. Abdominal and cremasteric equal. Sensory normal. Coordination good. Eye grounds improved. This improved state continued nine months. After this he began to have convulsions with unconscious periods. These became worse and a year after the operation 55 c.c. of fluid were aspirated through trephine opening. Prompt improvement followed. This procedure was repeated several times during the following year. Two years after the first operation the cyst was opened and packed with gauze. Instead of improving the state the attempts at obliteration seemed to stimulate secretion, for the cyst filled more rapidly and there was less marked improvement after the aspirations were done.
Comment.—It is not possible to state the nature and origin of this cyst. There was nothing in the fluid first removed to indicate that a hemorrhage had preceded it. The development seems to be too slow to be a degenerative developing in the interior of the tumor.

CASE 10.—A farmer aged fifty-six came to the hospital because of headache and a tumor on his head.

History.—Two years ago while fixing machinery a small bit of steel penetrated his eye. Pain followed and he was treated many weeks by an oculist. One year age he noticed a lump appearing on the top of his head. About the same time he began to have spells, when his speech would become thick. Headaches began to develop soon after the eye injury, and have persisted until the present time. These have been particularly severe during the past six months. There has been no nausea or vomiting. Now the speech is indistinct at all times and his mental processes are much impaired. For the past
three months his gait has been affected. He is particularly likely to stumble with the left foot.

**Examination.**—Over the parietal region, directly above the ear and midway between the ear and the midline, is an ovoid tumor, extending outward half an inch or more is a smooth, globular tumor (Fig. 20). The skin moves over it, but it seems a part of the skull. It is smooth, hard, and painless. There is a general impairment of the motor system most marked on the left side. There is no ataxia or Romberg. The right eye, the injured one, has a cataract. The pupillary reflex is gone. The left eye responds to light and the disc shows cupping. The spinal fluid pressure is 370 mm., Wassermann negative, Bp. 130.

**Diagnosis.**—The presence of a tumor in the parietal region as above noted with motor impairment of the opposite side suggests a tumor of the skull. Since tumors arising in the diploe tend to extend as much or more into the cranial cavity as they do beyond the surface, this seems the probable diagnosis. These tumors, when primary, are usually sarcomas. When metastatic they are adrenal or thyroid. There is no evidence of a tumor elsewhere, and this must, because of this lack, be regarded as primary. The eye signs and the result of the spinal puncture indicate an increased intracranial pressure. There is no evidence that the eye injury bears any relation to the present
trouble. Were it not for the tumor externally visible a chronic abscess might be considered. Considering the evidence at hand, a primary sarcoma of the skull seems to be the best diagnosis. Such tumors have been successfully removed.

Treatment.—The tumor mass was circumscribed with a Dahlgren forceps. Instead of finding a tumor protruding into the cranial cavity the tumor appearing externally proved to be merely a shell the bulk of the visible mass being made up of soft granular material. When the disc of bone was removed there was a large mass of this soft material apparent. It was brownish red and within it were many small granules giving the feeling of soft, finely mixed cement. This extended below the surface of the brain half an inch. The borders were ill-defined and all the tumor substance could not be removed.

Pathology.—The slide shows a cellular material with a small amount of connective tissue. Here and there are concentric masses which stain deeply with acid dyes. These are evidently psammoma bodies and the tumor therefore a psammoma (Fig. 21).

After-course.—The patient improved for a few months, so far as the headaches were concerned. After this the general impairment resulted in his death a few months later.

Comment.—It is quite unusual for tumors of this kind to produce a mass visible externally. In this case apparently the bone became involved and the tumor visible was the result of newly formed bone which attempted to bridge the impending defect. Psammomas being diffuse in character are never operable.
CHAPTER III

DISEASES OF THE FACE AND ACCESSORY SINUSES

That portion of the head which is not cranium and does not belong to the masticatory apparatus may be regarded as face. The lips are excluded because the covering mucous membrane causes them to align in their clinical behavior with the interior of the buccal cavity. The usual affections that come to surgeons are either neoplastic, inflammatory or neuralgic. A tumor may be inflammatory and hence painful, then painful because inflammatory. When a tumor is not painful it is neoplastic and when there is pain without augmentation in volume it is neurologic. Since the diseases in this region serve as the common meeting ground of half the specialists in medicine, self-defense demands of the general surgeon a detailed knowledge of the diseases of this region.

PAINFUL AFFECTIONS OF THE FACE

The common painful affection of the face of surgical importance is tic douloureux. The intermittence and the lancinating character of the pains are wholly characteristic. Notwithstanding this, patients are commonly subjected to unnecessary mutilations, of which extraction of teeth and enucleation of an eye are the most common. Formerly the teeth were extracted because they were regarded as the source of the pain; now they are removed because they are suspected of harboring foci of infection which are indirectly believed to cause the neuralgia. It is an unwarranted procedure in either theory. Eyes are removed because the neuralgia is mistaken for a glaucoma.

CASE 1.—A carpenter aged fifty-four came to the hospital because of paroxysmal pains in the face and jaw.

History.—Beginning eighteen years ago he noticed lancinating pains in the right cheek when exposed to cold blasts of air. These attacks recurred at infrequent intervals only, in the beginning. After several years the attacks came closer together and were excited by a variety of stimuli, particularly draughts of cold air and by light
stroking of the face. Eating did not excite the attacks unless the food was cold. After eight years a peripheral operation was done, removing the third branch. Relief for a year and a half followed. At the lapse of this time the pains returned, reaching their original intensity five years ago, when the second peripheral operation was done. The relief this time was less than a year, and one year ago a third peripheral operation was done. No relief at all followed this operation, and the pains increased in intensity, coming on in violent paroxysms, apparently without cause. At this time the movements incident to mastication excited attacks.

Examination.—Large, powerful man, not appreciably emaciated, but bearing the facial expression of intense suffering. An attempt to determine the nerve chiefly involved brought on paroxysms by the slightest touch. Obviously the second and third branches were involved, the lingual probably least of all. Because of the intense suffering, the nerves were blocked at the infraorbital and mental foramina with quinine. This was done to give temporary relief while operation was being arranged for and to permit an examination of the lingual branch. This gave complete relief, which likely would not have been the case if the lingual nerve had been involved. As a matter of fact this seems to be universally the case, so that I am skeptical about the primary involvement of this branch.

Treatment.—A typical Krause operation was done. The patient left the hospital in a week.

After-course.—After awaking from the anesthetic he occupied his time by singing religious songs. It was thought that he had suffered a mental aberration from the operation. He explained, however, that when he regained consciousness and discovered that he was free from pain, his joy was so great that he burst into song. His efforts bore evidence that musical excellence is not necessary to the expression of joy. He has remained free from pain, now ten years.

Comment.—The fact that he received no relief from the last peripheral operation must be explained by assuming that the nerve was not found. The large amount of fibrous tissue resulting from previous operations makes such an error easy. When recurrence follows a peripheral operation, it is unwise to attempt another.
CASE 2.—A merchant aged fifty-three came in for relief of pain in the left side of his head and face.

History.—For years he has had spells of pain in the left side of his head and face. He tried all the usual remedies with no improvement. Finally he had an x-ray examination made of his teeth. He was advised to have some of them extracted. This was done, with relief for a time. Later he had all the remaining teeth extracted. He then had no trouble for several months, but the pain came back. Recently the pain was so severe that he had to go to bed. He had the nerves injected with alcohol at this time. This relieved the pain until the operation was done.

Examination.—There is anesthesia on the left side of the face from previous alcohol injections. Blood pressure 110. Heart and lungs negative. The patient has lost about 30 pounds of weight but otherwise seems in good health. Neural examination was negative, save that the cell count of the spinal fluid was somewhat increased.

Diagnosis.—As in most of these cases, the patient brought the diagnosis with him.

Treatment.—The preliminary steps of the operation were done under local anesthesia. The lifting of the dura from the ganglion and nerve root proved painful, and ether was given. The sensory root was severed with a fine electric cautery. It was interesting to note that the perfectly dry field that was secured while working with local anesthesia burst into a multitude of small oozing points when the patient was under the influence of ether. This demonstrates well the greater disposition to bleed when the general anesthetic is given.

After-course.—He had considerable headache on the left side following the operation. This was still present when the patient left the hospital, but subsided in a few weeks following. He soon regained his lost weight.

Comment.—Despite the fact that he consulted competent men the teeth were needlessly sacrificed. No infected foci were demonstrated about their roots. Tic is a remittent disorder and a therapeutic measure may erroneously be credited with producing the free interval. This operation will never reach the ideal state until some method is discovered whereby the nerve can be exposed painlessly under local anesthesia. The cautery lessens the hemorrhage in the final step of the operation. The cautery point must be fine so that the degree of heat obtained will not injure surrounding tissue.
CASE 3.—A farmer aged sixty-three entered the hospital because of pain in the right side of his face.

History.—The patient has had spasmodie pains in the right side of his face for nearly thirty years. He was operated on for the removal of the nerves sixteen years ago, but without even temporary results. He was bedfast for two and a half years because when he got up the paroxysms increased in number and frequency. The paroxysms came on every 30 to 60 minutes. The pains begin at the angle of the jaw and shoot into the side of the head. The left side of the face has been painful every four or five weeks for a year. The pains on this side remain localized in the jaw. He is taking 32 grains of morphine a day.

Examination.—He bears the scar of the operation of sixteen years ago. Examination is impossible because of the pain excited.

Diagnosis.—Trigeminal neuralgia.

Treatment.—The ganglion was removed under local anesthesia. The operation was quite painless until the dura about the ganglion was being elevated. As soon as the ganglion was located an injection was made into it. This promptly produced vomiting, but the operation was then completed without discomfort to the patient.

After-course.—Relief from pain was immediate and permanent. He returned six months later for relief for the other side. A peripheral operation was done, removing the 2nd and 3rd branches. He was free from pain for two years, when it gradually returned. Three years after the first radical operation he returned for a radical operation on the left side. This was done under ether. The hemorrhage was so great before the ganglion was effectually exposed that packing had to be resorted to. Four days later the packing was removed and the ganglion exposed and attacked. This plan lessens the amount of hemorrhage considerably. The technic was modified to the extent that the sensory root was exposed and destroyed by a fine cautery at low heat. During the interval between the two operations while the pack was in place, he suffered much pain and had some mental aberration. I have used the cautery half a dozen times and the results seem to be satisfactory.

Comment.—It is always a misfortune when the operator is obliged to do the operation in two stages. It is probably a confession of too bungling operating. It is much better to do the operation in two stages, however, than to persist when hope of an effectual exposure
is passed. Having had the unique experience of having one side operated on under local anesthesia and the other under general, it seemed this patient's opinion relative to the methods of anesthesia should be worth something. He expressed himself as being emphatically in favor of local anesthesia. This preference may have been due, however, to the fact that he was packed after the second operation. Local anesthesia has the advantage of lessening materially the difficulties in technic because of the reduced hemorrhage. Cases where the operation is done under local anesthesia to the point where the ganglion is to be exposed and then ether is given illustrate this very well. A wound that is perfectly dry bleeds at myriad points upon giving the patient ether. There seems to be no way of controlling the pain of separating the dura from the base of the skull, however; theoretically the ganglion should be injected through the foramen ovale before the operation is begun. Practically this can not always be done. In the cadavers it is easy, but on the living it is another matter.

**CASE 4.**—A stockman aged sixty-four entered the hospital complaining of attacks of acute pain in the right side of his face.

**History.**—The patient has never been sick since childhood. He does not and never has used tobacco or alcohol. The present trouble started six years ago with occasional twinges of pain in the right side of the nose. At first the attacks of pain were not so severe, but they grew steadily more and more frequent. In the past two months it has been especially bad. The pains are of a spasmodic, jerky, lightning-like character. The paroxysm is brought on by brushing the side of the face against something as by taking anything into the mouth. The pains are now above the right eye, in the right eyeball, along the right side of the nose, and when very severe, it is felt over the malar bone and in the upper canine teeth. His attacks seem to be getting worse all the time. They come on of late as often as every 15 minutes, day and night. The pain is also felt now in the right occipital region and extends to the top of the head. His general health is excellent. He has no other trouble. Appetite good, bowels regular, no urinary disturbance.

**Examination.**—Blood pressure 150-90. Head and neck negative except that touching the side of the face starts paroxysm of pain. Heart and lungs negative. Abdomen negative.
Diagnosis.—Trifacial neuritis involving the 1st and 2nd branches.

Treatment.—The supraorbital and infraorbital nerves of the 1st and 2nd division of the 5th injected with grain alcohol. The technic of the operation is simple, yet it requires a certain amount of care. By preceding the injection of alcohol with novocaine the operation can be done with but very little pain. The first branch is the most difficult to inject, unless the nerve can be located by the pressure pain or a palpable notch is present. It must be remembered also that the nerve may appear as two divisions. The second branch is more easily found (Fig. 22). It is usually a bare fingerbreadth lateral to the nose. By entering the needle a fingerbreadth below

Fig. 22.—Direction in which the needle must approach the foramen in order to enter it properly.
the lower border of the orbit, the needle can be passed into the foramen usually half an inch or more. Care must be exercised not to force it through the thin plate of bone in the floor of the orbit and so make the injection in the loose orbital tissue. With care the needle can be made to enter the foramen. Once the needle is entered, a few drops of novocaine are injected and after a few minutes the alcohol is injected. The needle may be left in the foramen during this interval. Instead of using a diluted alcohol I allow the novocain solution to act as the dilutant injecting say 5 drops of novocain solution and follow this with 15 or 20 drops of standard grain alcohol. The mental foramen is found below the base of the canine tooth. By stepping along with the needle it can usually be located. If not, the injection can be made about where it should be. I have never failed to secure good results even when the foramen was not exactly located. I tried injecting the lingual branch opposite the lingula just once. The reaction in the masticator muscle produced a fibrosis which made it impossible for the patient to open her mouth more than half an inch. This is quite enough to enable her to express her opinion of the method.

After-course.—Within twenty-four hours after injection, the right eye was swollen shut owing to irritation of the alcohol on the soft tissues. The swelling was practically gone in three days, but he still had paroxysms of shooting pain along the side of the nose, in the right eyeball, at the inner angle of the eye, and along the supraorbital ridge towards the outer side of the eye. The pain was still present, but diminishing in severity when he left the hospital at the end of a week. Within a few days, however, all pain ceased.

Comment.—The injections of the nerves at the foramen give as prompt and as permanent relief as does injection at the foramen ovale.

CASE 5.—This man was brought to the hospital when sixty-eight years of age because of severe pains in the right side of the face.

History.—The patient has had paroxysmal attacks at intervals for some fifteen years. At first they were severe in the spring and fall only. In 1908 he had the nerves injected at the foramen by an expert at this art. Relief from symptoms followed, but the cornea became ulcerated and the sight of the eye was lost. The freedom from
pain lasted eighteen months. Following this he had a severe attack during the spring, lasting several weeks. During the summer he was fairly free, but now two years and a half following he has had nearly constantly recurring attacks every three weeks. Swallowing brings on violent spasms of pain.

Examination.—The point most sensitive to touch is just below the infraorbital foramen, but stroking the lip brings on the paroxysms which involve also the nerves of the lower jaw. The patient has a dilated heart, the apex being well beyond the nipple line. It is irregular in rate and volume. The urine is of low specific gravity and contains a few hyaline casts. His lungs are generally emphysematous.

Diagnosis.—In this, as in most cases, the patient comes to the surgeon with the diagnosis already made. Usually also he has run the gamut of injection treatment and he is prepared to listen to proposals of radical measures. The surgeon's task, therefore, is to diagnose the patient rather than the disease, to determine the kind of operation advisable.

Treatment.—Because of the patient's unfavorable condition, a radical operation was not proposed. A peripheral resection of the nerves was undertaken. In order to lessen the duration of anesthesia the second branch was removed under local anesthesia and the third branch under ether.

After-course.—The patient remained free from pain for a year and a half. After this time the pain returned to nearly its former intensity. Alcohol injections were made into the infraorbital and mental foramina. Relief for six months followed. Renewed pains and renewed injections at the same site followed at intervals of six months to a year for now six years. By this means he was kept comfortable. He has now been free for a year and a half since the last injection.

Comment.—Because of his general condition the peripheral operation was chosen instead of the removal of the ganglia. It appeared as though he would succumb from other causes during the usual period of immunity from a peripheral operation. The peripheral injection was done the first time because no needle suitable for a deep injection was available. The results were so satisfactory that the same method was pursued at subsequent sittings. I have had
occasion to employ the same technic with other patients with equally good results. This method has the advantage in that it can be done with an ordinary hypodermic syringe by any one, while the deep injection requires some special skill and a special needle.

CASE 6.—A matron aged fifty-seven came to the hospital because of paroxysmal pains in the right cheek.

**History.**—Six months ago while washing her face the patient had a sudden paroxysm of pain in the right cheek. This pain has recurred at intervals since that time, and for the past month they have been nearly constant, requiring opiates for their relief. The general health of the patient has always been good.

**Diagnosis.**—The upper lip and cheek on the right side are very sensitive to touch. There is marked tenderness over the infraorbital foramina. There is no involvement of the third branch. The routine examination of the hospital gave a blood pressure of 210, with normal urine.

**Treatment.**—The second branch was removed under local anesthesia.

**After-course.**—While the patient was lying in bed she discovered that there was some defect in vision. Certain areas in the field of vision seemed to be disturbed. Some parts of the wallpaper seemed to be blotted out, as it were. Since anesthesia of the optic nerve sometimes follows this operation it was thought that possibly the disturbance was due to the local anesthesia. When it did not clear up in a day an oculist was consulted. He found multiple retinal hemorrhages which he estimated to be from two to four weeks old. Fortunately the opposite eye was similarly affected. She had a blood pressure of 240 at this time, and the urine contained some albumin and a few casts. Notwithstanding that it was pretty certain that the defect existed before the operation, the patient was not fully convinced. She was permanently relieved of the pain, however.

**Comment.**—The embarrassment due to the disturbance of the eye might have been saved had the eyes been examined before the operation. Usually patients are grateful to be relieved from their trouble and do not complain of minor disturbances even when due to the operation.
CASE 7.—A housewife aged sixty-two came to the hospital because of neuralgia in the right side of her face.

History.— Attacks come on without warning, very suddenly, with severe pain along the lower jaw and at times across the cheek and up along the side of the nose to the inner side of the eye. It is sometimes a burning, jerking sensation, at other times a twitching, cutting pain. Attacks usually last about five minutes. They subside as quickly as they begin. She had some pain like this for about twenty years. Has been much worse for the past five years. Her surgeon injected the infraorbital nerve with alcohol about seven years ago. This gave relief for about one year. During the last year the patient has had attacks every few days to a few weeks apart.

Examination.— Heart action slightly lowered, probably due to narcotics. Skin yellow tinged. Very few signs of arteriosclerosis. Blood pressure 130-80. Sensation more acute over whole right side of the face. Touching face with a pinpoint did not start paroxysm.
Diagnosis.—As is usual with these patients she seeks relief, not a diagnosis.

Treatment.—The second and third branches were injected with alcohol at the foramen ovale. The technic employed was as follows: midway of the zygomatic arch at its lower border a needle is passed directly inward until the pterygoid process is encountered. This is usually from 4 to 5 cm. below the skin surface. The needle is then withdrawn until the point is just beneath the skin. It is then introduced a like depth in a direction along a line from the point of entrance to a point 2 cm. above the mastoid process on the other side or the needle may be entered just in front of the condyle of the lower jaw and passed obliquely inward, upward, and forward until the foramen is reached (Fig. 23). Here a few minims of Novo-eaine solution are injected and after an interval of five minutes the alcohol is injected. In order to mark the point on the needle when the pterygoid process is touched a cork disc may be placed on the needle or a small forcep may be clamped on it, or if the needle is near the right length, one can mark the point with his eye. If the patient complains of shooting pains in the jaw, one may know the right point has been reached.

After-course.—The patient remained free from pain for nearly two years. The pains became more intense than before and the ganglion was removed.

Comment.—It is ever thus. There is but one eure and that is the removal of the ganglion.

CASE 8.—A man aged fifty-six came to the hospital because of a needle-like pricking in the right side of his face.

History.—Ten months ago he began to have sharp shooting pains over the right eye. He had a bad cold during this time. Three days later an erysipelas began in this region. This was attended by a swelling of the tissues about the eyes and rapid pulse and fever. This lasted five to six days. Following this seabs formed in this region and lasted three or four weeks. Since then he has had almost constant severe burning pain with occasional sharp shooting pains in the forehead and over the top of the head. There are some pricking sensations in his face but no severe pains. In the beginning the gums of his right upper jaw were sore and he had some pain in his ear, but this soon disappeared. Otherwise he has always been
well. Two months ago he had alcohol injections for the pain. He had partial relief for a very few weeks only.

Examination.—Both eyelids are edematous and the upper one and the skin over the supraorbital ridge are red. There is partial loss of sensation over the eye and most of the right side of the forehead. Sensation in the face is normal. The pupil of the right eye is irregular. Both pupils react sluggishly to light and accommodation. The eye grounds are normal. The reflexes are active. Blood pressure 140-90. Two blood Wassermanns were positive and one negative. The cell count of spinal fluid slightly increased.

Diagnosis.—The sudden onset with coryza causes one to think first of a frontal sinus infection. The associated erysipelatous infection, assuming that there was such, may have been a continuation of this infection. The tissues now have the feel of a posterysipelatous lesion. It would be unusual for the swelling to last so long after the attack. It is possible that the swelling is due to the alcohol injections made two months ago. If so, the injection must have been unskillfully done, an assumption not warranted because it was made by a person of ample experience. If due to the original lesion, the continued thickening may account for the pain complained of. There is now no evidence of frontal sinus infection, rhinoscopically or on x-ray examination. The irregular pupil and sluggish reaction, together with the dubious laboratory findings might be taken to indicate the presence of syphilis. Be this as it may, that would not account for the swelling or for the character of the pain. This may be kept in mind as a reserve diagnosis.

Treatment.—He was placed on ascending doses of potassium iodide.

After-course.—He rapidly improved under this treatment and soon secured complete relief.

Comment.—The improvement following the treatment may be considered as evidence of syphilis, but the same drug often produces good results in other exudative lesions. At present the diagnosis is still unsettled. At any rate, there is no evidence of any relation to tie and operation is not advisable.

CASE 9.—A farmer aged fifty-six came to the hospital because of pain in the back of the head.

History.—Some years ago he had a severe pain in the back of his head. After a few weeks it gradually improved. He has had sev-
eral lesser attacks in the intervening time. Several months ago the pain returned with renewed intensity. He has not been free from pain day or night during that interval except when under the influence of hypodermics. He covers the occipito-parietal region with his hand when asked to indicate the site of his suffering. His general health has always been good and he knows of no cause for his trouble.

Examination.—The point of greatest sensitiveness is midway between the external occipital protuberance and the spine of the first cranial vertebra (Valleix’s point), and a point over the superior
curved line a fingerbreadth lateral to the external occipital protuberance. (Fig. 24.) There is no pain or limitation in the movements of the head or other evidence of disease in this region. Pain is caused by active movement.

**Diagnosis.**—The absence of any etiologic factor which might cause a neuritis compels the diagnosis of a neuralgia of the great occipital nerve.

**Treatment.**—A one per cent quinine urea hydrochloride solution was injected at a point a fingerbreadth lateral to the spine of the first cervical vertebra on a line connecting this point with the tip of the mastoid. The tip of the needle was passed through the trapezius and complexus. The nerve lies under the latter muscle. A few c.c. of the solution were injected here. The needle was passed obliquely upward, after withdrawing from the muscles, and in the direction of the point where the nerve becomes subcutaneous. Some of the solution was injected at various points along the course. In all an ounce of the solution was used.

**After-course.**—Relief came in a few hours and, while there was local soreness from the irritation of the quinine, he was able to sleep. A second injection was made a week later. He has remained free from pain.

**Comment.**—I have injected many of these cases and if this treatment fails, the patient is almost sure to have a positive Wassermann. These neuralgias are associated with myalgias just as lumbago and sciatica are linked together. The modern viewpoint seems to indicate a frequent association with some articular involvement but in most cases it can not be demonstrated. In actual arthritic involvement in spondylitis this type of affection does not occur.

**TUMORS OF THE FACE**

In no other region of the body does a mere name mean so little in designating the character of the tumor as in the face. An epithelioma may mean anything from a semibenign, basal-celled epithelioma to the very malignant carcinomas of the lip. A sarcoma may mean an epulis or a malignant osteosarcoma. Each individual tumor has its own peculiarities. No matter how experienced the observer, he will still have rude surprises in diagnosis and prognosis.
CASE 1.—A retired farmer of sixty-five came to the hospital because of an enlargement of the end of the nose.

History.—The end of his nose has been enlarging for sixteen years. It has never caused any pain or inconvenience until the past year. Now when he drinks coffee the end of the mass dips into the coffee so that he must drink it cooler than he likes in order to keep from burning the end of his nose. He wants hotter coffee, hence he seeks relief. He has never had any digestive disturbance.

Examination.—The end of his nose presents an irregular lobular mass 2 by 2½ inches in size (Fig. 25). It is somewhat boggy to the feel and may be twisted in any way without eliciting the interest of the patient. Examination otherwise is negative.

Diagnosis.—The irregular size and long duration of the trouble stamps it as an rhinophyma.

Treatment.—The excess mass was shaved off with a scalpel until the general outlines suited the esthetic sense of the operator. No attempt at grafting was done, the denuded area being allowed to cover of its own accord.

Pathology.—The cut surface of the mass removed was of a grayish white and dotted over with small whitish points. The slide showed
a fibrocellular background with a marked dilatation and hypertrophy of the sebaceous glands (Fig. 26).

After-course.—In two weeks the denuded surface had become completely covered by a new epithelium except for a small area at the point (Fig. 25B) where the cartilage had been removed in order to reduce the length of his nose.

Comment.—It is likely that nests of cells from the sebaceous glands take part in the epithelization process, else it would not be covered so rapidly. The grafting of skin on the denuded area sometimes recommended, is entirely superfluous.

CASE 2.—A merchant aged forty-four comes because of a tumor of his cheek.

History.—For several years the patient has been aware that there was a tumor the size of a pea in his left cheek. It caused him no trouble until recently when it began to enlarge rapidly and become quite painful.
Examination.—There is a hemispherical tumor the size of a small hickory nut behind and an inch below the angle of the mouth. The skin over it was reddened and attached to the tumor. The deeper portions of the tumor seemed to be free from the surrounding tissue as determined by a finger introduced into the mouth. The tumor is soft, semifluctuating, and tender (Fig. 27).

Diagnosis.—The history of long duration, its sudden enlargement, reddened surface, and its close relation with the skin characterized it as a wen which had recently become infected. Had it been in di-

rect line of the mouth fold, a dermoid would have had to be considered. Dermoids seldom become inflamed and are not attached to the skin. Occasionally small round-celled sarcomas begin in the cheek as globular masses. These usually occur in young persons, have but a brief history, and are attached to the deeper tissues of the cheek.

Treatment.—An elliptical incision was made about the summit so as not to open into the tumor. In this way the tumor was removed intact.

After-course.—Healing was prompt and the result permanent.

Comment.—Had this tumor been on the cheek of a woman, I should have incised and allowed the infected contents to escape. After healing had been completed I should then have removed the tumor. In
this way a finer scar would have been produced. In operating these tumors the facial nerve and Stenson’s duct must be remembered. I have seen one instance in which a wen of this region became malignant. In such instances one may be obliged to keep his eye on the tumor rather than on the anatomic structures above noted.

**CASE 3.**—A student aged thirty came to me because of a tumor on his face.

*History.*—Some months ago he noticed a tumor developing in his cheek. After a month it discharged spontaneously for a time and then healed, leaving a dimpled scar. After a time the tumor began to re-form. In the last day or so it has become painful again and has increased much in size.

![Fig. 28.—Chronic alveolar abscess simulating a wen.](image)

*Examination.*—Posterior to and below the angle of the mouth is a tumor the size of a hazelnut. It is firmly fixed to the skin, less so to the surrounding tissues, and does not seem to be fixed to the underlying tissues. The teeth seem to be unaffected and there seems to be no connection between the tumor and the jaw bone. (Fig. 28.)

*Diagnosis.*—The form of the tumor, its attachment to the skin and its freedom from attachment to the jaw seem to stamp it as a wen which has become infected and ruptured spontaneously.

*Treatment.*—The tumor was excised. It was noted that there was no encapsulation and the tumor was directly attached to the surrounding tissue. The wall of the abscess extended to the bone and contained thick pus without epithelial lining.

*Pathology.*—When the tumor was sectioned, it was discovered that the sac wall was composed of granulation tissue without epithelial lining.
After-course.—True to the predictions, warranted by the study of the section, a fistula formed. The corresponding area of the jaw was then exposed under nerve blocking and a bit of necrotic bone found. This was gouged out and the root of the tooth pointing in a root abscess was amputated. The sinus from the region of the bone to the cheek was removed. Healing now is permanent.

Comment.—There was no complaint pointing to a primary tooth abscess. The whole complaint had to do with the cheek, and I ascribed it to an infected wen. The deep dimple remaining could not have come from a suppurating wen and spelled certainly that the process came from a deeper point. The attachment to the skin extended over a wider area than is the case in an infected wen and the wall was thicker.

CASE 4.—A matron fifty-four years of age came to the hospital because of an ulcer about the nose.

History.—A dozen or more years ago she first noticed an ulcer at the junction of the side of the nose and lip. She was treated many years with various salves without result. She consulted a dermatologist who diagnosed lupus and treated it for several months with the x-ray. The ulcer seemed but to grow the faster after this treatment. Save for the slight irritation and the esthetic aspect, she was not annoyed.

Examination.—The patient shows an ulcerous lesion which has largely destroyed the right ala (Fig. 29), extends a centimeter along the floor of the nose, and reaches to the inner surface of the opposite ala. The edge is slightly indurated and hard to the touch. No tubercles can be found with the slide test.

Diagnosis.—Save for the slow growth, it does not resemble lupus. The growth is too slow also for a syphilitic lesion. The undermined edge with a dense border suggests basal-celled epithelioma.

Treatment.—The diseased area was widely excised and the defect remedied by a plastic operation.

Pathology.—The tissue was typical basal-celled epithelioma.

After-course.—There was a recurrence along the floor of the nasal cavity. Death occurred two years after operation.

Comment.—Dermatologists rarely use the x-ray with sufficient vigor to destroy a tumor of this character in this situation. When a basal-
celled epithelioma once invades the mucous membrane of the nose, the chance of cure by any means is not very good. Very wide excision must be practiced. The basal-celled carcinomas lose their relatively benign character when they invade mucous membrane. The x-ray seems to be entirely useless. The very slow growth with tendencies to heal in some places causes the resemblance to lupus to be quite close.

Fig. 29.—Basal-celled carcinoma of the alae of the nose.

CASE 5.—A farmer aged fifty-six came to the hospital because of multiple ulcers of his cheek.

History.—For seven years he has noticed numerous scaly patches developing on his face. These patches at first sealed only, later when the scales were forcibly detached slight bleeding would occur. The larger of them on the right temple is now permanently scabbed over and when he removes these considerable oozing of blood takes place.

Examination.—The patient is a thin, large-boned man of complexion vulgarly known as "sorrel top." In innumerable places over the entire face and sides of the neck, particularly on the right temple, are patches as above described. The larger one when deprived of its crust oozes and the edges are seen to be irregular and undermined. The border is somewhat elevated above the surrounding skin.
**Diagnosis.**—The gradual development of the lesion here described indicates a change from seborrhoeic patches to basal-celled epithelioma. Occurring in such numbers in blond persons these tumors are sometimes called sun cancers. The theory is that the skin being little protected by pigment is susceptible to the sun’s rays, the irritation resulting in these proliferations.

**Treatment.**—He was sent to a roentgenologist.

**After-course.**—Relief seemed to be complete after a few treatments. Late results are not known.

Comment.—Some of these are treated with radium by dermatologists but a capable roentgenologist will accomplish the work much more certainly and quickly. These multiple lesions usually respond to the x-ray. Sometimes one will persist in spite of the ray or recur quickly after being healed. This is particularly apt to take place in those situated above the level of the outer canthus of the eye as in the larger one shown in Fig. 30, or in those on the neck below the angle of the jaw. When these do not respond readily to the x-ray, excision should be done, and if situated on the neck, the excision

![Fig. 30.—Beginning basal-celled epitheliomas of the temple.](image-url)
should be radical,—a wide cut including superficial fascia and platysma.

CASE 6.—A farmer aged fifty-six came to the hospital because of several small tumors of his cheek.

History.—For many years he has had scaling patches over various regions of his face. During the past three years three of these near the angle of his mouth have formed annoying crusts. When these were removed, oozing of blood took place. He is a ranchman and has always lived out of doors.

Fig. 31.—Basal-celled epitheliomas beginning as warty growths.

Examination.—The patient is tall and slender and generally delicately built. His skin is soft, his hair like the sands of the plains. On his right cheek near the angle of the mouth are three elevations about as large as a pea. Their surfaces are covered with scabs. When these are removed a few drops of blood ooze from them. When the surface is thus exposed a whitish pink mottling can be detected. The tumors do not tend to become ulcerated, but in general the growth is expansile. Numerous seborrheic patches were present over various regions of the face. There are no glands. (Fig. 31.)
Diagnosis.—From their form one would think first of adenomas but the history of their beginning as scaly patches negates this, particularly as the patient still has scaly patches which he exhibits as replicas of the early history of the now more important lesions. The conclusion must be, therefore, that they are basal-celled epitheliomas.

Treatment.—The tumors were excised that tissue might be had for examination and the resulting wound cauterized with the electric cautery. The x-ray was advised for the seborrheic patches.

Pathology.—The tumors show the typical picture of basal-celled epithelioma.

After-course.—The lesions remained healed.

Comment.—Basal-celled epitheliomas when flat are best treated by the x-ray. True the elevated variety may be destroyed by the x-ray but not nearly so quickly as the flat kind. Where scarring is of less importance than time the cautery is preferable. Excision need not be practiced before the cautery is applied unless the surgeon has a curiosity as to the histology of the tumors, which must be satisfied.

CASE 7.—A man aged sixty was brought to me for diagnosis of a tumor in front of his ear.

Fig. 32.—Warty epithelioma in front of the auditory meatus.

History.—This patient has had a wart in front of his ear for several years. For a year or more it has borne a scab and recently has been uncomfortable.

Examination.—Just in front of his ear is a tumor 1 cm. in diameter. It has a wall continuous with the surrounding skin. This wall
is two or three mm. high and terminates in a crusty surface. When
this crusty surface is removed, an oozy, bleeding, granulating surface
is uncovered. It seems to involve the full thickness of the skin. (Fig.
32.) No glands are palpable.

**Diagnosis.**—The bleeding, granulating surface stamps it as malig-
nant. The history of an antecedent wart and the location about the
ear stamps it as of the graver sort of epithelioma.

**Treatment.**—Destruction by cautery was advised. It was excised
elsewhere.

**After-course.**—Reurrence began in a year and the patient died
two years later.

**Comment.**—Epithelial tumors in front of and below the ear are
particularly likely to be mischievous, and extensive destruction by
the cautery gives better results than even wide excision.

**CASE 8.**—A man aged sixty was brought for my delectation by
a colleague.

**History.**—He has had a small tumor below his eye for many years.
It has gradually enlarged until it has attained its present size. It
eases no inconvenience.

**Examination.**—A tumor 1 cm. in diameter and a half as high is
situated lateral to the ala of the nose. Its surface is smooth, is en-
crusted at only one fine point. Small lobulations can be made out.
(Fig. 33.)

**Diagnosis.**—The presence of the small lobulations and the absence
of ulcerations and encrustations exclude malignancy. Its close asso-
ciation with the skin stamps it as epithelial. It may be designated,
therefore as a benign cystic epithelioma.

**Treatment.**—The tumor was excised.

**Pathology.**—The tumor is made up of long masses of epithelial
cells containing numerous cysts within them. The cells show no ten-
dency to degeneration forms. (Fig. 34.)

**After-course.**—Nothing is known but it may be confidently stated
that cure resulted.

**Comment.**—Those tumors belonging to this category which I have
been privileged to study seemed to be derived from the sebaceous
glands, and in my opinion had best be designated adenomas of the
sebaceous glands.
CASE 10.—A farmer aged sixty-two came to the hospital because of an ulcer on his face.

History.—Seventeen years ago he began to have canker sores on his left cheek. A year ago a larger ulcer than usual appeared and he
had his teeth extracted. It has not healed since. For a number of months a sore has been developing on his cheek. His health remained unimpaired until six weeks ago. Since then he has taken only liquid

Fig. 35-A.—Carcinoma of the cheek.

Fig. 35-B.—Tumor after excision showing the oral part of the growth.

nourishment and has lost 12 pounds. His general health has always been good.

Examination.—Midway between the tip of the chin and the angle of the jaw is a tumor raised half an inch above the surrounding skin. It is an inch or more in diameter and the surface is red, granular, and
bleeding (Fig. 35-A). There are no glands palpable. The inside of the cheek is occupied by a fungating mass two inches across. There is an extensive pyorrhea. The urine is negative, Bp. 165-100.

**Diagnosis.**—The history of an ulcer which started from the irritation of a broken tooth is at once suggestive of carcinoma. The fragile nature of the fungating mass leaves no doubt of it. The question is to determine its operability. Being fungating the likelihood of metastasis is much reduced, but the chance of local recurrence is much enhanced. Wide local excision is the requirement.

![Fig. 36.—Four weeks after excision of carcinoma of the cheek. The upper part is completely healed while below there is extensive recurrence.](image)

**Treatment.**—The growth was widely excised under local anesthesia. A margin of healthy mucosa was removed with the tumor (Fig. 35-B). The opening was left, the idea being to allow the cut surface to heal over in order to see whether there was any disposition to recurrence.

**Pathology.**—The slide showed a typical carcinoma.

**After-course.**—The amount of tissue removed proved to be wholly inadequate. A rapid recurrence took place all about the lower border (Fig. 36). An area along the upper border healed over completely,
showing that here the disease had been controlled. The recurrent portion was removed with a cautery under nerve blocking. After the entire circumference was controlled, the deficit was covered by a long flap from the neck. The skin side was turned into the mouth. After this had healed, the pedicle was cut and folded over the skin filling the deficit, producing in this way a covering for the defect lined with skin within and without. In a few months recurrences

Fig. 37.—Six weeks after transplanting a skin flap from the neck to the cheek.
appeared in the deep cervical lymph glands and it was obvious the attempt at cure had failed.

*Comment.*—In fungating tumors I have found it a good working plan to excise the tumor, allowing the borders to heal before attempting to close the defect. This gives a good opportunity to watch for recurrences. In the case of the cheek, this is particularly desirable, for if a graft is transplanted at once and a recurrence does take place, it is exceedingly difficult to get at the recurrent area because of the limitation of movements of the jaw that follows such an operation. If in securing a flap for filling in the cheek one will go down the back of the neck and shoulder, one can fill the defect without scarring the neck (Fig. 37). If one uses a short pedicled flap, the neck will be badly scarred.

**CASE 11.**—A farmer aged fifty-two came to the hospital because of a tumor in his cheek.

*History.*—For four years he has noticed a tumor inside of his right cheek. It grew gradually and two years ago it was burned

![Fig. 38-A. Cauliflower growth of the cheek after excision.](image-url)
out. It did not heal, however, and the growth seemed only to be stimulated. It now interferes with the taking of food and he has lost some thirty pounds in weight.

Examination.—A mass two and a half inches in diameter and more than an inch thick occupies the inner surface of his right cheek. It is fungoid, irregular in outline, and the surface is fragile and bleeds on manipulation. There are no palpable glands in the neck.

Fig. 38-B.—Complete cicatization of the area excised.

Diagnosis.—The fungiform outline and the fragile surface indicates that it is a carcinoma. The fact that it is fungiform gives the hope that it is of relative benignancy. This hope is strengthened by the absence of lymph-gland involvement. In view of these facts operative removal seems warranted.

Treatment.—The growth, together with the entire thickness of the cheek, was removed by the cautery under local anesthesia. The large
wound was left open to granulate at will. After the border had healed a flap was advanced from the neck and the back of the shoulder. The skin surface was turned toward the interior of the mouth. In two weeks the pedicle was cut and a fold was placed over the original graft covering the wound. In this way the defect was filled in by a graft covered by skin on the inside and on the outside.

Pathology.—The tumor on section shows the cauliflower arrangement (Fig. 38-A). The cell columns are arranged in a radiating manner from the base. The slide shows a typical epithelioma.

After-course.—The wound healed completely, but in nine months there were signs of recurrence in the region in front of the pillars.
The growth was again destroyed and allowed to heal as before. This time the wound was allowed to thoroughly cicatrize (Fig. 38-B) before attempts at repair were made. The edges of the opening were then loosened, separating the mucous and cutaneous layers and then bringing the freshened edges in apposition. The skin edges were held together by tension sutures protected by pearl buttons (Fig. 38-C). The opening closed without further trouble and has remained so.

Comment.—The treatment here outlined was wholly successful. Had the first opening been allowed to remain open a longer time before the grafting was undertaken the second operation would not have been necessary. The removal of the tumor leaving the wound wide open until cicatrization has been complete gives a much better prognosis in many carcinomas of the face than the old method of immediate plastic.

DISEASES OF THE ACCESSORY SINUSES

Diseases of the sinuses belong partly to the rhinologist and partly to the surgeon. Those curable by drainage are usually claimed by the former, while those requiring major operative procedures are usually consigned to the latter. Even those ordinarily curable by drainage when long neglected may require extensive operations for their cure because of extensive secondary changes that have taken place in their walls. The chief problem which the surgeon must consider is whether the condition is due to neglected drainage on the part of the rhinologist or whether there is primarily some disease usually neoplastic which lies before him. The disease causing expansion of the frontal sinuses is usually due to infection, while neoplasms are the most common cause of distention of the antrum.

CASE 1.—A school teacher aged thirty-two came because of a tumor of the orbit which was displacing her eye.

History.—Since the patient was fifteen years of age she has noticed a growth involving the region of the left eye and temple. She first noticed a bulging of the temple. It caused no trouble save for its presence. It has grown slowly since. It now displaces the eye downward, but the sight is unaffected and there is no double vision. She has never had any nose trouble or headaches. She has had a
moderate goiter for seven years and had had some heart trouble with palpitation. She has pain in the back and dysmenorrhea.

Examination.—There is a pronounced bulging in the temple and in the orbit, pushing the eyeball a centimeter below the line of its fellow (Fig. 39). It is painless. Pressure over the temple causes the bone to crackle, evidence that it has become much thinned. The x-ray shows the frontal sinus to be much dilated.

Diagnosis.—The very slow growth removes this tumor from the malignant group. The thinness of the bone, shown both by the x-ray and by the crackling, is evidence of an expanding process beneath the bone. Because of the bulging of the roof of the orbit it is probable that the bulging in the temple likewise is due to expansion of the frontal sinus. The common condition which would produce such a state is a mucocele.

Treatment.—When the thin crackling bone was removed, a mass was found, silver in color and as friable as cottage cheese. After the mass was scraped out, a cavity as large as a turkey egg remained. The cavity at the median extremity ended in a narrow channel but an opening into the nose could not be found. The mass was as readily removed from the anterior wall as periosteum from the normal bone. The posterior wall for an area as large as a half dollar

Fig. 39.—Cholesteatoma. The picture shows the displacement of the eyeball and the bulging in the temple.
was bare of bone and the mass had to be removed from the dura. The removal of the mass left the dura smooth and uninjured, save at one point where some bleeding occurred.

Pathology.—No cellular elements could be found in the material removed save about the layer lying on the bone. The material removed has the appearance of that seen in cholesteatoma. The pearly white material was laminated and could readily be separated like the layers of a dried onion. The cell-layer demonstrable was nowhere continuous.

After-course.—Following the operation much serous fluid escaped carrying with it flakes of the mass which had escaped the curette. At the end of several months the entire cavity obtained a smooth lining and an opening the size of a lead pencil in the temple remained. She so arranges her hair that it covers this opening. The eye gradually reeded to its normal position.

Comment.—The material had the appearance of the contents of a wen. It seems hardly possible that a purulent accumulation could have produced such a mass of material. It seems warranted to make a diagnosis of cholesteatoma. Whether or not there may have been some primary connection between the mass where the dura lay free of bone, or whether the bone became eroded in the process of the development of the mass can not be determined. Considering the general genesis of cholesteatomas the first proposition seems quite acceptable. Considering the generally accepted opinion that cholesteatomas are epidermoidal in origin, it is difficult to understand the genesis of this tumor. However, a number of cases have been reported much like this, in all of which the dura lay exposed at one point. A possible relation to the odontomas, supposedly congenital in this region, may be considered. At any rate the location in the frontal sinus is not so hard to conceive as are those situated in the lower jaw, of which several have been reported.

CASE 2.—A telegraph operator came to the hospital because of a gradual enlargement of the skull over his eye and displacement of his eye.

History.—This patient has noticed a disproportionate size of the bones over his eyes for some fifteen years. For the past five years he has noticed a downward displacement of the eye on the prominent side and now he is sometimes annoyed by double vision. He has had no pain. He has had no marked trouble with his nose that he can
Fig. 40.—Osteoma of the frontal sinus.

Fig. 41.—The large clear area shows the size of the cavity occupied by the newly formed bone.

now recall. He recently consulted a surgeon who diagnosticated sarcoma and refused operation.

Examination.—There is a general prominence of the left supraorbital ridge amounting to an elevation of a centimeter and a
half above the ridge, and the roof of the orbit is depressed a like distance (Fig. 40). It is very dense and altogether painless to pressure. The corresponding eye is displaced a like distance downward. The x-ray (Fig. 41) shows a clear space the size of an egg. The border is thin and nowhere shows a deeper shadow than the normal bone septae. The eye is displaced downward and outward a third of an inch.

**Diagnosis.**—The general enlargement of the cavity indicates a gradual expansion from within. Because of the slow development the process is evidently benign. The contents must consist of a soft material, or of bone less dense than the normal bone septae of the skull. This rules out the eburnated osteomas of the sinus. The walls of the sinus instead of being thinned, as is the case in mucocele, are actually thickened. This suggests an associated osteogenetic process. The diagnosis seems to be a mucocele with osteogenetic reaction. If the contents is bone it must be very rare bone.

**Treatment.**—The enlargement was opened into from the temple region. The contents were found to be loose, cancellated bone which could be readily removed with the gouge and bone curette. A shell of compact bone surrounded it everywhere. A dilated cavity was found in the region of the ethmoid cells. Here the bony capsule was very thin. When the soft bone was removed there remained a cavity the size of an egg, the walls of which were thick and eburnated. The prominent portions of the shell were removed and the wound closed without drainage.

**Pathology.**—The bone removed had the structure of cancellated bone about the structure of that in the head of the tibia.

**After-course.**—It was hoped the pressure of the orbital contents would so displace the roof of the orbit that the eye would return to its normal position. This did not take place, however. A second operation was done which removed a part of the plate, but fear of injuring the optic nerve kept me from going back far enough, and but little improvement resulted. The bone removed from here was transplanted into the cavity left after the removal of the tumor tissue. This in large measure remedied the deformity resulting from the first operation.

**Comment.**—The genesis of this tumor evidently is from the surrounding walls of the sinus. The stimulus to this growth may have lain in a low degree of infection though there is nothing in the his-
tory to give any clew. The literature on this type of tumor is too meager to offer any aid. The history and physical findings of this case resemble very closely those of the preceding case. The chief difference lay in the character of the contents.

**CASE 3.**—A school girl aged nine was brought to me because of a swelling above the eye.

*History.*—For several years it has been noted that there was an en-

![Fig. 42-A. Osteoma of the frontal sinus showing bulging of the temporal surface. B. Depression of the roof of the orbit.](image)

largement above the right eye. There has been no inconvenience caused by it.

*Examination.*—At the lateral part of the supraorbital ridge there is a protrusion amounting to an elevation of a centimeter (Fig. 42). It is firm to the touch and quite painless. The x-ray shows a dark shadow without any difference in the center of the tumor. Neither the cerebral cavity nor the orbit is invaded.

*Diagnosis.*—The tumor seems to involve the frontal sinus. Osteomas are the most common tumor of this region and while they are
said to begin in childhood it is unusual for them to come to observation at so early a stage. Considering the undeveloped state of the sinuses at this age this seems the only diagnosis possible.

**Treatment.**—An incision was made along the supraorbital crest and the tumor exposed from the orbital side. When the plate was chiseled through a small tumor the size of a large bean was extracted.

**Pathology.**—The mass removed was dense bone but with some cancellations.

**After-course.**—The wound healed quickly and without apparent sear.

**Comment.**—This case seems to substantiate the belief that frontal sinus osteomas originate from a congenital anlage. This tumor, contrary to the rule, developed from the lateral end of the sinus while the usual site is at the nasal extremity of it.

**CASE 4.—A housewife aged thirty-six came to the hospital because of a tumor which was displacing the eye.**

**History.**—The patient is the mother of ten children. Her father died of tuberculosis. When four years of age the patient fell, striking her face on a flat-iron. Shortly after that a swelling was noticed above and to the inner side of the left eye. Following this whenever her face was exposed to a cold wind she had a severe pain over her left eye. There has been no abnormal discharge from the nose. The tumor gradually increased and the pain became more severe. She has been examined by a number of doctors all of whom pronounced the tumor of bony character. Sometimes there is no pain. At these times she thinks the tumor is softer.

**Examination.**—The patient presents the appearance of a hard working woman who has borne 10 children. The pupil of the left eye is displaced downward and lateralward about 2 cm. (Fig. 43). The sight in this eye is practically nil. The supraorbital ridge is not displaced, but below it, particularly in the medial portion of the orbit, is a rounded tumor. This is slightly sensitive to pressure and the covering bone can be made to crackle.

**Diagnosis.**—The tumor gives the impression of being formed by the depression of the orbital wall of the frontal sinus. The cracking of the bone indicates that the depression is caused by a fluid or semi-solid material. Because of the very slow growth the material is probably the product of the lining membrane and not neoplastic.
A bony growth would have remained hard. Besides the x-ray shows a cavity.

_Treatment._—An incision was made beneath the supraorbital border on the inner portion. The covering of bone could readily be elevated and removed. The contents of the cavity so exposed was a thick creamy substance containing some whiter and more dense flakes. The cavity was smooth walled and nowhere showed a defect. It was gently curetted and loosely packed with gauze and the wound reduced to a small opening.

_Pathology._—The material removed was structureless and bacteria-free.

_After-course._—There was considerable discharge for a number of weeks, probably because of infection from without. The temperature varied from 99.5° to 101.5° for ten days. Healing finally followed. The eye, now a year and a half after operation, has receded half the distance, but the sight has not improved.

_Comment._—Following a trauma it is possible the opening from the sinus was closed by the injury. An inflammation may have been set up without a closing of the opening, but there is no history of abnormal discharges. Such a negative history is of little value for the normal discharges in a child are often sufficient to cover up the added discharge from the sinus. Bearing the disfigurement for thirty years, it is possible that the environment was not unduly sensitive to aesthetic observations. No doubt the removal of more of the orbital

Fig. 43.—Mucocele of the frontal sinus.
plate would induce the eye to further recede into the socket. This would improve the appearance, without, however, restoring the atrophied optic nerve. Looks, however, is not the factor of prime importance. She looks good, no doubt, to her numerous family, and tinkering in this region is not without a small element of danger.

**CASE 5.**—A farmer aged fifty-one came to the hospital because of a tumor of his right cheek.

*History.*—About thirty years ago he had one of the right upper bicuspoid teeth pulled on account of severe aching and it was found to

![Fig. 44.—Prominence of the superior maxilla due to a carcinoma of the antrum.](image)

be "ulcerated" at the roots when pulled. Two to three weeks later the gums swelled at the site of the pulled tooth. It was opened and pus drained. Had some pain at the time but he is not definite as to whether the pain was facial or at the site of the swollen gum. For thirty years there has been drainage into the mouth from the place where the gum was lanced. This drainage was intermittent, stopping for two to three days at a time but no longer. The drainage was yellow, smelled and tasted very bad. There was very little pain at any time during the thirty years. Six months ago the drainage stopped. From that time on the side of the face began to swell,
something it had never done before. The swelling has been slow and its progress uniform. The swelling has always been somewhat painful, but it has been worse during the last three months. When the enlargement is pressed upon, there is a little discharge through a sinus into the mouth. He has lost no weight. The patient has very little headache. His general health is good, appetite good, bowels regular.

**Examination.**—There is a bulging of the superior maxillary (Fig. 44). The skin is red and inflamed in appearance over the tumor. The tumor is not very tender to ordinary pressure, but somewhat tender to rather hard pressure. The teeth are badly affected with pyorrhea. There is a sinus in the alveolar process on the right side of the cheek about opposite the second bicuspid. On pressure over the tumor stroking downward a serosanguinious fluid with a very foul odor escapes.

**Diagnosis.**—The history of long standing discharge with the appearance of a tumor, evidently due to an expansion of the antrum of Highmore would seem to suggest that what had been escaping was retained within. The expansion of the bone in an adult would hardly occur in so short a time from the products of a pyogenetic membrane. The long-continued suppuration may have resulted in

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Fig. 45.—Carcinoma of the antrum showing large cells, some of which have retained the intercellular bridges.
a neoplastic process—a sarcoma or what is more common in this situation, a myxosarcoma. In either event the condition is operable.

_Treatment._—An incision was made in the skin over the tumor. The malar and upper maxilla were partly destroyed. The tumor was of a soft, friable tissue. It was removed with a curette. The hard palate was eroded, the mouth and the right nasal fossa being opened in curetting out the tumor tissue. The cavity was tightly packed through the opening into the mouth and the skin incision closed. In about eight days the pack was removed from the antrum, bringing with it a considerable amount of sloughing tissue.

_Pathology._—The tissue removed consisted of large round cells with intracellular bridges. It was, therefore, a tumor derived from epidermal or dentine structures (Fig. 45).

_After-course._—The patient left the hospital at the end of the third week. The wound was still draining into the mouth, but granulations were well started and the opening into the mouth was beginning to get smaller. He felt well and had no pain. The right side of the face in the region of the incision was just a little larger than the left. He appeared for examination a year later apparently recovered.

_Comment._—There is no way of knowing how long the tumor has been developing, but most likely it was the growth of the tumor that occluded the long existent drainage opening. Though no area could be pointed to as definitely malignant, despite this a recurrence must be expected. Good surgery demanded the removal of the entire superior maxilla.

CASE 6.—A boy aged seven was brought because of a swelling of the upper jaw.

_History._—For three months the mother has noticed that the jaw was swollen. The lad seemed perfectly well and did not complain in any way. Curiosity, not suffering, caused them to seek advice.

_Examination._—There is a prominence of the superior maxilla. There is no bulging of the roof of the mouth and none in the nasal cavity. The enlargement is painless.

_Diagnosis._—The painless origin suggests a malignant growth. Sarcomas of the antrum are far from uncommon. Since there is no bone involvement apparent a closer examination seems justified.

_Treatment._—The upper jaw was exposed by a Weber incision. The bone was opened with a chisel. The cavity was found to be filled with
a jelly-like substance of a pale straw color. After this was removed there seemed to be a smooth interior. An opening was made into the nose.

Pathology.—The material removed was structureless, there being a cell only here and there with no stroma of any sort.

After-course.—The patient was allowed to go home after the operation. When he returned for a dressing, a quantity of sauerkraut was found between the dressing and wound. Quite a nasty suppuration followed. An inch of the alveolar process which became necrotic, was removed. Save for the loss of three teeth, recovery was complete.

Comment.—It appears as though the drainage opening became occluded and the cavity was filled with mucus which had undergone a thickening process. This looked like a "mucocele" if this name is ever applied to affections of this cavity.

CASE 7.—A woman of fifty-three entered the hospital because of a tumor of her upper jaw.

History.—Save for polyps removed from the nose twenty years ago, there is nothing in the history which relates to the present trouble. A year ago she had a feeling of numbness in the side of the face and the lip twitched and burned. Four months ago she noticed that the nose was occluded sufficiently to interfere with her breathing. She consulted a nose specialist who removed a growth. This relieved her for a few months, but one month ago she had the operation repeated, followed by the use of the cautery. The nose seemed to be infected since and it rapidly refilled. For the past few months she has noticed the enlargement of the upper jaw. Save for a distressing sense of fullness, this has not caused any distress. Ten days ago she developed an abscess over the sacrum. This was followed by one above the left elbow and the right arm. The right arm and the feet have been swollen for a week.

Examination.—The patient is thin and anemic and shows a marked enlargement of the left upper jaw (Fig. 46). The feet and right hand are edematous. Added to the prominence of the upper jaw, there is a protrusion of a pinkish white mass which fills the entire left nostril, bulges into the pharynx, and depresses the palate. The outer table of the upper jaw is so thinned that it crackles on pres-
sure. The Bp. is 100, Hg. 40, W.b.e. 13,000, Temperature 99°, pulse 84.

*Diagnosis.*—The existence of a nasal polyp twenty years ago and the reappearance of a nasal mass in the same region four months ago indicates that there may be some relationship. The pathologic states which develop the polyp likely formed the foundation for the recent

![Fig. 46.—Sarcoma of the antrum.](image)

more rapidly growing tumor. This would make it likely that the growth is a sarcoma. This is made more likely by the very rapid growth and systemic effect of the growth. The pinkish mass which protrudes into the nose leaves little doubt of this. A carcinoma would not be so rapid, would be more dense, and temperature exacerbation and leucocytosis would not be present unless there were complications. Occasionally an antral carcinoma may so disturb the nutrition of the turbinates that they become edematous and pendulous.
and because of this may be mistaken for protuberant sarcomatous masses. The presence of leucocytosis may cause sarcomas in this region to be mistaken for empyema of the antrum.

_Treatment._—None. Because of the extent of the growth and the general state of the patient operation obviously was out of the question. A small protruding mass was removed for a section. In these mucoid sarcomas the x-ray is useless.

_Pathology._—The specimen is grayish and glistening. It is cellular with many round and few bipolar and stellate cells.

_After-course._—The patient died in six weeks of progressive exhaustion.

_Comment._—The tissue removed did not permit the diagnosis of anything other than a myxoma. Nevertheless, the clinical diagnosis clearly was sarcoma.

**CASE 8.—A boy aged sixteen was brought to the hospital because of a growth in his upper jaw.**

_History._—Three years ago the patient was "ganged" by a company of hoodlums and badly beaten. His upper jaw was particularly badly injured. A year and a half later it was noticed that this side of the face was becoming larger and was beginning to displace his eye outward. Nine months ago an operator started to remove the growth, but finding it contained blood, he desisted. Since then it has been growing more rapidly and has caused the patient more pain.

_Examination._—A tumor the size of a fist occupies the upper jaw. The eye is displaced markedly outward and upward. The mass projects into the mouth, displacing the hard palate downward. The mass is dense to the touch and is adherent to the skin of the cheek along the site of the previous incision. The x-ray gives the shadow throughout the mass (Fig. 47). Anteriorly where the incision had previously been made osseous spicules show, a most wonderful example of the stimulating effect of cutting into a malignant tumor. The nasal walls are displaced, but not invaded, and there is no evidence of increased vascularity of the soft parts.

_Diagnosis._—The density of the tumor and the relatively slow growth declares the elemental osseous character of the growth. The mottled appearance of the x-ray indicates the porosity which differentiates it from solid osseous growths which sometimes develop in the accessory cavities. The fine spicules which grow from its
surface, clearly seen in the x-ray, indicate a sarcomatous admixture to the general bony character. The absence of invasion of surrounding tissue, the lack of dilated vessels in covering soft parts and its

Fig. 47.—Osteosarcoma of the antrum. The area occupied by the tumor shows a light shadow. The vertical spicules of bone seen on the surface are characteristic of sarcoma. The insert shows the gross appearance of the tumor in situ.

relatively slow growth indicates a low degree of malignancy which warrants an attempt at operative removal.

*Treatment.*—The hard palate beyond the median line and the maxilla, including the orbital plate, together with the ethmoid and part
of the malar bone, was removed. The chisel was used throughout. This instrument is more expeditious than the saw. Save for the ascending palatine artery, there was little bleeding. This was controlled with a gauze pack.

Pathology.—The mass was made up of cancellated bone throughout, but considerable tissue free from bone could be obtained. This showed small cells with little intercellular tissue.

After-course.—Despite the large wound he was able to leave the hospital on the eighth day. When last heard from, two years after the operation, he was still free from the growth. But it will return.

Comment.—This tumor represents one of the commonest of the osteomas. Not infrequently, as here, there is a history of trauma. They rarely come to the surgeon until they have been stimulated by injudicious tinkering. Because of the relative ease of their removal, operation is justified but by no means mandatory. The operator who undertakes their removal, however, must understand the technic of major surgery of the upper jaw.
CHAPTER IV

DISEASES OF THE MOUTH AND JAWS

Surgical diseases of mucous membranes are noteworthy for two reasons. Epithelial tumors are apt to be unusually malignant and the triad of lesions, cancer, syphilis, and tuberculosis, resemble each other very closely.

DISEASES OF THE LIPS

The malignant diseases of the lips are well understood by most practitioners both as to diagnosis and as to treatment. The borderland cases and a variety of other conditions are less well understood. The borderland cases, particularly, are too often grossly mishandled. Fissures and abrasions are too often irritated by various local applications. Any lesion of the lip should be destroyed, and there is no other region of the body that lends itself so well to destruction by the cautery because large defects are smoothed up to a remarkable degree by nature, so that little or no deformity results. Fortunately most diseases of the lip occur in men, in whom esthetic considerations, even to the most artistically inclined, need have little weight.

CASE 1.—A widow aged seventy-two consulted me because of a blue spot on her lip.

History.—The patient has noticed a blue patch developing in her lower lip for some months. There is sometimes a slight tingling, but otherwise she has no sensations. Her son, a physician, fears it is a melanotic tumor.

Examination.—Just to the left of the median line is a bluish patch irregularly spheroidal in outline. It lies beneath the mucous membrane, and on palpating the lip, no tumor can be felt. When the lip is pressed upon by means of a glass slide the dark area disappears.

Diagnosis.—The disappearance on pressure proves it to be vascular, and its deep blue color indicates that it is venous. If the area were a pigmented tumor it would not disappear. I have seen only one
malignant tumor in a woman's lip and that was a carcinoma of the upper lip.

Treatment.—Owing to the fact that microscopic proof of its benignancy was desired to exhibit to anxious relatives, the area was excised. Otherwise it would have been more convenient to plunge an electric cautery into it, or still better to have ignored its presence entirely.

Pathology.—The tumor is made up of a loop of a relatively large vein and is in every sense parallel to the small circumseribed varicosities seen often in the skin of women's legs.

After-course.—The lip remains well.

Comment.—If the patient has full faith in her advisor no treatment is required. A surprising number of old ladies have them, and, possessing the apprehension peculiar to old age, usually nothing short of a demonstration of one's knowledge by curing the tumors will satisfy them. A few drops of novocain and the plunging of a cautery tip into them produces a permanent obliteration.

CASE 2.—A merchant aged fifty came to the hospital because of a tumor on his lip.

History.—The patient first noticed a purple spot on the inside of his lower lip several months ago. He does not know whether or not he injured it. It gradually became elevated and bled quite profusely on a number of occasions. The tumor throbs sometimes, but gives no acute pain.

Examination.—To the right of the median raphe on the inside of the lower lip is a tumor the size of a grain of corn. It seems to extend into the depth of the lip so that it has an aggregate size of a hazelnut. It is bluish red in color and blanches and becomes smaller when it is pressed upon with a glass slide, but at once resumes its former state when pressure is removed. The manipulation incident to this examination caused a few drops of blood to ooze from the surface.

Diagnosis.—Its compressibility characterizes the tumor as an angioma, a capillary-venous angioma.

Treatment.—The tumor was destroyed with an electric cautery.

After-course.—There has been no recurrence in four years.

Comment.—Excision might as well have been practiced. The cautery, however, tends to obliterate by thrombosis vessels beyond the
actual line of cauterization and for this reason is preferable. The disability is less than after excision.

CASE 3.—A boy of fourteen was brought to me because of a thick lip.

History.—The lip has always been thick, but in the past year it has increased in size. It causes no inconvenience. He desires to be rid of it because of the taunting remarks of his school fellows, they regarding it, apparently, as an occupation hypertrophy.

Examination.—The lip is three times its normal bulk (Fig. 48).

Fig. 48.—Lymphangioma of the lip.

The color both of the covering skin and mucosa is normal. It is boggy and soft, but its volume is not diminished by compression.

Diagnosis.—The fact that the lip can not be compressed excludes hemangioma, and the absence of discoloration confirms this. Its boggy character characterizes it as a lymphangioma.

Treatment.—He was treated by x-ray for three sittings.

After-course.—A satisfactory reduction in size followed.

Comment.—In adults x-ray does not give satisfactory results and even in patients of this age operation as described in hemangioma gives more satisfactory results. The x-ray was used in this case to test the efficiency of the treatment. It often fails even in children.
CASE 4.—A railroad brakeman of twenty-eight came to me because of a thick lip.

History.—The patient has always had a thick lip. He has no discomfort from it except as it offends his esthetic sense.

Examination.—The patient has a capillary nevus covering both sides of his chin. The lower lip is twice the thickness of its fellow (Fig. 49), is soft, compressible, and of a deep wine color. It does not pulsate, but when pressure is relieved, resumes its former size instantly.

![Fig. 49.—Hemangioma of the lip.](image)

Diagnosis.—The capillary angioma of the cheek, together with the color and compressibility of the lip, is sufficient to characterize it as a cavernous venous angioma.

Treatment.—A clamp was placed at each angle of the mouth, the blades extending outward and downward. A wedge of tissue was removed from the lip, the base representing half the thickness of the lip and the apex terminating at the point where the lip secures attachment to the jaw. The cavity thus resulting was then obliterated by placing a series of four lines of sutures, the first beginning in the depth of the wound, and the last uniting the mucous border. The three lower were of catgut, the last of horse hair.
Pathology.—The tissue removed presented the usual appearance of a cavernoma.

After-course.—Healing occurred without incident. After cicatrization was complete, it was found that the lip was thinner than had been planned since the sutures caused obliteration beyond the line of excision.

Comment.—In lymphangiomas the obliteration beyond the line of excision does not take place but in hemangiomas a little allowance should be made.

CASE 5.—A man aged thirty-eight came because of a scaling on his lower lip.

History.—For a year and a half a gradual roughening of the lower lip has developed. It scales off usually without pain or bleeding. Occasionally the area near the left extremity bleeds when the heavy layer is picked off.

Examination.—The lip is roughened and sealy. The scales are removed easily except near the left end of the lesion, where a little oozing takes place. Beneath this scaling area the tissues seem soft. The whole process seems to involve the epidermal mucous layer only. (Fig. 50.)

Diagnosis.—The very superficial nature of the lesion seems to warrant the diagnosis of a precancerous keratosis.
Treatment.—The lesion did not respond readily to the x-rays and consequently was excised with a margin of healthy tissue.

Pathology.—There was no tendency to epithelial proliferation downward, no change in cell type, but little plasma cell infiltration, and no change in the tinctorial reaction of the connective tissue.

After-course.—There is no evidence of further trouble after two and a half years.

Comment.—These lesions usually respond to the x-rays. There is no apparent reason why this one should not have done so. Though there was no microscopic evidence of malignancy, I shall not be surprised if this patient does have future trouble, because the epithelial nuclei showed a well marked avidity for basic stains and because of the failure of the lesion to respond to the efforts of a competent roentgenologist.

CASE 6.—A packing house employee came to the hospital because of an ulcer at the angle of his mouth.

History.—Six months earlier the patient noticed a small ulcer in the angle of his mouth. It bled sometimes and interfered somewhat with opening his lips. It has developed slowly and the discomfort is increasing.
Examination.—An ulcer about 8 by 15 cm. (Fig. 51) occupied the corner of his mouth. The surface was granular, covered by a crust which, when removed, caused bleeding. The wall was indurated for 0.5 cm. or more about the edge of the ulcer. The edges of the ulcer, while hard, were not craterform and they were rounded off and presented evidence of attempted healing. No cancer nests could be exposed and none were visible. The glass slide test failed to show any evidence of tuberculosis. There were no palpable glands.

Diagnosis.—The situation was noted as being unusual if not unique for carcinoma. No distinct cancer nests could be identified and the attempts at healing negated a primary epithelioma. It was assumed that the ulcer might have arisen from an adenoma which secondarily ulcerated and became malignant. Nothing indicated syphilis, and an isolated tuberculous process here seemed as unlikely as a carcinoma, therefore a diagnosis of carcinoma secondary to adenoma was made.

Treatment.—A wedge-shaped excision was made including a margin of healthy tissue.

Pathology.—On section much to my amazement it was found to be a trachinous infection with no sign of malignancy.

Comments.—This lesion shows the fallacy of being too sure in diagnosing even so simple a lesion as carcinoma of the lip, as well as the fallacy of attempting diagnosis by exclusion. The infection evidently was local for no general manifestations were noticed. He worked constantly with fresh pork but never ate any.

CASE 7.—A retired farmer aged sixty-nine came to the hospital because of an ulcer of the lip.

History.—His trouble started as a small ulcer of the lower lip four years ago, resulting from a small cut, and this on healing first had the appearance of a small fever blister. It would scab over and be apparently healing but it never entirely disappeared, remaining practically stationary for three years. A year ago, while working with a threshing machine, the smut from the wheat covered the ulcer, causing a great deal of irritation, and from that time on it grew rapidly. It was twice treated with a caustic paste, but after each application it failed to heal.

Examination.—The growth involves the skin over the anterior portion of the chin. The soft parts of the chin are firmly attached
to the bone. The lymph nodes under the chin are noticeably enlarged, but the neck below the hyoid bone is free from palpable glands.

**Diagnosis.**—Carcinoma of the lip with metastasis in the submental node is the simple clinical diagnosis. That the disease is incurable requires but little more mental reservation. The area involved is confined to the point of the chin and to the upper cervical triangles. The condition, therefore, is technically operable. His physician has confidently recommended operation, and the patient earnestly desires it.

**Treatment.**—The treatment outlined was the blocking out of the neck at one sitting and a resection of the chin two weeks later. As the work progressed it seemed so easy to finish that the chin, including the bone between the mental foramina, was resected and the defect covered with Dieffenbach flaps.

**Pathology.**—The specimen presented a typical carcinoma of the lip and lymph glands.

**After-course.**—The hyoid bone being deprived of its support by the removal of the chin allowed the larynx to drop back against the posterior pharyngeal wall when not supported by artificial means. A loop of catgut was passed about the hyoid bone and fastened to a large dressing pad. He progressed fairly well for some days, and then died of sepsis on the twelfth day after the operation.

**Comment.**—A two-stage operation as originally planned would not have resulted fatally, for the neck would have been healed before the mouth was opened into; hence infection would have been avoided. This case was operable, but not curable; operable because all of the palpable disease could be excised, incurable because once the glands of the neck are involved in a carcinoma of the lip or tongue, cure is out of the question, in my experience, no matter how radical the operation may be. While a period of well-being may be secured the patient by operation the total duration of life is not noticeably increased by it.

**CASE 8.**—A mechanic aged thirty-eight came to the hospital because of an ulcer of the lip.

**History.**—For several years he has had a scabbing on his lip. It gradually developed into an ulcer which bleeds when the scab is removed. He is otherwise well.
Examination.—An indurated ulcer less than 1 cm. in diameter occupies the vermilion border midway between the median line and the left angle of the mouth (Fig. 52). The edges are hard, the base is granular and bleeds when pressed upon. There are no palpable glands.

Diagnosis.—The long history, the density of the border, and the tendency to bleed characterize it as malignant. It has somewhat the feel of a chancre, but the history is too long and the border is hard instead of being dense elastic as in the specific lesion. A chancre would have inflamed submental glands.

Treatment.—The growth was excised with an electric cautery and the deficit allowed to granulate.

Pathology.—Long columns of epithelial cells project into the depth of the tumor. The cells change their type in the deeper portion and they are surrounded by abundant round cell infiltration (Fig. 53). This is sufficient to establish the growth as malignant.

After-course.—After the wound produced by the cautery had completely healed, the edges were freshened and the parts were united with silkworm gut. He has remained well.

Comment.—My experience with local destruction of the tumor as the first act leaving the plastic for a second sitting has been more favorable than the radical block dissection for the relief of or anticipation of metastasis. The chief objection to this plan is the inconvenience it imposes on the patient. Weeks are required for reeov-
ery from the cauterization, and a second visit is required for the plastic operation.

Fig. 53.—Early carcinoma of the lip.

DISEASES OF THE TONGUE

The single grave lesion of the tongue is carcinoma. Whenever an ulcer of the tongue is noted, this disease must be thought of, for in comparison to it all other diseases are trivial.

CASE 1.—A school boy aged seventeen came to the hospital because of an inflammation of the tongue.

History.—For four or five years the tip of his tongue has felt thick and stiff. Every three to six months it becomes markedly inflamed and remains so for a week or two and then subsides. On the whole the end is becoming larger.
Examination.—The tip of the tongue is covered by fine translucent nodules for a distance of two or three centimeters (Fig. 54). It is not much thickened as a whole, but there is some bulging. On palpation the affected area is surprisingly thickened, while the surrounding portions of the tongue are normally compressible. The affected area feels nodular and decidedly dense. It is but slightly sensitive to pressure.

Diagnosis.—The translucent vesicles, the nodular feel, the step-like growth, stamp the trouble as lymphangioma.

Treatment.—An area including the growth with a margin of healthy tissue was removed. The defect was closed by suture.

Pathology.—The nodules were formed by dilated lymph channels. They had thick endothelial linings and much perivascular round-cell infiltration.

After-course.—There was no notable defect in speech after a few months and no recurrence.

Comment.—When the disease is confined to a limited area of the tongue, immediate operation should be done, for if allowed to remain, enlargement will most certainly take place. I observed a condition similar to this twelve years ago. The patient refused operation and by stages the tongue has enlarged until the mouth will now hardly contain it. A cure now would require the removal of the entire
tongue. Operation cannot be too strongly urged in these cases while the lesion is still small.

**CASE 2.**—A housewife aged thirty-six came to the hospital because of a tumor on her tongue.

*History.*—The patient complains that for six weeks she has been developing a tumor in her tongue. There is some dull pain and this, together with the size of the tongue, interferes with talking. She has three children apparently healthy and has had no miscarriages.

*Examination.*—A mass half an inch in diameter and an inch long occupies the substance of the left half of the tongue. It is fairly firm, tender to pressure and intimately attached to the surrounding structures. The mucous membrane is not affected. Further inspec-
tion discovers a periostitis of the medial half of the clavicle, also of about six weeks' duration (Fig. 55).

**Diagnosis.**—Owing to the social surroundings, it seemed safest not to pry into the personal history of the patient. The tumor being away from the midline, where vestigial tumors develop, and not being a sarcoma, even had I obtained truthful replies, the information would have been quite superfluous, for in addition to the tongue lesion, there was the unmistakable periostitis of the clavicle.

**Treatment.**—Potassium iodide was given three weeks until the tumor disappeared, then mercuric.

**After-course.**—The local lesion completely disappeared. I removed a fibroid of the uterus from her ten years later. There was no evidence of a return of the former disease.

**Comment.**—In patients of conspicuous virtue of whom one is not warranted in suspecting a venereal disease, I am in the habit of asking no questions and am content to prove my point by therapeutic means. If the patient then manifests enough interest to come down on a level on the basis of facts revealed, the case is considered seriously from the standpoint of actual cure.

**CASE 3.**—A farmer aged fifty-six came to the hospital because of a tumor on the base of his tongue.

**History.**—For some time the patient has felt a fullness at the base of the tongue when he swallows. He would not venture to guess as to the duration. His consultation was actuated more by curiosity and the thought of future trouble, than by any discomfort he now experiences.

**Examination.**—At the base of the tongue is a clear cyst with relatively thick walls. It resembles a ranula save that it is hemispherical and the walls are thicker, and also of course that it is in the wrong place. There are no other peculiarities of the thyroid system. (Fig. 56.)

**Diagnosis.**—Being situated at the point where the thyroglossal duct originally enters the mouth, it seems probable that it is derived from these structures, that is to say, a thyroglossal cyst.

**Treatment.**—The patient disdained the use of a local anesthetic, and in accordance with his instructions, I grasped his tongue firmly with the towel-armed left hand while with the right I cut off the top of the cyst with one swipe of a curved scissors. This left a saucer-
shaped area which was cauterized with lunar caustic. The cut edges of the cyst bled but little.

Pathology.—The portion removed showed a fibrous walled cyst covered without by a thin layer of squamous epithelium and within by a columnar layer.

![Fig. 56.—Thyroglossal cyst of the base of the tongue.](image)

After-course.—The cyst did not return, neither did the patient, but from relatives I learn that he has remained free from recurrence.

Comment.—A more elegant treatment would consist in an enucleation under local anesthesia and a closure of the defect. One needs to observe in these cases whether there are other cysts more deeply situated in the tongue or even further down the thyroglossal tract. There seemed to have been none in this case.
CASE 4.—A physician aged forty came to me because of an ulcer near the tip of the tongue.

History.—Several months ago he noted a small nodule on the left margin of the tongue. This gradually enlarged until a small ulcer resulted. This was sensitive to food striking it. He smokes, but there has been no source of irritation. He is a large, corpulent man who has always enjoyed good health.

Examination.—The ulcer has a punched-out appearance, the edges are slightly overhanging, show some infiltration, but they are not dense. Other examinations are negative.

Diagnosis.—This condition emphasized the difficulty in diagnosing ulcerous lesions of the mouth—each of the triad of common diseases was simulated in some degree. It had the general appearance of a tuberculous ulcer, but the unusual robustness of the individual made this seem unlikely. So small an ulcer is seldom seen in a gummatous ulceration, and, finally, the ulcer was too soft for carcinoma. Sad experience has taught me that beginning carcinomas of the tongue in young persons may develop rapidly and remain soft, therefore, a diagnosis of malignancy was made.

Treatment.—The growth was resected and the defect closed by suture.

Pathology.—The general survey showed a generalized inflammatory mass and it required a second section to show typical tubercles. I have found this difficulty in locating tubercles to be the case in tuberculosis of the tongue quite generally, being true according to the acuteness of the process.

After-course.—Recovery was prompt and has remained so.

Comment.—The general rule that tuberculous lesions of the tongue are found in those who have a like lesion of the lung did not hold in this case.

CASE 5.—A bookkeeper aged fifty-two came to me because of an ulcer on the tongue.

History.—His occupation has kept him constantly indoors. He had had to interrupt his work from time to time because of ill health of an indefinite nature. Fifteen years ago he spent some months in Arizona because of a persistent cough. At intervals since then he has returned to that climate when he found he was losing weight. According to his statement a definite diagnosis of tuberculosis was never
made. Six months ago he noticed that there was a sore spot on his tongue which soon manifested itself by a flat, wart-like outgrowth. This has gradually increased in size until it now interferes much with his taking food. He is some 20 pounds under weight, but he ascribes this to his inability to masticate his food properly. He has some cough which likewise he ascribes to the irritation of the growth.

**Examination.**—The patient is somewhat anemic, has some dullness and prolonged expiratory sounds in the upper portion of the right lobe. No rales were heard. His sputum contained a few tubercle bacilli. On the left half of the tongue from near the dorsum for 5 cm. forward is a fungoid-like mass projecting from the surface of the tongue about a centimeter. The surface was angular, papilliform, moderately dense, but did not bleed on manipulation. The growth was sharply defined from the surrounding tongue tissue and there was no gland involvement. The growth looked like the fungating carcinomas of the cheek I had seen, and a diagnosis of malignancy was made accordingly.

**Treatment.**—Resection of half the tongue through a Kocher incision was done.

**Pathology.**—I was confident of my clinical diagnosis and I demonstrated it as a carcinoma to my students. Sections were made and passed out to the class. Much to my amazement, a delegation of students promptly announced that the lesion was not carcinoma but tuberculosis. They were right.

**After-course.**—The wound healed promptly, but his cough increased and despite a change of climate, he died of pulmonary tuberculosis some nine months later.

**Comment.**—I had never before seen a fungating tuberculous process of the tongue and did not realize from the descriptions I had read that so large a mass could be produced. As a general rule it may be stated that an individual suffering with tuberculosis of the tongue has a like disease in his lung. And conversely, if an individual has pulmonary tuberculosis and has a lesion of the tongue, this lesion likely is tuberculous also. I have never seen either carcinoma or syphilis in a patient affected with lung tuberculosis, though no doubt they do occur. Nevertheless, the rule has stood me in good stead.
CASE 6.—A broker aged thirty-two was sent to me because of a small ulcer on his tongue.

History.—Three weeks ago he noticed a tiny ulcer of the tongue which has been gradually enlarging. He thinks the ulcer was preceded by a little nodule, but is not sure. It is moderately painful to contact with food. He has never had any other disorders about the mouth and his general health has always been excellent. The family history contains nothing of interest.

Examination.—The patient is an exceptionally robust and energetic young man. A tiny ulcer not more than 5 or 6 mm. across occupied the right margin of the tongue about 2 or 3 cm. from the tip (Fig. 57). It was about as deep as broad and the margin was rather clear cut. It was hard to the touch, and the tiny white cancer nests could be seen about the border. One of these was pressed out, flattened on a side, and the epithelial character of the plug was demonstrated by means of a nuclear stain.

Diagnosis.—Carcinoma of the tongue. The border was dense, characteristic of carcinoma. This alone would not have been conclusive had not the cancer nests been visible to the naked eye and demonstrable on the slide.

Treatment.—Half the tongue was removed and a complete block dissection of the neck was done removing all but the carotid vessels and the nerves from the clavicle to the root of the tongue.

Pathology.—Section showed a typical carcinoma.

After-course.—Notwithstanding the very radical operation, recurrence in the neck appeared in three months and in six the patient was dead.

Comment.—Carcinoma of the mouth and tongue in young persons is a hopeless disease. This case was so early, having been noted less
than a month before, the general health of the patient so excellent, that I thought a very hard try for a cure was justified. I did not know then that the very robustness of the patient was an evil omen. A skinny, knockkneed patient would have stood a better chance. Now instead of doing the radical operation I did, I should destroy a wide area with the electric cautery in order that he might live his allowance undisturbed by any extensive mutilations.

**CASE 7.**—A matron aged thirty-five came to the hospital because of a tumor under the tongue.

![Sublingual ranula](image.jpg)

*Fig. 58.—Sublingual ranula.*

*History.*—For a number of months she has noticed a small tumor under her tongue. It causes no pain but begins to make its presence known because of its size.
Examination.—A small, ovoid, translucent tumor occupies a position beneath the tongue from the middle of the frenulum extending downward and backward to the floor of the mouth (Fig. 58).

Diagnosis.—The position, in the line of the sublingual duct, together with its translucency, stamp it as a ranula.

Treatment.—The major part of the tumor was removed by one snip of the scissors. The interior of the sac was then cauterized with a stick of lunar caustic.

Pathology.—The cyst was lined with cuboidal epithelium.

After-course.—There has been no recurrence, notwithstanding the fact that this tongue has led an exceedingly active life.

Comment.—This simple treatment is uniformly effective.

CASE 8.—A merchant aged fifty-four came to the hospital because of pain in the region of the liver and loss of weight and strength.

History.—Until four months ago his general health had always been good. Since that time he has had a dull pain in the right side in the region of the liver. His appetite remained good until a short time ago, but he has lost ten pounds in the last two weeks. He has no special aversion to any particular kind of food. His digestion has always been good. He has smoked heavily and has consumed much beer but no stronger drinks.

Examination.—The patient is a short, corpulent man without any evidence of anemia or cachexia. When asked to indicate the site of his pain he places his open hand over the lower part of his right chest. There is no abdominal tenderness and no rigidity. The liver dullness extends to the fourth rib but the border moves on respiration. The liver extends the breadth of two fingers below the costal border, is hard, undulating, but not nodular. The spleen is not palpable. Casual investigation discloses an ulcer in the midline of the floor of the mouth under the tongue (Fig. 59). He was much astonished when apprised of its presence and had to conduct an investigation on his own account before his credulity was satisfied. The border of the ulcer is irregular, hard and bleeds on touch, obviously a carcinoma. Search in the submaxillary region fails to discover any palpable glands.

Diagnosis.—The liver is enlarged and hard without evidence of portal obstruction thus excluding hepatic cirrhosis despite his habits. Its density also is suggestive of malignancy. There is no reason to sus-
pect the stomach except on the ground of general probability. There is an obvious possible source in the carcinoma in the floor of the mouth. Systemic metastases from these are rare, however, but do occur. The diagnosis lies therefore between metastasis from this source, from the gastropancreatic region, or a primary tumor of the liver. The first is an obvious source but rare, the second frequent

but without evidence in this case, the third gives the identical picture here presented but without evidence available for differential diagnosis.

_Treatment._—None. The ulcer could have been cauterized but the gravity of the other symptoms was too great to warrant it.

_After-course._—The patient died after about three months, the details of the terminal symptoms were not obtained other than that of progressive weakness.
Autopsy.—The gastropancreatic region was free from any disease. The liver was occupied by numerous tumors varying in size from a hickory nut to a small orange. The picture is that of a primary carcinoma of the liver. The tumor is derived neither from hepatic nor bile duct epithelium. The mouth remains the only obvious source of the malignancy.

Comment.—It seems strange that an ulcer the size of this one could develop under the tongue without exciting the apprehension of the patient. He has been a saloon keeper but has quit the business, therefore he is a man of some intelligence. It is not unusual, however, to find cancers in the mouth which remain undiscovered. The only way to exclude these things is to carefully inspect the mouth. In obscure conditions one can well put in his time at such work as this while he is thinking. It helps to cover up his mental agitation and conveys the impression of great thoroughness instead of mental obfuscation.

DISEASES OF THE JAW

The important diseases of the jaws are the malignancies. The chief ulcerous lesion is carcinoma. Actinomycosis, however, is a more common simulant than is generally appreciated. The connective tissue tumors are chiefly epulides. Those of the lower jaw are much less malignant than like tumors of the upper jaw. The expanding tumors of the upper jaw are mostly malignant, those of the lower cystic or developmental anomalies.

CASE 1.—A veterinary surgeon consulted me because of a swelling of his face.

History.—Fifteen months ago he noticed a swelling in his lower jaw just back of his wisdom tooth. The jaw gradually swelled and became painful. After nine months a sinus formed in the skin just above and behind the angle of the jaw. A few months later a sinus developed an inch lower down the neck. During the past month the temple has swollen markedly and he has severe headaches. He has had no other sickness. He has consulted a number of surgeons who all diagnosed carcinoma.

Examination.—There is an ulcer on the alveolar border extending from the wisdom tooth up along the anterior pillar (Fig. 60). It has an overhanging edge and a granular base. The edge is very firm and
feels carcinomatous, but on inspection there is proliferation of epithelium along the edge. The granular base can be made to bleed by manipulation. The bone is exposed at the base. According to his physician this ulcer has not changed in the past year. Because of the pronounced swelling of the jaw he is unable to open his mouth perfectly. The swelling of the cheek and temple is so great that the ear is elevated. The eye is likewise encroached upon. The openings above mentioned are crateriform and puckered with scar-like ridges leading out from them. When the swollen area is pressed upon a liquid pus exudes, carrying with it numerous flakes of a dirty greyish white color. The flakes showed filaments but no club-shaped forms. Some of the pus was injected into a guinea pig.

Diagnosis.—While the crater-like openings were distinctive of actinomycosis, there were no yellow granules. Furthermore the greyish flakes closely resembled those often seen in tuberculous pus. The injected guinea pig died in thirty days and whitish nodules from 2 to 6 mm. in diameter were found on the peritoneum. This was regarded
as confirmatory evidence of tuberculosis. It was only after these peritoneal nodules were sectioned that the fallacy was discovered.

Treatment.—General supportive measures were recommended.

After-course.—The head pains increased and he died thirty days after the first examination from a gradually increasing meningeal irritation.

Comment.—The local ulcerous lesion together with the swollen cheek with the puckered crater-like openings prevented me from making a perfectly obvious diagnosis. The presence of the tubercles in the peritoneum made the confusion complete. At the time this patient was observed none of the inoculation experiments had been recorded in the literature. I was not aware that actinomyeosis could produce tubercle-like lesions. The fallacy was not suspected until the lesions were sectioned as a matter of routine. There are cases recorded identical with this which likewise were mistaken for tuberculosis because of the presence of greyish floecenli and the absence of yellow bodies. Whenever an ulcer of the jaw is accompanied by induration of the cheek, actinomyeosis must be thought of, and if puckered crateriform openings are formed, the diagnosis is certain, irrespective of the character of the pus. Massive induration does occur in some carcinoma of the jaw with breaking down and the formation of sinuses, but in these there is no puckering about the opening.

CASE 2.—A man aged fifty came to the hospital because of swelling of the left side of his face, pain and difficulty in opening his mouth.

History.—His trouble started seven years ago when he was struck over the left side of the lower maxillary bone by a mallet used for driving railroad spikes. Several lower teeth were loosened and he bled from the mouth. The pain never left, but continued to grow worse, and after two years he had two teeth extracted from the lower jaw on account of the pain. The dentist said there was necrosed bone about the teeth. An incision was then made over the left side of the lower jaw and the necrosed bone was removed. Three months later when the wound had not healed, he consulted a surgeon who called it carcinoma and said there was nothing to do except to resect the jaw. He consulted another surgeon who agreed with this diagnosis and treated
him with radium. The wound healed apparently perfectly after four months of radium treatment.

He had no further trouble until four years later when he had swelling and pain over the left antrum. Two upper teeth began to pain and these were pulled. The dentist at that time said he had antrum trouble. An opening was drilled through the alveolar process into the antrum which was treated by the dentist for a month. The condition did not improve.

Examination.—The patient presents an indurated swelling of the left cheek. It is thickened, indurated, almost hard to the touch and but little painful. It occupies the whole cheek from the zygomatic arch downward to the upper part of the neck. The whole cheek is twice its normal thickness. There is an opening into the antrum above and behind the canine tooth. Exposed spicules of bone present about the opening. There is no pus present. There is no general reaction of any kind.

Diagnosis.—The tissues above indicated presented the general appearance of induration. The necrosed bone seems to be the cause of the chronic irritation. It has all the physical characters of a woody phlegmon.

Treatment.—The exposed bone was removed. It was nowhere separated from the surrounding bone. No noteworthy improvement followed and he returned a year later in much the same condition. A similar incision was made and some dead bone removed from the alveolar process and a portion of the hard palate. The cavity was packed with gauze, which was removed on the same day. No improvement followed. He returned a year later and was operated on again. An incision was made straight back from the left corner of the mouth through the cheek. A portion of necrotic upper maxilla was removed and the antrum found filled with a myxomatous looking tissue which was curetted out. The cavity was packed with gauze which was removed on the following day.

Pathology.—It was noted that the bone nowhere showed a disposition to separate from the adjoining unaffected bone. The soft tissues seemed to be separated from the bone, like gums from the teeth in pyorrhea. The tissue gave the general appearance of slowly developing granulation tissue.

After-course.—The wound seemed to heal after the last operation, but it remained painful. The swelling was subsiding up to three
weeks ago when it started again. The pain started in the left ear and along the center of the cranium and has been very severe. The swelling and pain have been increasing ever since they began three weeks ago. The pain is steady and present all the time.

The inside of the mouth healed smoothly with nothing to indicate a new growth. The whole left side of the face was swollen like an inflammatory process. The swelling now extended over the temporal region to the orbit, partly closing the eye, to well below the jaw. On the cheek a number of small crater-like openings presented which could be made to expel milkish-white flocculi (Fig. 61). The true diagnosis now dawned on me for the first time. The greyish white nodules were crushed and stained and the characteristic filaments of actinomycosis readily demonstrated. The indurated tissues were then injected with Lugol's solution and the patient was given large doses of potassium iodide. Improvement began at once. The process extended toward the ear, however, and he died six months later of meningeal irritation.

Comment.—It seems hardly possible that so clear a history should have been overlooked even in the hurry of practice. The carious bone following the extraction of the teeth should have indicated the truth. When I first saw him the ulcerous lesion surrounded the area
occupied by the teeth, the edge was irregular and dense and bled on manipulation. The feel seemed entirely characteristic of carcinoma. At none of the subsequent operations was any pus of any sort observed, this in the presence of alleged necrotic bone should have pointed the way, particularly since there was no disposition of the exposed bone to separate itself from the unaffected bone. As Wright long ago pointed out, the literature has too much emphasized the yellow color of the granules. In this case, as in the most of those I have seen, the granules were greyish in color. The failure to appreciate this led me into an error many years ago.

CASE 3.—A girl aged fourteen was brought to me because of a hard growth on the angle of the jaw.

History.—For several years she noticed a small tumor of the jaw on the external surface just above the angle. It caused no pain, but it was beginning to be obvious to the public gaze. It had been diagnosed as sarcoma and its removal by extensive jaw resection advised.

Examination.—On palpation a hard, smooth mass, free from the soft parts but firmly attached to the jaw bone, is evident. The x-ray shows it to be globular and dense throughout (Fig. 62A).

Diagnosis.—Its sharply defined outline and smooth surface shows it to be a simple exostosis, likely a developmental dentigerous rest. Sarcoma can be ruled out because of its smooth surface and constricted base.

Treatment.—An incision long enough to admit a small mastoid chisel was made well under the margin of the jaw. The chisel was introduced and the tumor cracked off at its base. The tumor was then shelled out with the end of a small scissors (Fig. 62B).

Pathology.—The tumor was composed of dense bone throughout.
**After-course.**—The incision after a few weeks was quite invisible.

**Comment.**—Bony tumors with constricted bases are presumably benign, and before disfiguring operations are done for their removal, all factors in connection with them should be intelligently reviewed. These dentigerous outgrowths occur most frequently on the oral surface of the jaw.

**CASE 4.**—A student aged thirty sought advice because of a bony prominence on his lower jaw.

**History.**—For as long as he can remember he has noted a hard prominence projecting from the inner side of the lower jaw toward the tongue. It has not grown and, aside from its presence, causes no disability.

**Examination.**—A small nodule the size of a hazelnut kernel projects inwards at the level of the second molar tooth (Fig. 63). It is smooth, possesses a covering of mucous membrane, and is extremely dense to the touch. He has the normal number of teeth.
Diagnosis.—Odontoid exostosis. Its long duration and fixity to the jaw bone distinguishes it from other bony outgrowths.

Treatment.—It was removed with a small chisel.

After-course.—Recovery has been complete.

Comment.—Sometimes simple exostoses occur about the jaw but these are usually on the outer surface.

CASE 5.—A farmer aged thirty-four came for relief from thickened gums.

History.—For a number of years the patient has noticed that his gums were becoming thicker. At first the disturbance was slight, but
for a year or more mastication has been seriously interfered with. His general health is good.

*Examination.*—Three teeth are absent on the right side and those on the left are not normally developed and are irregularly placed. The teeth that are absent he explains were removed because they were decayed before the present trouble began. The gums are so thickened that they protrude nearly to the level of the teeth and extend so far toward the median line that they nearly touch. The thickened mass is dense, elastic, and has the feeling of the harder varieties of keloids. (Fig. 64.)

*Diagnosis.*—The uniform thickening does not correspond to any definite tumor, and must be called, therefore, a hypertrophy. Epulides are circumscribed and always unilateral. Cysts sometimes affect both sides of the jaw, but they are always uniform and spindleform, never lobulated. These masses are too soft to be derived from the bone.

*Treatment.*—The hypertrophied masses were removed piecemeal. An area was trimmed down, and after this had healed, another area would be treated in the same way.

*Pathology.*—The tissue was made up of thick bundles of fibers, about a cross between elephantiasis and keloid.

*After-course.*—Because of the close histologic resemblance to keloid, I predicted a rapid return, but in this I was happily mistaken for as long as a year and a half after operation no disposition to recurrence was in evidence.

*Comment.*—The genesis of this affection seems to be a mystery.

**CASE 6.**—A business woman aged thirty-two consulted me because of swelling of her gums.

*History.*—For some months the patient has observed a tumor developing back of the incisor teeth. It gradually extended until it covered the greater part of the area of the hard palate. The pain was rather acute in the beginning, but now it is dull with an uncomfortable sense of pressure. The chief cause of complaint is interference with mastication. She has never had trouble with her teeth.

*Examination.*—The tumor extends from the right lateral incisor to the left bicuspid. It extends backward halfway to the beginning of the soft palate and to below the level of the incisor teeth. It is soft and semifluctuating. (Fig. 65.)
Diagnosis.—The tumor has the feel of a lipoma—an indefinite pseudofluctuation. Lipomas do not occur in this situation, however. The mass shades gradually into the surrounding tissue which indicates an inflammatory process. If it were located elsewhere one would think at once of tuberculosis. It is at any rate a "cold" abscess.

Treatment.—When cut into a thin pus containing flocculi like tuberculous pus escaped. The bone was exposed for a considerable area, but there seemed to be no bone necrosis.

Pathology.—No culturable organism could be obtained. The slide showed a few cocci and many degenerated polynuclear leucocytes.

After-course.—After some months the abscess was entirely healed and remained so at least for many years and was well when the patient was last heard from.

Comment.—The patient was a well-nourished woman, little suggesting anything of a tuberculous nature. The infection likely was due
to an attenuated pyogenic organism. I have repeatedly seen smaller abscesses from near the roots of decayed teeth. These usually persist until the exact focus is eradicated. None such appeared here and it may be assumed that the infection gained entrance through the soft parts.

CASE 7.—A retired farmer aged seventy-two came to the hospital because of an ulcer in his palate.

History.—The patient had two sisters who died of cancer; one cancer of the larynx, the other cancer of the uterus. A month ago while eating he bit his cheek, causing a sudden sharp pain which did not subside. He consulted a doctor who discovered a white patch on the anterior pillar. This was cauterized. Despite this it continued to spread. His general health has always been good. He uses tobacco in moderation.

Examination.—There is a white patch on the anterior pillar extending to the lower jaw, and over the hard palate. The surface of the area is soft but the border is raised and easily palpable. The border feels as if a tiny string of beads were embedded beneath the surface about the border. The wisdom tooth is still present and injures the affected area between it and the plate of the upper teeth. The border when irritated tends to bleed.

Diagnosis.—Obviously the affection existed before the injury above noted occurred. This event merely caused the patient to seek advice which led to its discovery. The primary state may be accepted without argument as leucoplacia. The question of importance is that of possible malignant degeneration. The raised border and the disposition to bleed makes it probable that a malignant change has occurred. A piece removed for microscopic examination failed to show definite signs of malignancy though there were some changes in the cell forms and round-celled infiltration (Fig. 66-A). Cauterization was advised, but refused.

A year and a half later he returned to accept the treatment advised. During the intervening period the lesion extended somewhat, but the chief changes were noted in the border in some areas, particularly over the lower end of the pillar and on the adjoining part of the tongue. Here the border was much raised, was dense and irregular, and bled easily when manipulated with the finger. The membrane was separating at these points and an ulcer was forming.
Treatment.—Excision of the affected area was done. The cheek was split to give access to the affected region. The wound so made was closed by suture.

Pathology.—The border excised showed a distinct tendency to invade the surrounding tissue in some regions (Fig. 66-B) while in others the microscopic picture resembled that of a year before.
After-course.—Healing was prompt. There was no evidence of recurrence when the patient died of cerebral hemorrhage three years later.

Comment.—When these leucoplacie areas become malignant, they do so slowly and a vigorous cauterization at an early stage may be expected to effectually annihilate them. Had I to meet this indication now, I should excise it with an electric knife under local anesthesia. This would lessen the operative risk materially, besides making the incision through the cheek unnecessary. I have employed this means repeatedly without recurrence. It is necessary to reach every nook and corner. Because of the extent of the lesions, this may be a very trying procedure both on the patient and to the operator.

CASE 8.—A traveling salesman aged thirty-eight came to the hospital because of a thickening of his lower jaw.

History.—The patient noticed for several years that the left side of the lower jaw was becoming thickened. It was painless and until it became great enough to bulge the side of the cheek he neglected it. Now he seeks relief from the deformity.
Examination.—There is a spindleform enlargement on the external surface of the jaw beginning at the mental foramen and terminating at a centimeter or two in front of the angle. At its highest point it attains an elevation of about 2 cm. It is smooth, hard, and painless. The inner surface of the jaw is not affected. The mucous membrane is movable over most of its extent. The bone can not be indentated by pressure. There are no teeth missing. (Fig. 67.)

Diagnosis.—The slow growth stamps it as benign. It is evidently connected with the bone. Solid bony tumors are usually globular, the spindleform are usually cystic, combined osseous and cystic are irregular globular. This one must therefore be cystic.

Treatment.—The surface was infiltrated with novocain and the inferior maxillary nerve was blocked at the lingula. The mucous membrane was incised along the most prominent part and the periosteum deflected. The shell was opened with a mastoid chisel. The excess of bony capsule was excised with a small rongeur. That portion of the cyst wall nearest the jaw was curetted. The deflected periosteal mucous flaps were then pressed into the opening and held there by a tampon.

Pathology.—The shell was composed of normal bone, the lining of squamous cells. There were no giant cells.

After-course.—More or less infection took place and some six weeks were required before the lesion was healed.

Comment.—Such simple treatment is always sufficient for this condition. These cases are often subjected to needlessly radical operations.

CASE 9.—A man aged sixty came to me because of an ulcerated condition in the roof of his mouth.

History.—For six months he has had ulcers in the roof of his mouth, extending more or less over both the hard and soft palates. He states that a Wassermann has been made which was negative, but despite this his physician gave him several doses of salvarsan, but no improvement has resulted. The general history is not illuminating.

Examination.—The patient seems a man in good health. Save for the roof of his mouth he has no lesion of any sort. The site of complaint presents an uneven surface, resembling pictures of fields torn by shells. There seems to be no regularity except about the border, where a reniform outline, both of the individual lesion and the com-
posite arrangement, can be made out. Some areas have healed. Those still in a state of ulceration present sharp, slightly undermined, fairly soft borders. The soft palate, as well as the hard, is affected. Nowhere is there a complete perforation. The pillars and pharyngeal walls are not affected. (Fig. 68.)

**Diagnosis.**—The outline of the lesions and the type of ulceration is distinctive of syphilis, and this diagnosis must be maintained despite the serum reaction and therapeutic test. The soft character of the tissue and the tendency to heal, together with the superficial character of the lesion, excludes carcinoma. Tuberculosis is more apt to attack the pillars or pharyngeal wall, but it does not produce the regular outlines found in this case.

**Treatment.**—The vigorous prosecution of the antisyphilitic treatment was advised.

**After-course.**—Complete healing took place after several months' treatment with mercury and has remained so.

**Comment.**—When the clinical character of a lesion speaks pronouncedly for syphilis, the therapeutic test may be pushed to an extreme degree. I have seen lesions respond after 750 grains of potassium iodide were used over a period of several weeks when doses

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**Fig. 68.**—Syphilitic ulceration of the palate.
of half this amount failed to make an impression after being given for weeks.

CASE 10.—A housewife, aged forty-six, came to the hospital because of a tumor of the upper jaw.

History.—The patient has observed the formation of a tumor on her gums for four years. It has not caused any pain, neither has it bled, but its size begins to annoy her and its esthetic effects were quite unsatisfactory to her. She has had no trouble with any of her teeth.

Examination.—A bluish-red tumor the size of a walnut occupies the external surface of the alveoli corresponding to the incisor and canine teeth. The tumor is smooth and covered everywhere with mucosa. It is constricted at its base and can be moved about somewhat. (Fig. 69.)

Diagnosis.—Its site, consistency, and covering of mucosa identifies it as an epulis.
Treatment.—The gingival mucosa was cut through to the bone both externally and internally, well away from the base of the tumor. The alveolar process, together with incisor teeth, was removed with a large cutting forceps. The exposed bone was cauterized with iodine, and the wound packed to control oozing from the bone. The operation was done under local anesthesia.

Pathology.—The tumor is a giant-celled sarcoma.

After-course.—The wound healed over and has remained a smooth scar.

Comment.—Had the patient been more subservient to suggestion, I should have cut the tumor from the bone with the knife blade cautery, extracted the tooth and then have cauterized the socket. This would have left an alveolar border which, with a bridge across the toothless space, would have left no deformity.

Epulides with a broad base of attachment along the alveolar process are more malignant and do not lend themselves to such conservative treatment. Fortunately they are usually situated farther back, and the removal of the alveolar process does not cause so much deformity.

CASE 11.—A boy aged eight was brought to me because of a tumor of the gums.

History.—Nine months ago it was noticed that the lad was developing a tumor of the gums of the upper jaw. Three months ago it was removed by the family doctor. It returned promptly, and now is larger than before the operation.

Examination.—Going out from the region of the canine tooth of the right upper maxilla is a tumor the size of a hickory nut (Fig. 70-A). It is irregularly lobulated and surrounds the canine and bicuspid teeth. It is dense to the touch and covered with mucosa except in two places where a red fibrous mass seems to be forcing itself through the covering. The base of the tumor is sharply defined from the gums.

Diagnosis.—Its density and the fact that the covering epithelium is unaffected indicates that it is an epulis. It is too firm for a granuloma and too large. It is too sharply defined to suggest a periosteal sarcoma.

Treatment.—The alveolar border, together with the teeth, was removed (Fig. 70-B).
Pathology.—The tumor is made up of fibrous tissue without giant cells.

After-course.—The patient remained well.

Comment.—Epulides are ordinarily semibenign tumors, but frequently, when incompletely removed, they show great malignancy, particularly those without giant cells. Usually the teeth affected must be removed to the base of their sockets. However, the small ones arising from the surface of the gums may be destroyed with a cautery and the teeth saved.

CASE 12.—A farmer aged thirty-nine came to the hospital because of a tumor of the left upper jaw.

History.—The patient first noticed a slight swelling of the gums outside of the left eye tooth three years ago. It remained stationary about a year, and then started to grow. At the end of the first year his dentist curetted the enlargement from the gum and from around the tooth roots. It remained away for six months then started to grow again and was curetted once more and burned with acid three times. In the last three months it has grown rapidly and the enlargement could then be noticed from the outside. It never gave any pain until the last few months, when a disagreeable sensation was noticed over the cheek bone. It has never bled.

Examination.—A tumor is seen extending from the alveolar process...
in the region of the bicuspid and molar teeth on the left side (Fig. 71). The surface is smooth and is entirely covered by epithelium. Bosse
diated borders widen the alveolar border half a centimeter on either side. It does not seem to extend into the antrum. There is no other evidence of involvement.

*Diagnosis.*—The growth is obviously an epulis. It seems confined to the immediate environs. The patient is very desirous that removal be effected without making an incision through the cheek. The growth is so well confined that local resection seems warranted.

*Treatment.*—The growth was removed under local anesthesia, with

![Fig. 71.—Epulis of the upper jaw.](image)

a considerable free margin, through the mouth. The antrum was opened into for an inch or more.

*Pathology.*—The slide shows the usual giant-celled sarcoma.

*After-course.*—The wound healed, but in less than a year extensive involvement of the upper jaw had taken place. A complete resection of the upper jaw was then done but without avail. The growth re
turned and caused his death a year later.

*Comment.*—When a surgeon approaches a malignant growth he should be deaf to sentiment. A resection of the entire superior max
illa in the first place, I have no doubt would have resulted in a cure. Once an epulis has recurred, further temporizing is not permissible.
This is one tumor that is curable, and if its cure is not accomplished the plans must have gone awry somewhere.

**CASE 13.**—A school teacher aged forty-two came because of a tumor of the gums.

*History.*—For three months she has noticed a small tumor growing between two of her front teeth. It has not been painful, but sometimes it bleeds. Her doctor removed a part of it and sent it to a professor of pathology in a neighboring state who returned a report of a small round-celled sarcoma. On the basis of this she comes to have a resection of the jaw. Her health is good.

*Examination.*—Between the canine and bicuspid teeth is a deep red fungus-like tumor the size of two grains of corn. It is soft and compressible, but quickly regains its form when pressure is relieved. Its base occupies the space between the teeth and about their roots. Bleeding follows the attempt to determine the extent of its attachment. (Fig. 72.)
Diagnosis.—It is too soft and bleeds too readily to be an epulis. Furthermore, epulides do not develop so rapidly. Its rapid growth, its vascularity and its tendency to bleed stamp it as a granuloma. Sarcoma it most certainly is not. Small round-celled sarcomas of the jaw are very rare and they involve a greater space.

Treatment.—The growth was cut off with a cautery knife blade and the site of origin carefully cauterized. The teeth were not pulled.

Pathology.—The tumor is made up of small round cells with round nuclei and sparse protoplasm, together with many polymuclear lymphocytes. The whole is interspersed with bundles of fibrous tissue. The connective tissue was small in amount and interspersed between the cells.

After-course.—Healing was prompt and permanent.

Comment.—The error here was possible because the pathologist attempted to make a diagnosis on the microscopic picture alone. Not infrequently granulation tissue simulates sarcoma and the clinical history must be taken into account.

Case 14.—A boy aged six was brought because of a tumor of his upper jaw.

History.—When the child was four years old it was noticed that a tumor, half the size of a grain of corn, had appeared about the root of his first double tooth. A dentist destroyed this, but it soon returned. Six months later he was given an anesthetic, the tooth was extracted, and the growth again destroyed. Still six months later the growth again appeared and has grown gradually since. He is well otherwise and the growth does not seem to inconvenience him.

Examination.—There is a growth extending from the canine to the last molar tooth. It represents a roundish roll something more than half an inch in diameter (Fig. 73-A). The growth seems to elevate the mucus of the hard palate to near the median line. It is covered with epithelium and is of a bluish red color. Pressure causes but little pain. The growth has a generally firm elastic feel.

Diagnosis.—The tumor evidently is an epulis. The problem is how extensive an operation should be done. The second operation, if properly done, should have resulted in a cure. That it did not and because there is apparently an extension across the hard palate, indicates that this growth is not to be trifled with. Therefore a radical resection of the jaw may well be advised.
**DISEASES OF THE MOUTH AND JAWS**

Fig. 73-A.—Epulis of the upper jaw which has extended to the antrum and across the hard palate.

Fig. 73-B.—Slide of the preceding showing typical giant-celled sarcoma.

*Treatment.*—A resection of the superior maxilla was done going a little beyond the median line in the hard palate but leaving the floor of the orbit and the malar articulation.

*Pathology.*—The tumor is a typical giant-celled sarcoma (Fig. 73-B).
After-course.—Recovery was prompt and complete and remained so.

Comment.—Evidently neither of the first operations reached the full extent of the growth. It cannot be too often repeated that giant-celled epulides of the jaw tend more to recurrence than tumors of like structure and extent situated on the lower jaw. Had this tumor not been previously operated on, or had but a superficial operation been done, I should have been more conservative. Once an operation has been done, which may have entered the antrum, nothing short of a complete resection of the jaw is warranted.

CASE 15.—A farmer aged sixty-four came to the hospital because of a tumor of his jaw.

History.—Four years ago he noticed a tumor on the gums of his upper jaw. It was scraped off and burned by his dentist. It began to grow after a few months and has continued to enlarge to the present time. Only in the past two months has it caused any pain.

Examination.—A tumor as large as a hulled walnut occupies the alveolar border and hard palate of the right upper jaw. It is reddish blue in color, the surface smooth and the consistency firm. It seems sharply defined and the antrum seems free. The chest is emphysematous and otherwise general examination is negative. (Fig. 73-C).

Diagnosis.—The slow growth, the color, the firmness characterize it as an epulis. The patient is a fairly well preserved man but shows some evidence of recent emaciation. The patient seems but a fair risk and he fears an operation. Under local anesthesia a resection of the upper jaw seems a good risk and the prospects of a cure seem excellent.

Treatment.—Before operation was begun a chain of lymph glands were discovered. They were smooth and hard and fairly movable. Considering the unwillingness of the patient to stand his share of the responsibility, operation was refused.

After-course.—The progress continued unabated, the glands of the neck assuming the ascendancy.

Comment.—The lymphatic involvement was overlooked at the first examination. An operation was technically possible and had the patient been willing to accept the best surgery had to offer I should
have been willing to attempt an operation. It is unusual to find lymph gland involvement in these tumors.

Fig. 73-C.—Large epulis of the upper jaw involving the alveolar border and the hard palate.
DISEASES OF THE NECK

Diseases of the neck are multitudinous and important. A greater variety of tumors are encountered here than in any other region of the body. Inflammatory affections of the neck are sometimes difficult to separate from true tumors. The various types of tumors may be separated only with difficulty. The surgeon must always anticipate the worst and proceed with caution.

LYMPHATIC TUMORS OF THE NECK

Tumorous enlargements of the lymph glands of the neck are presumably malignant. It requires painstaking consideration of all the clinical signs in many instances to arrive at a positive opinion. Even with every care time alone in some instances can render a positive verdict. Excision of a gland for the purpose of making a microscopic diagnosis is not justified. Too often even with this aid the diagnosis remains uncertain and at best the disease is stimulated to renewed activity if it is malignant.

CASE 1.—A widow aged eighty-two came to the hospital because of a tumor under her ear.

History.—Two months ago the patient noticed a tumor developing on the neck below the right ear. It was painful from the start and the summit soon became red and soft. Her doctor believing it was an abscess incised it. Failing to secure anything but a free hemorrhage he sent her to the hospital.

Examination.—Just behind the posterior border of the sternomastoid near its insertion is a pyramidal shaped tumor the size of an unhulled walnut. The surface is reddened and soft and from a small incision at the apex a thin bloody ichorous discharge is escaping. The remainder of the tumor below the soft apex is firm but elastic. It moves slightly laterally with the underlying tissues but is immovable.
upward or downward. There are no palpable glands. The patient's general health is unimpaired.

Diagnosis.—This tumor springs from the deep structures, obviously from the posterior lymphatics. Its rapid enlargement and solitary character suggests a lymphosarcoma. It is obviously not inflammatory. The absence of other lymphatic enlargement excludes Hodgkin's disease. From abscess it may be distinguished since abscess never is so circumscribed in proportion to its height. Abscesses when they become fluctuant are so in their center while in these tumors the pseudo-fluctuating area is confined to the apex.

Treatment.—None. The x-rays would have been used had they been available.

After-course.—A fungating mass soon appeared in the opening and rapidly enlarged it. In a few weeks a large fungiform mass covered the whole summit of the tumor. This was associated with a rapid enlargement of the tumor in all directions. The patient died in two months.

Comment.—I have observed a number of instances in which these tumors were opened into under the impression that they contained pus. The result is always that a fungating mass appears and the tumor is stimulated to more rapid growth. The ulcerating, secreting mass is annoying both to the patient and to the attendant who incised it.

CASE 2.—A widow aged seventy came to the hospital because of a tumor on her neck.

History.—For a year a tumor has been developing under the angle of her jaw. Recently it has been enlarging more rapidly until it has attained its present size. Otherwise she has always been well.

Examination.—The patient is an unusually well preserved old lady. She has a tumor the size of a lemon over the sternomastoid process (Fig. 74). It is smooth and elastic and is movable slightly laterally but not vertically. It is attached to the deeper tissue but can not be made to protrude into the mouth. There are no other tumors palpable.

Diagnosis.—Being solitary and elastic in this situation attached to the deeper tissue indicates its origin from the lymph gland. The blood examination being without change, this must be a localized
Hodgkin's or a lymphosarcoma. Because it is solitary it is best placed with the lymphosarcomas.

_Treatment._—The x-rays were recommended but the advice was not followed.

_After-course._—The patient remained in much the same state for nearly a year with but little change in the outlines of the tumor. At about this time she began to have attacks of dyspnea and some digestive disturbance and she lost weight rapidly. She died four months later with gradually increasing weakness.

_Autopsy._—The mediastinum and the retroperitoneal glands were as large as potatoes compressing the adjacent tissues. The slide showed lymphoid cells with a small amount of reticulum.

_Comment._—The lymphatic tumors when they remain solitary for a long time are usually regarded as lymphosarcomas; when multiple, as
Hodgkin's. In structure the chief difference lies in the fact that in Hodgkin's eosinophiles and endothelial cells are often much increased. When these are absent there is no definite mark of distinction.

**CASE 3.**—A merchant aged forty-two came to the hospital because of recurrent tumors of the neck.

*History.*—Three years ago he noticed a tumor developing under the angle of his jaw. This was soon followed by others. He con-

![Fig. 75.—Secondary nodule in Hodgkin's disease showing the thinned skin covering it.](image)

sulted a surgeon who removed the tumors. In nine months other tumors developed and the same surgeon removed them also. Within a few months they returned and he consulted another surgeon who
cured them by two blood transfusions. That is now nine months ago and he has some more tumors despite the cure. His general health is good.

Examination.—On the left side of the neck is a mass the size of an egg situated with its long axis directed toward the mastoid process. The skin over it is thinned and of a reddish color. Anterior to this is a smaller mass over which the skin is less reddened. Beneath the chin is a deeply lying one over which the skin is movable. Above the clavicle a number of other nodules are palpable. There are three scars marking the site of previous operations (Fig. 75). The larger nodule is quite firmly fixed, yet possesses a certain degree of mobility. The right side of the neck is free from any evidence of tumors. General examination fails to discover anything of moment.

Diagnosis.—Multiple nodules with an unchanged blood picture indicates Hodgkin’s disease. The thinned skin over the larger mass makes it likely that it is of the endothelial type. On the whole, the case presents a rather uninviting problem for surgical interference, but since the variety is endothelial and the patient’s general condition is unimpaired, it seems warranted to make an attempt at radical removal.

Treatment.—A complete block dissection of the neck was done, leaving only the common and internal carotid vessels and the large veins.

Pathology.—The glands removed showed an endothelial arrangement of the cells. The larger gland contained a cyst as large as a pigeon’s egg.

After-course.—Six months later glands appeared on the right side of the neck also. A complete block dissection was done on this side of the neck. He remained free from recurrence for a year. Then new tumors formed back of the mastoid process and evidence of substernal compression appeared. He lived a year after this. The right side remained free from recurrence.

Comment.—The endothelial type offers some promise of prolonged relief by early radical operation but even these are best reached by the x-rays.

CASE 4.—A laborer aged forty came to the hospital because of tumors of his neck.

History.—For several years the patient has noticed lumps coming on the side of the neck. They first appeared below the ear but soon
they extended over the whole right side of the neck. The left side remained free. His general health is good.

**Examination.**—A number of enlarged glands occupy the side of the neck. They vary in size from a hickory nut to that of a walnut.

![Cross section of lymph glands in a case of endothelial type of Hodgkin's disease.](image1)

Fig. 76.—Cross section of lymph glands in a case of endothelial type of Hodgkin's disease.

They glide about under the examining finger and are firm. No other glands are enlarged. The blood picture is normal.

**Diagnosis.**—The large size of the glands with the absence of softening and the freedom of fixation stamp them as Hodgkin’s glands.

**Treatment.**—The neck was blocked out.
Pathology.—The larger gland showed areas of degeneration which resemble tuberculosis superficially. On closer inspection the areas are seen to be more sharply defined and of a more yellow color (Fig. 76). The slide shows the picture of an endotheliotous Hodgkin's disease (Fig. 77).

After-course.—The patient was operated on by a junior surgeon and he was taken from the operating room to the morgue.

Comment.—These specimens resemble carcinoma closely. The mother cells most likely are the endothelial cells of the lymph glands.

CASE 5.—A laborer aged forty came to the hospital because of a tumor in his neck.

History.—For two years he has had tumors in the neck. He first noticed them at the upper part of the left side. They caused no inconvenience at first but as the number and size increased the movements of his head were interfered with and he began to feel weak.

Examination.—The patient presents a large conglomerate mass on the left side of the neck. The larger one of the masses measures 6 x 8 cm. There is an indefinite number of smaller ones. The masses
are discrete and move on each other and beneath the muscles which cover them. There is a moderate general anemia.

Diagnosis.—The size of the glands and the little tendency to invade the capsule stamp them as Hodgkin's disease. Their large size and rapid development together with the age of the patient excludes tuberculosis.

Treatment.—A radical blocking of the neck was done.

Pathology.—When the larger of the glands was cut through it showed a uniform white surface for the most part with only small areas where the original gland structure was retained. The degenerated area was homogeneous, not granular (Fig. 78). About the vessels the original lymph cells were presented. The microscopic appearance was not determinate (Fig. 79). The smaller glands showed the usual picture of Hodgkin's disease, being marked by an unusually large number of eosinophiles.

After-course.—The glands of the opposite side of the neck began to enlarge soon after, followed by the mediastinal glands. He died in less than a year under the typical picture of malignant lymphoma.

Comment.—The degenerations of lymphomas resemble tuberculosis in general outline. Usually the degenerated area is either pearly,
glistening in color, or canary-yellow in color, differing from the dirty white, cheesy color of tuberculosis.

**CASE 6.**—A married woman aged seventeen came to the hospital because of tumors in her neck.

*History.*—The patient is the mother of one child. Fifteen months

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*Fig. 80.*—Gross appearance of pocket of tuberculous lymph glands after removal.
ago she noticed the glands of the left side of the neck began to enlarge. Those near the angle of the jaw were the first to enlarge, and were followed by the enlargement of those of the entire side of the neck. There were no other enlarged glands. She has felt a general weakness for some months.

**Examination.**—The entire left side of the neck is occupied by a conglomerate mass of glands. They are easily palpable individually but they are attached more or less closely together. There are no areas of softening. Her Hg. is 70 and the white count 5,000.

**Diagnosis.**—The characteristic feature is the attachment of the glands to their environments. The enlargement was more rapid than is usual in tuberculosis, and the glands more discrete than is usual in this disease. In Hodgkin's disease the glands usually are more freely movable on each other.

**Treatment.**—The entire glandpack was removed by block dissection (Fig. 80).

**Pathology.**—A number of the glands showed central caseation, but nowhere was the capsule perforated. The caseated area was sharply defined as in Hodgkin's disease (Fig. 81). The slide shows tuberculosis.

**After-course.**—The glands on the opposite side of the neck enlarged a year and a half later and were likewise removed. Four years later a group of submental glands enlarged and were likewise removed. She has now been free from glandular enlargement for several years.
Comment.—It is a mistake to do these radical operations for lymph gland tuberculosis. Had I to manage this patient now I should proceed differently. The avenue of infection is generally the tonsils and I should remove these and allow the glands to take care of themselves. Radical operation is objectionable because of the liability of a general tuberculosis taking place. At best more or less of a scar remains permanently.

CASE 7.—A retired physician of sixty-four came to the hospital because of a series of tumors on the side of the neck.

History.—For six or eight months the patient has noticed an enlargement on the side of the neck below the angle of the jaw. This was soon followed by other lumps lower down. They cause no considerable pain. The larger tumors were aspirated by his physician and a straw-colored fluid was obtained.

Examination.—The tumor nearest the jaw is the size of a hen’s egg. The ones lower down the size of a walnut and smaller. The upper one is soft and fluctuating, but not painful. The lower one is dense, elastic. Both are fixed to the surrounding tissue but free from attachment to the skin. There is an ulcer on the lower surface of the tongue extending to the floor of the mouth. It has a dense edge, the outline is irregular. It bleeds when manipulated. Blood counts and the various laboratory tests had been made, all with negative results.

Diagnosis.—The ulcer of the tongue is clearly a carcinoma, though the patient seemed to be ignorant of its presence. The tumors of the neck it is fair to assume are cancerous also, despite the fact that the larger one is fluctuating and contains, according to his physician, a straw-colored fluid.

Treatment.—At the urgent solicitation of the patient a block dissection of the neck was done. The operation up to the point of where the growth had to be elevated from the submental space was done under local anesthesia. A general anesthetic was used in the final steps of the operation. Three weeks later the growth in the mouth was removed under local anesthesia with an electric cautery. An attempt was made to give a general anesthetic for the second operation, but as the larynx was firmly bound down as a result of the very radical dissection done three weeks before, it became occluded whenever the patient began to relax from the anesthetic.
Pathology.—The ulcer in the mouth was a typical epithelioma. The tumors in the neck were cystic (Fig. 82-B). The walls of the cyst were fairly smooth and seemed to be lined with a distinct membrane.

The solid portions of the tumor showed a peculiar admixture of epithelial cells and spindle-form cells as though an epithelial tumor was intermingled with a spindle-celled sarcoma (Fig. 82-A). The walls
of the cyst were epitheliomatous. The cells of the tumor mass in some situations were spindleform with pronounced reaction of the connective tissue, reminding one of transition tumors sometimes seen in mice.

After-course.—The patient recovered well from the operation. Several months later he began to have violent headaches. These increased in intensity and he died in delirium after a partial paralysis of the right side, probably a cerebral metastasis.

Comment.—It is curious that the mouth lesion should have been overlooked by the patient who was himself a physician. The genesis of the cyst was due probably to the occlusion of a lymph sinus and was, therefore, a lymph cyst brought about by the metastatic growth.

CASE 8.—A husky farmer aged forty-six came to the hospital because of a tumor under his jaw.

History.—For several months he has noticed a tumor under the edge of his left lower jaw. He has had no pain but a certain sense of uneasiness. He has had no throat trouble of any sort.

Examination.—Just below and anterior to the angle of the jaw is a globular mass the size of a hulled walnut. It is smooth, elastic, hard. It seems to be free from its environment. When pressed upon from the outside it protrudes into the mouth seemingly being located just beneath the mucous membrane but unattached to it. There are no palpable glands and there is no lesion in the mouth.

Diagnosis.—Its situation, its smooth, ovoid, and apparently tense elastic character, and above all its close relation to the buccal mucous membrane, made me regard it as a thyroglossal cyst. The entire absence of palpable glands seemed to corroborate this.
Treatment.—The tumor was removed under local anesthesia. It was found to be a solid, well encapsulated tumor (Fig. 83).

Pathology.—For some reason the tumor was not examined at once.

After-course.—The wound healed promptly. In two months he returned with a number of small hard glands below the region of the operation. These were evidently malignant. The primary tumor was hurriedly sought and examined. It proved to be carcinomatous, and squamous-celled carcinoma at that (Fig. 84). Perfectly formed pearls were found. The region was rayed and five months later a block dissection was attempted. This was followed within a few months by a return. The x-rays were again used, but the patient died a year later.

Comment.—The source of the squamous cells is a matter of primary interest. No lesion could be found in the mouth or any other tributary region. The next most obvious source of squamous cells would be a tumor developing in a gill eleft rest. There was a border of lymphatic tissue in the primary tumor. Since lymphoid tissue is often found about gill clefts, this point does not aid in deciding as to whether the tumor was primary in this region or was transported to a lymph gland from a distance. It is of importance to note that the carcinomatous nature of a tumor of the neck is not ruled out because

Fig. 84.—Microscopic section of case in Fig. 83, showing pearl formation.
a primary tumor is not found. I have in a number of instances made that error. If a pre-operative diagnosis is not made the section of the tumor should not be neglected. So far as the patient's welfare is concerned, it makes no difference. I have never yet cured a patient who had any malignant disease, primary or secondary, in the neck. But it is a source of personal comfort to accurately call the coming course of events.

**Case 9.**—A housewife of thirty-four years of age came because of a swelling under the left jaw.

![Fig. 85.—Lymphosarcoma of the submaxillary lymph gland.](image)

**History.**—The patient has always enjoyed good health. Three months ago she noticed an enlargement below the lower jaw on the left side. It is slightly painful but the chief complaint is the disfigurement.
Examination.—A mass the size of a bantam egg is located over the lower border of the jaw just in front of the angle (Fig. 85). It is folded over the edge of the jaw like a ball of mud over the edge of a board. It is elastic, firm and uniform. It is attached to the bone but the skin and superficial fascia move freely over it.

Diagnosis.—The tumors in this region when single are usually infected lymph glands but an acute infection should have suppurated or regressed by this time. There was no apparent lesion in the mouth. Tuberculous glands are situated further down the back and usually multiple and are not so intimately attached to the bone. Solitary tumors in this region are usually lymphosarcomas but this one seems to have come up too suddenly and then remained stationary too long to warrant this diagnosis. Excision was decided on to clear up the matter.

Treatment.—The tumor was removed and the submental triangle was dissected out.

Pathology.—The tumor on gross appearance is uniformly pinkish, the surface moist and glistening with no areas of degeneration. The sections showed a typical lymphosarcoma (Fig. 86).

After-course.—There was a recurrence within three months.

Comment.—The operation done was wholly inadequate. The whole side of the neck should have been blocked out or better still, no op-
eration at all attempted. The x-ray has but little effect on this type of tumor, but does more than operation to stay their course.

NONLYMPHATIC TUMORS OF THE NECK

Tumors of the neck not associated with the lymph glands are usually solitary and of slow growth. They are usually a part of or are associated with some of the parenchymatous organs and are nearly always unilateral.

CASE 1.—A married woman aged fifty-four came because of nervousness and loss of weight.

*History.*—She formerly had good health, but for the past several months she has been very nervous and has lost more than thirty pounds in weight. She becomes easily fatigued and perspires easily on effort or exertion. The appetite is fair. Sleep is variable.
Examination.—The patient’s eyes are markedly protruding. Stelwag’s, Kocher’s and Dalrymple’s signs are all positive. She has a marked tremor of the hands. The pulse is 132, full and bounding. The thyroid is not palpable. On the left side of the neck below the angle of the jaw, is a tumor the size of a walnut. It is pulsatile, almost expansile. When pressed upon, it protrudes into the floor of the mouth at the base of the tongue. The apex beat of the heart is diffuse and near the axillary line.

Diagnosis.—The patient unquestionably has an "exophthalmic goiter." The goiter, however, is not in evidence. The thyroid is not definitely palpable. The tumor at the angle of the jaw, however, has the expansile feeling of a toxic goiter. The pulsation of the vessels is identical. The close association with the floor of the mouth at the base of the tongue seems to line it up with the accessory thyroids located at the base of the tongue. The patient is too toxic to permit of operation. It would be a typical case for pole ligation if one knew where the pole is located.

Treatment.—Rest in bed and bromides.

After-course.—In the three months following she regained her weight and the pulse was reduced to 90. The tumor reduced somewhat in size and the pulsations ceased. She has now been in good general health for three years past. The tumor is reduced to the size shown in Fig. 87. There is still marked exophthalmos, and she is easily fatigued and excited. The tumor does not pulsate.

Comment.—Unfortunately histologic verification of the diagnosis can not be offered. After the patient reached a state where operation would have been safe, she was improving so rapidly that she refused operation.

CASE 2.—A farmer aged fifty-two came to the hospital because of pain all over the left side of the face and a mass under the lower jaw.

History.—Twenty-five years ago he had an attack of acute fever of some kind. He was in a hospital in New Mexico for six weeks. He does not know what it was, but he made a complete recovery. Twenty years ago he had an attack of severe pain running down the back of the left thigh and leg. He says that all of his extremities were attacked later by the trouble, lasting a year. His hands and feet and face became puffy, but not all at the same time. The pain
was severe and shooting. He says the joints enlarged. A diagnosis of inflammatory rheumatism was made.

Seventeen years ago, while he was riding a wheat binder, he had a sudden severe pain in the left ear. He thought a bug had entered his ear. The pain spread from the ear out over the face but never crossed the median line of the face. Some pain is present all the time, but it gets worse every night and keeps him awake. The pain extends clear up the side from the lower edge of the jaw to midline of the scalp. Rubbing the side of the face and scalp gives relief. Cold draughts of air start the pains and make them worse. The pain seems to radiate from the ear.

Three years after the attack of pain he noticed a hard kernel in the region of the submaxillary gland. This has grown steadily, but has grown worse more rapidly during the past year. During the past month his pain has been much worse and constant.

He passes a great deal of urine. Gets up four to six times at night. Is rather constipated most of the time. No pain or difficulty on urination. Has had some trouble with his eyes, can not read without glasses. Never has a headache.
Examination.—Pupils react to light and accommodation. Well developed arcus senilis for a man of his age. Throat negative. Tumor the size of a hen’s egg on the left side under the mandible in the region of the submaxillary gland (Fig. 88). It is very hard, freely movable, and somewhat nodular.

Diagnosis.—The long duration of the growth, its hardness and irregular surface is diagnostic of a mixed tumor.

Treatment.—The tumor was removed under local anesthesia. It was freely movable and unattached.
Pathology.—The section showed a glistening surface and fine points visible in some areas (Fig. 89). The slide showed the usual admixture of endothelioma and myxoid tissue (Fig. 90). It is evidently a mixed tumor of the submaxillary gland.

After-course.—He has remained free from recurrence three years.

Comment.—The patient sought to connect the tumor with the past ailments, but there is no evidence that such was the case. The mixed tumors run their course wholly without symptoms.

CASE 3.—A school teacher aged forty came to the hospital because of a tumor of the neck.

History.—When thirteen years old, this patient first noticed a small lump under the lobe of her left ear. It grew slowly, reaching the size of a walnut one year ago. At this time it became painful and began to grow rapidly. It seems to vary in size and when large is quite painful.

Examination.—In front and below the left ear is a tumor the size of a small orange (Fig. 91). It is bosselated, varying in density in the different regions and is fixed to the underlying tissue. From this growth downward along the anterior border of the sternomastoid is a series of nodules varying in size from a pea to a large hazelnut. There is a larger group behind the mastoid extending downward. These nodules are somewhat movable laterally on the underlying tissue but do not move vertically.

Diagnosis.—The location, the long period of development, the bosselated surface and the varying consistency stamp the growth as a mixed tumor of the parotid. There is no other type in this region that develops so slowly. The secondary growths are evidently metastases. While mixed tumors of the parotid are little disposed to form metastases, they may do so. When they take on rapid growth as the history indicates this one has done, they commonly metastasize by way of the lymphatics. The small tumors in the neck are evidently of this character. In epithelial metastatic tumors cure is hopeless, but in the case of mixed tumors, cure may be hoped for even after the lymph glands have become involved.

Treatment.—The entire side of the neck was blocked out including the vein and external carotid artery. The entire parotid was removed, the facial nerve being disregarded in the operation.
Pathology.—The growth is typical of a mixed tumor. There is an admixture of myxoid areas and a few islands of cartilage along with the usual endothelial cells. The endothelial areas particularly show activity. The gland metastases show only the development of the endothelial cells.

After-course.—The patient developed an erysipelas in the wound on the fourth day and was very sick for a week. As often occurs in erysipelas in a wound, once the infection subsides, wound healing is astonishingly rapid, so in this case at the end of two weeks the wound was entirely healed. The patient remained well for six months. While sitting in the basement in June she became somewhat chilled. As she sought to arise to go upstairs she experienced an acute lumbar pain. The diagnosis of lumbago was made on telephonic description of symptoms. There was no improvement and at the end of a month numbness of one leg was complained of. The patient was visited at this time and a metastatic tumor of the cord diagnosed. At operation a tumor 1.5 x 1 x 0.5 cm. was found extradurally. This was easily removed. The patient unfortunately died on the tenth day after operation from postoperative pneumonia.
Comment.—While mixed tumors present a prospect of a cure after they have reached a degree of development which would render other tumors utterly hopeless, it is more than doubtful whether one is warranted in going to the extent of removing a metastatic nodule from the eord.

CASE 4.—A farmer aged forty-eight came for relief from a recurrent tumor of his neck.

History.—A dozen years ago he noticed a tumor in front of and below the ear. This grew in size until it became nearly as large as a hen’s egg. This was removed two years ago by a capable surgeon. A nodule just below the site of the first operation was removed a year ago. Others soon formed and one of these has ulcerated. He has a persistent cough and raises some mucus. He has had a similar cough in previous winters. Otherwise his health is good.

Examination.—There is a scar parallel with the lower border of the jaw extending from the tip of the mastoid process nearly to the tip of the chin. Below this is a conglomeration of nodules about the size of hazelnuts. They extend down as far as the lower border of the
hyoid bone. They are quite firmly fixed to their environment. There is a nodule in the skin below the tip of the ear and below this is a superficial ulcer the size of a dime. Repeated examination of the respiratory organs fails to discover any lesion save a chronic pharyngitis. (Fig. 92.)

**Diagnosis.**—From the history it seems most likely that the primary tumor was a mixed tumor of the submaxillary gland and that the nodules now present are metastatic. Because of this fact their removal seems worth attempting. The presence of a cough in a patient with a recurrent tumor is a matter to cause grave apprehension. The assumption is that there is a lung metastasis. The fact that the lung findings are negative is by no means a valid argument that none exists. The fact that he has had cough during the winter for a number of years gives warrant to the hope that he now has only a recurrence of this and that a laryngitis and tracheitis is the extent of his disability. The fact that mixed tumors are little likely to metastasize here likewise enters the argument.

**Treatment.**—The entire side of the neck was blocked out under quinine and urea-hydrochloride anesthesia. The internal jugular vein, the external carotid artery, and the vagus and hypoglossal nerves were removed. Because of the close association of the growth to the

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*Fig. 93.—Slide of recurrent mixed tumor of the submaxillary gland.*
skin a considerable area of it had to be removed. This was replaced by sliding a flap from the lower part of the back of the neck.

Pathology.—The glands showed the usual picture of metastasis in mixed tumors of the parotid. The typical endothelial arrangement of the cells is maintained even in the recurrences in the skin (Fig. 93).

After-course.—He has been free more than ten years after the operation.

Comment.—Experience alone can prove whether such extensive operations are warranted in metastasis after mixed tumors of the parotid. Any recurrence following mixed tumors of any of the salivary glands that is technically operable offers some hope of a cure. In following this principle I have not hesitated to remove all the large nerves and vessels from the side of the neck. When one considers that anything less will most certainly end fatally, almost anything that offers any prospect of result is justified. This is particularly true if the patient has the intelligence to comprehend the situation and is allowed to elect his fate.

CASE 5.—A merchant aged sixty came because of an ulcer below his left ear.

![Fig. 94.—Carcinoma of the neck.](image)

History.—For a year and a half he has had an ulcer on the side of the neck. It is scabbed over much of the time but more recently the discharge has elevated the crust and escaped down his neck. For this reason he wants it removed.
Examination.—An ulcer the size of a half dollar is located just below and posterior to the angle of the jaw. The edges are distinctly elevated and hard. The ulcer itself when cleaned of scab presents an irregular granular base. The edge of the ulcer presents fine pin-point white clots when pressed upon with a glass slide. The ulcer does not move freely over the platysma, but ulcer with platysma can be freely moved over the deeper structures of the neck (Fig. 94).

Diagnosis.—The location, the hard border and the close association with the platysma is suggestive, and the small points are diagnostic of carcinoma. The deep association with the platysma characterize it as the deep form as distinguished from the basal-celled type.

Treatment.—The ulcer with a half-inch margin together with the platysma and fascia were removed.

Pathology.—The lesion is a typical squamous-celled cancer with pearl formation.

After-course.—There has been no recurrence, many years after.

Comment.—This type is best treated by operation. All pearl-forming epitheliomas are destroyed with difficulty, although very expert x-ray men accomplish the task.

Cystic Diseases of the Neck

Cystic diseases of the neck are usually associated with some disturbance in development. For this reason their location is always a prominent factor in diagnosis. When not so situated a cystic tumor is usually due to secondary changes in a previously solid tumor.

Case 1.—A farm laborer aged thirty came to the hospital because of a tumor on the side of the neck.

History.—He has noticed a tumor on the side of his neck for a period of years. It has gradually developed to its present size. It has never caused pain or inconvenience.

Examination.—In front of and overlying the sternomastoid muscle, extending from the mastoid to the level of the hyoid bone (Fig. 95) is a smooth elastic tumor. It does not move with deglutition. When pressed upon it can be made to bulge into the floor of the mouth.

Diagnosis.—Its close relation to the floor of the mouth, the superficial position of its outer portion, and its smooth elastic feel characterize it as a thyroglossal cyst. There is nothing that could be con-
fused with it. Lymph cysts are vastly softer and do not approach so close to the floor of the mouth.

Fig. 95.—Gill cleft cyst.

Fig. 96.—Gill cleft cyst. A. Area covered with flat epithelium. B. Area of columnar epithelium forming papillary projections.

Treatment.—It was excised under local anesthesia.

Pathology.—The cyst wall was fairly firm, the contents clear. The
lining for the most part was smooth with a small area covered with papillary projections (Fig. 96).

After-course.—Healing was without note.

Comment.—These tumors must be approached through a liberal incision so that the deeper parts can be fully exposed. They are occasionally the site of carcinomas.

CASE 2.—A farmer lad of eighteen came because of a swelling under his jaw.

History.—For nine months he has noticed a bulging under his right jaw. It causes him no pain but a sense of fullness under his tongue. This is augmented when he presses on it.

Examination.—A mass the size of an egg is visible under the border of his inferior maxilla (Fig. 97). It is smooth, soft and fluctuat-

Fig. 97.—Ranula bulging beneath the angle of the jaw.
ing. When pressed upon, it seems to disappear in the depth of the floor of the mouth. When the mouth is inspected while pressure is being made, a blue ridge is seen to appear in the floor of the mouth extending as far forward as the frenulum.

Diagnosis.—The appearance under the tongue is that of a ranula. The larger cyst under the jaw appears to be a continuation of it. The cyst in the neck must therefore be a bulging ranula.

Treatment.—The top of the protruding mass under the tongue was cut off and the stringy contents mopped out. The entire sac was then swabbed out with iodine and packed with gauze.

After-course.—The gauze was removed on the fifth day. Complete obliteration of the sac took place.

Comment.—There may be a question whether this had not better be called a cyst of the sublingual gland. It is worth noting that it was cured without an external incision. If these cysts are attacked by open incision and the sac is not fully removed, a false cyst may be formed in the neck which may become large and involve the deep structures requiring a difficult dissection for its eradication.

CASE 3.—A matron aged fifty-four came to the hospital because of a tumor in her neck below the angle of the jaw.

History.—For some months she has noticed a lump in her neck below her jaw. It caused no inconvenience and she disregarded it. Recently it has enlarged more rapidly and is painful. Her general health has been good.

Examination.—Her general appearance confirms her judgment as to the state of her general health. In front of the sternomastoid just below the level of the hyoid bone is a tumor the size of a hickory nut. The skin over it is reddened and somewhat attached to it. It seems imbedded in the superficial structures of the neck. It can be displaced in various directions, along with the superficial structures, save downwards. When pulled downwards it seems restrained by a deep attachment. There are no lymph glands palpable.

Diagnosis.—A tumor which is globular, and attached to the skin, is usually a wen, and when inflammation or thickening exists these are usually ascribed to secondary changes. In the neck, however, wens are rare and since this is in the line where thyroglossal ducts are prone to lie and particularly since this has a stalk that seems to keep it from being depressed downwards, the best diagnosis seems to be
a thyroglossal remnant which has become inflamed. While this tumor is attached to the skin, it does not seem directly attached to it as one would expect in the case of a wen. Furthermore it does not protrude from the surface as wens do. The same topography applies to dermoids. They are prone to extend beyond the surface. Besides this is away from the line of location of dermoids. Why it should be so dense is another question. It is reddened and painful and this seems the best reason for its density, though for it to be so hard, the history should indicate its presence for a longer time.

Treatment.—The tumor was widely excised. When it was exposed a stalk was found which reached to the floor of the pharynx. The deep opening was closed by a series of layers of catgut.

Pathology.—The tumor is firm, whitish and on section a thick white wall with a central cavity the size of a hazelnut is found. The white wall contains many fine punctiform dots obviously carcinoma. The slide shows it to be a squamous-celled carcinoma.

After-course.—The patient has remained free from recurrence now four years.

Comment.—According to the literature, these tumors always return. This seems to have been removed early and wide. The secondary infection served to compel the patient to seek surgical relief which she most likely would not have done had this complication not supervened.

CASE 4.—A college girl aged twenty-two came to the hospital because of a swelling on her neck.

History.—Five years ago the patient noticed a swelling in the midline of the neck. It was not painful but disturbed her esthetic sense. She was operated on, but after a few months a sinus formed. This was operated on and again after a few months a fistula reformed. This same procedure was repeated twice, and at the present time, there is still some discharge in a dimple in the old scar.

Examination.—The patient has a scar in the midline of the neck a centimeter wide by seven centimeters long. At the junction of the upper and middle third is a discharging sinus. A fine wire probe passes up the sinus to near the base of the tongue.

Diagnosis.—The position in the midline and the extent of the tract stamps it as a thyroglossal duct. The persistence in the midline dif-
differentiates it from a gill cleft sinus which would deviate to one or the other side as it approached the floor of the mouth.

_Treatment._—The old scar was excised and followed up beyond the site of the previous operation where the unchanged duct was found. It seemed to pass through the body of the hyoid bone, consequently a part of this was resected. By separating the hyoglossus muscles and the geniohyoglossus, the tract was followed to the base of the tongue (Fig. 98). The duct was carefully isolated at the lower surface of the mucous membrane of the tongue and cut off without opening into the mouth. The soft parts were coapted with fine catgut and the wound closed without drainage.

_Pathology._—The duct was lined with cuboidal and columnar epithelium.

_After-course._—There has been no recurrence after seven years.

_Comment._—The point of interest lies in the evidence of the futility of operating on these cases unless the entire tract is cleanly removed. This is not easy, and unless care is exercised, they are apt to be lost in the region of the hyoid bone. They sometimes pass in front, sometimes behind and sometimes through the body of this bone.
CASE 5.—A retired farmer aged sixty-four came because of a tumor on his neck.

History.—For twenty years he has had a gradually growing tumor of the neck. He was a widower and the reason why without additional provocation he desired his old friend removed was not discussed.

Examination.—A flat globular tumor occupies the right half of the neck immediately below the external occipital protuberance. It is smooth, semifluctuating, somewhat attached to the skin, but free for the most part, and entirely painless. (Fig. 99.)

Diagnosis.—Its semielasticity, its very slow growth, and the tendency to lobulation downward seem to stamp it as a lipoma. The skin seems suspiciously adherent to its surface, however, but the thick skin of the neck makes it difficult to determine definitely whether or not the tumor is attached.

Treatment.—An elliptical incision enclosing an area of skin 1 x 2 inches was made. When the mass was exposed it was found to be
a wen instead of a lipoma. Care was exercised and the cyst removed intact.

After-course.—Primary healing.

Comment.—Wens usually project out as globular masses but when very slowly growing, may make themselves comfortable habitants in the body of the underlying muscles. Errors in diagnosis have no greater significance than disturbing the harmonious appearance of the operation record card.

CASE 6.—A matron of fifty-two came to the hospital because of a tumor on her neck.

History.—She has noticed a tumor on her neck for a number of years. It has gradually enlarged, but causes no pain. She desires to be rid of it because of its appearance. Her general health is good.

Examination.—Just above the level of the hyoid bone is a tumor the size of a hulled walnut (Fig. 100). It is unattached to the skin, is smooth, elastic, and painless. It is slightly movable laterally, but not vertically. It moves with the larynx in deglutition.

Diagnosis.—The movement with deglutition establishes it as being connected with the deeper structures. Being free from the skin it is not a wen and is not likely to be a bronchiagenetic rest.

Treatment.—The tumor contains a gummous material. The cyst wall was attached by a stalk with the hyoid bone.
Pathology.—The sac was smooth-walled which the slide showed to be lined with squamous epithelium (Fig. 101).

After-course.—Healing was uneventful.

Comment.—These deeply lying cysts must be removed with care lest a stalk extending toward the base of the tongue be overlooked and a sinus result.

Fig. 101.—Dermoid cyst of the midline of the neck.

INFLAMMATORY DISEASES OF THE NECK

Inflammatory affections of the neck are usually self-evident. When there is any reasonable doubt the probability is that the disease is neoplastic and not inflammatory. Inflammatory affections of long duration, notably the woody phlegmons, are diffuse and therefore do not present "tumors."

CASE 1.—A farmer aged thirty-four came to the hospital because of pain and swelling under the jaw.

History.—A week ago while pitching wheat a beard from the wheat found its way under his tongue. He removed it at once but the irritation did not leave. At night he discovered that a point had remained. This was removed by his doctor. He felt relieved for a day, then he began to have pain under his jaw. This had gradually increased during the time and the swelling has kept pace.
Examination.—There is an indurated mass beneath the angle of the jaw which extends upward over the parotid and beyond the median line (Fig. 102). It is hard to the touch and painful. The infection does not elevate the floor of the mouth and the larynx is not edematous. The patient’s temperature is 102°.

Diagnosis.—The rapidity of its onset, the fever and the sensitivity to pressure distinguish it as an abscess rather than a woody phlegmon which would give the same physical characteristics.

Treatment.—Incision at a point which was estimated would bring the scar under the angle of the jaw. An abscess containing a dram of pus was drained.

After-course.—The pain disappeared and the swelling rapidly subsided.

Comment.—Such cases should be drained wide and early for fear of extension down the neck to the mediastinal space or toward the
DISEASES OF THE NECK

larynx, producing edema. These cases, when it is certain there is no pointing into the mouth or pharynx where spontaneous rupture may occur, are best done under a general anesthetic.

CASE 2.—A retired farmer aged sixty-five came to the hospital because of a swelling of the neck and inability to open his mouth.

History.—Ten days ago pain began under the corner of his jaw. There was pain on pressure at this point. He was unable to open his mouth more than half an inch. The swelling in the neck has increased until the whole neck to his collar bone is painful. He has had some fever from the beginning, going at one time to 103°. The pain has been so severe that he had been unable to sleep and he has taken only small amounts of liquid nourishment.

Examination.—The entire right side of his neck is swollen and hard and it is very sensitive to touch. There is no definite site of maximum reaction and no fluctuation. The left side is unaffected. He is unable to open his mouth more than half an inch. The posterior end of the lower jaw is much swollen and red and very sensitive to pressure with a spatula. The wisdom tooth is absent. The patient states that he never had one. The temperature is 102°, pulse 110, respiration 26. W.b.c. 26,000.

Diagnosis.—A diffuse swelling in the neck with marked limitation of movement of the lower jaw must come from a process involving the masseter muscle. The absence of a wisdom tooth and the marked swelling in this region marks this as the site of origin of the inflammatory process. Notwithstanding the absence of palpatory evidence of localized suppuration, the general condition is such that its presence must be assumed.

Treatment.—An incision two inches or more in length was made along the anterior border of the sternomastoid muscle. When the plane below the muscles was reached a considerable amount of pus was discovered. All the tissue below the platysma was markedly edematous. The wound was packed with gauze.

Pathology.—No less than six varieties of bacteria were plated among which was a staphylococcus.

After-course.—The swelling rapidly subsided. It required two months before the jaw could be opened wide enough to permit the extraction of the tooth. It lay parallel with the level of the alveolar
border and its crown impinged against the tooth lying in front of it. Recovery was complete after the removal of the tooth.

Comment.—The infection was a diffuse cellulitis and not a lymph gland infection. This made prompt and wide incision imperative in order to prevent extension of the infection into the mediastinum. This done the process was limited to the region of the jaw. To have removed the tooth at the time of the incision into the neck would have required an external incision with consequent scarring.

CASE 3.—A farmer aged thirty-four came to the hospital because of an infection of the neck.

History.—Two months ago his right upper wisdom tooth began to pain. A dentist made several attempts to extract it. A second dentist succeeded in removing it three days later. Soon after the first attempt he began to have pain in the neck below the jaw. This progressed slowly until the whole side of the neck was swollen. He had a low fever and marked loss of appetite. The pain was constant but not severe.

Examination.—The right side of the neck from above the mastoid process and medially to beyond the trachea is markedly swollen. The swelling is hard yet somewhat springy. It is somewhat sensitive on deep pressure. The advancing border is not apparently elevated, but on palpation there is a hard ridge not unlike the border of an erysipelas only much more pronounced. It is too dense to pit.

Diagnosis.—The slowly progressive character of the lesion with the thick tumor-like thickening suggested a woody phlegmon since it lacked the more acute symptoms of Ludwig's angina.

Treatment.—In order to be sure, the mass was deeply incised. The subcutaneous tissue was dense and glassy. It showed but little tendency to bleed and there was no pus.

Pathology.—A culture of cocci was obtained which failed to show the characters of any of the familiar forms. On section the mass is composed of a rich cellular mass not unlike a small round-celled sarcoma (Fig. 103). Many areas of polynuclear infiltration are found. At the border these cells follow in the edematous connective tissue spaces. Evidently the edema precedes the cellular infiltration.

After-course.—The lesion gradually extended downward over the chest and across to the unaffected side of the neck. He became septic,
showed signs of delirium with progressive dyspnea. These symptoms gradually increased until he died.

Comment.—The interesting feature is the slowly progressive course,

and the peculiar abundance of a lymphoid type of cells. A cursory glance at the section suggests sarcoma. A closer study shows in addition much granular fibrin and many polynuclear leucocytes.

CASE 4.—A merchant of fifty-two came because of an inflammatory affection of his neck.

History.—Two weeks ago he began to have pain on swallowing and noticed a swelling in his neck below the angle of the jaw which was very painful on pressure. His physician applied iodine, but the condition has become gradually worse, until now the whole side of the neck and floor of the mouth is painful. He has never had anything of the sort before.

Examination.—There is a bulging below the border of the jaw which is painful on palpation. The skin is not reddened and is mov-
able on the underlying mass. The chief part of the swelling projects into the mouth (Fig. 104). There is a palpable ridge between the tongue and maxilla which is extremely sensitive. The alveolar border is not affected and the affection does not seem to be focused at any one point and there is no fluctuation. The mucosa was cocainized and the prominent ridge was sounded with a fine round needle. Half an inch from the frenulum a solid object is struck.

Diagnosis.—The normal color of the skin and its mobility separated the affection from an infective cellulitis. The peculiar ridge-like swelling suggested the presence of a sialolith which was proved by the needle.

Treatment.—An incision was made over the point where the needle encountered resistance, and a stone turned out.

Pathology.—The stone was bean-shaped 15 by 10 by 7 mm. It was slightly roughened and of a yellowish brown color.

After-course.—The inflammation quickly subsided and the patient has remained well.
Comment.—This disease is usually overlooked because the surgeon does not think of the possibility. It is the ridge-like mass independent both of the jaw and tongue that should suggest such a condition. The cellulitis is sometimes extensive, but the skin is never involved as in a true cellulitis of the floor of the mouth. Abscess does not form. The x-ray may be used to locate the trouble, but when the stone is small, it may not show on the picture.

CASE 5.—A young farmer aged twenty-eight came to the hospital because of periodical swelling over his lower jaw.

History.—For eight years he has had periodic pains and gatherings over the right jaw near the ear. It never has had to be opened. Sometimes after the swelling reaches its height it suddenly goes down and he is relieved for a time.

Examination.—The parotid, particularly its anterior portion, is swollen and tender. He is able to open his mouth but little more than half an inch. After a considerable effort a fine probe (stylet from a hypodermic needle) is passed into Stenson's duct and a stone can be felt.

Diagnosis.—The swelling seems to involve the parotid gland and to be limited to it. The limitation of movement of the jaw must be due to irritation of the masseter muscle. It is not clear how a sialolith in the duct could cause such a swelling of the parotid and so little at the site of the stone. The history of sudden subsidence of pain seems to be explainable by assuming the release of dammed-up secretions.

Treatment.—The duct is slit open half an inch with a cataract knife but a stone could not be discovered.

After-course.—The patient has been free from recurrence now three years. The obstruction must have been only cicatricial.

Comment.—Stone in this duct, as compared to the submaxillary, is very uncommon. Symptoms may be caused by constriction of the duct without stone. At least cases are observed in which no stone can be found and opening the duct relieves of the symptoms.

Note.—After the above was written there was a violent recurrence of the trouble with involvement of the deeper tissues of the neck. An x-ray disclosed a malerupted wisdom tooth, the removal of which cured him once more—this time I believe for good. The inability
to open the mouth should have put me on the right track before. A simple damming-up of secretions in the parotid would not affect the muscles of mastication sufficiently to have limited the movements of the jaw. I am sure I have made this error before.

CASE 6.—A farmer aged sixty-eight came to the hospital because of a sore throat and swelling under his jaw.

History.—Three weeks ago the patient had a chill which lasted several hours and was followed by profuse sweating. He has had a tendency to chill since when exposed to the air. The day following the chill his throat became sore and the soreness has persisted. A few days later a swelling developed in his neck. For the past week fluid runs out of the nose when he attempts to drink. He is very weak, has palpitation when he moves about, has complete anorexia and a persistent headache.

Examination.—The patient presents the appearance of being very sick. He lies with his mouth partly open and fluid trickles out of it. A swelling is noted under the jaw which on palpation shows several glands the size of a pigeon’s egg. The mouth can be opened only imperfectly. On the anterior pillar and over the posterior portion of the toothless lower jaw is an ulcer half an inch by an inch and a half in extent. It is undermined with a ragged wall and a dirty gray base. The soft palate and uvula are edematous. The tonsil itself is hidden by the swollen anterior pillar and when forcibly exposed shows but a general redness. The patient has a dilated heart with a systolic apical murmur and an accentuated second sound. The urine contains albumin and hyaline casts.

Diagnosis.—The acute onset and the ulcer with glandular involvement indicate some acute infection. I had not seen such a picture before, but a swab from the ulcer showed an abundance of Vincent’s spirilla. The diagnosis therefore was Vincent’s angina.

Treatment.—The ulcerous area was painted twice a day with tr. iodine and glycerine, equal parts. The patient was much improved in a week.

After-course.—Subsequent observation indicated that his heart trouble as well as his albumin was of ancient date and he retained them after his throat trouble disappeared.
Comment.—This disease is generally overlooked. An ulcerous lesion calls for a microscopic study of its secretions. Usually the disease responds with astonishing promptness to iodine. One must guard against overlooking some associated disease. I once saw it as the terminal disease in a pernicious anemia which had previously been recognized, and once in leukemia in which a good prognosis was given because the leukemia was overlooked.
CHAPTER VI

DISEASES OF THE THYROID GLAND

NONTOXIC DISEASES OF THE THYROID

Enlargements of the thyroid may be either functional hypertrophies or neoplastic formations, and in considering their clinical aspects, both possibilities must be considered. The so-called innocent goiter may present the pressure problems of a benign tumor, with the potential of becoming a malignant one, and it may at any time manifest a perverted activity and become toxie. There is no such thing as an innocent goiter, any more than there is innocent dynamite.

CASE 1.—A farmer aged sixty came to the hospital for relief from a goiter.

Fig 105.—Huge colloid goiter.

History.—The patient has had a goiter for forty-four years. It grew gradually but slowly for many years, but has developed rapidly during the last few years. Aside from the inconvenience of its size,
he has not suffered from it. He desires its removal because its presence limits the movements of his head.

Examination.—A huge thyroid surrounds his neck acting as a jury mask (Fig. 105). His chin is held permanently aloft. Rotation is not hindered. The goiter is fairly firm but not hard. Veins the size of a finger are visible under the skin. The superior thyroid vessels are seen and felt as huge pulsating cords reminding one of the feel of the brachial artery in aortic regurgitation. The mass is movable around the neck. The sensation imparted to the examiner recalled that experienced in adjusting a horse collar.

Diagnosis.—The feel of the mass is firm and little elastic. That it is a colloid goiter is substantiated by the great size and long duration. The only question which presents itself is the risk in its removal. The large size of the vessels and the hardness of their walls made the question of their ligation a pertinent one. While the vessels are huge, there is no evidence but that their ligation would be successful, since neither these nor the vessels elsewhere in the body are unduly atheromatous. Generally speaking the large colloid goiters of long duration are easy of removal.

Treatment.—The right lobe and isthmus were removed at the first sitting. During the interval between the first and second operations
the lobe remaining had descended so that instead of occupying its normal position on the side of the neck it had come to lie transversely across the neck. Three weeks after the first operation four-fifths of the remaining lobe were removed. Both operations were simple of execution. The large size of the vessels made their localization easy.

Pathology.—The combined weight of the two lobes was four pounds. The section showed huge areas of colloid divided into small lobes by septae with here and there patches of cystic degeneration (Fig. 106).

After-course.—Healing was uneventful. After he recovered from the operation he showed slight mental aberration. It was thought the disturbance in circulation caused by the deranging of so large a reservoir near the brain was the cause of it. On inquiry a relative some weeks later relieved us by the information that he had shown these peculiarities for some years.

Comment.—Very large goiters, particularly those of long duration, are easy to operate because they are dislocated by their size. In the process of dislocation the vessels are made more prominent. In this dislocation the recurrent laryngeal nerves are sometimes astonishingly misplaced and resection may be made difficult because the two poles are so widely removed from each other. In such cases it is best to do a clean dissection, ligating each vessel cautiously until the nerve is located. It can then be avoided.

CASE 2.—A matron of fifty-two came to the hospital because of a large goiter.

History.—She has had a goiter thirty-two years. It has caused no trouble until recently. She has a shortness of breath which she ascribes to the goiter because when lying down the breathing is relieved if she can arrange her pillows in a certain way. The breathing is not disturbed by ordinary exertion, but when exertion is combined with stooping or leaning backward she has trouble in getting her breath. Her general health is good.

Examination.—She has a very large goiter which displaces the trachea markedly. It is unusually firm but elastic. It can be freely moved about, but manipulation produces a cough. The mass rides on the clavicle and presses under the jaw. The heart shows no abnormalities.
Fig. 107-A.—Gross appearance of a fibrous goiter.

Fig. 107-B.—Slide of the preceding showing the large amount of a cellular fibrous tissue.
Diagnosis.—The goiter seems to cause disturbance only because of its size. With any change of position it is forced against the trachea. The problem is that of a mechanical hindrance.

Treatment.—A simple lobectomy was done.

Pathology.—A cross section of the tumor shows it to be composed of fibrous tissue (Fig. 107-A) with a number of small cysts containing clear fluid imbedded in it. About the periphery the gland substance in a state of colloid degeneration is retained. In several parts of this there is a hemorrhagic infiltration. The slide (Fig. 107-B) shows a dense fibrous tissue with nests of compressed gland tissue. The glandular portion showed ordinary colloid degeneration.

After-course.—Recovery was prompt and the dyspnea was relieved.

Comment.—This is the most "innocent" goiter I have ever seen. Save as a mechanical factor, it was capable of little mischief. It shows in an exaggerated form the spontaneous obliteration of gland substance.

CASE 3.—A woman aged seventy came to the hospital because of a persistent cough.

History.—She has coughed for thirty years. It has varied in intensity, but this has not been dependent on any particular time of the year or any definite circumstances except that it was worse when she had a cold. During the past few weeks it has been aggravated by such an event. It is worse the fore part of the night and she has a spell in the morning after getting up. At this time sputum is more abundant than any other time of the day, but she raises some during the day the most of the time. The mucus raised is a dirty gray, except in the morning it is whiter and more foamy.

She has spells of distress and heaviness in the epigastrium following meals and has to be careful what she eats. Is obstinately constipated and the stomach symptoms improve after catharsis. She has lost 42 pounds in weight during the last year.

She has had a tumor of the neck for thirty years. It has grown gradually. It does not interfere with respiration now, but several years ago it caused a choking sensation at night. She has had a rapid heart now for the past year. She has had the goiter treated both by outside application and injection of medicine into the goiter substance.
Examination.—The patient is a small, stooped, much emaciated woman weighing scarcely a hundred pounds. Respiration is somewhat labored. Talking visibly tends to bring on coughing spells. Much effort is required to produce a glairy dirty whitish gray mucus. The dyspnea seems to be both inspiratory and expiratory. She has a medium large goiter, both lobes and isthmus being enlarged. A large, spheroid tumor occupies the isthmus; the goiter is firm and fairly well fixed.

The chest is barrel shaped. The right lung is less resonant than the left, particularly in the region of the fourth rib in front and the seventh behind. The breathing is somewhat tubular in this region. The left lung behind at its lower border is somewhat flat. There are medium-sized moist rales over the whole of the right lung and at the base of the left one. These findings varied in the different examinations made. The apex of the heart is displaced outward and downwards, the pulse is full and bounding but there are no murmurs. The x-ray shows radiating shadows, particularly in the right side, beginning at the hilus and extending outward and downwards.

Diagnosis.—She has a goiter, a chronic bronchitis with bronchiec-tasis. The problem to determine is the relation of the goiter to this syndrome and to calculate the effect of the removal of the thyroid. The dyspnea apparently is an obstructive one. The size and consistency of the goiter makes it well calculated to exert a pressure on the trachea. Whether or not the rapid pulse and tremor is the result of her general condition or from a secretion of the gland is more difficult to estimate. The determination of this must be awaited.

Treatment.—The patient was placed in bed and given ammonium chloride internally and creosote and benzoin inhalations twice daily. The cough improved under this treatment and the pulse came down to 72 to 90. After three weeks of this treatment the right lobe of the thyroid was removed. After the lobe was dislocated the trachea was found to be much flattened and care had to be exercised in order to avoid the compression of it during the manipulations. There was an area of calcification at its medial lower border.

Pathology.—The gland was made up of large amounts of colloid with some areas of hemorrhagic infiltration.

After-course.—The dyspnea disappeared at once after the removal of the thyroid. The distressing morning cough disappeared as if by
magic. She gained rapidly in weight but some expectoration continues, particularly in the morning.

Comment.—Unquestionably the compression of the trachea was the cause of her dyspnea. Whether this may account for her bronchiectasis or not is difficult to say. The general improvement has been so pronounced that it seems quite likely that there was some toxic secretion of the gland.

CASE 4.—A housewife aged fifty-eight came to the hospital because of a tumor of the neck and difficulty in breathing.

History.—The patient has had a goiter twenty-five years. It has attained gradually its present size. She does not believe it has grown more rapidly in recent months but it seems to fit more tightly resulting in restricted freedom of movements and sometimes in dyspnea. This is most marked when she lies down. It troubles least when she lies on a high pillow and points her chin downward and to the right. There is no trouble in swallowing, but there is some trouble in her speech. She has five grown children and has never had any illness of any sort.

Examination.—The front of the neck is occupied by a bosselated tumor mass. The mass in the right side is as large as an orange, the surface is hard, particularly its medial surface, which is stony. The left side is the size of a large lemon and is less dense than the right. The isthmus is represented by a mass the size of an egg. The mass is firmly fixed to the trachea and any attempt to study its mobility relative to the trachea and other tissues of the neck precipitates an attack of dyspnea. The general condition of the patient is good. No evidence of intoxication.

Diagnosis.—The very dense feel indicates that the glands are calcified in part. Its fixity to the trachea together with the presence of the dense area on the medial lobe indicates that the gland is attached to the trachea by calcified masses. The disposition to dyspnea when the tumor is manipulated shows that the trachea is flattened either by erosion or compression or both.

Treatment.—Because of the probable involvement of the trachea a tracheotomy tube and intubation set were at hand before the operation was begun. The right lobe and isthmus were removed. The gland was so closely attached to the trachea that it was removed with difficulty. There were calcareous masses uniting gland and trachea.
In making this separation just above the plaques a small artery was severed which was controlled with difficulty.

Pathology.—Many large plaques of calcareous material were scattered throughout the gland. Below and median were areas suggestive of malignancy.

Fig. 108.—Intratracheal thyroid. A. As seen at operation. B. As it may be conceived as appearing on cross section.
After-course.—A year later the patient returned, the left lobe having more than doubled in the intervening time. It was nodular and hard. A carcinoma could be diagnosed without the exercise of great acumen. This lobe was removed, albeit not without difficulty. No symptoms of myxedema developed. She returned in slightly less than a year complaining of dyspnea. Nothing could be seen or felt to explain it, so she was put to bed for observation, but she did not appear to the attendants to be suffering. She stated, much to my surprise, that she would rather be dead than to suffer constant dread of suffocation. This dramatic statement from the composed old lady quite took me aback. I sought to intubate, but the tube lacked half an inch of going home. I opened the trachea and found a globular tumor filling it (Fig. 108). It was attached for a third of the circumference of the trachea, about twice the extent indicated by the artist. This was excised with the electric knife and the trachea closed. No myxedematous symptoms appeared after this operation and it was evident that further thyroid metastasis was present somewhere. The mass removed showed malignant thyroid tissue. She was free from symptoms of any sort for six months. At this time a diffuse malignant growth developed on the left side of the neck which led to her death.

Comment.—In calcified glands which are attached to the trachea persistent bleeding points often result when the growth is detached. These can not be ligated and the most effective way is to touch them with an electric cautery or if this is not at hand, a pledget of gauze soaked with iodine may be pressed against them as was done in this case. In these cases also the trachea is often flattened and the trachea may become occluded. Usually by the careful manipulation of the gland, however, compression can be avoided. The fact that no myxedematous signs developed after the complete removal of the gland was evidence that metastasis had already taken place. The growth later discovered in the trachea would have in itself been sufficient to prevent hypothyroidism. Though there was a strong suspicion at the first operation that the goiter was malignant, a complete removal of the gland was not done. The history of goiter cancer shows them to be incurable. It is quite justifiable, to be sure, to do a complete removal when carcinoma is known to exist. Once the tumor has escaped from its capsule, requiring a section of arteries, veins and nerves and even of the trachea and esophagus, the opera-
tion clearly becomes a "stunt" and is removed from the legitimate field of conservative surgery.

**CASE 5.**—A boy aged ten years was brought to the hospital because of a goiter and frequent urination.

*History.*—His general health as a child had always been fair. He had had frequent attacks of tonsillitis. In June it was noticed that he was developing a goiter. In July his tonsils and adenoids were removed. In August his vision became poor and it was noticed that he passed urine frequently. The amount was determined to be 24 pints in 24 hours. He gets up frequently at night, which disturbs his sleep; complains much of a dry throat, and is losing weight.

*Examination.*—The boy is languid and listless. He weighs 65 pounds, which is a gain of 4 pounds in two months instead of a loss as his mother surmised. He has a median goiter the size of an egg. It is smooth and firm. There are no eye signs or tremors. The tongue is dry and inelastic. The urine is 1.002 and free from foreign elements. Pulse is 76. The x-ray shows a normal sella. (Fig. 109.)

*Diagnosis.*—The polyuria may be regarded as a diabetes insipidus. The x-ray failed to show any sellar change, but the visual

![Goiter in a case of diabetes insipidus.](image-url)
CLINICAL SURGERY BY CASE HISTORIES

disturbance suggests such a possibility. Despite the thyroid enlargement, his general demeanor suggests a hypofunction.

Treatment.—In the absence of pituitary extract he was put on a grain of thyroid extract night and morning.

After-course.—He returned in three weeks. There was no change save he had a tremor and distinct lid lag. He was put on pituitary extract four grains a day. He died a month later from unknown causes.

Comment.—The details of diagnosis and termination are lacking, but the association of enlargement of the thyroid gland, disturbances of vision, thyroid intoxication after the therapeutic use of thyroid extract and the early fatal termination makes it a case not without interest.

CASE 6.—I was called to see a woman aged fifty-eight because of a swelling of her neck.

History.—Six months ago she had a series of chills, fever, and fullness of the throat. Three months ago she had some cough with difficulty in swallowing. She thinks she had fever, for she had no appetite and lost in weight. From this time she had more or less difficulty at intervals in swallowing. A week ago all efforts at swallowing were unavailing. She had fever and became emaciated, and lost weight rapidly.

Examination.—The patient gives the general impression of acute emaciation. Her features are caved in and she fairly hangs on her pillows. Her weight can not exceed 70 pounds. Her thyroid is uniformly enlarged, each lobe being as large as an orange. The skin over it is red. To the feel it is hot and tense and the patient complains of pain on pressure. The sound meets an obstruction in the esophagus in the region of the thyroid, but can be easily forced past. The leuocyte count is 12,800 with 86 per cent polymorphons. There is no nervousness, in fact she is the embodiment of stoicism. There is no tremor. The urine is 1030, no abnormal findings. Her pulse is 120 to 130, the temperature is 99° to 102°.

Diagnosis.—The dyspnea and dysphagia obviously are due to pressure from the enlarged thyroid gland. The nature of the enlargement is not so easily determined. The redness of the skin and the local tenderness suggests an inflammation, a subacute nonsuppurating thyroiditis. The duration seems too long for this, however. The leuco-
The fully cosis. in an attempt of gained is long. rather removed patient's the purating was the condition became up should credulous sure 14.0 that on ity explored seen exploration tively count 99° for an acute abscess enlarged to again it was broken to slow was seen in the hospital. Her family stated that her wish was to die rather than submit to any operative procedure, and they desired to accede to her wishes. She died in two days.

Treatment.—The patient was fed regularly by means of a tube, and an ice bag was placed over the neck.

After-course.—In ten days she could swallow liquids freely and she gained rapidly in weight and strength. She still had a temperature of 99° to 101° and a pulse of 120. She rejected the suggestion that the enlarged gland be aspirated. She returned home and I learned in a month that she was gradually improving. Two months later I was again called in consultation. She was delirious and had a suppurating sinus over the highest point of the right lobe. When she attempted to swallow fluids they ran out of this opening. Obviously an abscess had broken simultaneously into the esophagus and through the skin. This had been going on for ten days, I was informed. The patient's tongue was dry and leathery. The pulse was running about 140 to the minute. I declined to see the patient again unless she were removed to the hospital. Her family stated that her wish was to die rather than submit to any operative procedure, and they desired to accede to her wishes. She died in two days.

Comment.—The course before final suppuration was unusually long. I little thought at first that it would break down. I was quite sure it was of that slow woody type, sometimes diagnosed sarcoma by credulous microscopists. Had I fully appreciated the situation I should have insisted on aspiration. One feels a hesitancy in stirring up an acute thyroiditis. The fact that the condition had been going on for six months before I saw her, that there was no softening and that it broke spontaneously two months later might be held to indicate that the condition was nonsuppurative in the beginning and only become suppurative later. This does not necessarily follow. I have seen cases in which the gland was as hard as bone and yet when explored showed an abscess. Instead of mildly suggesting the desirability of exploration in this case I should have demanded it. The relatively low total leucocyte count and the relatively low polynuclear count made me less certain than I might otherwise have been that exploration was urgently indicated.
CASE 7.—A farmer presented himself because of a swelling in the neck.

History.—Ten days ago the patient began to have headache without known cause. Soon he noticed a swelling in the neck which was tender. All these symptoms increased until the time he presented himself for examination. He has had no tonsillitis or any other sickness of which he is aware.

Examination.—The patient has a tumor on the right side of the neck just below the hyoid bone which moves with the trachea in deglutition. It is the size of a lemon and is tender to the touch, but is hard and nonpulsating. His pulse is 88 and temperature 100.2°. His white count is 18,000.

Diagnosis.—The tumor is obviously the enlarged right lobe of the thyroid. Its rapid enlargement and tenderness and the leucocytosis speak for a suppuration. The nonsuppurative type is usually slower in onset, but the leucocytosis may be as high. In suppuration the polymuclears are much increased, while in the nonsuppurative type the mononuclears may predominate. The mass is hard but that is the ease when the abscess is deep seated, as it usually is. The fever curve frequently assumes a pyemic curve. Positive diagnosis is made only by exploring the interior of the gland.

Treatment.—The skin and muscles covering the highest point of the mass were infiltrated with novocaine; this done, a larger needle was substituted and plunged into the depth of the tumor. Pus was produced. An incision was then made and a drain placed.

After-course.—In three days the pulse was 56, the temperature 97.6°. The headache was severe for two days following the drainage, but was controlled by aspirin. The drain was removed in four days. It required a number of months before the gland had receded to its normal size. Recovery was complete.

Comment.—This is the most frank suppuration of the thyroid I have seen. The disease is usually far more subtle. Usually fever lasts for a number of days even weeks before the enlargement of the gland is discovered.

CASE 8.—A school girl aged eighteen came to the hospital because of a large goiter.

History.—When the girl was three days old her mother noticed a lump in the lower part of the neck just above the collar bone lateral to
the windpipe. It has gradually grown until it is unsightly. She is otherwise well. Various treatments have been tried without avail.

Examination.—A mass occupies the right and midline of the neck. It is the size of a large orange. The left lobe is the size of an unhulled walnut. Save for this, she seems a normal girl. The general examination was wholly negative.

Diagnosis.—True to form, this congenital goiter seems to spring from the lower pole of the right lobe. With this history and the type, general treatment, despite the youth of the patient, offers little.

Treatment.—The operative removal was undertaken. As the gland was being dislodged a furious venous hemorrhage occurred. This was disconceerting both to the patient and to the operator so a liberal gauze pack was placed behind the partly dislocated gland and the operation suspended. After five days the patient was given a general anesthetic and the operation terminated without trouble.

Pathology.—The tumor was made up of colloid material. There was no adenomatous formation as one would expect from the history.

After-course.—Despite the fact that the incision in the soft parts was kept open five days by the pack, healing was smooth and uneventful, and the line of union not markedly conspicuous.

Comment.—This was my first goiter operation. The fault lay in trying to shell out the gland before the line of cleavage had been accurately located. This resulted in the tearing of important vessels, probably the middle vein of Koehler. The location of the line of cleavage is not easy, but it is the most important step in the operation. This case is detailed so that the beginner may see that if severe hemorrhage is encountered, tamponing may control the situation. It illustrates well the old saying that "he who fights and runs away may live to fight another day." An ignominious retreat is better than a dead patient. Many patients are lost because the operator persists after he is lost anatomically.

CASE 9.—A woman aged forty came to the hospital because of a goiter.

History.—The patient has had a goiter for five years and recently has had choking spells with rapid heart. Menopause four years ago. General health has always been good.

Examination.—A tumor as large as a medium-sized orange occupies the right side and median aspect of the neck. On inspection it seems
to be a goiter. On palpation it is found to be soft, semifluctuating, glides over the deep muscles of the neck and does not move on deglutation.

Diagnosis.—Its soft semifluctuating feel and the tendency to form lobulations at its upper pole suggests lipoma. It is evidently superficial to the platysma.

Operation.—Enucleation. The tumor lay below the superficial fascia and platysma and upon the deep muscle.

Pathology.—The tumor is a simple lipoma.

After-course.—The wound healed promptly and all the associated symptoms disappeared.

Comment.—Owing to the fact that the patient's doctor had diagnosed goiter and the patient had full confidence that the operation would cure, it was thought best not to disillusion her either before or after the operation. The sense of choking disappeared. It is difficult to understand how any pressure on the trachea might have been caused.

TOXIC DISEASES OF THE THYROID GLAND

There is no disease that offers the surgeon such a rich field for study as does the perversion of the thyroid gland. He has every advantage the internist and physiologist have and is besides enabled to study the changes wrought by lessening the blood supply and from the removal of a part of the disease. The lure to the acquisition of fundamental knowledge is impelling, for not only is the problem of technic still far from settled but the problem of recognition of the disease and its interrelation to other diseases is ever present. Every nervous and nutritional concomitant of surgical disease raises the question of possible perverted thyroid secretion.

CASE 1.—I was called to see a girl aged eighteen because of fever and delirium.

History.—The patient is said to have had good general health save for a severe dysmenorrhea, but for the past month or more she has been nervous and wakeful. Rather suddenly ten days ago she began to have fever and for the past four days she has been delirious at
times. The disturbance was attributed to the dysmenorrhea, for when she first took to her bed she did so because of abdominal cramps.

Examination.—The pulse was 150, the apex bounding in the anterior axillary line. The eyes were protuberant and Stellwag’s sign was so marked that intervals of a minute elapsed between involuntary winking, and Dalrymple’s sign was so marked that fully half a cm. of the conjunctiva above the cornea was exposed. She had a mediumsized, uniform, soft goiter which pulsated violently.

Diagnosis.—Obviously this was a marked example of thyroid intoxication.

Treatment.—Rest in bed with large doses of bromides, 20 gr. four times a day, were employed. The fever subsided gradually, and in two months she had a pulse of 120 and was gaining in weight.

After-course.—While in this state much to my amazement she married. I warned her of the probable disastrous effect of pregnancy. Contrary to my dire predictions, she became pregnant promptly and promptly improved. At the termination of pregnancy little of the thyroid intoxication save the exophthalmos remained. When she menstruated again, six months after delivery, she did so without pain. She subsequently went through four more pregnancies, the last a twin, without any recrudescence of the thyroid symptoms. Recently, now forty-two years of age, her menses have become irregular and she has hot flashes, and is again showing mild symptoms of thyroid intoxication and some goiter.

Comment.—It seems impossible to predict which patients will be markedly injured and which benefited by pregnancy. We may assume that the dysmenorrhea in this case had a deleterious influence on her thyroid gland and that pregnancy, by causing this to subside, relieved the gland of this irritation. With the approaching menopause, there is a slight recrudescence of the thyroid disturbance. As a working basis it may be assumed that those in whom the thyroid disturbance is associated with dysmenorrhea, particularly if there is an exacerbation at the menstrual period, are most apt to be benefited by childbearing. Those who are neurotic and free from pelvie disorders are more apt to be made worse by pregnancy. Practically, it is safe to advise all against marriage and childbearing, for one may be assured his advice will go unheeded if opportunity offers, and if unfavorable results follow, no blame will attend the advice.
CASE 2.—I was called to see a young woman because of persistent vomiting.

History.—The patient has one brother who has always been neurotic and was kept in a private hospital several months because of melancholia. The patient during her girlhood was somewhat nervous and excitable, but her general health was good. She has one child two years old. During her pregnancy she developed a goiter and was exceedingly nervous. After labor she gradually improved but the nervousness and goiter persisted. She has now missed two periods and for the past three weeks has vomited persistently and has become rapidly emaciated. She has become weak and exceedingly nervous during this period. Her chart shows a pulse rate of 140-160 and a temperature of 101-102°. Her eyes have become prominent during the past week. She sleeps only when under the influence of a soporific.

Examination.—There is a medium soft symmetrical pulsating goiter. Exophthalmos is marked. Graefe and Kocher signs are pronounced, pulse 140, full and bounding. The uterus is the size of a three months' pregnancy, retroverted, the cervix is soft, lacerated, and everted. There is a second degree perineal laceration. There is a marked acetonuria.

Diagnosis.—The thyroid intoxication and pregnancy were obvious. The diagnosis has to do rather with estimating the resistance than with the naming of the disease. The hyperemesis seemed the dominating factor and the cause of this likely was the pregnancy. She had some persistent vomiting during the first pregnancy. Persistent vomiting as well as rise in temperature and rapid emaciation may attend acute thyrotoxicosis. It was not possible to determine definitely to which factor the alarming condition was due. The fact that the goiter appeared during the previous pregnancy made the supposition that pregnancy exercised a deleterious influence over her thyroid plausible. At any rate in the face of fever, emaciation, and acetonuria any operation on the thyroid would most certainly result fatally. The pregnancy, in addition to being the most plausible offending factor, seemed to present possibilities of relief by interference.

Treatment.—The uterus was rapidly emptied. In the hasty dilatation the cervix was lacerated requiring a suture to control the hemorrhage. The fetus was enucleated with the finger.

After-course.—The hyperemesis subsided promptly and the nervous symptoms subsided materially but without material change in the
goiter and exophthalmos though the pulse came down to around a hundred. Six months later pelvic repairs were made. After that the patient improved more rapidly. She continued to improve and for the past ten years she has considered herself well, but is still nervous when "company comes." The eye signs disappeared but exophthalmos is still present to a limited degree. The enlargement of the thyroid has subsided.

Comment.—Where two conditions are present, each capable of giving rise to the threatening symptoms, it is advisable to attack the factor which can be made to subside with the least risk to the patient. If this proves to be the dominant factor, the fortune is so much the greater. In such cases it is inadvisable to delay interference by the use of temporizing measures. In this case the bromides and chloral had been used to produce sleep without in any degree mitigating the hyperemesis. Since the acetonuria promptly subsided when food was retained, it was obviously due to starvation and not to the thyrotoxicosis, though thyroid intoxications of this degree are commonly attended by acetonuria.

CASE 3.—A woman aged forty came to the hospital because of dyspnea, vomiting, and goiter.

History.—The patient has had three children. Her health was good until three or four years ago except that she usually vomited a day or two before the menstrual flow began. At this time she began to have vomiting spells at times other than the periods. She lost weight rapidly, going from 190 pounds to 90. It was discovered by her physician that she had a pulse of 130 and was developing a goiter. She was treated by injections of iodine into the substance of the goiter. Twenty minims of the tr. of iodine were injected into the substance of the gland at intervals of several weeks for eight weeks. During this time she gained 38 pounds in weight. During the three years since the treatment above detailed was given, she has done fairly well. Three months ago the vomiting became more persistent and the injections were repeated though without benefit. Now the vomiting begins a week before menstruation and continues a week afterwards. Menstruation itself is not painful and lasts two days. There is some frontal and occipital headache at the beginning of menstruation, but none at other times. She has some leucorrhea, particularly just before and after menstruation.
Examination.—There is moderate exophthalmos but no other eye signs. There is marked pulsation of the neck, but the gland itself does not expand. There is a moderate goiter, bilateral, quite firm, and but little movable. There is marked tremor. The pulse is 120, the apex is diffuse. There is a moderate perineal laceration. The uterus is large, retroverted, firmly fixed by masses on either side, and there is a small fibroid in the left upper pole. The uterus is tender on bimanual examination.

Diagnosis.—The diagnosis of hyperthyroidism is apparent at a glance. The only problem is that of interrelation of thyroid and uterine symptoms. The premenstrual vomiting antedated the recognition of hyperthyroidism by seven years. The hyperthyroidism was terribly toxic when first recognized, the patient having lost half her weight. The toxic symptoms subsided simultaneously with the rest in bed and iodine injections. After three years the symptoms became worse, often coincident with an increase in the menstrual vomiting. It is possible that there was present already some thyroid disturbance which played a part in the premenstrual vomiting or that the pelvic disturbance reacted on the thyroid, producing symptoms of intoxication. It is of interest to note that the intraglandular injection of large doses of tr. iodine produced a rapid subsidence of the thyroid as well as the uterine symptoms. At present both sets of symptoms are aggravated. On the whole it seems that there is an abnormally sensitive endocrine system that responds readily to a slight stimulus. Since the pelvic lesion is one justifying surgical treatment an attempt to break the vicious chain by these means seems justifiable.

Treatment.—Supravaginal amputation was advised but rejected.

After-course.—The patient continues in a state of semiinvalidism, now better, now worse.

Comment.—This case illustrates very well the disposition to vomit not infrequently noted in patients with a labile thyroid. In such cases operation on the thyroid itself is highly dangerous. Consequently if any associated lesion, having any bearing on thyroid secretion can be discovered it should be corrected if possible.

CASE 4.—Physician aged thirty-six came to the hospital because of attacks of nausea and vomiting.

History.—Measles and mumps in childhood. Four years ago he had a spell of sickness in the fall of the year in which he had nausea
and vomiting and diarrhea accompanied by a fever of 102-103°. Sick about ten days. No pain at any time.

Present trouble began about two years ago with a nausea that would come on him suddenly. It came on with no particular regularity. They come at intervals of one week to six weeks. They come on always in the daytime, but were just as apt to come before meals as after them. He would lie down and vomit once, rarely more than once, and in fifteen minutes get up and go about his work again. He would not have any appetite afterwards, but otherwise felt all right. He had no pain whatever with the attacks. He was never jaundiced with the attacks or afterward. He has had no abdominal distension. He was almost always constipated before the attacks. No particular food seemed to have anything to do with the attacks. Vomitus green and contained food particles.

About May 1, 1919, he noticed an increasing constipation. He felt all right but he began to take cathartics and could get no bowel movement. He took Hinkles, A.B.S.C., and mag. sulph. without results. In about three days he became very nauseated and began to vomit. He had no pain, distention of the abdomen or temperature. Does not know the pulse rate. The vomitus at first was bright green and as it continued, it became feecal in character. Vile taste and smell. Taste bitter and sour at first. He vomited every half hour or so for 4 to 5 days. It continued day and night. Food taken was vomited. Even water was brought up. At the end of five days he took some sodium phosphate which for the time settled his stomach and he got up and went to the hospital. He felt all right then for a day and a night and did not vomit. He was given some tablets and the nausea and vomiting started again. He vomited for five days. He was given enemas and laxatives and finally his bowels moved for the first time since the onset of his attack, an interval of about ten days without a bowel movement. As soon as his bowels moved he was relieved and went home. For the next ten days he did not vomit, he ate some, his bowels moved about every day with a cathartie, but he did not feel well. His nausea and vomiting then returned and he vomited every fifteen to twenty minutes for a day. His bowels had begun to become constipated the day before and with the second onset again stopped moving. He vomited again for six days, when they again got his bowels moving and he got better. He then came to Halstead Hospital and last night (6/31/19) he was given three Hinkles.
He slept well but this morning woke up with nausea and vomiting. The vomitus is green, tastes bitter and sour. He vomits frequently, fifteen to twenty minutes. No pain, no rise of temperature. Never any blood with vomitus. Bowels moved, stool white. Never noticed this before. He has no headache, no shortness of breath on exertion, no habitual cough, no edema of face or extremities, no night sweats. He has probably lost 20 pounds in the past year.

He uses no alcohol. Chewed tobacco a great deal until June, 1918, when he quit because he thought it might affect his nausea. Smoked a good deal afterwards, three to six cigars a day.

**Examination.**—Pupils dilated, react to light and are equal and regular. No thyroid enlargement. Throat negative. Heart not enlarged, no murmurs. Pulse 95, regular. Lungs negative. No tumor mass in abdomen, no points of abdominal tenderness. Reflexes, all exaggerated. Patient has a rather nervous, restless appearance. Very little or no tremor.

Blood-Hg. 75-80%. W.b.c., 8,200-8,600-9,600. R.b.c., 3,648,000-3,860,000. Dif. Count. Polys. 42%-46%. L.L. 6%-6%.-S.L., 52%, 48%. Eos. 2 in one slide.

**Gastric—Emesis,** about 50 c.c. Free HCl. 35%—Comb. acidity 65%. Urine 1012, negative.

X-ray examination of the gastrointestinal tract was done twice. The first time showed a normal pylorus and duodenal cap, but at the end of six hours there was quite a retention of food in the stomach. At the end of twelve hours the meal had passed to the colon. The colon was filled all the way, the appendix filled, and the colon showed much spasticity.

The second examination was like the first, except the stomach was empty in six hours and at the end of 12 there was still barium in the terminal ileum.

In the next few days while in the hospital the patient had two attacks of nausea and vomiting with a three-day interval between them. They lasted six to eight hours. There was never any blood in the vomitus. It seemed that the cathartic brought on the spells.

**Diagnosis.**—In the face of the entirely negative physical findings and the marked increase in the small leucocyte count and the nervousness of the patient and the high pulse rate, always about 100, a diagnosis of some disturbance of internal secretion, most likely a hyperthyroidism, was made.
Treatment.—Sod. brom. gr. x, Fl. Ext. Hyoscyamus m. vi, t.i.d. p.e. was given.

After-course.—He visited a distinguished clinician, when after a thorough examination, a tentative diagnosis of tabes was made. The subsequent course has not made the nature of the disease clear.

Comment.—This case likely represents some disturbance of the endocrine system. Possibly time will clear up the problem.

CASE 5.—This patient aged twenty-nine consulted me because of persistent nervousness.

History.—The patient's mother died from some wasting disease soon after the daughter was born. The patient has been nervous for years. Since April she has had a shortness of breath and palpitation. This has gradually grown worse. Her general health has been fair. She was nervous, sleep was not good, and the appetite generally indifferent. It is better now than usual, despite the advent of the new symptoms. She has pain over the eyes but no real headache. The bowels moved ten to twelve times a day for a time but only move two to three times now. The menstrual flow is scant, lasting one to two days and until just recently she had not flowed for 5 months. She always has pain during the flow. She has missed for two or three months at a number of times. She has more or less pain over the pubes and has leucorrhea at intervals. This has been nearly constant for the past two months.

Examination.—The patient is quite tall, flat chested, decidedly frail in appearance. She has recently lost 15 pounds and now weighs less than a hundred pounds. There is a moderate bilateral enlargement of the thyroid. No eye signs. The pulse is 140, bounding, the apex beat is diffuse and there is marked tremor of the hands.

Diagnosis.—Hyperthyroidism can be diagnosed at a glance. Diagnosing the patient is quite another matter. Born evidently of an ailing mother she has had barely the vitality needed for existence. The thyroid enlargement represents only an additional burden. Amenorrhea and diarrhea both bespeak a high degree of intoxication. Resistance for operation is low, the recuperative powers very light.

Treatment.—In view of the patient's past history and the gravity of the present condition, operation was refused, and the patient advised to seek rest in bed and sedative tonic treatment, bromides and nux vomica.
After-course.—She improved somewhat on this treatment during the following months. At the end of this time she had a part of the right lobe of the thyroid removed by a competent surgeon and a month later the appendix. Six months after the first thyroid operation a portion of the left lobe was removed. Subsequently she was given x-ray treatment. Following this last operation she gained 15 pounds in weight. Two years later she reappeared complaining of much the same symptoms. She had pain in the lower abdomen. She menstruates every five to six weeks for ten to twelve days. The flow is scant and the suprapubic pain persists. Her pulse is 100, the heart still dilated, and she is able to get about only with great effort. There is a small lump of thyroid as large as a hulled walnut, in the region of the left lower lobe. It is dense and slightly painful on manipulation. She recently found a tumor of the left breast. She has pain in it before menstruation. Examination fails to show anything that might be regarded as a tumor, but the breast is firm, cake-like, a diffuse interstitial mastitis.

Comment.—It is a question whether the operation did the patient any good. It is my belief that operation on the thyroid in neurotic substandard persons such as this is ill advised. In reviewing this history, I do not believe the surgeon who operated on the patient proved his point. Certainly the removal of the appendix with the hope that it would relieve the persistent suprapubic pain was wholly without justification. The patient now, though scarcely able to get about, is still seeking for further operative effort. True she improved some, but such patients do improve with simple rest and time. Nothing will save her from being what she always has been, wholly substandard.

CASE 6.—A telephone operator aged twenty-nine came to the hospital because of loss of appetite and digestive disturbance.

History.—For a number of months the patient has had epigastric distress. This distress bears no particular relation to meal time and the kind of food makes but little difference. There has been marked loss of appetite with some vomiting and at times intense pain in the temples. She has lost 15 pounds in weight in the past three weeks. Recently she has had a feeling of choking, particularly when first lying down. She has been more nervous recently, which she ascribes to the lack of proper nourishment due to the stomach condition. She
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sleeps fairly well, but not as well as formerly. She dreams more and does not feel refreshed when she gets up, as formerly. There has been no dizziness. She has long been constipated, but this has been aggravated recently. Menstruation is painful. The stomach trouble is not aggravated at that time. Ulcer has been diagnosed and she is on a diet in harmony with this opinion.

Examination.—Pulse 134, full bounding, the apex beat is diffuse, there is a pronounced tremor of the hands. She has a moderately sized goiter, particularly the right lobe, which extends under the sternomastoid as high as the hyoid bone and well down to the clavicle. The goiter is soft and pulsating. She had not noticed any symptoms in the neck, save the sense of choking above noted.

Diagnosis.—The enlarged thyroid together with the rapid pulse and tremor are sufficient to classify the condition as hyperthyroidism. The question arises whether she may or may not have an affection of the stomach. There is nothing but that can be explained by the hypersecretion.

Treatment.—A general nerve sedative treatment was carried out. A liberal diet was advised.

After-course.—On this treatment the symptoms generally improved and she regained her weight. The goiter has not changed, though the pulsation has lessened. She is not bothered by the sense of choking. Her appetite and digestion are satisfactory. Operation was advised, but she feels confident improvement will continue. Most likely she will improve, but relapse is also likely.

Comment.—When there is any doubt as to whether hyperthyroidism explains all the symptoms or not, it is well to employ sedative treatment until this point can be determined. A thyrotoxic patient may have stomach trouble, notably hyperacidity and ulcer. The attempt to meet these conditions by diet in the presence of the over-active goiter but aggravates the latter condition. Actual hemorrhage is the only symptom that compels an active ulcer treatment. This case should have had a lobectomy, for despite her temporary treatment a relapse is likely.

CASE 7.—A matron aged forty-one came to the hospital for relief from a goiter.

History.—She has six children and had one miscarriage at three months, twelve years ago. For the past three years she has had a
weak heart. It beats too hard whenever she becomes agitated, not so on exertion. She has smothering spells during the day. Despite a good appetite, she is losing strength and weight. She gets trembly spells without known cause. Her menses are regular, last two days, stop for a day then flow two days again. During the periods she has indefinite abdominal pain and a constant dragging low in the back. These are made worse by long standing, as in ironing.

Examination.—The patient seems well nourished and does not display the nervousness of which she complains. There is a marked fine

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Fig. 110.—A. Gross appearance of an adenomatous thyroid. B. Gross section of the same.

Fig. 111.—Microscopic appearance of a toxic fetal adenoma.
tremor in the hands, however. She has a well circumscribed nodule in the isthmus, the size of a turkey egg. The lateral lobes are not enlarged. The pulse is 124-140, quick and jerky. The heart is not enlarged. The uterus is large, retroflexed and tender. There is a second degree perineal laceration.

Diagnosis.—There is evidently a hyperthyroidism as indicated by the nervousness and tremor. There is also an endometritis as evidenced by the intermittent menstruation and lower abdominal pain. The well localized goiter suggests itself as the first line of attack.

Treatment.—The circumscribed area was shelled out and the wound closed without drainage. The lateral lobes were inspected and appeared to be normal.

Pathology.—The external surface is smooth and regularly ovoid (Fig. 110). The cut surface shows a uniform granular appearance. The slide shows evidence of cellular activity. The glandular increase is much more marked than the increase of colloid content (Fig. 111).

After-course.—The nervousness and tremor as well as the tachycardia disappeared so that before she left the hospital her pulse was 75 to 80. She declared herself to be perfectly well. Three years later save for the distress at menstruation she had no complaints.

Comment.—This case illustrated the prompt results which may be obtained when the sole cause of intoxication is confined within the adenoma without involvement of the remainder of the gland. Had this patient had a small uniform goiter, I should have done the pelvic repair first.

CASE 8.—A carpenter aged thirty came to the hospital because of weakness in the knees and shortness of breath.

History.—The patient has been sick three and one-half months. He noticed some shortness of breath, but has been particularly annoyed by a weakness in his knees. The knee trouble has become so marked that he can not work because of the uncertainty of his gait. His knees gave way so suddenly several times that he was precipitated to the ground while he was at work. He sweats easily. He has slept poorly for several weeks, but has been sleeping better during the last two weeks. His appetite is good, and he has lost no more weight than he usually does during the summer, about 10 pounds. His regular weight is 165 pounds.
Fig. 112.—Section of toxic thyroid.

Fig. 113.—The ascini are widely dilated and the cells form papillary projections into their lumen.
Examination.—The man presents the appearance of exhaustion and appears to have lost much weight. When his statement of no unusual loss of weight is questioned, his gaze becomes fixed and the eyelids slowly become elevated leaving a considerable scleral border exposed. He has a medium goiter on the right side. It is moderately soft and nonpulsating. The tremor of the fingers is marked, the pulse is 120, and bounding, the apex beat is broad but not displaced. The laboratory findings were negative. He weighs 138.

Diagnosis.—The presence of toxic goiter is unquestioned. The determination of operability is the only question. His appetite is good, he has lost considerable weight but he sleeps well. There is nothing in the urine that is prohibitive.

Treatment.—Right lobectomy was done.

Pathology.—The gross specimen showed a uniform, reddish-gray, fine granular surface (Fig. 112). The section showed a typical papillary proliferation (Fig. 113).

After-course.—He improved promptly and was able in six weeks to do heavy work which he continued to do for a year.

Reentry.—Eighteen months later he felt the weakness and nervousness returning. Six months later he began to notice palpitation of the heart and one week ago his knees began to give way again, causing him to fall. He has lost 30 pounds since the beginning of his trouble, but is 20 pounds heavier than he was just after his first operation. He still sleeps well, the appetite is fair, and the bowels are regular.

Examination.—The left lobe of the thyroid is enlarged, smooth, fairly firm, movable. There is noticeable exophthalmos and Graefe is positive. He is of a nervous, jerky appearance. Some tremor of the tongue and fingers. Pulse 90, after lying in bed one-half hour.

Diagnosis.—The diagnosis was easy, as in the first entry.

Treatment.—Two-thirds of the remaining lobe was removed.

After-course.—Uneventful, and improvement was as complete as after the first operation.

Comment.—Here one lobe enlarged first attended by the typical symptoms. Its removal cured the patient. Obviously the left lobe at this time was in a normal state. Later it developed. This is often the case. When one gland enlarges rapidly, usually sooner or later the opposite side will enlarge. The patient should be apprised of this possibility. In such cases it is important to remove the enlarged lobe.
before its fellow begins to enlarge. It is interesting to note that the patient had lost about 30 pounds though he was not aware of it. It is always worth while to learn the weight of the patient when last weighed and then by comparing the present weight the actual loss can be approximated. Patients are very apt to be much mistaken as to the actual state of their weight. The weakness of the knees prominent in this case is an unusual but important sign of hyperthyroidism. It sometimes appears when none of the pathognomic signs are present and should serve to cause the diagnostician to search for other symptoms.

**CASE 9.**—A housewife aged forty-three came to the hospital with a complaint of nervousness and weakness.

**History.**—Her present trouble began four years ago with nervousness and increasing rapidity of heart action. She thought they were due to gallstone trouble. There was no enlargement of the neck at this time. She also noticed that she had a choking cough when she drank fluids. This cough has persisted to the present time. Two years ago she noticed a prominence of the eyeballs and an inability to control the eyes. The nervousness, palpitation, and eye trouble have steadily grown worse. She also noticed herself getting weaker from the beginning of her trouble. A month ago she had an attack of some kind of sore throat and at that time all her symptoms grew suddenly worse and have continued so. She has been troubled with shortness of breath and puffiness of the face and extremities a great deal of the time. She also noticed these symptoms for four years, but the puffiness of the extremities has not been so bad of late. Last winter for six months she felt well. She feels hot much of the time, sweats easily, and gets flushed when excited. She has to have a temperature of about 60° F. to keep comfortable. Her appetite is very good, the bowels regular, but she sleeps poorly. There is no urinary disturbance.

**Examination.**—Blood pressure 205-95. The patient is a well-nourished individual. Her general appearance is that of an anemic person, but the mucous membrane of the eye and mouth are not pale. She does not appear to be extremely nervous, but she has a marked tremor of the fingers. Both lobes of the thyroid are enlarged. There is a moderate exophthalmos, otherwise negative. There is a soft systolic murmur over the base of the heart. This is not transmitted.
Diagnosis.—The patient bears the diagnosis of exophthalmic goiter with her. The fact that she improved once spontaneously and now has a relapse indicates the need for radical procedure. While the disease is well marked the fact that she has lost no weight and has a good appetite warrants recourse to operation without preparatory treatment. This degree of toxicity with a firm uniformly enlarged

Fig. 114.—Section of glandular thyroid.

Fig. 115.—Slide of the preceding showing increase of the gland acini.
gland makes the prognosis somewhat dubious in so far as immediate results are concerned.

_Treatment._—The right lobe of the thyroid was removed. It was small, hard and densely adherent to all surrounding structures. It was very firmly adherent to the trachea. A thin slice of the posterior and internal side of the gland was cut off along the trachea. Wound was closed without drainage.

_Pathology._—The section of the gland shows the fine dotted field of a glandular proliferation in part while the remainder is light gray in color due to a general degeneration of all elements and not to a colloid increase. The slide shows a great increase in the acini with separation of the cells from the walls.

_After-course._—The patient made a normal recovery. For the first two days all of her symptoms were aggravated, but after this they gradually began to improve. Her highest temperature after operation was 100.5° and pulse 128. She was extremely nervous the first ten days. At the time of dismissal from the hospital her pulse was about 80 to 100 and the nervousness was much improved. She continued nervous many months, but gradually improved, although her condition after several years is still unsatisfactory.

_Comment._—The delay in improvement may have been due in part to the fact that she evidently had an acute thyroiditis some months before operation.

_CASE 10._—Young woman aged twenty-one entered the hospital because of enlargement of neck, nervousness, rapid heart, and difficulty in swallowing.

_History._—She first noticed an enlargement of the neck at the age of fourteen. She apparently had no symptoms from it and consequently paid little attention to it. Three or four years ago she noticed that it was beginning to get larger. She also noticed at this time that she was getting nervous. Nervousness was the only symptom at that time. This steadily increased. The next thing she noticed was a rapid heart on the least exertion, which would slow down when she rested. She has noticed during the last two years that the heart was more rapid even during rest. Six months ago her family noticed the increasing prominence of the eyes and that the neck enlargement was increasing more rapidly than ever before. About five weeks ago all of her symptoms increased in severity rather suddenly,
and added to the troubles she already had, a difficulty in swallowing fluids set in. She now chokes whenever she tries to swallow. The palpitation and nervousness is much more severe. She has hot flashes and feels uncomfortably warm all the time. Her appetite is good and her bowels regular. She sleeps well.

Her menses started at twelve and have always been regular. She flows three days and save for some backache she is free from pain. She has had severe attacks of tonsillitis every winter as long as she can remember. She had smallpox three years ago and was severely sick. She has one sister and five brothers who are well. No history of goiter in the family.

Examination.—The patient thrusts her diagnosis upon the observer. Eyes moderate but positive exophthalmos. Von Graefe, Stellwag, and Moebius signs are all positive. Tonsils hypertrophied, filled with large crypts. Tonsils and pharynx red and look inflamed.

The thyroid gland is almost uniformly enlarged, right lobe is perhaps a little larger than the left. It is smooth, rather hard and non-pulsating. Heart not enlarged, apex beat is in the 5th interspace and is diffuse and bounding. There is a loud blowing murmur at the apex, systolic in time, and is well transmitted to the axilla and the left side of the sternum. Pulse rate 135, regular, the blood pressure 156-75.

The reflexes are exaggerated. The patient is well nourished, rather slightly built, but has the general appearance of good health. She is manifestly extremely nervous and has a marked tremor of the fingers. The skin has the appearance of being flushed.

Diagnosis.—The disease is labeled. The patient not so. The gland is hard, suggestive of thyroiditis. The heart lesion, judging from the location and transmission of the murmurs, is probably organic. There has been a slight but not marked loss of weight. All these factors indicate that she is not a good operative risk.

Preoperative Management.—The patient was put to bed at absolute rest in an attempt to get the nervous symptoms quieted down. She refused to take her illness seriously and sat up in bed whenever she felt like it and did about as she pleased generally. Her pulse rate decreased some and her nervousness was some better, but at the end of a week she returned home without any appreciable improvement in her general condition. She reentered the hospital two weeks
later, her condition being about the same as in the previous entrance. The pulse was 146 after being in bed two hours.

_Treatment._—Despairing of securing a better state, most of the right lobe, the isthmus, and a part of the left lobe of the thyroid were re-

![Fig. 116.](image)

Fig. 116.—Glandular thyroid with a small encapsulated area in the center.

![Fig. 117.](image)

Fig. 117.—Slide of the preceding showing the encapsulated nodule to be a fetal adenoma while the remainder shows papillary proliferation of the epithelium.

moved. The whole gland was large and very vascular and rather difficult to remove because of its close association with the capsule.

_Pathology._—The cut surface shows a fine granular field with an encapsulated nodule in the center (Fig. 116). The slide of this nod-
ule shows the usual structure of a fetal adenoma. The bulk of the gland shows a good deal of round cell infiltration and papillary proliferation (Fig. 117).

After-course.—On the day of the operation after the effect of the morphine, given before the operation, had worn off, there began to be noticeable an increase in the patient's nervous symptoms. Her temperature went to 100.5° and the pulse to 140. The pulse remained of good force and regular. She slept very little that night even after a hypodermic of 1/4 grain of morphine was given. Her temperature went down to 97.8° during the night. The next morning all symptoms were worse. The nervousness increased and the pulse ran between 140 and 150. She vomited frequently a green fluid during the preceding night and early part of the day. The respiration went from 30 to 38. By noon the pulse was running about 150 and she developed a marked arrhythmia. It was weaker at the wrist than previously. The temperature went to 102.5, axillary as it could not be taken accurately by mouth. She was getting a sodium bicarbonate solution by proctoclysis. By midnight the pulse was running 160 to 165 stethoscope count. It was extremely arrhythmie and could not be counted accurately at the wrist. The respiration was 50 per minute and the extreme nervousness gave way to periods of lethargy at times. She had the appearance of being extremely toxic. On account of the extremely rapid and irregular pulse rate tr. digitalis m xv had been given every three hours by mouth since noon. Up to midnight it had apparently had no effect. An ice bag was placed over the heart because the patient was complaining of precordial pain. The pain apparently was relieved by the ice bag, but it had no effect on the heart action. Sodium bicarbonate had been given all day by mouth and by proctoclysis. In the evening and up to midnight the patient coughed at times and brought up a blood stained mucus. Anteriorly the lungs showed no edema, but the bases were not examined posteriorly because it was deemed best not to disturb the patient at this time.

The patient's condition improved between the succeeding midnight and the following morning very noticeably. The restlessness and nervousness were markedly less. The patient did not sink into the semistuporous condition as she did at intervals the day before. The respiration rate receded to 42, the pulse to 150 and was regular in contrast to the marked arrhythmia noticeable during the preceding night. The cough decreased somewhat and the sputum came up with
greater ease. At 2 p.m. there was no particular change since morning. Pulse 150, regular, strong, respiration 40. Temperature dropped from 102.5° to 100.5° (axillary) since the preceding night. General condition of the patient much improved the next day. The temperature in the morning was 100.6° and the pulse 130 and strong. The nervousness was much allayed and the patient seemed much improved in general.

From this date on the temperature did not rise over 99.5° and the patient's general condition steadily improved. There was a marked improvement noticed from day to day in her general nervous condition. She did not exhibit the jumpy nervous action which she had previous to operation. Up to the time of dismissal her pulse did not go below 110. It remained around 118 to 120 stethoscope count. The systolic murmur at the apex persisted up to the date of dismissal from the hospital. She improved rapidly during the year following, and, save for slight instability of the nervous system, she is well.

Comment.—This case presents a stormy recovery, the patient obviously just missed disaster. It is clear that she was in no state for radical operation and ligation would have been useless. Preliminary treatment of a month or two in bed should have been insisted upon. Patients showing marked toxic symptoms with hard glands are poorer risks than equally toxic patients with soft pulsating glands. They do not show the prompt improvement after operation. If improvement does come it is only after many months. If one is asked to choose between immediate operation or nothing he should unhesitatingly choose the latter.

CASE 11.—A maiden lady aged fifty came to the hospital because of weakness and palpitation.

History.—For the past six months the patient has been weak, becoming exhausted on the least exertion. These symptoms date from an acute tonsillitis but have grown progressively worse. Three months ago she became emotional and had insomnia. She consulted a physician who discovered a goiter and noted that her pulse was 132. For a month she has had severe headaches. She has lost 30 pounds in the past few months. For the past few weeks she has had choking spells, particularly after first getting up in the morning. She had a goiter as a child. Ten years ago she had a spell of nervousness similar
to her present one but not nearly so severe and it subsided in a few months under general treatment. She had typhoid at twenty and diphtheria at twenty-two. Her father and one sister had goiters.

Examination.—The patient’s general attitude is apprehensive and she is manifestly nervous. She seems depressed and her skin hangs loose and is inelastic as though she had lost much weight. Her gaze is somewhat fixed and staring, but there are no definite signs present. She has a medium large, fairly firm, nonpulsating goiter. The right lobe is twice the size of the left. The heart rate is 130, the apex bounding but not displaced. There is a fine, irregular tremor of the hands. The reflexes are exaggerated. The urine is negative. Blood pressure 180-95. White blood count 7,400, Poly. 51, S.L. 28, L.L. 21.

Diagnosis.—The condition is obviously one of a thyroid intoxication which evidently is still progressing. The temperature ranges between 97° and 99.5°. The increasing loss in weight, and the addition of insomnia to the other nervous symptoms indicate a progressive character. The reduction in polynuclears is not so great as one often sees in such states, yet it is a definite reduction. In view of these factors, the patient is not a fit subject for operative treatment.

Treatment.—The patient was put to bed, and moderate doses of bromides given.

After-course.—The pulse reduced to 110 and there was some general improvement. At the end of two weeks she became mildly delirious and the goiter became very firm and sensitive to touch and in a few days the skin over the right lobe became somewhat edematous. The temperature ran from 97° to 101° and the pulse and other symptoms were not materially changed. She remained in a state of mild delirium for ten weeks. She had delusions of persecution and had to be constantly watched to prevent her escaping. She complained to her relatives of the treatment accorded her by the hospital attendants. She was examined by Dr. Skoog at this time. The following is excerpted from his report: "Pupils irregular and dilated. Reaction to light and accommodation impaired. Mild temporal pallor of the discs and mild papillitis. The disc borders and vessels blurred. All deep reflexes greatly increased. Babinski and Oppenheim negative. Superficial reflexes blunted." At the tenth week the delirium suddenly disappeared. She volunteered the information to the relatives that her statements of unkind treatment were all bosh and that she was at a loss to know why she made such charges. She improved
rapidly and was allowed to go home in three more weeks with a pulse of 88, temperature 98° to 99.6°. The goiter was still hard, but not so sensitive to pressure. She was advised to use general tonic measures and to return when she had regained her weight.

Reentry.—Five months after dismissal she returned having gained

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**Fig. 118.**—Gross appearance of nonsuppurating thyroiditis.

**Fig. 119.**—The slide shows acini filled with colloid much retracted from the walls and showing vacuoles in the substance.
40 pounds in weight. Her appetite was good. The goiter was much softened but nonpulsating, tremor was marked and pulse 110. The right lobe of the thyroid and the isthmus were removed. There was moderate but not excessive difficulty in separating it from its capsule. Postoperative recovery was uneventful. The section of the gland was unusually pale and uniformly granular (Fig. 118). Round cells were numerous and about the periphery polynuclears were in evidence in small numbers (Fig. 119).

*Comment.*—The hardness and sensitiveness of this goiter suggested an infection, but the leucocytes never reached 10,000 and the polynuclears remained low, both factors against suppuration. The physical signs, however, warranted one as regarding the organ as being in a state of reaction, therefore, a nonsuppurative thyroiditis. The long period of delirium and the type of mental disturbance was unusual. Operation at the height of the disease would no doubt have resulted fatally.

**CASE 12.—A** widow aged fifty-seven came because of dyspnea and nervousness.

*History.*—The patient is short of breath on exertion. She first noticed this a year ago, but recently it has become so aggravated that her activities have had to be considerably limited. The shortness of breath is most distressing when she attempts to lie down, so that she is obliged to sleep propped on many pillows. She has been exceedingly nervous and irritable during the past six months. She has had a goiter for thirty years, but it has never caused her any trouble. Recently she has felt that it might be adding something to her dyspnea. Her general health during her childbearing period was good. She had three children.

*Examination.*—The patient looks ill and distressed and appears as though she might have lost weight recently. She has a moderately large bilateral goiter. The carotids pulsate markedly, but the gland does not seem to participate. The goiter is firm, somewhat bosselated. The apex of the heart is in the axillary line and is diffuse. The rate is 96 and it intermits. The right border is in the midsternal line. There are no murmurs. There is a marked tremor of the hands. Bp. 210-120. Urine 1.012, negative.

*Diagnosis.*—The goiter is firm as though long stationary. It does not seem to displace or compress the trachea but because of its size
and density may readily do so when she lies down. The enlarged heart is that of a degenerated myocardiud rather than that of thyroid intoxication. The degeneration likely is due to the long existence of the goiter. The pulse rate is that of decompensation rather than that of hyperthyroidism, since it becomes more rapid on exertion and is slower in the morning. The nervousness seems more that of arrogance than of thyrointoxication. The tremor seems to be that of hyperthyroidism and the loss of weight is likewise suggestive of intoxication.

Treatment.—It was decided to call the therapeutic test to our aid. Rest in bed with cardiac stimulants improved the dyspnea under certain conditions and the edema disappeared. The nervousness and tremor were not lessened, they were, on the contrary, rather worse than at the beginning of the treatment. After using heart stimulants three weeks, a right lobectomy was done. A well localized adenoma lay behind the trachea at the level of the suprasternal notch (Fig. 120). The technic was made more difficult because the patient insisted that the attempts to raise the chin caused an intolerable shortness of breath.

Pathology.—The adenoid portion had undergone a general degeneration, evidently a necrobiosis. The remainder of the lobe showed some proliferation indicating that there is a mild thyroid activity. The slide shows a low epithelium with moderate increase in colloid which is acidophilie (Fig. 121).

After-course.—Some hours after the operation the patient complained of the old shortness of breath. The patient showed a mild cyanosis and an obstruction to both inspiration and expiration more marked than before operation. It was thought that hemorrhage had taken place into the space where the lobe lay and was compressing the trachea. The wound was opened and a clot of blood as large as the thyroid was removed. A drain was placed in this pocket after the clot was removed. Convalescence after this was uneventful. The dyspnea largely disappeared and the heart rate lessened albeit with cardiac tonics. The nervous symptoms did not improve following the operation. On the contrary, after three months they increased, but it was never determined whether there was an actual mental aberration or just the latent manifestation of a strenuous disposition. She died six months later from general dropsy, due to an active return of the cardiac decompensation dependent on ill-advised activity.
Comment.—The thyroid, aside from the obstruction, had little to do with the picture as detailed. Very possibly the long existing goiter had much to do with the cardiac muscular system. The high blood pressure may be sufficient explanation for the difficulty with the heart. It seems to me the state of the thyroid was largely re-

Fig. 120.—Gross appearance of the thyroid showing round nodule which lay behind the trachea.

Fig. 121.—Adenoma with palely staining cell and degenerated colloid.
sponsible for the dyspnea, particularly when the patient held her head aloft. The operation despite this was ill-advised. The patient expected complete relief from all her symptoms and failing to attain this visited inveeive on her regular medical attendant. When lobes extend behind the trachea adequate drainage should be practiced.

CASE 13.—I was called to see a married woman of twenty-six years, because of extreme nervousness and vomiting.

History.—The patient was delicate as a child. She had chorea at nine. Since then she has been very nervous. She was married two years ago and has one child eight months old. She was very weak during pregnancy and spent much of her time in bed. Three months ago she again became pregnant. She vomited a good deal and became very weak. Because of this she was curetted a month ago. She has been worse since. She has continued to vomit, and emaciation has been progressive and rapid. She is extremely nervous and sweats easily and is sleepless unless given anodynes.

Examination.—The patient is extremely emaciated and is exceedingly nervous. The least attempt at examination aggravates the general nervous attitude. There is marked exophthalmos, Koehre and Dalrymple signs are well marked. There is extreme tremor. There is a medium symmetrical goiter which pulsates violently. The apex is in the mideclavicular line, is diffuse and pounding. The rate is 110-130, irregular in rate and volume. The temperature varied between 99° and 102.5°, the respiration between 28 and 36. The patient’s father, a physician, declares he had not noticed either goiter or eye signs until five or six days ago and the attending physician had not yet noted their presence, the father having suppressed his fears.

Diagnosis.—The cause of the nervous state was easy to perceive at the time of my visit. A marked acute thyrointoxication in a woman under par, developing during an early pregnancy and curettment, presents a problem in the diagnosis as to the operative resistance. Since the gland was pulsating and the patient obviously was rapidly growing worse, it was deemed warranted to recommend operation, though it was emphatically impressed that to do so or not to do so were both invested with great danger.

Treatment.—The proposal to ligate the right superior thyroid ves-
sel was rejected. She was placed on bromides and morphine in the hope of lessening the extreme nervous state.

After-course.—The patient passed from nervousness to delirium and after the beginning of the delirium the temperature ranged higher and she died in two weeks.

Comment.—To have operated would have been foolhardy. This patient was observed years ago, during the period I believed what I read on this subject. In these cases nothing avails. One scarcely knows what to do, and when in that state of mind the obvious thing to do is nothing.

Some of these extreme toxic cases improve after abortion, and I agreed with the attending physician that he acted wisely. In this case, however, there was no thought of the possibility of thyrointoxication at the time the uterus was emptied. The character of the nervousness was such that a possible thyrotoxic origin should have suggested itself. Emesis gravidorum in the absence of thyrotoxic symptoms does not have the same type of nervousness, but the borderline is close enough to cause one to wonder whether the endocrine system may not play a part in every case of excessive vomiting of pregnancy.

CASE 14.—I was called to see a matron of forty-nine because of palpitation and loss of weight.

History.—The patient began to be nervous at times more than a year ago. She attributed this to the approaching menopause. She began to notice some swelling in the feet nine months ago. She had palpitation and some pain in the region of the heart. She was treated by a rest in bed for a time and the swelling of the feet disappeared. She had a goiter at this time the size of a lemon. This was not regarded as a matter of consequence by her attendant because she had a goiter when a girl which disappeared after a time. Two months ago she became worse and sanitarium treatment was again advised and continued for six weeks. She was given enemas by her attendant. She improved under this treatment. The diagnosis was cancer of the stomach. She returned home two weeks ago and became worse again. Since that time she has been vomiting persistently at intervals. When these spells are on she is unable to retain anything whatever. The goiter has disappeared. She used to weigh 150 pounds, but has lost gradually since the beginning of her sickness.
She has seven children, no miscarriages and never any pelvic trouble. Her periods were much delayed several times during the past two years. The chart shows a pulse rate varying from 120 to 144, the temperature 99.2° to 101.6° and the respiration 26 to 44. The pulse on several occasions is recorded as being 70. The nurse states that she is of the opinion that every other beat was too faint to be counted certainly. She counted only what she was sure she could feel.

Examination.—The patient is much emaciated, stares anxiously straight ahead and a movement of the hand precipitates a rapid fine tremor. The left foot pits slightly on pressure. The abdomen is flat and painless to pressure. The aorta pulsates visibly. The apex is in the midelavicular line, diffuse and bounding. The right heart reaches to near the midsternal line. There are no adventitious sounds, but occasionally the ventricle fails to contract. There is a palpable enlargement of the right lobe of the thyroid and there is a definite Moebius in the left eye and voluntary winking occurs only at unusually long intervals. The lungs are negative, the pulse 140, temperature 101.6°, respiration 26-34. The carotids pulsate violently. The patient weighs not more than 70 pounds.

Diagnosis.—The preceding nervousness, swelling of the feet and emaciation suggest a nutritional disturbance. The fact that until recently she has been able to eat normally indicates an increased destruction rather than a failure to absorb nutriment. The fever and rapid heart are not compatible with the theory of a digestive disorder. The nervousness and the character of the heart beat suggest a disturbance of the nervous system. The fact that she had a noticeable goiter and still retains fairly well marked eye signs makes it likely that the thyroid is the source of intoxication. The extreme emaciation and finally the vomiting are in no wise incompatible with this theory.

Treatment.—The patient was given morphine to suppress the persistent vomiting.

After-course.—The patient died in two days with increasing rapidity of the heart and persistent vomiting.

Comment.—The significant facts here presented are the nervousness followed by a goiter that appeared quickly, remained for a time, and vanished. Goiters that appear suddenly and as suddenly disappear are sometimes wandering goiters, being intrathoracae when not in evidence in the neck. When toxic goiters begin gradually to
become reduced in size without the lessening of the symptoms, one may be sure that disaster is impending. These belong to the most toxic of all conditions, and death nearly always follows.

CASE 15.—A farmer's wife aged thirty-five came to the hospital because of heart trouble.

History.—The patient has had seven children, the youngest of which is three years old. She had an abortion at three months, four months ago. She has had a goiter six years and the eyes became prominent a year later. Still a year later she became short of breath and had palpitation. All her symptoms are worse since the abortion. She menstruates regularly four days without pain. Her symptoms are not worse at these times.

Examination.—The thyroid is moderately enlarged, particularly the right lobe. It pulsates markedly, and the superior thyroid arteries are easily palpable. The eyes are prominent and show Graefe and Dalrymple signs. The heart extends beyond the mid-clavicular line and the apex beat is diffuse. The uterus is in position but is large and sensitive to bimanual examination. The cervix is deeply lacerated and extensively eroded and is covered by a diffuse discharge. The right ovary is as large as a hen’s egg and lies low in the culdesac. The perineum shows second degree laceration. Pulse 140, full and quick.

Diagnosis.—The fact that the patient has been markedly worse since the abortion four months ago, made it appear that a correction of the pelvic lesion would result in an amelioration of the thyroid symptoms.

Treatment.—An enlarged ovary was removed and the cervix amputated and the perineum repaired.

Pathology.—The ovary was made up of many follicular cysts and the capsule was thickened. The cervix contained many small cysts.

After-course.—The appetite and sleep and the general sense of well being improved much. The heart did not slow materially, neither did the pulsation in the thyroid markedly lessen. Edema of the feet developed after six months, and the patient gradually failed under the sign of myocardial weakness.

Comment.—This patient should have had a preliminary ligation of the thyroid vessels followed in a few months by a repair of the pelvic lesions and still later by a lobectomy; however it seems evident
that there was a myocardial degeneration before she came under observation.

**CASE 16.**—A restaurant proprietor came to the hospital because of palpitation and nervousness.

**History.**—The patient has always had good health until the present illness. About five weeks ago without known cause he began to feel worn out and was irritable. Following this, palpitation began. This rapidly increased so that he was obliged to go to bed. He had some fever. He has been in bed two weeks. His sleep is fair and there is no shortness of breath. The palpitation is made worse by excitement rather than by exercise. He has one child, a daughter, who has been operated on for exophthalmic goiter.

**Examination.**—The temperature is 100°, the pulse 106, and the respiration 30. Lungs negative; abdomen negative. The apex beat is diffuse, a fingerbreadth outside the nipple line. The right border is near the center of the sternum. The patient was apprehensive but otherwise all was negative. Mitral sounds not clear but no distinct murmurs. The laboratory examinations were without moment. There was marked tremor.

**Diagnosis.**—The slightly dilated heart and the indistinct character of the mitral sounds, the rapid pulse, the slight but persistent fever made an endocarditis the most probable diagnosis, though there were no laboratory findings to support this conclusion.

**Treatment.**—The patient was put to bed and sedatives were administered.

**After-course.**—With rest in bed the temperature varied from 97.6° in the morning to 100° at five in the afternoon. The pulse from 80 to 100, and the respirations from 18 to 22. This was continued for about five weeks. He returned home without noticeable improvement and returned in two months in the same condition. As I was sitting beside him, trying to figure out the cause of the trouble, he asked me point blank what the nature of his trouble was. I started to explain to him that the cause was indeterminate, but that the heart was probably the organ at fault. I noticed his fixed gaze which caused me to pause, gradually the upper lid retracted revealing an arc of sclera between it and the iris (Koehler's sign). This with the fixed gaze (Stellwag's sign) established the diagnosis of hyperthyroidism. Therefore, instead of expounding on endocarditis I explained the relation between hyperthyroidism and the heart's action.
There was no enlargement of the thyroid. He was placed on sedatives, but there was no improvement. On the contrary, the nervousness and sleeplessness increased. At the end of a month the right lobe of the thyroid began to enlarge and attained the size of a hen’s egg. The left lobe did not emulate its fellow. While the symptoms were at the height, the gland began to regress and within a few months entirely disappeared, while the nervousness and sleeplessness increased. There was mental confusion at times. After several months of further treatment he improved and returned to his home. Soon nervousness increased and the heart rate increased. He died with ascending temperature and a countless pulse.

Comment.—The rapid heart and peculiar nervousness with tremor should have been sufficient to make the diagnosis at the time of his first admission to the hospital. The wide apex beat without evidence of definite cardiac lesion was confirmatory. This case is particularly interesting because the thyroid enlarged then regressed without there being any change in the general symptoms.

CASE 17.—A widow of fifty-eight came because of a goiter.

History.—When she was nine years old it was noticed that she had an enlargement of the neck. It grew rapidly for a time but improved under the external use of iodine. It remained stationary then until she became pregnant, when it enlarged rapidly again. After delivery it subsided. This sequence repeated itself with every pregnancy. After she ceased to bear children it remained stationary until a year ago. Nine months ago she had influenza and she has not fully recovered. From that time she has been nervous and trembles under exertion or excitement. A month after she had influenza she had a spell with her heart. She had violent palpitation, became weak, and short of breath. Since then she has become more nervous. She was in bed six weeks and improved somewhat. She has been up a part of the day the past several months. She sleeps poorly and the appetite is variable. She has lost 60 pounds in weight.

Examination.—There are no eye signs. She has a large, hard, nodular goiter. It is freely movable and not sensitive. The apex is in the anterior axillary line and is very diffuse and bounding. There is no enlargement to the right. Pulse 140, arrhythmic. No murmurs. There is a fine tremor of the hands. The urine contains a trace of albumin. Hg. 70, W.b.c. 6,800, Poly. 35, L.L. 13, S.L. 49, Eos. 3.
After being in bed a week the pulse beat varied between 100-110 with occasional exacerbations to 140. At times it became as low as 72.

*Diagnosis.*—The patient has a goiter and a bad heart. The problem is to determine the relation of the two and from this to determine the plan of treatment. That the trouble should date from the influenza helps but little, for the cardiac trouble might have been excited by this, and many previously quiescent goiters have taken on vicious secretion after attacks of influenza. Despite the dilated heart, there are no edemas and there is no evidence that dyspnea followed exertion. That the cardiae trouble is primary does not seem likely. On the other hand, she has lost 60 pounds which harmonizes with thyroid intoxication but not with a primary cardiopathy. The high lympho-

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*Fig. 122.*—Section of a degenerated toxic goiter.
cyte count speaks distinctly for thyroid disease, as does the tremor. No change in the gland appeared which could be counted in favor of such a diagnosis neither could any be expected, for these old veterans do not enlarge even if hypersecretion takes place. It seems fair to assume that she has a thyroid intoxication and as a result a disturbed heart. This conclusion is in harmony with her attitude, for after being in bed two weeks she did not improve and refused to stay in bed longer. Cardiac patients when they are once "bed broke" are contented to remain, at least they do not exhibit the wild determination to get up that thyrotoxic patients do.

*Treatment.* — The left lobe and a portion of the right were removed. The tumor was large, extending deeply behind the clavicle. It was firmly adherent to the capsule.
Pathology.—Many calcified areas were scattered throughout the gland. The main portion showed a grayish white translucent appearance, with here and there a cyst (Fig. 122). In some areas the slides show some round-celled infiltration, but for the most part the acini are large and lined with flat cells from which the colloid content has retracted. The colloid masses show openings which make the whole area resemble an aeroplane view of a shell-riddled battlefield rather than the usual vacuoles seen in this situation (Fig. 123).

After-course.—In the first few hours following the operation the temperature rose to 100° and the pulse to 130, but it was regular and of good volume. The patient was nervous and restless. The following morning the pulse was 145 and markedly arrhythmic but the volume remained good. She was markedly more nervous and restless. By evening the pulse was 150 and softer. The temperature rose to 104 at midnight when she died. Sodium bicarbonate and heart tonics had been given.

Comment.—Obviously the patient should not have been operated on. The marked loss of weight and the high lymphocyte count should have been warning enough. A goiter which is not toxic admits of operation under local anesthesia no matter what the heart condition. The weakened heart muscles do not bear the strain of superintoxication.

CASE 18.—A single woman of twenty-two came to the hospital because of an enlargement of the neck and prominent eyes.

History.—Her father died of cancer of the stomach, and one sister died of tuberculosis. As a girl she was strong and healthy. Her menses were regular until a year ago when they ceased without known cause. Six months ago she consulted her family physician who found a pulse of 100 with a temperature of 98°. She was nervous but well nourished and had lost no weight. Two weeks later the pulse was 120, irregular and the apex beat was diffuse and she was more nervous. The pulse remained so for six weeks when it became 130. At this time the urine was 1012 without foreign elements. The blood pressure was 150. At this time, too, three months ago, eye signs were first noticed. Tremor likewise was pronounced for the first time. The month following the eye signs became more prominent and the pulse increased to 144; some thyroid enlargement was noted for the first time. During the three weeks following, the thyroid increased con-
Fig. 124-A.—Papillary formation in exophthalmic goiter.

Fig. 124-B.—Cell degeneration and exfoliation in exophthalmic goiter.
siderably in size. Vomiting appeared for the first time. She could not remain in bed as ordered because she was "too nervous." During the two weeks preceding the entrance into the hospital she lost rapidly in weight.

**Examination.**—The patient is highly nervous and regards the approach of the examiner with apprehension. The eyes are obviously protuberant. Stellwag's sign is well marked, the intervals between involuntary winking being the longest I have ever seen. When the gaze was fixed on the examiner's finger, the lids, notably the right, retracted fully an eighth of an inch above the corneal border (Kocher's sign). In repose there was a ring of white about the cornea (Dalrymple's sign), giving a permanent look of terror. There was marked tremor of the hands. There was a moderate-sized bilateral goiter, of medium consistence without pulsations. The apex beat was wide, the impulse pounding. The pulse was 120, respiration 28, temperature 98°. During her first few days' stay in the hospital it remained about the same.

**Diagnosis.**—The name of the disease was determinable at a glance. The diagnosis of the actual state of the patient was the only problem. The rapid development of the disease and the progressive character stamped it as one of great gravity. The loss of weight, the lack of appetite and the recurrent vomiting all attested to its progressive character. The exact amount of weight lost was not exactly determinable, but was estimated about 30 pounds. Because of the evident progressive character, it was determined to interfere.

**Treatment.**—She was placed on sodium bromide gr. xx three times a day for the four days she remained in the hospital before operation. This did not produce any perceptible lessening of the nervous manifestations. The right lobe and the isthmus were removed on the fifth day. The operation presented no peculiar difficulties.

**Pathology.**—The cut surface of the gland was a deep wine color with little admixture of dots of a lighter color. The slides show the acini large with extensive papillary projections into them (Fig. 124-A) and in many regions pronounced cell exfoliation and degeneration (Fig. 124-B.)

**After-course.**—The morning of the operation she had temperature 99°, pulse 100, respiration 24. Two hours after operation temperature was 97°. The evening of the day of operation temperature 101.4°, pulse 140, respiration 40. The succeeding morning the tem-
Temperature came to normal and in the evening went to 104°. The next morning the temperature dropped again to normal and was 99.6° at 10 o’clock, but by 3 p.m. it had risen to 106 (Fig. 125). She died that evening. The pulse gradually rose from the beginning of the post-

![Temperature curve in a fatal case of exophthalmic goiter.](image-url)
operative period. During this interval she had a small amount of light yellow emesis a number of times and took but little nourishment.

Comment.—The attempt to stay the progress of the disease by operation was the rankest folly. The pulse quieted when she was placed in bed with the exhibition of sedatives. Had this plan been persisted in, the probabilities are that the intoxication would have lessened, the appetite returned, and the weight would have been restored and operation could have safely been done. The time that would have been required to bring this state about probably would have been from three to six months. There is the rub. To induce patients to submit to such restraint is difficult, usually impossible. Were it not equally dangerous to ligate, this might be done, as it usually serves to attach the patient to the surgeon and insures her return at the time when operation is safe. Unfortunately pole ligation when the disease is on the ascendency is quite as fatal as the more radical resection. It is only by experiencing disasters that the surgeon learns self-restraint which enables him to refuse operation when conditions are not right.

CASE 19.—A farmer aged twenty-four came because of a goiter.

History.—Two years ago he noticed that he was very nervous and that he had palpitation of the heart and that he slept badly. A month later he noticed an enlargement in the lower part of the neck. He had the vessels tied on both sides several months later. He improved very much and was fairly comfortable until two weeks ago when all the symptoms became suddenly worse and are now worse than before the vessels were tied. He has lost some 30 pounds in weight.

Examination.—A large pulsating thyroid occupies the lower part of the neck. The sears of the ligation operation are plainly visible. The entire gland seems to expand with each pulsation. The gland extends well down to the clavicles and the lower border can not be palpated. The x-ray shows an indefinite shadow extending below the clavicles. There is marked exophthalmos (Fig. 126). Graeffe's and Kocher's signs are well marked. He has pronounced tremor. The W.b.e. is 8,000, the lymph cells are increased. Temperature 98.4°.

Diagnosis.—The toxicity of his goiter can not be questioned. The rather prompt improvement following the ligation operation suggests that the procedure may have stayed the downward course. Now he is worse than before and has lost 30 pounds within a month. Operation would be hazardous. A ligation now might be undertaken had
this procedure not been done before. If ligated with catgut, the vessels most likely become patulous, in which event they might be ligated again. Observation would be desirable before any treatment is undertaken.

Fig. 126.—Facial expression of a pronounced exophthalmic goiter case.
Treatment.—He took bromides a short time without benefit. Refused to remain in bed.

After-course.—He went about as he pleased and died a month later of gradually increasing symptoms.

Comment.—The onset originally was hyperacute. Notwithstanding this, the results ligature produced were good, lasting more than a year. I would not have had courage to ligate under such conditions.

CASE 20.—A housewife aged thirty-seven came to the hospital because of nervousness and a tumor of the neck.

History.—About fourteen years ago, just after the birth of her eldest son, she noticed an enlargement of the neck. About a year and a half later she noticed that the mass was enlarging. It was treated with iodine applications and internal medicine. It has grown gradually, there never being any period of rapid growth. Seven years ago while pregnant with her last baby she began to notice a gradually increasing nervousness. The tumor of the neck seemed to press more at this time and she could not lie on her back at night without having pressure sensations or a choking feeling. After the birth of the child the choking sensation ceased, but the nervousness remained and in the last year it has increased perceptibly. She is easily excited and when in this state she notices that her heart beats more rapidly, but under no other circumstances. She does not get short of breath on exertion or have palpitation. She has not lost weight. She perspires easily under nervous strain. She is inclined in the last year to worry about trifles. Her appetite is good and her bowels are regular. Her menses have always been regular, and practically without pain. The flow is profuse the first two days. The day before the flow she has occipital headache. These stop when the flow starts. She has four children, eldest fourteen, youngest seven. Four years ago she had a miscarriage and almost died of hemorrhage. She had pneumonia at eight, mumps at thirteen and acute articular rheumatism at fourteen.

Examination.—The patient seems well nourished, shows no visible signs of nervousness, and does not look acutely ill. She has a slight exophthalmos; the pupils are equal, regular and react to light and accommodations; no van Graafe, Stellwag or Moebius. There is an enlargement in the neck the size of a lemon attached to the right lobe of thyroid. It is spherical, hard, and a little nodular, movable up
Fig. 127-A.—Colloid-toxic goiter. The smaller nodule on the right is a displaced thymus.

Fig. 127-B.—The thymus nodule shown in the preceding cut.
and down on swallowing. It lies a little to the right of the midline. The left lobe of the thyroid is also enlarged. No visible pulsation in neck. No thrill or bruit over tumor. Tonsils small, pharynx normal.

Fig. 127-C.—The thymus nodule on cross section.

Fig. 127-D.—Slide of the thymus nodule shown in the preceding figures.
Teeth all pulled except lower incisors and canines. Heart dullness extends from midsternal line to $9\frac{1}{2}$ cm. to left of sternum. Apex beat in fifth interspace. Systolic murmur heard best at apex transmitted to axilla and along left side of sternum. It is a soft, blowing murmur. Pulse taken at two different times was 105 and 120.

**Diagnosis.**—This obviously is an example of thyroid intoxication implanted on a long existing "simple goiter." There is no loss of weight, and radical operation may safely be undertaken without any preparatory treatment.

**Treatment.**—The removal of all of the right lobe of the thyroid and a piece of the lower end of the left was done. The right lobe was as large as the fist and was firmly adherent to the anterior and right side of the trachea. It was separated from its capsule with difficulty. The left lobe was enlarged more than was apparent before operation. A piece the size of an egg extended down behind the sternum. This piece was removed.

**Pathology.**—The interest in this case centers in the unexpected pathologic findings. The right lobe presented the irregular bosselated appearance of a colloid goiter (Fig. 127-A). It showed extensive areas of degeneration of the entire tissue. The portion of the left lobe representing a somewhat encapsulated mass (Fig. 127-B), was more elastic than is usual in thyroid lobes. The section showed a pale whitish surface which was uniformly granular. (Fig. 127-C). The slide shows a general lymphatic tissue with areas of epithelial cells embedded within it. These cells in many places are arranged about a deeply staining structureless center (Fig. 127-D). This nodule obviously represents a displacement of a portion of thymus.

**After-course.**—There was no apparent shock following the operation. The second day the pulse was 125, temperature $100.4^\circ$ and the patient was a little nervous. The temperature did not go higher and after the second day the patient rested easily, temperature and pulse gradually subsided. The after-course was entirely uneventful. At no time were there toxic symptoms. On dismissal temperature was normal, pulse 90; there was no apparent nervousness, the wound was entirely healed, but the neck was still much swollen. She has since reported that she feels perfectly well.

**Comment.**—Unless all material from the operating room is systematically examined, many interesting things will be overlooked.
CHAPTER VII

DISEASES OF THE CHEST AND SPINE

The thoracic cavity, like the cranial, is subject to attack by surgeons about the periphery only. Nevertheless, those diseases capable of surgical cure are numerous and for the most part are badly done.

DISEASES OF THE MEDIASTINUM

Until the development of goiter and thymic surgery the mediastinum was an inaccessible field to the surgeon except in rare instances and for those disposed to do technical stunts. Now that substernal goiters offer easy and almost certain results there is a new stimulus to the study of subcostal diseases. Furthermore the efficiency of the x-ray, in certain mediastinal malignancy, is so striking that the early identification of these growths is but little less important than the discovery of substernal goiters. Contrasted with these are the aneurysms and the metastatic nodules of malignancies, and finally rare conditions that simulate tumors but which are not.

CASE 1.—A retired farmer aged sixty-eight came because of hoarseness, difficulty in swallowing and cough.

History.—His trouble began three years ago with an attack of grippe. He was sick with an indefinite ailment three days. When he got up, he was hoarse and this has never improved, but seems to have become worse lately. A year or more ago he began to cough. The cough bothers him but little when he is lying down. He raises but little sputum. Recently the amount expectorated has much increased. For two years he has had difficulty in swallowing. He has had little difficulty in swallowing fluids, but solids often regurgitate and the attempt to swallow brings on coughing, and during the coughing spell the food is apt to be expelled. Sometimes after he has eaten solid food and then stoops over the food is expelled in the same state as when he ate it.

Examination.—The patient looks haggard and weary and speaks with a rough voice which only at times breaks above a whisper. His
cough is brassy and unproductive. The chest is barrel-shaped and moves imperfectly with respiration. The breath sounds in front are normal but expiration is somewhat prolonged, vocal fremitus is faint. The percussion note behind is somewhat high pitched and vocal sounds are but faintly heard. There is substernal dullness above the angle.

Fig. 128.—A slight bulging due to the goiter is seen above the sternoclavicular joint.
The apex is in the fifth interspace two fingers to the left of the midclavicle line. The sounds are clear, the aortic accentuated. He has pyorrhea and chronic pharyngitis. The right vocal cord is paralyzed. The finger placed over the substernal notch receives an impulse when the patient coughs. A slight bulging can be made out above the left sternoclavicular joint when the patient cranes his neck forward and to the right (Fig. 128). The x-ray shows a wide aortic arch and a shadow behind the upper portion of the sternum. This shadow is much widened when the patient takes a cup of barium milk. The stomach tube passes three inches down the esophagus and comes to a sudden stop. Laboratory examinations were negative.

Diagnosis.—The x-ray excludes aneurysm—an unlikely possibility in a man of his age. The onset was more sudden, and the duration too long for a carcinoma, and the site of the obstruction too high. However, this appeared to be the presumptive diagnosis until a substernal tumor was discovered. The location, mobility and smooth surface of this indicated a thyroid. The sudden onset was not accounted for on this score, but the mobility excluded dermoid or lipoma.

Treatment.—The thyroid was easily removed. The patient's efforts at coughing produced on request aided materially in the elevation of the gland. Coughing ceased as soon as the thyroid was elevated above
the sternal notch. The deep cavity remaining was drained with a
small soft rubber tube.

Pathology.—The tumor removed was the size of a small orange. It
was somewhat bosselated and fairly firm. The cut surface showed a
large cavity filled with a firm clot with smaller areas of thyroid tis-
sue at one extremity (Fig. 129). The slide showed a simple colloid
goiter.

After-course.—The patient was quite comfortable following the
operation, being completely freed from his cough, and respiration
was unhindered. He did have much trouble with accumulations of
mucus in the throat which he had difficulty in removing. The night
of the second postoperative day he was given a drink of water at 3:15.
At 5 o'clock the nurse heard a groan and going to his side, found him
dead. The wound was examined and found free from blood clots or
other disturbance. Death likely was due to embolism.

Comment.—The sudden onset of his trouble can be accounted for
most likely by a hemorrhage taking place in a cystic thyroid. Un-
less sought for, substernal goiters may easily be overlooked. The
first time I saw this patient I did not even suspect a goiter, the as-
sumption being that he had a carcinoma, though malignant tumors
in this part of the esophagus are rare.

CASE 2.—A matron aged twenty-three came to the hospital be-
cause of difficulty in breathing.

History.—The patient has always enjoyed good health. In Novem-
ber, 1914, she noticed some difficulty in respiration and had some
sense of fullness in the neck. Soon afterward a bulging was noticed
above the breast bone. She consulted several surgeons, who made
a diagnosis of mediastinal sarcoma and refused treatment.

Examination.—A bulging in the suprasternal notch was apparent
on inspection. The skin covering this area was slightly reddened. On
palpation the tumor was slightly tender to touch and presented a soft
semifluctuating resistance. The mass extended 2 cm. above the upper
border of the sternum and was hidden by the sternomastoid muscles
on either side. There was no bulging of the sternum or of the costal
cartilages. On percussion there was dullness extending on either
side of the sternal borders and downward as far as the angle.

Diagnosis.—Because of the reddened skin and boggy feel of that
portion of the tumor accessible to palpation, the diagnosis of dermoid
was suggested, because of the close resemblance to the appearance and consistency of irritated wens. This opinion was strengthened by the globular outline of the substernal dullness. Sarcoma was excluded because of the consistency of the palpable portion of the tumor and because only the upper portion of the mediastinal space was occupied by the tumor. A number of conditions must be considered.

Aneurysm.—Those confined to the retrosternal space or that immediately adjoining will suggest the more frequent aneurysm. The absence of beats of pulsation is the sign to be relied upon. The presence or absence of the Wassermann reaction may be of some value. Frequently the early age of the individual is of importance.

Tuberculosis.—In a few instances tuberculosis has been diagnosed, owing to the dullness in the upper part of the lungs associated with expectoration. The absence of bacilli should be enough to warrant care in making such a diagnosis. Tuberculosis existed as a complication in five cases.

Empyema.—The history of pain and dyspnea with the presence of fluid in the lower chest has led to error in diagnosis. Examination of the contents obtained by aspiration should be distinctive. In those rare instances in which there is a pleural exudate associated with the intrapulmonary dermoid and only the contents of the former is obtained at aspiration, error is very likely, and the operator may consider himself fortunate if he orientates himself during the course of the operation.

Malignant Tumors.—The malignant tumors which are primary in the mediastinum usually run their course rapidly in contradistinction to the long history of the dermoids. However, if a dermoid becomes infected, the increase in size may be even more rapid than in malignant tumors. Nevertheless, some of the dermoids have presented such urgent problems that a history was not available. Though the roentgen rays have been employed in but a few cases of mediastinal dermoids, it is quite possible that the irregular masses of mediastinal malignancies might be distinguished from the more sacular dermoids. If the latter contained calcareous material, teeth or other bony structures, diagnosis might be aided.

Benign Tumors.—Lipomas and tumors of the thymus have presented pictures that might have been confused with mediastinal dermoids. In such cases aspiration or diagnostic incision alone could
present a positive answer. With perfected technic it is to be hoped that more frequent diagnostic operations will be undertaken.

_Treatment._—Operation was begun by exposing the upper portion of the mediastinum. A transverse incision was made over the upper border of the sternum, extending well beyond the insertion of the sternomastoid muscle on the left side. The insertion of the muscle was severed. The superior pole of the globular tumor was thus readily exposed. This was freely incised and a grayish-yellow, greasy fluid escaped. After this was sponged out, a mass the size of a walnut presented. This was covered with fine lanugo-like hair of the color of a newly hatched gosling. The appearance of this mass established the diagnosis without question.

The operation was completed by the removal of the mass and the exsection of as much as possible of the sac. The part adjacent to the sternum was readily removed; that of the lateral borders caused greater apprehension. The posterior wall of the cyst was in close apposition with the large vessels of the neck, and was allowed to remain. The cavity was swabbed out with iodine and the wound was closed, except for a small opening admitting a drain. This was removed a week later, and the wound rapidly became closed, and has remained so.

_Pathology._—The mass removed presented a dermal surface studded with the fine hair above noted. On section the mass showed a fatty tissue, save for the epidermal covering (Fig. 130). On microscopic examination stratified squamous epithelium and sweat and sudoriferous glands with hair follicles were noted (Fig. 131). The cyst wall was of the same structure, save that hair was much less abundant and the glands sparse. There were no more highly organized tissues present.

_Comment._—The presence of these is most frequently manifested by cough and dyspnea, less often as pain from pressure. Cough when due to pressure is caused by irritation of the nerves. Cough of another type is caused by irritation of the bronchi when perforation is impending. When due to irritation the character of the cough is similar to that noted in pressure from aneurysm.

Dyspnea seems to be due to direct pressure on the trachea or bronchi, or from pressure upon and displacement of the lungs. When from causes usually unknown, the tumor becomes the source of reactive inflammation, phenomena of a more violent character are
induced. The cause for this irritation is not clear. The gradually increasing amount of the cyst contents probably undergoes some chemical change which inflames the sac and irritates the environment. In this they imitate the life history of wens. This simi-

Fig. 130.—Cross section of a retrosternal dermoid.

Fig. 131.—Slide from a dermoid of the mediastinum.

larity of reaction to that so often noted in wens was the condition that suggested the diagnosis in my patient. Pleurisy has often been diagnosed in such instances, and often exudation about the tumor has resulted, which gave rise to the diagnosis of pneumonia. Often
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the tumor has been accidentally encountered when supposedly pleural exudates have been attacked surgically. When the bronchi are irritated, perforation into them during attacks of coughing has been noted in three cases. The attendant expectoration of other grumous material and hair has led to a positive diagnosis more often than any other factor. The invasion of the bronchus by the tumor seems to be in the nature of a pressure necrosis, often enhanced by a secondary infection of the tumor contents. The irritation of the bronchus is responded to by the production of glassy mucus. After perforation, honey-like fluid, atheromatous material, and hairs have often been observed. Clubbing of the fingers and toes has been noted.

The greatest possible variations in their topographical relations have been noted in dermoids of the mediastinum. The typical location of the simple dermoid is represented by my own case, a sac occupying the space between the sternum, great vessels, pericardium, and soft tissues covering the episternal notch. Every possible variation has been reported. One existed as a small egg-sized cyst in the upper part of the lung near the hylus, while others occupied the mediastinal space and projected boldly out into the pleural cavity, and some extended from the sternum to the diaphragm, markedly displacing the lung. In one instance a retrosternal dermoid communicated by a small sinus with a similar tumor external to the sternum.

CASE 3.—A minister aged thirty-six came because of pain in his arm and difficulty in breathing.

History.—Two years ago he had pains in the left arm which were called neuritis. These were particularly bad during the past winter and with intermissions these have continued to date. Six months ago he began to have huskiness of speech. Recently he has noticed difficulty with respiration, particularly on exertion. Six months ago he noticed an enlargement above the left collar bone. This has remained so since. He has had cough at intervals, but has not expectorated.

Examination.—There is a bulging above the left clavicle. This is firm, elastic to pressure. There is marked substernal dullness on percussion extending to the junction of the third rib and laterally to near the midsternal border. The apex beat is in the sixth inter-
Fig. 132.—Lymphosarcoma of the mediastinum.
space. The breath sounds in the upper portion of the left lung are diminished. There are no enlarged lymph glands. The x-ray shows a shadow beneath the upper end of the sternum and extending laterally as indicated by the percussion line above mentioned (Fig. 132). The vocal cords are not paralyzed.

Diagnosis.—The neuralgic pains of two years ago probably were due to this tumor. The dyspnea indicates a bronchial pressure. This sequence suggests a posterior mediastinal involvement. This is a relatively slow growth which indicates its origin in a lymph gland. There being no other glands involved, Hodgkin's disease may be excluded.

Treatment.—Arsenic was given and he was advised to have x-rays used.

After-course.—He did not follow the suggestion to use the x-ray for three months. At this time he was cyanosed and scarcely able to exert himself at all. The left recurrent laryngeal nerve was involved. He now submitted to x-ray treatment and was improved at once. After undergoing treatment for a number of months, he was free from symptoms and the x-ray showed nothing of the retrosternal shadow. That has continued now a year.

Comment.—This case may yet terminate as a typical Hodgkin. The increasing cyanosis is usually the lot of such cases. The x-ray produced marked temporary relief and it has endured longer than is usual in such cases.

CASE 4.—I was called to see a housewife aged fifty-six because of difficult respiration.

History.—The patient has always enjoyed good health, never had any lung trouble. A year and a half ago she had the left breast removed for carcinoma. Three months ago she began having attacks of dyspnea, not relieved by usual remedies. After much coughing she is able to raise a little sputum lightly tinged with blood.

Examination.—The patient is bolstered upright in bed and constantly coughs in short, nonproductive expulsive efforts. After much labor a little bloody sputum is raised. The trachea does not move in the forced expiratory efforts. Inspiration and expiration seem equally impeded. The percussion note over the lungs seems unchanged other than a moderate emphysematous increase in resonance. Over the sternum in the region of the angle is an elliptical area of flat-
ness directed transversely to the long axis of the sternum (Fig. 133). A few large rales are heard over the lungs, especially over the lower scapular region. The heart sounds are clear, the second pulmonary somewhat accentuated. The attending physician suspects a substernal goiter. The dullness lies too deep. There is a resonance between the dullness and the suprasternal notch. The development of the symptoms is too rapid for goiter and finally the sparse blood-stained sputum speaks unmistakably for malignancy.

**Fig. 133.**—Schematic representation of the area of dullness in a case of metastatic carcinoma of the mediastinum.

**Diagnosis.**—The fact that the patient had a carcinoma of the breast removed a year and a half ago and now has a mediastinal dullness and dyspnea is sufficient to warrant the suspicion that there is a metastatic carcinoma of the mediastinum. The sparse, frothy sputum faintly tinged with blood indicates that there are cancer nodules in the substance of the lung as well as mediastinal mass. Blood-tinged sputum is not prone to attend peribronchial infiltrations.

**Treatment.**—None. Morphine to control the cough.

**After-course.**—The patient died in increasing dyspnea within twenty-four hours.
Comment.—In a patient who has been operated on for malignancy any disease occurring afterwards is likely to be caused by cancer metastasis, and this possibility should always be carefully considered before an independent disease is diagnosticated.

CASE 5.—A farmer aged thirty-six came because of cough and dyspnea.

History.—The patient complains of cough and dyspnea. For three years he has noticed dyspnea at times with cough. He tried various asthma cures and changes of climate without marked benefit. More recently dyspnea has been most marked on exertion. His cough is nonproductive and he has noticed that it is difficult for him to get his breath in as well as to get it out, as he has read is the case with asthmatics.

Examination.—The patient is well nourished. The chest, save for a chest that approaches the barrel shape, appears normal. It is hyperresonant on percussion. The breath sounds are somewhat feeble, considering the well-shaped chest, and there are numerous medium-sized rales most marked at the lower angle of the scapula. The apex beat is in the fourth interspace at the nipple line. There is substernal dullness as far as the angle and beyond the right sternal margin, where the x-ray shows a shadow beneath the sternum which corresponds to the area of dullness (Fig. 134). The patient recounts that he had a fibrous tumor removed from the upper part of the calf of the leg which was removed four or five years ago. It was examined by a pathologist who pronounced it a fibrous tumor.

Diagnosis.—The physical signs and x-ray indicate a substernal tumor. There are none of the circulatory or vascular symptoms of aneurysm. Its peculiar lobulations likewise would exclude its origin from the vessels. The knowledge that the fibroblasts situated in the calf, though presenting in general the appearance of pure fibromas, are in reality fibrosarcomas, and unless widely excised, are prone to return. This knowledge together with the x-ray picture and the physical findings is sufficient to warrant the diagnosis of metastatic sarcoma of the mediastinum.

Treatment.—He was referred to an expert roentgenologist who rayed him vigorously half a dozen times.

After-course.—Notwithstanding the above treatment improvement was not marked, though there was no perceptible advance during the course of the treatment.
Comment.—The fibromas of the calf demand careful excision together with a margin of surrounding tissue. They usually manifest their malignancy by local recurrence, but may, as in this case, show metastasis. The x-ray in tumors of this kind is less useful than in tumors arising in the lymph glands primarily. These tumors tend to metastasize in lymph glands, which fact, together with the disposition to recur locally, would align them clinically with the endotheliomas, but notwithstanding this, their structure is that of fibrosarcoma.

Fig. 134.—Metastatic sarcoma of the mediastinum.
CASE 6.—A soldier aged twenty-four came to the hospital because of dyspnea.

History.—He has three aunts who have tumors of the womb probably uterine myomas. He first noticed a growth at the right border of the breast bone five years ago. It remained stationary for a year or more and then gradually grew. During the past year it has grown rapidly. It caused him no trouble until the past year. Since then he has been short of breath. Recently his left arm has been swollen and painful. He has noticed lumps in the groin and under the arms for six months or more.

Examination.—A mass the size of a split cocoanut occupies the left border of the sternum and left breast. It is fairly dense but distinctly elastic. The skin is unattached to it but the tumor does not move on manipulation. There is a mass the size of a walnut in the
left groin. Both axillae are filled with enlarged glands, most of them being the size of a hickory nut to a walnut. The glands of the lower cervical triangle are markedly enlarged (Fig. 135). The upper glands of the neck are not involved. The superficial inferior-

Fig. 136.—Lymphosarcoma of the mediastinum.

epigastric veins are much dilated. There is dullness in front over the tumor and about its border. The resonance is fairly clear on the back. The x-ray shows a wide shadow behind the sternum (Fig. 136).
Diseases of the Chest and Spine

Diagnosis.—The primary tumor sounds like a mediastinal tumor. The occurrence of the many discrete enlarged glands is pathognomonic of lymphoma.

Treatment.—X-ray treatment was advised.

After-course.—Treatment was not persevered in; six months later he presented a large ulcerous mass which protruded at the left border of the sternum.

Comment.—It is remarkable that he should have been able to continue the duties as a soldier with such an enormous mass in his chest.

Case 7.—A barber came to the hospital because of general pains, most pronounced under his breast bone.

History.—He had always had good health, when he began to have pain in various joints, particularly in the elbows and ankles. He has severe pain in the breast bone which he ascribed to an injury he received six months before by being struck by a limb of a falling tree.

Examination.—None of the joints complained of show any limitation of motion or pain on manipulation. There is marked tenderness on pressure over the sternum at the angle and just below. There is pain over the third rib cartilages. There is no dullness on percussion and no difference in the pupils. The vocal cords are unaffected and there is no tracheal tug. The x-ray shows a shadow in the mediastinum. The borders are fairly clear cut (Fig. 137). There is a slight general anemia.

Diagnosis.—The sternal pain and the shadow in the mediastinum are pathognomonic of aneurysm and sternal periostitis. A mediastinal malignancy when it does involve the sternum is not attended by pain. Though he denies syphilitic infection, he does so with a far-away look in his eyes as though he were harboring a memory.

Treatment.—He was given ascending doses of potassium iodide.

After-course.—The pains disappeared in three weeks and his general condition markedly improved. He was continued on mercurial treatment which he soon neglected. A year and nine months after the first observation, while shoveling snow a gush of blood shot from his mouth and he fell on his face in the snow, dead.

Comment.—The general appearance of the patient, the character
of the periostitis and the evidence of the x-ray was amply confirmed by the therapeutic test. When these factors align themselves it furnishes the most positive evidence of the diagnosis of syphilis.

Fig. 137.—Aneurysm of the aorta.
CASE 8.—A broker aged twenty-eight came because of a painful swelling on his breast bone.

History.—For six or eight weeks he has had pain over his breast bone. It has been painful at intervals, but in the past week it has been increasing. When he is actively at work he does not mind it much but when at leisure, particularly at night, the pain is severe. His general health is good but he does not have the vigor or endurance he formerly had. He has been treated for several weeks without benefit.

Examination.—Over the angle of the sternum there is a flat swelling measuring 5 to 6 cm. across and about 1 cm. high. It is firm

Fig. 138.—Gumma of the sternum.
to the touch and tender on deep pressure. No definite border can be made out, but it diffuses by stages into the skin surrounding. The clavicles are not tender (Fig. 138).

**Diagnosis.**—A painful periostitis coming in so short a time can be nothing but syphilis.

**Treatment.**—He was given injections of mercury until the swelling subsided and was then sent to a syphilologist for further treatment.

**After-course.**—He is well now after ten years.

**Comment.**—The sternum and clavicles are frequent seats of periostitis and, save for rare tuberculosis of the sternoclavicular articulation, is the only lesion that need be kept in mind.

**DISEASES OF THE LUNGS**

The surgical diseases of the thoracic cavity and the lungs are few. None in fact, save the drainage of purulent accumulations, is beyond the developmental stage. Formerly when empyemases were not diagnosed before the hectic stage was reached, it was time to interfere as soon as they came to the surgeon. Now that the average practitioner is well qualified to make a diagnosis, pus is usually detected early and it devolves upon the surgeon to stay his hand until there is adhesion between the parietal and visceral pleura. In lung abscess the surgeon usually must make his own diagnosis as to location even if the patient is delivered to him as one likely suffering from an abscess of the lung. These factors make it desirable that the surgeon be equipped with a practical knowledge of physical diagnosis.

**CASE 1.**—A married woman aged twenty-five entered the hospital because of chills, fever, sweats, and pain in the right side.

**History.**—She had a normal delivery at term on the second of December, 1918. Four days after delivery she had a chill. She does not know about fever, but thinks she had some. She had chills after that every second or third day, followed by intense sweats. The doctor said she had fever but she does not know how much. She felt pretty well between chills. After about three weeks the chills stopped for four or five days and she was able to be up and around. Had no pain during that time. On the sixth day after delivery both legs below the knee were puffy.
After the free interval she had two chills in one day. She went back to bed and from that time on she would have chills on about three successive days. They would then stop for a day or two and begin again. This has kept up to the present time, now eleven weeks. On one day she was told her temperature was 104°. About seven weeks after the trouble started she had a rather sudden pain in the left side of the chest. This was quite severe. She coughed some but not a great deal. Did not bring up much and does not cough much now. The pain lasted about two weeks. At this time about 1½ pints of a yellow watery fluid was drawn from the left chest by her doctor. She still has a little pain in the left chest. When the fever comes up, the breathing is difficult. She feels fairly well except on the days she has the chills. In the past two weeks she has had pain along the lower border of the ribs on the right side.

Examination.—The patient is not emaciated, shows no anemia, but is very nervous. Both legs are still puffy to the knees and pit on pressure. The patient states that the swelling of the feet is not as great as it was.

The chest shows the following findings: lungs, posteriorly, normal resonance to percussion over whole right lung. Decreased resonance to percussion over whole left lung. Almost flatness around lower angle of scapula and along the inner border of the scapula half way up. Auscultation over the whole right lung gives loud increased breath sounds. Breath sounds diminish over the whole left lung. Along lower part of inner border of scapula and lower angle of scapula the breathing is almost tubular in character. The spoken voice is increased over the whole left lung, but especially at the lower angle of the scapula.

The apex beat is felt just to the left of the sternum. The right border of the heart is to the right of the midline. The second pulmonary sound is relatively loud. There is tenderness in the hepatic region. The liver is just palpable. The uterus is in position and is large and soft. There is a boggy mass on either side, most marked on the left. The x-ray shows the right lung clear and normal. A rather dense shadow is seen on the left side taking up most of the lower left lobe.

Diagnosis.—Chills coming on four days after labor suggests infection. The swelling of the feet on the sixth day indicates thrombosis of the pampiniform veins. The recurrent chills and sweats confirm this evidence and the physical examination verifies it. The sudden pain in the left chest suggests a small thrombus. Had it been large, dyspnea would have been more marked. Following this an exudate formed in the pleural cavity, which was removed by the doctor. She remained as sick as before and has added pain in the right upper quadrant of the abdomen. With this history, consolidation of the lower lobe suggests an infection. The leucocyte count does not bear this out but the x-ray examination does. The abdominal pain is probably due to congestion of the liver, the result of slight displacement and increased labor of the heart. The diagnosis is, therefore, thrombosis of the pelvic veins, secondary septic thrombosis of the left lung with abscess formation.

Treatment.—Feb. 10, 1919. Seventh rib resection just below angle of the scapula. The pleura was much thickened. A pocket was opened, this small cavity being pretty well walled off by adhesions. Only a little bloody serous fluid escaped. The lung could be felt at the top of this cavity. It was dark red in color and felt firm to the touch having the consistency of liver. An aspirating needle passed (3 to 4 times) into the solid lung tissue revealed no definite abscess cavity, but showed only a bloody serum. The cavity was drained with gauze.

After the operation the temperature became normal for two days. On the third day it went up to 102° and from that time on she ran a septic temperature, going up to a little over 102° each day up to the second operation. She had no real chill after the first operation.

Second operation, Feb. 17, 1919. An aspirating needle was passed into the lung substance. No pus was found but the whole lower lobe was found solid. The needle was followed by the electric cautery and a rubber drainage tube was inserted and left. The cavity below was packed with gauze.

After-course.—The patient ran a temperature of 102° for about two days. It then dropped down and has been from normal to 100.5° up until today (Feb. 24). Quite a large amount of greenish-yellow pus has drained from the wound but most of it seems to come through the gauze pack. The general condition of the patient has been much better since Feb. 19.
March 2, 1919. Gauze pack removed from around the drainage tube. There had been considerable greenish-yellow pus drainage but when the pack was removed it was followed by a profuse discharge of greenish-yellow pus. On deep respiration the lower left lobe expanded and forced pus and air out of the chest cavity.

Condition at dismissal, March 11, 1919. The x-ray shows the rubber drainage tube in about the middle of the lower left lobe. Lung shadow of lower left lobe approaching the normal in appearance. The temperature for the last eight days has never gone over 100°. The pulse is still rapid, at times going up to 120. The drainage is purulent, but not very large in amount. The patient feels well. She was allowed to go home, retaining the tube.


Comment.—The history of the case indicated the presence of a septic thrombosis. In spite of the fact that the needle failed to locate an abscess, the tube was placed in the region of the greatest density. In the puerperal lung infections there is seldom a single large abscess but a number of small ones. In such cases by introducing a drainage tube into the area of maximum involvement these separate areas of infection are made to become confluent and drain out of a common opening.

CASE 1-A.—A farmer aged forty-six came to the hospital because of a sinus in the left side.

History.—One year ago the patient was accidentally hit in the side with a stone. The skin was not broken and there was no swelling, soreness or sickness following. One month later he fell and struck the same side. Slight swelling followed but there was no break of the skin, or sickness, and the soreness lasted only a short time. He worked as usual and paid no attention to the soreness. There was a swelling of skin over the rib however, which remained all winter. During harvest the swelling broke open and began discharging pus and has continued discharging since. Three weeks ago he caught a severe cold and since has had shortness of breath and temperature to 103°. He took osteopathic treatment which relieved it in two or three days. He has had no fever since and no cough until a week
ago, when he began to have occasional cough. He has suffered short-ness of breath until the last two days, but is better again. His general health has always been good. He had the usual childhood diseases, but no scarlet fever, diphtheria, pneumonia or typhoid. He had malaria at sixteen. He does not have headache, no eye, ear or throat trouble; no bladder frequency or pain, no Neisser or luetic infection; no history of tuberculosis in family. One sister died of cancer of intestines at sixty. The oldest daughter of patient had cancer of breast at twenty years. The patient's appetite has been good until the past week. There has been no loss of weight until past three weeks, but since then he has lost 17 pounds.

Examination.—The patient is in bed but does not look acutely ill. He is of large frame and fairly good nutrition, the skin is warm, elastic and shows many small moles. There are no glands palpable in the neck. The chest is symmetrical, the respiratory movements equal above, lessened below. There is a sinus over the 6th rib which is discharging pus. The heart is felt about 9 cm. left in 5th intercostal space and is best heard here. The dullness of heart apex extends to left axillary space. Below the 6th rib there is a tympanitic note as far as the costal margin. The sounds of the heart at the apex are distant, rapid and the intervals are nearly equal. At the base sounds are clear, no murmurs, no abdominal organs felt, no masses, no tenderness on pressure, no pain. X-ray examination of the chest shows a shadow extending almost to the top of the left chest.

Diagnosis.—Obviously there is an empyema. From the history it seems likely that there was an infected periostitis which infected the pleural cavity secondarily. Localized infections of the ribs are usually tuberculous, but this one likely is not or if it is tuberculous there must be a mixed infection.

Treatment.—The rib to which the sinus extended was resected. Two sinuses were found which communicated with the pleural cavity. The pleura was much thickened and an area of calcification extended around the parietal pleura. The diaphragmatic pleura was much thickened as was the pleura over the left lung. The cavity was filled with a thin yellow pus.

After-course.—There was no operative shock. The wound drained considerable thin yellow pus the first two days. Temperature the second postoperative day went to 102.5°, the highest after the operation, pulse 100. The gauze was removed from around the tube the
third postoperative day. The thin purulent discharge changed at the end of a week to a pinkish yellow. It did not seem to decrease in amount even up to the day of his dismissal from the hospital. He ran a mildly septic course. The temperature dropped to about 99 every morning and went to 100° or 101.5° in the evening. He suffered no pain. The drainage tube was not removed or shortened when the patient left the hospital, 16 days after operation. He felt well and had a good appetite. He was allowed to go home with instructions to return in a month for examination. It was obvious that the thickened calcified pleura would not permit of a spontaneous obliteration of the cavity. In two months, after the virulence of the infection had abated, two ribs were resected and a flap from the anterior abdominal wall was pushed up into the cavity (Fig. 139) after the thickened calcified pleura had been removed. In order to facilitate the holding of the flap in the deep cavity the tip was grasped by an eight-inch forceps and by this means pushed into the deep cavity. The handle of the forceps was then fastened to a rib. In two weeks the forceps was removed and the flap was found permanently adherent.

Comment.—In these chronic cavities the dermatization by means of a pedicled flap furnishes an efficient means of stopping suppura-
tion. The skin-lined cavity does not annoy the patient in any way. Holding the flap in place by means of a forceps, as indicated, simplifies the otherwise most difficult step in the operation. This operation is easily performed under local anesthesia.

CASE 2.—A widow aged sixty-two came to the hospital complaining of dyspnea.

History.—The patient had her right breast removed ten years ago because of carcinoma. She has had no trouble since. Two years ago she began to have cough. She had pain in the left side with pain on deep respiration. She has had more or less cough but no expectoration. She has dyspnea on exertion and when first lying down.

Examination.—She is a very thin, pale woman. The breath sounds in the front of the chest are loud, the expiration is prolonged with a high pitch as compared to the average. Behind the left side is dull from the sixth rib down and the breath sounds and vocal fremitus are much diminished. The heart sounds are normal. The x-ray shows a dark space between the lung and chest wall as though the lung were pushed away.

Diagnosis.—Pain in the chest in a person who has been operated on for carcinoma of the breast suggests a vertebral metastasis and dyspnea, a mediastinal growth. The lung findings together with the x-ray findings suggest a simple pleural exudate.

Treatment.—Five hundred c.c. of a clear exudate was removed by aspiration.

After-course.—The patient was much relieved by the aspiration, but the fluid reaccumulated and aspirations had to be repeated. She gradually weakened and died six months later.

Autopsy.—There was a metastatic carcinoma the size of a lemon about the left brachial tree. There was no vertebral metastasis.

Comment.—The pain complained of apparently was due to involvement of the intercostal nerves near their exit.

CASE 3.—A farmer boy aged eighteen came to the hospital because of cough and expectoration.

History.—The patient complains of great weakness and continual cough with expectoration of a dark yellow foul-smelling mucous substance together with pain along the ribs on the right anterior side of the chest when he coughs, and under the right scapula when he turns over in bed. His trouble began two days after a tonsillecctomy under
ether anesthesia five weeks ago. It started as a sharp pain in the chest, which was made worse by deep inspiration. The pain is chiefly in the right side and in front of the chest when he coughs and some under the right shoulder blade when he turns in bed. The cough did not begin until about two weeks after the first attack of pain. He says the cough is started by the purulent mucus coming up in his throat and he must cough to get it out. About the time he began to cough he felt as though he had a fever. He says that after coughing up a large amount of purulent material he would be free from cough, often as long as twenty-four hours. Change of position in bed always brought on a coughing spell.

Examination.—His temperature is 105°, pulse 110 and respiration 34. Hemoglobin is 75 per cent and there are 17,500 leucocytes. There are increased breath sounds and dullness below the fourth rib. When the expectoration stands it becomes divided into three layers, a foamy one above, a clear one intermediate and a creamy one below.

Diagnosis.—The pain followed by sudden cough with expectoration of a large quantity of foul-smelling pus is pathognomonic of lung abscess. Added to these are the fever, leucocytosis, separation of the expectorate into layers on standing and the sudden cough with expectoration when he changes his position. The fact that his temperature is so high indicates that drainage is not so free as it should be.

Treatment.—Resection of the seventh rib in the postaxillary line with insertion of a gauze pack. The pleura had become adherent from the preceding pleuritis except at the median part of the lung. This made packing with gauze to induce adhesions necessary before the abscess was sought. The abscess was entered six days later.

After-course.—The drainage at first free, rapidly diminished and when he left the hospital on the 32nd day only a slight drainage remained. When examined three months later, healing was complete and he was free from any disturbance.

Comment.—Not all abscesses require drainage after they have once ruptured. Children, particularly, often heal spontaneously. Abscesses diagnosed before rupture should always be drained. Abscesses that do not heal in two months should be drained, and if the temperature does not promptly subside after spontaneous rupture, they should be drained.
CASE 4.—A school girl aged ten was brought because of pain in the chest.

History.—Following an attack of tonsillitis she suffered from sudden pain in the right chest and had the general symptoms of influenza then epidemic. The pain in the side resembled a pleurisy and consolidation was never pronounced. The temperature rose and continued unabated until the time of operation, now three weeks ago.

Examination.—There is dullness in the lower right chest, but not the marked flatness of exudate. There are breath sounds over the larger part of the dull area. The dull area extends higher in front than in the back and does not move with a change in position.

Diagnosis.—The manner of onset suggested a pleurisy and the course of the fever suggests its transformation into an empyema. The marked respiratory sounds are not usual in fluid accumulations, though this is inconstant.

Treatment.—Rib resection and drainage.

Pathology.—The pleural cavity was free but obliterated. A needle passed 2 cm. into the lung secured pus. A drainage tube allowed a considerable amount of pus to escape. The abscess cavity seemed unusually well defined but no necrotic lung was in evidence.

After-course.—Recovery was complete in six months.

Comment.—This case suggests the possibility of a direct metastasis from the tonsils and the possibility that lung abscess following tonsillectomy need not be due to a faulty technic.

CASE 5.—A baby aged fifteen months was brought to the hospital because of abdominal distention, constipation, and general wasting away.

History.—Two months ago the baby had the German measles and a week later she developed bronchopneumonia with a rise of temperature to 104°. After a couple of weeks temperature became normal in the mornings but went up in the evenings usually to about 102°. About May 1 the doctor pronounced the case empyema because the child had gradually weakened and wasted away. For the last two weeks she has had abdominal distention and obstinate constipation.

Examination.—There is flatness of the entire right side of the chest. Absent vocal fremitis on this side and the breath sounds are scarcely audible. The temperature is 103°.
Diagnosis.—The history of measles and bronchopneumonia with continued temperature and flatness of the chest leaves but little doubt but that we have to do with an empyema.

Treatment.—The seventh rib was resected and half a pint of pus escaped.

After-course.—The temperature came to normal in a few days and the child began rapidly to gain weight.

After several months of well-being, the child began three or four days ago to run a temperature. It went as high as 104° several evenings. She vomited a few times, and became very much distended and had five or six watery green stools daily. She had been practically on an adult diet. On admission the temperature was 100.5°, the pulse 120 and the respirations were 22. There was no flatness on percussion on either side of the chest, breath sounds were normal through both lungs and there was no decrease in voice sounds in either lung. The wound in the chest wall from the rib resection and drainage of empyema had entirely healed. Acute gastroenteritis was diagnosticated. Appropriate treatment for this complaint was instituted and the recovery was prompt and lasting.

Comment.—The patient was returned for a renewed drainage of the chest. The temperature and distention of the abdomen were similar in the two admissions, but the physical findings were wholly different. Yet the family doctor was entirely correct in his surmise for a recently drained empyema that develops temperature most likely has retained pus.

CASE 6.—A school girl of seven was brought to the hospital because of continued fever and loss of weight.

History.—Thirteen months before while at play, she swallowed a pin. It was a steel pin with a round head, and about an inch and a quarter in length. It gave her no trouble at the time. Five or six months later she gradually developed a cough which has continued and grown worse. She had weak spells while at play and had to be carried in. Two months before entering the hospital the symptoms increased. The cough gradually became worse, especially at night. Some sputum was raised. Starting from the back there was pain which radiated to the epigastrium and left side. The temperature was 102-103°. There was loss of appetite and frequent attacks of vomiting. The left shoulder drooped when she stood straight. Sputum examined was negative.
Examination.—The patient is greatly emaciated and very weak. Temperature 104°, pulse 144, respiration 40. Physical examination of the chest showed dullness, decreased breath sounds and decreased fremitus over the entire posterior left side. The x-ray showed a shadow over the entire left chest, indicating fluid in the pleural cavity, and a very definite shadow of a pin, head downward, about an inch or an inch and a half above the diaphragm, a quarter of an inch
to the left of, and one inch anterior to, the bodies of the vertebrae, the point of the pin pointing slightly toward the midline (Fig. 140).

**Diagnosis.**—Empyema or lung abscess from a foreign body. It is most likely to be an empyema because of the extent of dullness. It would be very unusual for a lung abscess to occupy so much space.

**Treatment.**—A rib was resected and the chest drained. The temperature promptly dropped and the patient soon began to gain strength.

**After-course.**—She left the hospital in fifteen days with the chest still draining, and returned for observation and dressings occasionally. A month after leaving the hospital she had a coughing spell and coughed up a piece of the pin a little more than \( \frac{3}{4} \) inch in length. The point was quite sharp yet, but the other end where it was broken off was very much corroded. On December 13 when the patient was last seen, she was feeling perfectly well, she had gained weight from 26 to 46 pounds, and the chest was normal. X-ray of the chest at this time showed no foreign body.

**Comment.**—An abscess evidently formed about the pin and later ruptured into the pleural cavity.

**CASE 7.**—A farmer aged twenty-four came to the hospital because of cough and loss of strength.

**History.**—The patient was perfectly well up to six months ago. While riding a cultivator he had a sharp pain in the epigastrium—he thinks also that there was some tenderness. The pain was continuous and gradually increased in severity. He consulted a physician four or five hours after the onset, took some medicine, and the pain left about ten hours later, leaving soreness in the epigastrium and weakness for two or three days. He had fever, 100° or 100.5°. He was quite well for two weeks, when he became chilled during a ride and developed tonsillitis, lasting two or three days. After the tonsillitis subsided he began to have fever which persisted. Never had chills. He commenced coughing at this time and expectoration began a day later.

**Examination.**—The patient has a distinctly hectic appearance. The respiration is rapid and somewhat labored. The left lung shows no abnormalities. The right gives limited dullness over the 5th to 7th ribs behind, with lessened resonance above and below. There are some lessened heart sounds over the dull area. A diagnosis of lung
abscess was made and preparations were made to drain it. During the night he was seized with a fit of coughing and spat up 350 c.c. of pus. This on standing separated into three distinct planes (Fig. 141).

Diagnosis.—The early history of this case is confusing. The source of the epigastric pain was not determined. There was no history to aid. It had the sudden onset of an appendiceal pain. In view of

Fig. 141.—Sputum from a case of lung abscess showing separation of sputum into three layers.
the subsequent history, it seems quite possible that it was pleural in origin. The continuous fever, cough, and general weakness gave rise to a diagnosis of typhoid fever and acute tuberculosis by several doctors who were consulted. The localized dullness, the irritating cough, and rapid respiration centered the attention on this region and the temperature and leucocytosis found suggested suppuration rather than tuberculosis. After the profuse expectoration appeared, further speculation was unnecessary.

*Treatment.*—Since the abscess had ruptured before drainage could be effected, he was sent home to recuperate and to await Nature's efforts to effect a cure.

*After-course.*—The patient improved in general health and the expectoration gradually lessened. Though signs of consolidation remained for many months, the recovery ultimately was complete.

*Comments.*—The source of infection is obscure. If the epigastric pain was appendiceal in origin, this may have furnished the focus. Should there have been a pneumonia, the source was equally plain. The organism was predominantly streptococcic. Most likely the tonsil attack was linked in the chain of etiologic factors. I have seen tonsillitis and appendicitis associated, as have all surgeons, and I have seen lung abscess follow each, and possibly as in this case following both.

**CASE 8.—A school girl was brought to the hospital because of complications following pneumonia.**

*History.*—The patient had influenza four months ago. In ten days she had a temperature of 105° and pneumonia was diagnosticated. Both lungs were said to have been involved. In a week the temperature came down to 101-102°. A week following the temperature was subnormal in the morning and usually reached 103° in the afternoon. This state continued for six to eight weeks. Four weeks ago she had a violent coughing spell at the termination of which she spat up half a pint of pure pus. The temperature remained around 100° to 101° for a week or two. Following this the temperature began to rise again until she coughed up a large quantity of pus, after which the temperature again went down. It began to rise again in a few days, and on entering the hospital, she had pulse 130, temperature 102.5°, respiration 40.

*Examination.*—The patient is anemic and emaciated. The left
side of the chest is large and motionless, while the patient labors diligently in her breathing, but without cyanosis. The whole lower portion of the chest is flat and the vocal fremitus is absent. The x-ray showed the whole lower chest to be occupied by a shadow.

Diagnosis.—The history of the expectoration of a large amount of pus after violent coughing was evidence that an accumulation of pus was present in the chest. The sole problem was whether an empyema had reached a bronchus or whether the process was primarily a lung abscess. The complete flatness over the entire area spoke for a primary empyema while the repeated periods of expectoration followed by a drop in the temperature spoke for a primary lung abscess. At most the question was purely academic.

Treatment.—A portion of the 9th rib in the axillary line was removed. The lung was adherent to the parietal pleura. Since the opening in the chest was so low, it was thought that the empyema might be higher. After separating the pleurae for the distance of an inch the fluctuating abscess within the lung could be felt. A hemostat was pushed into the lung and a huge cavity opened. The depth of the cavity could not be measured by the finger. A large rubber tube was placed in the cavity and an abundant dressing applied over the chest.

After-course.—The temperature reached normal in two days and remained so for a week, when it suddenly went to 104° accompanied by rapid respiration. Investigation showed the drainage to have become checked. The reestablishment of the drainage was followed by a prompt and permanent drop in the temperature. She was allowed to go home on the fifteenth day. She returned at intervals of three weeks when the tube was shortened each time. The tube was left out at the ninth week. The resonances had returned and the breath sounds were returning. After four months there was little save the scar remaining.

Comment.—In draining lung abscesses, as in any other abscess drainage should be efficient and should reach near the deepest point of the abscess, lest a collapse of the walls separate off a part from the drainage tube. The drainage tube should be allowed to remain so long as the drainage is free. At the same time the fact must not be overlooked that the tube itself will be responsible for some discharge. A good rule is that whenever the abscess has closed down to the tip of the tube it should be shortened.
CASE 9.—A real estate dealer aged fifty-six came because of stomach trouble, pain in his chest and difficulty in breathing.

History.—Ten years ago he began to be troubled with gas on his stomach. His doctors diagnosed gallstones. Every month or so he would be sick at his stomach and he felt as though everything was turning over. Four years ago he had a severe spell; it came on suddenly while he was milking. He was scarcely able to get to the house. The doctor remained with him all night. The pain stayed in the pit of the stomach, it did not radiate and there was none in the back. A brown streak developed on his tongue. The doctor said he just escaped typhoid. He was nauseated and vomited at intervals for 24 hours. His most severe pain was over the heart. He had fever and was in bed two weeks. Since then he has had brief spells of nausea and pain in the region of the heart or stomach. They are not related to the meal time. He has some generalized headache at this time. He has had a slight cough at times. His bowels are very irregular, diarrhea alternating with constipation. He has had bladder irritation at intervals. Three years ago it was quite severe for a day. Six or seven months ago he noticed a mole on his right shoulder. Soon after it began suddenly to grow. He thinks he must have bruised it because it seemed inflamed. Three months ago a doctor snipped off the projecting part with a pair of scissors. It began to grow again and now is larger than ever. The patient had various diseases of childhood and malaria many years ago. He had chills and fever at intervals for a year and a half. He was cured by change of climate and quinine.

Examination.—The patient makes it clear that he must have relief and that he is willing to do whatever is necessary to secure this end. He has an apprehensive look and gives evidence of loss of weight and strength. His muscles are flabby, the skin inelastic. He indicates the site of his severe pain four years ago, as just below and to the left of his xiphoid process. His abdomen is a little distended, soft and slightly tender at the upper part. The edge of the liver is just palpable. Heart and lungs are negative save for a slight loss of resonance in the right lower lobe behind. The lower lung border is negative. The tumor on the shoulder is half an inch in diameter and half as high. It is deep blue-black in color and there are many dilated vessels visible in the skin about it (Fig. 142). This growth was removed. It is a melanoma. The advancing border of the
growth shows large deeply staining cells which contain pigment. The patient’s urine is negative, the renal output 50 c.c. the first hour, 25 c.c. the next. His blood shows 90 per cent Hg., R.b.c. 4,400,000, W.b.c. 26,000, of which 90 per cent are polynuclears. The temperature is 98.4°, pulse 70, respiration 18.

**Diagnosis.**—The history suggests a primary stomach trouble proba-

![Fig. 142.—Irritated melanoma of the shoulder.](image)

bly an ulcer which likely perforated four years ago when he had a sudden epigastric pain and could hardly get to the house. His condition must have been somewhat serious or his doctor would not have stayed thirty-six hours. He probably was not much of a doctor or he would not have done so anyway. There must have been some toxic symptoms because he was in bed two weeks and got a brown streak down his tongue. He has had attacks since which would in-
dicate the possibility of a perigastric adhesion. There is evidently something that has been added in the past few months that has produced a rapid decline. The leucoeytosis of 26,000 is unexpected and impressive. One thinks of a perigastric abscess. His appearance is not that of sepsis, there is not sufficient epigastric tenderness or rigidity to warrant such an assumption. Furthermore, the pulse is normal in rate and volume, and the temperature is undisturbed. An abscess capable of producing such leucoeytosis would scarcely allow this. The melanoma of the shoulder stands out as a source of trouble. Whenever a melanotic tumor is present or was present it should be regarded as guilty until the contrary can be proved. A melanotic metastasis is entirely capable of doing all of which the patient has complained. The x-ray, while not diagnostic of an intrapulmonary lesion, is compatible with such an assumption. The probable diagnosis is melanotic metastasis probably in the right lung.

**Treatment.**—Expectant.

**After-course.**—His condition did not improve by rest in bed. At the end of a week dullness was definite in both lungs. On the tenth day 5 c.c. of clear, thin fluid was aspirated from the left chest. A motile bacillus was cultured from this. The laboratory man regarded this as a contamination, thus making the opinion unanimous. On the twelfth day there was dullness on the right side extending up as high as the angle of the scapula. There was no flatness anywhere. While the respiratory sounds were diminished over this area, they were present. The same is true of vocal fremitus. At this time an enlarged gland was noticed in the right axilla. This gland rapidly enlarged and attained the size of a walnut. It was hard, encapsulated, somewhat bosselated, and only slightly sensitive to pressure. The patient developed a dyspnea with distress not definitely defined, and in two days he died. Autopsy was refused.

**Comment.**—There seems but little doubt that the terminal disease was a melanotic metastasis. The high leucoeytosis is not unusual in this condition.

**DISEASES OF THE SPINE**

Congenital deformities of the spine offer no difficulties, and Pott's disease is well learned in school, but the various inflammatory diseases of the spine are usually overlooked. The lesions of the cord are
well understood by the neurologist, but inflammations must be found by the surgeon himself if he is not to be led into useless operating.

CASE 1.—A baby three and a half months was brought in because of a tumor on the back of its neck.

History.—The baby was born with its tumor. It seems otherwise well and has nursed at the breast. There is another child two and a half years old who is normal in every way. The mother is fleshy, of almost myxedematous habitus.

Examination.—The baby seems a fine physical specimen save for

![Fig. 143.—Spina bifida of the cervical region.](image-url)

the tumor on its neck. This is as large as an orange, soft, and compressible. The surface is reddish and shows a large number of vessels. The tumor can be seen through this area to be made up of a straw-colored fluid. There is a spinal defect representing about the fifth and sixth cervical arches (Fig. 143). The large fontanelle is somewhat bulging and the forehead unduly prominent. All the extremities seem capable of normal movement.

Diagnosis.—No strands or bunches can be made out in the wall of the sac. This, together with the fact that all the extremities are active, makes it likely that it is a pure meningocele. The tenseness of the fontanelle and the size and shape of the head make it likely that a certain degree of hydrocephalus is present.
Treatment.—An elliptical incision was made near the base of the mass and the flaps deflected. An attempt was made to transfix the dura with a catgut suture, but it was torn into and it had to be united with a sort of mattress Lembert followed by a whipped overstitch. The skin was united by a mattress stitch.

Pathology.—The portion of the membrane removed showed no nerve structures.

After-course.—The baby did well, save that in spite of collodion dressings, large quantities of cerebrospinal fluid escaped. This checked materially in a week, and since the wound was without reaction, the parents were allowed to take the child home. Her doctor wrote that four days following the return home, the baby became restless, the fontanelles sunken and a bluish discoloration presented about the wound. The next day it died.

Comment.—It is likely that a meningitis followed the drainage tract. Greater care might have prevented a leaking wound. At least once the leak occurred the desire of the parents to return home should have been combated until the leak should have ceased. Cessation of such leaks is often exceedingly difficult to bring about, many weeks being often required in the process. What the ultimate outcome would have been had the operation been successful is difficult to say. Usually there is a progressively increasing hydrocephalus. Possibly it would be better not to operate these patients at all.

CASE 2.—A child nine days old was brought to me because of an ulcer on its back.

History.—At birth it was noticed there was a tumor in the middle of the baby’s back. Immediately after birth it was not noted that there was any discharge from the tumor, but for a number of days any dressing that is applied quickly becomes saturated by a clear fluid. The child nurses vigorously, and moves its arms freely, but has not been observed to move its feet. The mother has nine other children, in none of whom is there any defect.

Examination.—In the dorsolumbar region is an ovoid elevation 2 cm. high. It is 10 by 14 cm. in size (Fig. 144). The outer border is covered with normal skin continuous with the skin of the back. Inside of this border of normal skin is a thin, reddish membrane-like structure and covering the center is a thin, veil-like membrane which has a defect at one point from which a thin clear fluid escapes. Be-
neath the thin membrane are numerous whitish indefinitely formed strands. The baby moves its hands, but cannot be excited to move the legs.

Diagnosis.—The fine pellicle-like membrane above noted evidently represents the pia, and the ill-formed bundles, a portion of the spinal cord. The condition then must be designated a meningomyelocele. Since no movements of the legs have been noticed neither can any be elicited, it seems fair to assume that the sacral plexus is destroyed.

![Fig. 144.—Spina bifida.](image)

Treatment.—None was advised save the application of aseptic dressings.

After-course.—The patient died in ten days.

Comment.—No sort of treatment can produce motion in the legs in such cases. The most that can be hoped for would be the preservation of a child whose legs are useless and whose bladder and rectum are beyond control. Whether or not professional duty compels one to make this effort is a question each must decide for himself. If there is a defect in the control of the bladder, death usually follows from this cause. If the sac has ruptured, death usually follows in a week or two; if unruptured, a repair of the defect is usually possible.

CASE 3.—A girl aged three years was brought to the hospital because of a tumor on the lower part of her back.

History.—The child was normal at birth in every way save for the tumor over the lower part of the back. She learned to walk at the
normal period. There was no disturbance of the rectum or bladder. There are four older children in this family, none of whom have any developmental anomaly. The period of gestation the mother states was not marked by any unusual occurrence. She also states that she had no menstrual disturbance prior to conception.

Examination.—A tumor the size of an orange occupies the lumbo-

Fig. 145.—Spina bifida of the sacral region.

sacral junction (Fig. 145). The skin about the base is normal, but toward its surface is thinned and attached to the underlying tissue, but is not reddened. It is fluctuating and transmits light. The child walks normally and there is no abnormality of formation or function of the legs.

Diagnosis.—When there are no disturbances in the legs usually the tumor is composed of dilated spinal meninges, though some-
times in these cases the nerves may be united in the wall of the tumor. Usually in myeloele the legs are paralyzed. From teratomas this may be differentiated because of the transmitted light, the evident absence of solid mass and in a measure by the location. Teratoid tumors are usually located at the extreme terminal portion of the spinal column.

Operation.—A sufficient area of skin was preserved below an elliptical incision. The meninges and soft parts were carefully dissected loose to the base. The redundant portion was removed above a pair of intestinal clamps. After inspection of the contents of the sac, this membrane was united side to side by a shoemaker's stitch, the subcutaneous tissue and skin were closed by separate layers. The wound was sealed with a collodion dressing. The spinal cord and cauda lay in the depth of the cyst, apparently unharmed.

Pathology.—The cyst wall removed was composed entirely of fibrous tissue. The fibers were collected in irregularly placed bundles in some places which gave them the appearance of nerves. No nerve elements could be demonstrated.

After-course.—Recovery was uneventful and the child developed normally.

Comment.—Such simple cases unfortunately are seldom encountered. Usually the cord structures are involved in the sac and despite every caution are subject to injury. The practice of attempting to cover the defect by bone or periosteal transplants is unnecessary.

After the bulging sac is removed the surrounding structures tend to cover the defect more and more. The idea of closing the gap is theoretically sound, but it prolongs the operation and extends the traumatized field. In children who have reached the age of discretion, a simple collodion dressing suffices. In very young children a rubber covering should be added. In addition a relay of nurses should keep the child in a sitting position for a week in order that excreta may gravitate downward and not jeopardize the dressing by creeping along the sacral spine. Infection is the one danger, and this continuation of precautions is the only effective means of controlling it that I have found.

CASE 4.—A farmer age twenty-nine came in for tonsil removal.

History.—From the day after the operation the temperature went up to 103° and remained between 100.5° and 104.5° for nine days.
He complained of a very severe pain in the cervical vertebrae during the whole time. The temperature gradually came to normal and the pain lasted some time after the temperature became normal, gradually passing away.

The highest blood count during the fever showed a leucocytosis of only 10,800. The lungs were negative, urine negative, and the whole physical findings were negative with the exception of a rigidity of the neck and pain on movement of the head from side to side. He was troubled with severe headaches at intervals.

Brain abscess, lung abscess and generalized infection of the tissues of the neck were thought of, but a diagnosis of neither could be made.

The trouble seemed to be an acute spondylitis involving the cervical vertebrae.

CASE 5.—A farmer aged forty-three was brought to the hospital because of pain in the back.

History.—The patient has always lived on a farm and for five years prior to his illness worked in a coal mine during the winter months. Eight years ago he began to have pain in the hips. During the winter he had a severe pain which extended down the back of the right leg. This was diagnosed as sciatica. With rest in bed and general treatment this gradually improved, and by spring it had entirely disappeared never to return. Three years later he began to have pain in the chest, shoulders, and neck. This was at one time so severe that he could not turn his head. These pains have continued, and now he is unable to turn his head, even when he bears the pain. When he lies in bed for a few days with the head and neck well supported the pain disappears. His general health has always been good, except for rheumatism as a boy and recurrent attacks of tonsillitis. Recently he has lost in weight and his appetite is poor.

Examination.—The patient lies in bed with the neck slightly flexed on his chest. When asked to look from side to side he rotates the eyes as far as possible and supplements this when necessary by turning the entire body. When the examiner attempts to rotate the head he exclaims from pain and complains that the muscles are caused to cramp painfully. He thinks this is the cause of his inability to rotate his head. To the sensation of the examiner
it is evident that the limitation is due to bony changes. The head can be flexed slightly more on the chest until it encounters bony resistance. Attempts to flex it beyond a certain point are met at once by bony resistance. He is unable to flex or extend the lumbar region to any degree. The right thigh can be flexed to an angle of 60 degrees only, when it is stopped by bony resistance. When attempts are made to flex it beyond this point, it is noted that the lumbar spines are completely ankylosed. The left thigh flexes in a normal degree. He has noticed a gradual impairment of vision. There is no demonstrable changes in sensation and no painful areas.

Diagnosis.—His preliminary pains in the hips were due obviously to an arthritis as is evidenced by the bony limitation of motion still manifest. Recovery may be ascribed to the organization of the arthritic process. The sciatic pain was an extension of irritation from the capsular involvement. The later pains in the chest and neck no doubt were due to a spondylitic process. What remains is a complete ankylosis of portions of the vertebral column and a still existing spondylitis in other segments. The general deterioration in his health must be secondary to this. The whole process may be defined as an ossifying spondylitis.
TREATMENT.—He was given guaiacol internally as suggested by MacNaughten Jones. Heat was used along the spine. Neither of these measures modified the disease in the least.

AFTER-COURSE.—The pains lessened, but the general condition continued to decline. No obvious cause could be assigned. He died in nine months after the first examination without there being discoverable any lesion of any organ.

PATHOLOGY.—The upper dorsal vertebrae were completely ankylosed (Fig. 146). The lumbar and cervical regions were less completely affected, but the changes were sufficient to make a completely fixed column. The intervertebral ossifying process seems to begin in the ligaments and affects the joint surfaces and the intervertebral discs secondarily. This seems to confirm the x-ray findings in the milder cases that recover. At autopsy no lesion was found responsible for death, save a metastatic pneumonia.

COMMENT.—The interesting factor in this case is the progressive character of the affection. The nerve manifestations both in the leg and those supplying the muscles of the neck throw an interesting sidelight on the nature of these affections. Why these patients progressively weaken and die is not apparent in any of those I have observed. In the three which I have seen come to autopsy, no secondary or associated lesion was found.

CASE 6.—I was called to see a housewife aged sixty-three because of pain in the side and back.

HISTORY.—Thirteen years ago she had severe pains in the right upper quadrant of the abdomen. An exploratory operation was done by a competent surgeon without clearing up the diagnosis. Following this she began to lose weight, the ankles swelled, and she became anemic. A tender point appeared on the left side of the median line, corresponding to that on the right side present before the operation. Three years following the onset she developed curvature of the spine. She attributed this to the constant leaning over to lessen the pain. She improved without known cause; she used a spinal brace for a time without benefit. She was free from pain for a number of years. Four years ago the pain began again and has been present more or less since. It has always been most intense at night. These pains are very intense and follow the course of the spinal nerves. The pain now is most intense in the region of distribution
Fig. 147.—Chronic spondylitis.
of the 12th dorsal nerve. The pain is acute, making rest impossible and destroying a desire for food. Pressure relieves the pain sometimes, as does heat; when intense, all of these measures are useless. Recently 3/8 grain of morphine has been required to relieve the pain. Four days ago following a dose of castor oil she had black stools which reacted to benzidine.

Examination.—The spine shows a marked curvature. There is no tenderness over the spine. There is limitation of the movement of the vertebrae. The 12th nerve is not tender to pressure, but the area of greatest pain is described in the region of the distribution of this nerve. The x-ray shows a marked deviation of the spine (Fig. 147). The point of maximum bony change corresponds to the 12th dorsal vertebra and in harmony with this the 12th dorsal nerve represents the region of greatest pain. No very marked exostosis could be made out, and while the back was held rigid, there was an absence of definite evidence of bony union.

Diagnosis.—Because of the long course, malignancy could be ruled out. The intercurrent course of the disease suggests a rheumatic type of disease rather than a destructive one. The spinal deformity and the distribution in all of the attacks of the pain along the course of a definite spinal nerve suggested pressure. The x-ray did not bring the confirmatory evidence, but a clear x-ray plate could not be obtained. A competent neurologist failed to find evidence of any specific type of cord lesion. The absence of sensation changes excluded myelitis.

Treatment.—Quinine blocking of the intercostal nerves was attempted but without results.

After-course.—The injections having failed wholly, anodynes were continued. The pain increased and general loss of strength followed. She died after six weeks of gradually increasing inanition.

Autopsy.—A general spondylitis with multiple exostosis with the formation of fibrinoid plaques on the pia mater was discovered (Fig. 148). The changes in the cord membranes apparently were of the same nature sometimes seen in the soft tissues in the neighborhood of arthritic joints. The changes in the spine were more extensive than the distribution of the pain.

Discussion.—This disease was characterized by the successive involvement of segments of the cord. The existence of pain in any of the regions likely corresponds to the arthritic process then active
Fig. 148.—Spinal cord in chronic spondylitis showing plaque in the dura.
in some of the vertebral joints. Any persistent pain representing
the distribution of any spinal nerve where there is no evidence of
specific cord disease, should always excite the suspicion that there are
bony changes in the spine. Even when these can not be demonstrated,
search should be made for a primary focus, particularly in the teeth
and tonsils. The correctness of this hypothesis is often demonstrated
by the simultaneous disappearance of the pain with the offending
teeth or tonsils.

CASE 7.—A farmer aged twenty-eight came to the hospital be-
cause of pain in his back.

History.—The patient’s father died of tuberculosis. He himself
had dysentery for three or four days two years ago and measles one
year ago. There were no recognizable sequelae. He was shot in the
back with a load of No. 6 shot nine years ago. He was well from
this in a month. About ten months ago he noticed that his back became
very tired when he rode farm machinery. This bothered him again
for a few weeks six weeks ago. Ten weeks ago there was marked pain
in the lumbar region when he straightened up from a stooping
position. Soon after this the pain appeared between the shoulder
blades and along the back of the neck. There was some pain over
the top of the left shoulder. Six weeks ago he noticed a marked
stiffness of the spine. For a month there has been pain about the cos-
tal margin. He has lost fifteen pounds in weight in the past ten weeks
and he has become markedly weak though his appetite remains good
and his bowels regular.

Examination.—The patient looks emaciated and weak. He holds
his spine and head rigid, carefully turning his whole body when he
wants to look about. When he lies down, he supports his head with his
hands. The lower part of his back is much seared up from the wounds
received from the shotgun, though the injury evidently did not ex-
tend below the deep fascia. The upper portion of the spine is rigid
to movement and sensitive to deep pressure. His temperature is
99.6°, respiration 18, and pulse 84. The urine is strongly acid and
contains a few granular casts. There are 13,400 leucocytes. The
x-ray shows a deposit of bone across the intervertebral discs in the
dorsolumbar region (Fig. 149), none in the upper dorsal, and cervical
region where he now has the most pain. His tonsils are large, red-
dened and many white plugs can be expressed from them.
Fig. 149.—Chronic spondylitis.
Diagnosis.—The extent of the vertebral column, the acute onset and progress excludes tuberculosis, of which one thinks because his father died of that disease. The x-ray changes are distinctly those of a hyperplastic rather than of a destructive process.

Treatment.—He was placed in bed on his back without a pillow. In a week his tonsils were removed.

After-course.—The slight temperature he carried the first week in the hospital gradually disappeared and remained for the most part below the normal line. The pain lessened and the mobility returned. When he left the hospital, he had regained most of the normal mobility in the cervical region, but the dorsal region remained rigid, but he was free from pain.

Comment.—This case was received in the acute stage, an unusual hospital experience. The rather prompt improvement after the removal of the tonsils indicates that these organs were the source of the infestation.

CASE 8.—A farmer aged twenty-eight came to the hospital because of pains in the back and deformity.

History.—His present trouble started four years ago when he first noticed a pain along the spine in the thoracic region. These pains in a few weeks began to pass around the lower chest and back around to the abdomen in front. Pains were not constant. They would come and go and were made worse by exertion. The pains were severe all summer of 1914. In the fall they decreased and gave only a little trouble until the summer of 1916. The pains were severe all that summer. In fall of 1916 he quit work on account of a broken down arch of his left foot and his back pain disappeared and gave little trouble that winter. In the spring of 1917 he worked on a farm and the pains became quite severe in the hips too at that time. He was very weak all last winter and had some pain. This summer the pain has been very severe in the hips. He noticed the deformity of the spine at early as four years ago. He says it has not developed much in the interval. Has lost 20 pounds in last four years. He has no cough, but in the summer of 1916 he had night sweats and some the following fall and winter. Says he had noticed that he had fever in the afternoons and evenings many times but his temperature has never been taken and recorded. He is
rather obstinately constipated. He has had a sore throat for the past week.

He had measles in childhood and typhoid eleven years ago when he was in bed two months. In January, 1914, he had measles a second time and never regained the strength he lost at this time. Family history is without interest. He has been repeatedly examined by surgeons, and a month ago was examined by an orthopedic surgeon who diagnosed tuberculosis of the spine.

Examination.—The patient’s general appearance does not suggest an invalidism of four years. The heart and lungs are negative. The tonsils are enlarged and ragged and there is a generalized acute pharyngitis. His teeth are sound. Abdomen negative. Spine more or less rigid from the 6th dorsal vertebra down. There is a gradual kyphosis, the highest point being at the 10th dorsal. X-ray examination of the spinal column shows a complete bony ankylosis of the vertebrae from the 9th to the 12th dorsal. The intervertebral lines on both ends of this area show rather hazy. The cervical vertebrae are rigid, so that he can not turn his head, and his pillows must be arranged to just fit the bend of his neck.

Diagnosis.—The onset of his trouble following an attack of measles four years ago followed by night sweats and fever favors the diagnosis of tuberculosis. This probability is much heightened by the expressed opinion of a capable orthopedist. However, the character of the spinal deformity, together with the rigidity of the entire spine, makes this viewpoint questionable. The x-ray shows a complete ankylosis of the lower dorsal vertebrae. The upper dorsal and the cervical show a shadow along their borders indicating a proliferative reaction. The diagnosis is not apparent. The teeth show no defect, and the tonsils, while ragged and now acutely hyperemic, show no crypts and the history does not incriminate them.

Treatment.—While the tonsils showed no obvious defect they were seized upon as the most likely culprits and enucleated.

Pathology.—No abscesses or any localized infections could be discovered.

Postoperative Course.—For several days following the operation the temperature ranged from 102° to 103°. This temperature was due to infection preexisting in the throat. The temperature subsided, but on the tenth day it reached 102° again.

The throat has recovered and the patient said there was very little
pain in the neck. Examination of the heart and lungs show nothing. The patient complains of pain in the back in the region of the lower dorsal vertebrae. The cause of the rise of temperature can not be exactly determined, the exacerbation of the pain in the spine suggests that the old lesion has been stirred up.

Following this the pain in the back rapidly subsided and in a few weeks the rigid areas in the cervical and upper dorsal regions began to become mobile again. When he left the hospital a month later, the head could be turned freely and the spine was no longer painful.

Comment.—The x-ray examination in this case at once gave the positive diagnosis. That the improvement should be so rapid following the removal of the tonsils is illuminating. The fact that no foci were discovered in the tonsils after removal shows how difficult the determination must be from clinical examination. When there is present a lesion, likely the result of a focus when such focus can not be located elsewhere, the removal of the tonsils is justified.

CASE 9.—A boy of seven was brought because of inability to control the bladder and bowels.

History.—The patient seemed normal at birth save for a tumor over the lower portion of his spine. He began to walk at fifteen months, but after a fever spell lasting two weeks he was unable to walk for many weeks. He had whooping cough at three. The left leg has always been smaller than its fellow. It was early noticed that he had no control of his urinary apparatus. The bowels have always been constipated; otherwise he developed normally both mentally and physically.

Examination.—The lad seems normally developed for his age. He has adenoids and a moderately large uniform goiter. The left leg is a centimeter shorter than the right and the thigh is 4 cm. smaller. There is a soft mass over the sacroiliac juncture, 7 x 12 cm. (Fig. 150). It is soft and fluctuating and transmits light. The x-ray shows a bony defect at the base of the sacrum extending from the midline to the articular border. Sensation on the left leg seems a little dulled. The foot is slightly extended in equinus and bears a punched-out ulcer a centimeter across in the center of the heel (Fig. 151).

Diagnosis.—The entire sac transmits light, indicating that it is a meningocele. Since, however, there is impaired control of the emunc-
Fig. 150.—Perforating ulcer of the heel in spina bifida.

Fig. 151.—Spina bifida showing a protrusion at the right border of the sacrum.
stories and the ulcer on the heel indicates destroyed innervation, injury to or defect of development in these respective nerves must have occurred. The important question is the determination of prospects of improvement following operation. Generally speaking, no improvement can be promised.

_Treatment._—The parents were told that the tumor could be removed but no change in innervation could be expected.

_After-course._—The condition has remained unchanged.

_Comment._—When the emunctories are paralyzed or the patient cannot use the legs, operation is not warranted; for no matter how skillfully nerves contained in the sac are manipulated, function is not restored.
CHAPTER VIII

DISEASES OF THE BREAST

When a diseased breast is approached, one instinctively asks whether or not there is a tumor. If there is a tumor, is it encapsulated? If it is not encapsulated it presumably is malignant until it is proved otherwise. If it is encapsulated one thinks of a benign tumor but its periphery is carefully searched for possible areas of beginning malignancy. If the disease is diffuse, one thinks of an interstitial mastitis, but one must assume there is a malignant area in it until careful search has made this unlikely. If there is a nodule in it, one thinks of malignancy or a cyst.

NONENCAPSULATED TUMORS

Nonencapsulated tumors are nearly always malignant. The diagnosis is usually so evident that no more than a passing glance is required. The diagnosis in this class of diseases has to do with possible extensions already present. The axillary and supraclavicular glands must be carefully scrutinized, as is generally recognized. The search for accessory symptoms, which might disclose visceral or bony metastasis, is not as generally carried out as the importance of the matter demands; however, no matter how simple the diagnosis may seem, certain points must be kept in mind. Fixation of the nipple, retraction of the skin causing dimpling and the general hardness of the tumor are the chief factors. When a tumor is not definitely palpable, then the dimpling of the skin when the breast falls from side to side of its own weight and the higher place of the nipple when the patient sits upright are signs of the greatest value.

CASE 1.—A housewife aged fifty-two came to the hospital because of a sense of uneasiness and pulling in the breast.

History.—She has had three children whom she nursed without any marked disturbance in the breast. Three months ago she began to have a sense of uneasiness in the left breast which she unconsciously sought to relieve by support from the hand. This sensation has been
intermittent but rather increasing in intensity. She has had no periods for nine months and she thinks she is in the menopause.

_Examination._—There is no obvious difference in the size of the two breasts. Both nipples seem markedly retracted for a woman who has nursed children. The flat hand does not detect a definite tumor in either breast but the left seems a little harder. When the nipples are pulled upon the right extends freely while the left is firmly fixed. When the whole skin of the breast is lifted, the right lifts up more freely than the left. Likewise when the patient is turned from side to side the right follows the beck of gravitation to a greater extent than the left and finally when the patient sits upright the level of the left nipple is higher than the right.

_Diagnosis._—All the signs above enumerated indicate a shortening of the connective tissue strands of the breast, and though no definite tumor is palpable, the diagnosis must be carcinoma of the breast. When the patient complains of stinging or burning in a breast without palpable tumor the signs elicitable by changes of position are often pathognomonic, particularly when confirmed by manual elevation of the skin. Old infections, whether they come to abscess or not, may produce them but when there is stinging in the breast
an exploration is indicated whether there is a history of past inflammation or not.

_Treatment._—Radical excision, removing an area of skin as large as a hand and the muscles as well.

_Pathology._—When a cross section of the breast is studied the cause of the signs is evident. Dense bands of fibrous tissue extend from the nipple (Fig. 152) but nowhere form a definite tumor mass. The disposition of these bands to radiate towards the skin shows that the area of skin removed is none too great. The section showed a small strand of malignancy beneath and to the left of the nipple—an isolated duct cancer.

_After-course._—At the end of two years a nodule appeared in the scar at a point over the anterior axillary line. This was removed and she has remained free an additional year.

_Comment._—This case represents all the classical traction signs in a striking degree. The origin of the tumor antedates much the appearance of the symptoms for the patient's complaints were due to contraction of the fibrous tissue bundles. The recurrence in the scar shows an error in judgment in estimating the amount of skin removed. Skin recurrence impeaches the judgment, recurrences in the axilla the technical skill of the surgeon, only when recurrences take place in the interior of the body can he complacently point the accusing finger at the gods.

CASE 2._—The patient aged seventy-three came to the hospital because of a tumor of her right breast.

_History._—She has had a lump in her right breast for eight months. There is no real pain but a sticking sensation in the region of the tumor. She has had five children, all of whom she nursed without any accident to the breast.

_Examination._—There is a mass 2 x 2 x1½ inches in the upper quadrant of the right breast. It slides on muscles but the skin is attached to it. The skin is reddened over the greater extent of the tumor and is ulcerated over its center (Fig. 153). The skin is incorporated in the tumor. The tumor is very dense to the touch and shows some low bosselations of its surface. No enlarged axillary lymphatics are found.

_Diagnosis._—The presence of a large dense tumor with a reddened ulcerating surface is characteristic of a colloidal malignant tumor.
DISEASES OF THE BREAST

Sarcomatous tumors when they destroy the skin do so by pressure necrosis as it were and the skin is not attached to the tumors.

Treatment.—Wide excision of the tumor was made. The defect in the skin, about four inches in diameter, was covered with skin grafts.

After-course.—Eight months after operation the patient reported that several small lumps had recurred along the right side of the incision. Further treatment was not accepted.

Comment.—Usually colloidal tumors are of relatively low malignancy and usually in old persons there is less disposition to recurrence. Both these rules failed in this case. This is due in part to an insufficient operation. Whenever recurrences take place in the skin, the operator has used poor judgment in outlining his incision.

CASE 3.—A matron aged fifty-two came to the hospital because of recurrent pain in the upper part of the abdomen.

History.—The patient had only fair health as a girl, having had asthma from childhood to seventeen years of age and rheumatism at six years of age, with a second attack when twelve years old which kept her in bed seven weeks. Four years ago she had a severe attack for several weeks. She had typhoid fever when twenty-four years of age and was in bed five weeks. She has had a number of attacks of severe pain in the right side under the short ribs, which were accompa-
nied by fever, nausea, and vomiting. The attacks were followed by soreness all over the abdomen. The last attack was four weeks ago, and she still has some pain in the lower chest and back, but no abdominal pain. She has never been jaundiced. Several months ago she struck her breast against the edge of a dishpan and since has had a drawing-in of the outer part of the breast. She has had four children whom she nursed without incident.

Examination.—The patient is a plump, well-preserved woman, presenting no evidence of having undergone any recent suffering. There is deep tenderness over the hepatic triangle. The right breast shows retraction of the nipple and a hard mass the size of a hickory nut above and lateral to it. The outline of the tumor is indistinct, but it glides freely over the deep fascia and the skin is not attached to it.

Diagnosis.—The history of recurrent pains in the right upper quadrant radiating to the back and attended by nausea indicates gallstones, and this assumption is confirmed by the deep tenderness in the region of the gall bladder. The breast tumor, because of its dense feel and retraction of the nipple indicates carcinoma.

Treatment.—Inasmuch as the breast carcinoma presented the graver though not the most annoying symptom, a breast amputation was done.

Pathology.—The tumor was the size of a large hazelnut with long
branching fibrous bundles extending from it. On section it showed a typical scirrhus.

After-course.—Healing was uneventful. She returned after two years with a nodule the size of a hazelnut in the line of the scar (Fig. 154). This was widely excised. There has been no further recurrence in three years after the first operation.

Comment.—The fact that the breast tumor was a scirrhus makes it unlikely that the development of the tumor long antedated the alleged injury. Most likely had the breast not been sensitive from the presence of the tumor, she would not have noticed that she struck the dishpan. Though the primary tumor was small, the recurrence appeared early and more than likely she will soon return with more evidence of disease. A plump woman with large breasts is lucky to be alive three years after operation.

CASE 4.—A matron aged fifty-two came to the hospital because of an ulcer over the breast bone.

History.—Twenty-two years ago she had an abscess in the right breast which ruptured just below the nipple. This healed and nothing was noticed until five years ago when she noticed a lump just about the location of the abscess. Six months later the breast was amputated and the axilla cleaned out. A year and a half ago she noticed a pain over the upper part of the breast bone which extended through to the shoulder blade behind and to the arm pit. The skin seemed fastened to the breast bone at this time. She worked at it trying to loosen it up. Six months ago the skin ulcerated and scabs formed. It has never healed, but, on the contrary, has gradually increased in size.

Examination.—The site of the operation seems free from recurrence. Over the angle of the sternum is an ulcerated area the size of a dollar. The edge is reddened, serrated and hard. The base of the ulceration is granular and somewhat besmeared with a greyish exudate. The skin surrounding and the base of the ulcer is firmly attached to the bone. There is no palpatory evidence of any disease elsewhere. Neither percussion nor the x-ray show any trouble in the mediastinum. Laboratory examination is negative.

Diagnosis.—The patient having once had a carcinoma, any destructive disease she may have subsequently presumably is of the same nature. This presumption is made more probable by the
dense, reddened, serrated outline of the ulcer itself. The mode of its origin is less easily determined. It may be from lateral extension from the breast focus or from a metastatic deposit within the sternum. The latter hypothesis is unlikely, since there are no bony changes notable by the x-ray and the patient noted a reddening of the skin before enlargement appeared. It seems reasonable to assume that the local condition began as a periosteal metastasis. As such it may be an isolated recurrence. In ulceration over the sternum we have always to think of a syphilitic periostitis. Syphilitic lesions come more quickly, appear as ovoid elevations, and if they do ulcerate they leave a soft undermined border quite distinct from the hard border of carcinoma.

**Treatment.**—At any rate the affected area is technically operable and the patient understands a cure is not hoped for. The ulcerated area of skin, therefore, was widely dissected and a portion of the sternum was chiseled off with it. Skin flaps were shifted to cover the newly denuded area and the part so exposed was covered with grafts from the thigh.

**Pathology.**—The tissue removed showed a simple carcinoma starting probably in the lymphatics of the skin (Fig. 155).

**After-course.**—Healing was uneventful.
Comment.—The operations of local recurrences are often followed by prolonged periods of freedom from the disease. The only criterion we have to go on in determining that the recurrence is isolated and solitary is our inability to discover anything elsewhere. This is, of course, usually fallacious, but it is the only working plan we have.

CASE 5.—A matron aged fifty-one was brought to me because of a tumor of the breast.

History.—Two months ago she began to have a pain under her right arm. She consulted a doctor who made a small incision and advised poultices. Several weeks later she noticed a tumor in the breast. She began to have an occasional sharp, sticking pain in this breast and occasionally a dull ache. She applied iodine but received no benefit. She consulted her regular physician who diagnosed cancer. She has always had good health, never having consulted a physician except at childbirths, of which she has had three. In none of these has there been any trouble in the breasts, save that she noticed at weaning of the last she had more difficulty in drying up the left than the right breast. She passed the menopause eight years ago without any disturbance.

Examination.—The patient is a rugged woman apparently in the best of health. As she sits in the chair, the left nipple hangs a good half inch lower than the right. The upper outer quadrant of the right breast is a reddened area 2 inches in diameter. The borders of this shade gradually into the surrounding skin. This area is flatter in contour than the same area of the left breast. As the patient is turned from side to side this breast remains rigid and does not respond to the action of gravitation as does the other breast. Both nipples are puckered. The axilla of the right side seems fuller than that of the left. Careful inspection fails to find the site of the incision alleged to have been made two months ago. On palpation the reddened area above described is found to be hard, board-like, and the whole quadrant of the breast appears as a solid mass. The whole breast moves freely over the pectoral fascia, but the skin is firmly fixed and has a hard, rough corrugated feel like an orange. The nipple is fixed and does not respond to traction, while the left does, though both appear the same on inspection. The axilla is occupied by a solid mass in which no separate tumor masses can be made out, but the whole mass is freely mova-
ble on the surrounding tissues. There are no supraclavicular glands palpable. Both this mass in the breast and the tumor in the axilla are sensitive to firm pressure. All other examinations are negative.

Diagnosis.—The history alone is confusing. Since after two months the alleged incision has left no trace it is safe to say it did not extend through the skin. If anything, she could have had nothing more than a follicle infection. Most likely it was already the development of the axillary mass that took her to the doctor. At this time neither she nor the doctor noticed a tumor in the breast. The physical findings leave no doubt as to malignancy. The elevated and fixed nipple, the hard mass in the breast, the fixation of the skin in that quadrant, and the mass in the axilla end all doubt. The problem of diagnosis is that of operability and curability. The duration of the tumor has not been long. Her physician, a capable and careful man, examined her chest repeatedly during an attack of pneumonia seven months ago and found no tumor in the breast. While no special examination was made to determine this point, he did make a careful examination with the chest completely exposed. The fact that two months ago she began to have axillary pain and that now there is a mottled mass here and a hyperemic skin over the breast mass indicates that the growth is an acute one, and that the maximum growth has taken place in the last few months. Such a rapidly growing tumor in a healthy, florid woman with pronounced axillary metastasis indicates that the disease is a very malignant one. In view of the fact that the axillary mass is freely movable and that there is no evidence of involvement of the axillary vein, it is reasonably certain that the disease is technically operable. We conclude, therefore, that the patient has a carcinoma of her breast which is technically operable, but is incurable.

Treatment.—A radical breast operation was done.

Pathology.—The mass in the breast is ovoid, about the size of a hen’s egg. The tissue about it is infiltrated with round cells and an associated hard edema. The axillary glands are hard and are matted together by a periglandular exudate.

After-course.—The wound healed without incident. A recurrence appeared in the axilla in six months and she died of lung metastasis nine months after the operation.

Comment.—While the prognosis is grave, so long as all diseased tissue can be removed, operation is indicated, for it at least gives the
patient peace of mind for a varying period for which she exchanges the pain and inconvenience incident to the operation. Occasionally the period of freedom is longer than one is led to expect, and in rare instances a considerable period of years may elapse before the disease reappears. If the patient is fortunate enough to have her recurrence in an internal organ, she may escape the pain incident to a fatal local entaneous and glandular disease.

CASE 6.—A woman aged sixty-six entered the hospital for treatment of a breast tumor considered inoperable because of heart disease.

History.—General health has always been good except for heart trouble. She knows no cause for this. She has taken heart medicine for palpitation and shortness of breath for some time.

Three months ago she first noticed a lump in her breast. She has some dull pain in it. Her physician said it could not be removed because she could not take an anesthetic on account of her heart.

Examination.—The patient is a thin woman who shows some dyspnea on exertion. The lungs are negative. The heart is in the midsternal line at the fifth interspace. There is a systolic murmur at the base. There is a moderate arteriosclerosis. No edema. The left breast presents a flat, hard tumor in its outer quadrant. It is irregular in outline and follows a tug on the nipple and there is pitting in the skin along the outer border of the breast when the nipple is pulled sharply toward the median line. There are no palpable glands.

Diagnosis.—The irregular and dense character of the tumor allows no doubt as to the diagnosis of carcinoma. The position of the murmur indicates a mitral stenosis. The fact that the left heart is enlarged suggests that there must be an associated regurgitation. The disposition to dyspnea indicates a moderate decompensation. This with the character of the valve lesion would make the giving of a general anesthetic hazardous.

Treatment.—In consideration of the heart lesion, the amputation was done with novocain-epinephrin solution. The breast was first loosened and with the breast as a tractor the axillary contents were everted by traction. In this way the axillary vein was brought into view together with all the associated structures (Fig. 156-A.)

Pathology.—On section (Fig. 156-A) a dense, granular mass is seen to occupy the lateral portion of the gland. There are many fibrous
Fig. 156-A.—Carcinoma of the breast with axillary contents.
bands radiating toward the nipple, and a few projecting toward the skin over the lateral border of the breast. These bands explain the disposition of the tumor and skin to follow the traction on the nipple noted in the examination; though there was no actual retraction of the nipple. No lymph glands were found. The section shows a preponderance of fibrous tissue, therefore a scirrhus.

After-course.—Healing was uneventful. During the week’s stay in bed together with strophanthus the heart improved.

Comment.—The prognosis in this case is good. In spare women beyond the menopause hard tumors give a very good prognosis. The patient noticed the tumor only three months before operation. A scirrhus does not develop so rapidly in an old woman and it may be assumed that the actual period of development exceeded this manifold.

Note.—Despite the above prediction, the patient returned in a year and a half with a recurrence in the line of the scar (Fig. 156-B). An insufficient operation must be ascribed as the cause. The recurrence healed under the x-ray.
CASE 7.—A housewife aged thirty-six came to the hospital because of a lump in her breast.

History.—The patient has had nine children, the youngest is two months old. After the birth of the second last child two years ago, her breast became inflamed and never fully recovered. After she weaned this child the breast continued gradually to enlarge. It was somewhat painful but never caused much inconvenience. After the birth of the last child two months ago it became painful and began to enlarge more rapidly.

Examination.—A tumor occupies the upper quadrant of the left breast. It is the size of a lemon, is hard and shows an irregular surface. These irregularities of the surface are hard and seem to be the agencies by which the tumor is more or less fixed to the surrounding skin. The skin is attached to it but is not reddened, and the nipple, while not retracted, is fixed. The axillary space is sensitive, but no definite glands can be palpated though because of her adiposity examination is unsatisfactory. Blood and urine are without interest.

Diagnosis.—The density, the gradual onset, the limited pain, the fixity of the skin makes the diagnosis easy. It must be a carcinoma.

Treatment.—A radical breast amputation was done. There were a number of palpable glands found when the axilla was exposed. These were suspiciously soft, but the mammary tumor when exposed gave palpatory evidence of malignancy and was not cut into.

Pathology.—Much to my amazement, when the tumor was cut into it proved to be not a carcinoma but a chronic abscess. The abscess itself was as large as an unhulled walnut. This was surrounded by a wall nearly an inch thick (Fig. 157). This was made up of, chronically infiltrated breast tissue which felt hard. The cellular infiltration is made up mostly of plasma cells (Fig. 157). This accounts for the dense feel of the tissue. The sensation to the finger was very much like that often seen about chronic indurated ulcers of the stomach. The contents of the abscess was not examined, because after I recovered my composure, it had all been lost.

After-course.—Recovery was uneventful and she has remained well.

Comment.—The beginning of this tumor two years ago during lactation should have been sufficient clew to prevent error. Had it been a carcinoma at that time, in a lactating breast, she would not
have been alive to bear another child two years later. Had I cut into the breast during the course of the operation, the irritating fluid might have stimulated bacteria to sufficiently vigorous growth to have caused trouble.

On the whole, removal of the breast may have been the best thing to do, for the tissue so long indurated would have left a discharging sinus for an indefinite period. The axilla should have been left

Fig. 157.—Chronic abscess of the breast simulating carcinoma of the breast. A. Gross appearance of the abscess. B. Slide of its wall.
unmolested, however. In rare instances one finds just such conditions which have a border of malignancy. One can not know in these cases whether the malignancy developed about an abscess or whether an abscess formed in a malignant area. My opinion, from a study of the cell content and topography, is that the first of these possibilities obtains. If such is the case, the amputation of the breast for chronic abscess is no calamity, particularly in persons whose esthetic sense is submerged in the cares of a large retinue of offspring, as in this case.

CASE 8.—A widow aged ninety-two came to me because of a tumor of the nipple.

History.—For many years she has had a nub on the end of her nipple. Recently it has grown rapidly and the rubbing of the clothing causes it to bleed.

![Fig. 158-A. Carcinoma of the nipple.](image)

Examination.—On the end of an attenuated nipple two inches long (Fig. 158-A) is a tumor 1 1/2 by 2 1/2 inches. It is dense and is covered with incrustations which when removed leave bleeding areas.
Diagnosis.—Its density and tendency to bleed indicate malignancy.

Treatment.—The base of the nipple was circumscribed by an elliptical incision.

Pathology.—The cross-section shows a mottling of white and pink.

The white areas are finely granular (Fig. 158-B). The slide shows a cellular carcinoma. The nipple is free from invasion.

After-course.—Healing was prompt and recovery should be permanent.

Comment.—It is curious that the apex of the nipple should develop such a huge tumor.

CASE 9.—I was asked to see a matron aged fifty-two who was complaining of pains in the arms and a tumor of the breast.

History.—The patient has always been an invalid. Now for a week she has had pain and swelling in the right arm. She has been married twenty-one years, has had no living child but had a miscarriage eighteen years ago. She has had uterine trouble for eleven years. Menses irregular and too profuse, now has almost constant bleeding. She had typhoid fever twenty-five years ago.

Examination.—The patient looks thin, exhausted, and anemic. The right arm is swollen and boggy to the feel. The right breast is fixed to the underlying fascia and the nipple is fixed and retracted. Cyst in the left breast from which a sinus is discharging a serous fluid. The right sternomastoid muscle is fixed and hard, producing a torticollis. The muscle stands out as a firm strand. No supraclavicular glands can be made out but the fossa seems to have a
firm bottom making it impossible to differentiate any structures. Blood Hg. 90x, r.b.c. 4320000, w.b.c. 7000. Polynuclears 41 (Im., 6, ambo. 8, neutro. 15, base 11, deg. 1) eos. 3, mast. 3, monos. 53. Hyaline 36, small 13 (5 possible plasma) large 4. Platelets decreased. Bp. 120.  

**Diagnosis.**—The cyst of the breast with the discharging sinus is best regarded as a papillary cyst which has become malignant. The swelling of the arm and the affection of the muscles of the neck suggests a slerosing metastasis despite the fact that no definite tumor masses can be made out. The apparent rather sudden onset might suggest an inflammatory process or a slerosing type of Hodgkin’s disease. There was no evidence of local reaction and Hodgkin’s rarely infiltrates the surrounding tissues sufficiently to obstruct the venous or lymphatic return. The blood picture is that of an indefinite aplasia but substantiates none of the hypotheses enumerated.  

**Treatment.**—The condition obviously was not surgical. X-ray and general treatment was followed.
After-course.—Six months later the right arm was still swollen. The right breast was bound down tight to the chest wall due apparently to a sclerotic process originating in the lymph ducts and glands which were reddened, swollen and slightly tender. Throughout the skin of the chest are many nodules the size of a grain of wheat to that of a pea. These seem to be seated in the skin and are more evident to the touch than to sight. Between each of these and the underlying tissues there seems to be an attachment. The left side of the chest likewise is affected and the breast of that side is mottled, fixed and the nipple is retracted. These nodules and indurated skin form a belt about 10 inches wide which nearly encircles the entire chest (Fig. 159). This picture is typical of the so-called carcinoma en cuirasse. It is only in the last four weeks that the nodes have appeared across the median line and about the left breast. The patient has had no menses the past year, and has gained two pounds in weight. The blood picture remains almost identically as above recorded. The patient died about six months later from the harassing pain and inanition.

Comment.—This type of carcinoma usually appears as a diffuse carcinoma of a breast gradually involving the skin secondarily, finally reaching the neighboring lymph glands late if at all. The process is that of a carcinomatous lymphangitis with conglomerate proliferation here and there forming palpable nodules. In this instance there evidently was a metastasis to the axillary and supraclavicular glands early. The condition is always hopeless. The peculiar blood picture suggests that there may have been an early marrow metastasis. In view of the patient’s confirmed invalidism it is equally likely that there was an undetermined constitutional state responsible for it.

CASE 10.—A matron aged fifty-four sought consultation because of a tumor of the breast.

History.—One year ago the patient noticed a small knot in the left breast. She has had five children all of whom she nursed without incident. Several months ago she had a pain in the back. A sojourn at the Springs did no good, in fact, the pain became aggravated instead of better.

Examination.—A nodule the size of a walnut occupies the upper outer quadrant of the left breast. The tumor is somewhat attached to the skin but it glides freely over the pectoral fascia. The nipple
is not retracted but lies on a plane half an inch higher than the unaffected side when the patient sits upright, with both breasts dependent. The axillary glands are free. There is tenderness over the vertebrae at the seventh cervical and the patient moves the head backward with hesitancy. The x-ray shows rarefaction of the first dorsal vertebra.

**Diagnosis.**—The elevation of the nipple in the dependent breast together with the tumor is sufficient evidence to warrant the diagnosis of malignancy, though there is no retraction or fixation of the nipple. The x-ray shows a lesion in the body of the first dorsal vertebra and taken in connection with the findings on the breast, characterizes it as a metastatic nodule. It likewise makes the breast tumor unsurgical.

**Treatment.**—The breast tumor is operable, but this procedure is useless in view of the metastasis in the spine. Despite the urgent wishes of the patient, operation was refused.

**After-course.**—A colleague amputated the breast despite the spinal trouble, apparently ignoring its significance. The spinal trouble grew rapidly worse and the patient never left her bed after the operation, dying some nine months later.

**Comment.**—In carcinomas of the breast, more than in any other tumor the general bodily condition must be scrutinized lest some metastasis be overlooked. This patient failed to make any reference to the trouble in her neck when first interrogated, and when the difficulty in turning her head was noted she insisted that she frequently had various pains in her back of no significance. It was only by careful quizzing that a history of the pain high in the back could be separated from miscellaneous lumbar and sacral pains of the childbearing period. She seemed intuitively to recognize the pains as something ominous which she sought to minimize by refusing to recognize them. I have noticed this tendency in a number of instances. The only safeguard is to think of the possibility of metastasis in bones as well as the axilla in every case of breast carcinoma.

**CASE 11.**—A woman aged fifty-six came to the hospital because of a tumor of the chest.

**History.**—For a number of years she has noticed a tumor developing along the upper border of her right breast. It has always been
hard and but little painful, though at times she has some discomfort. Her general health has always been good and she had no trouble with her breast during any of her five pregnancies.

Examination.—Beginning just below the clavicle is a large tumor

Fig. 160-A.—Desmoid of the pectoral region.

Fig. 160-B.—Desmoid of the pectoral region. 1. Increase of fibrous tissue in the subdermal region. 2. Fibrous tissue replacing the muscle tissue of the pectoralis major.
which extends downward for four inches where it seems to suffuse with the fairly prominent mammae. The skin near the tumor is not discolored, neither are the veins dilated. On touch the skin is felt to be movable over the tumor, but the tumor is quite firmly fixed to the underlying structures. The tumor is firm and quite painless. It is not distinctly encapsulated. The breast seems to be free from the tumor and is unchanged. Other examinations are negative.

**Diagnosis.**—A large, very dense tumor in this situation is unusual. A mixed tumor or a fibroadenoma going out from the upper border of the breast should be movable, bosselated and completely encapsulated. Its density suggests a fibrosarcoma going out from the pectoral fascia. This diagnosis is not wholly satisfactory because of its slow growth and for the fact that there are no enlarged veins in the skin which should be the case were the tumor malignant.

**Treatment.**—The tumor with the attached surrounding fibrous tissue was excised. It was found to be entirely free from the breast but incorporated the pectoral fascia, and some of the muscle was cut away with the tumor.

**Pathology.**—When the tumor is cut, it is found to be very dense and it cuts with difficulty. The surface is mottled with whitish and pinker areas. The white areas show a distinct fibrillation (Fig. 160-A). The section shows in the denser portion a distinctly fibrous tissue, while in the pinker areas a fibrous tissue with small, more spheroidal cells is intermingled with compressed striated muscle fibers giving the picture of a sclerosing myositis (Fig. 160-B). It may be classified as a desmoid.

**After-course.**—The relief has been permanent now for five years.

**Comment.**—This type of tumor is usually found in the recti muscles of women who have borne children, and are supposed to be the result of partial rupture of the muscle in childbirth. There was no history in this case of any undue strain to the pectoral muscles.

**CASE 12.**—A housewife of sixty-one came for consultation because of an ulcer in the left breast in an operative scar.

**History.**—The patient had a small lump in the left breast with retraction of the nipple; it grew in one year to the size of an unhulled walnut. It was removed a year ago. The wound healed up perfectly
well and the scar has been firm until six weeks ago, when she first noticed bleeding in the inner angle of the scar. Since then there has developed an ulcer which is increasing in size rather rapidly. No pain save tenderness at times. General health is good. There is some aching under the tip of the right shoulder blade which is worse on doing hard work.

Examination.—The patient is well developed and well nourished, does not look acutely ill. Has several warts on the face and telangiectatic area over the chest. There are no palpable glands in the neck except two hard, small nodules above the left clavicle. The right breast has been removed. The scar of the operation extends from anterior axillary line to region of nipple and from this point down and out about 12 cm. long. At the angle of the scar is an ulcer about 3 cm. across, with sharp edges, and 0.5 to 1 cm. deep. Surface below looks red, bleeds readily on manipulation, edges clear cut, and hard (Fig. 161). Area over ribs lateral to scar is tender. No glands felt in axilla. Lungs normal, heart slow, distant, regular, sounds at

Fig. 161.—Cancerous ulcer following operation for carcinoma of the breast.
base somewhat muffled, no murmurs. Right breast firm, red, and board-like.

Diagnosis.—Recurrent carcinoma of the left breast with metastasis above left clavicle is evident. She is told cure is impossible, but she desires to be rid of the pain and annoyance of the ulcer.

Treatment.—The ulcer on the left chest was widely dissected out, and nodules in left supraventricular space removed. The wound covered with skin by shifting a flap. A drainage opening was made in left side of the flap and gauze drain inserted.

After-course.—The drain was removed from the wound the fourth day and all the sutures except three where the skin flaps were brought together, were removed on the seventh day. The rest of the sutures were removed on the eleventh day, the wound was healed except for two places, one where the skin was incised and sutured in opposite directions to remove tension and one where three skin flaps were brought together. Wound in the neck completely healed. The patient was dismissed on the twelfth day after operation. The patient returned in two months. The skin over the whole front of chest to above the chest was hardened, slightly pebbly, feel and red. This was obviously a carcinoma en cuirasse.

Comment.—Though the patient was told cure was not to be expected she was much displeased at the result. Evidently what appeared as telangietatic areas were metastases already beginning. The ulcer was regarded as a breaking down of the scar, but it was in reality a malignant degeneration.

CASE 13.—A housewife aged twenty-eight came to the hospital because of a mass in the right breast with an ulcerated area over it, and pain in the right side.

History.—The patient noticed a lump in the right breast five years ago. It was about the size of a bean, not painful, and apparently rolled around under the skin. It was just to the outer side of the nipple. It did not grow until a year ago, after an attack of influenza. She weaned her baby at the time, and the breast became engorged and painful. When this disappeared she noticed the tumor was growing, and since then there has been sharp sticking pain in it at times. Eight months ago a doctor treated the tumor with caustic plasters. An area the size of a saucer was denuded and the breast supposedly removed. Two weeks ago her physician discovered a lump
in the right axilla and told her to consult a surgeon. Since the birth of the last baby two years ago she has had a pain in the right side. This pain is just inside the anterior superior spine of the ileum. It is localized in a small area and does not radiate. She has had attacks of epigastric cramps with vomiting. They usually come on in the morning before breakfast. They come as often as twice a week. She has never had generalized abdominal pain with vomiting and fever. She is troubled considerably with pains low in the back. They come any time, but are worse at the periods. She has a profuse leucorrhea.

Examination.—The patient looks somewhat anemic, but does not look acutely ill. The left breast is small, no masses or areas of ten-
derness. The right breast presents a scar which is ulcerated over the center of the scar (Fig. 162-A). There is a mass under the scarred area which is hard, movable, and nodular. There are several small nodules in the right axilla which are hard and somewhat tender. Lung expansion is good on both sides, normal resonance, no rales, no increased vocal or tactile fremitus. There are no palpable masses in the abdomen. The perineum is lacerated to the second degree. The cervix is deeply bilaterally lacerated and discharges a thick pus. Small hemorrhoids, not ulcerated. Reflexes all rather exaggerated. Urine 1,018, albumen present.

Diagnosis.—The history of a small movable tumor suggests an adenoma. This grew and a plaster was applied. This is a familiar

Fig. 162-B.—Cross section of the preceding showing the large cancer nodule in the center.

history of the treatment of benign growth by cancer quacks. The mass here presented evidently is something out of the ordinary. It is dense but moves over the underlying fascia. The borders are hard and nodular and not encapsulated. It suggests a mastitis or a malignancy. The overlying scar is so dense that palpation is unsatisfactory. It does not seem as though a malignancy could have occurred to such an extent in so short a time. If it is malignant, it must represent the original breast, the skin only having been destroyed by the plaster. The axillary glands are as large as hazelnuts and are not hard as one would expect cancerous glands to be. It seems removal alone can decide the problem. The history of vomiting and pain in the back causes one to pause lest one overlook metastases already
present. The backache is predominantly sacral and is worse at the menses. The epigastric pain was present to some degree for a time six years ago. It seems, therefore, that the hazzard of overlooking a metastasis is minimal.

**Treatment.**—The mass representing the right breast was removed preceded by a dissection of the right axilla. The wound was completely covered with skin by shifting flap.

**Pathology.**—The mass removed was as large as the palm of one's hand and an inch thick. The cut surface is mottled and punctiform (Fig. 162-B). The slide confirms the suspicion of malignancy.

**After-course.**—The patient suffered some shock. Pulse 130 and very weak after operation. Temperature went to 97, with a pulse of 60 in the evening following the operation. The after-course was uneventful. The wound healed except a small area about 2 cm. across where the skin was under too great tension when the patient was dismissed ten days after operation. The patient reported three weeks after going home that she was feeling well except for pain in the left leg in the calf muscles. Three months later again she reported. Her right arm became stiff following washing one week before. No trouble in the left leg at that time. Pain in the abdomen was as bad as before, worse at the periods, not continuous. The right arm could not be straightened completely, no pain, no swelling, no axillary nodes in the right, but a small one in the left. Left breast negative. The sear four months after operation showed a small recurrence. This was removed by the cautery. Three months later there is no recurrence.

**Comment.**—It is possible that a benign tumor was stimulated to malignancy by the irritation of the plaster. Possibly the whole breast was so stimulated. The area involved at operation makes such an assumption tenable. If one could have been sure of the diagnosis it would have been better not to have operated. Surgery gets the blame for the failure to cure. It will most certainly recur.

**CASE 14.**—A matron aged forty-five came because of pain in her left breast.

**History.**—Six months ago, without known cause, her left breast began to be painful. It was somewhat swollen and was sensitive to pressure, but there was little or no spontaneous pain. She had trouble with this breast when she nursed the last child eight years ago, but she
continued to nurse despite the pain. Her general health has always been good.

**Examination.**—The breast is generally enlarged and the nipple is prominent and looks edematous. The skin covering the whole breast is mottled red. The whole surface is hard beneath the skin and the

![Image](image_url)

*Fig. 163-A.—Skin over a rapidly developing carcinoma. The dimpling of the skin is well marked.*

skin has a boggy feel. The whole skin area is pitted, a typical *peau d'orange* appearance (Fig. 163-A). The whole breast is sensitive to pressure. There are several glands in the axilla the size of beans.

**Diagnosis.**—The firm feel and the dimpled skin is diagnostic of carcinoma. The redness indicates a very malignant type and the
glands in the axilla attest to metastasis already in progress. The patient is very anxious that an attempt be made to relieve her.

*Treatment.*—An area of skin $5 \times 8$ inches was removed. This seemed to take in, with a wide free margin, the affected area. The axilla was dissected out with care, the pectoral muscles together with a very wide area of fascia were removed. The wound was closed with wide sliding flaps. The ribs were so completely denuded that grafting seemed inadvisable.

*Pathology.*—The breast was diffusely affected. The slide showed
an extensive malignancy, the cells being arranged tandem rather than in nests.

After-course.—The wound healed promptly. Three weeks later the skin along the edges of the wound was reddened. In an additional three weeks the skin had a hard brawny feel and the redness had become more pronounced (Fig. 163-B). The reddened area was cut out and the wound left wide open. The intensive use of the x-ray

Fig. 163-C.—Slide from the specimen shown in the preceding figure. The cancer cells are scattered diffusely and in some areas present a true lymphangitis carcinomatosa.

was begun in the widely open wound. The wound began to heal, but in two months there were multiple nodules in the skin of the chest. The slide of the skin recurrence shows a diffuse dispersion of the tumor cells (Fig. 163-C). The term lymphangitis carcinomatosa may well be applied to it.

Comment.—Whenever the skin over a diffuse carcinoma of the breast is reddened, any sort of treatment is utterly futile and can but bring disaster to the patient and chagrin to the surgeon. In
large glandular carcinomas the skin may become invaded and the prognosis yet be fair, but these must be separated from the above type. Such cases had best be sent at once to the roentgenologist. It is not to be expected that he will do any particular good, but at least his efforts will do no harm.

DIFFUSE AFFECTIONS OF THE BREAST

In diffuse affections of the breast one usually thinks of an interstitial mastitis or a senile parenchymatous hypertrophy. If there is any sense of discomfort or if there are any palpable bosselations one thinks of malignancy. If these areas are dense, of irregular border, particularly if there is fixation of the skin or nipple, malignancy is probable. Inspection through an incision alone can determine the facts. This problem tests the acumen of the surgeon more than any other in tumor surgery.

CASE 1.—A childless married woman of thirty came to the hospital because of an affection of both breasts.

History.—The patient has had trouble with both breasts a year. She thinks she can feel a tumor in each. Her physician has confirmed this. They get sore before menstruation and sometimes are painful at other times. Now she has pain in the chest as well. The menses are scant and are becoming more so, the flow lasting but a day or so. She has a good deal of pain in the lower abdominal region, particularly the last half day of her period, which often compels her to go to bed. Bowels are regular. There is no leucorrhrea. The patient is emphatically stout, having passed the two hundred mark some time before this estimate was made. The patient volunteers the information that a sister had a similar complaint for which a double amputation was done. This sister, she states, on inquiry, is like herself, decidedly plump, and suffers from a progressively diminishing menstrual flow. The patient has been advised to have a double amputation done.

Examination.—The breasts represent huge masses of fat of uniform consistency and form. Large lobules of fat can be made out, particularly near the axillary border. It is these masses which were regarded as tumors. There is no suggestion of retraction of the nipple or limitation of motion of the skin anywhere.
Diagnosis.—Nothing but fatty masses can be made out. These breasts present some interstitial mastitis, but these bundles are quite lost in the huge masses of fat. The excessive adiposity associated with diminishing and painful menstruation represents some disturbance of the ductless gland system. There is an associated menopause usually. The breasts are but a secondary process to this.

Treatment.—Operation not indicated. No treatment seems to do these patients any good but this one was given luteal extract, more to keep her under observation until she should lose her desire for operation than from any hope of benefit from the treatment.

After-course.—The menses gradually diminished and have now been absent nine months with a corresponding cessation of the pains in the breast. She is content with her lot.

Comment.—Progressive gain in weight associated with diminished painful menstruation particularly menstruation that is painful at its termination is associated with precocious atrophy of the ovary and often results in premature menopause. These patients often complain of pain in the breasts. The breast changes are confined to an increase in the fibrous tissue. To remove such breasts is to subscribe to the dictum "when in doubt, operate," with a vengeance.

CASE 2.—A matron aged thirty-seven came because of an uncomfortable fullness of both breasts.

History.—The patient is a well-developed woman with an energetic, nervous manner. Both breasts feel thick and full to the flat hand. No nodulations can be separated out, but there is some general unevenness of the surface. The skin is free and the breasts move freely over the underlying structures. The nipples are not attached or retracted.

Diagnosis.—Though no definite areas of malignancy can be detected, because of the marked general thickening a satisfactory palpation is not possible. The general roughened surface indicates a cystic state and the elasticity of the intervening tissue presents the rubber-like elasticity of interstitial mastitis.

Treatment.—Because of the extensive area involved and the unusual density of the tissue it was felt that all areas might not be sufficiently explored, and because the patient’s physician thought a double amputation should be done, this plan was followed.

Pathology.—The mass is made up of dense fibrous tissue with a few
Fig. 164.—Interstitial mastitis with cysts.

Fig. 165.—Interstitial mastitis with slight cyst proliferation.
small cysts (Fig. 164). No area of malignancy was found, but the cells of the acini are larger than normal and in some of the outlet ducts show a piling up of the epithelium (Fig. 165).

After-course.—The patient is free from disturbance three years after operation.

Comment.—The operation was purely a prophylactic one. The indications given were wrong on both counts. A sufficient operating exploration would have been adequate and the desire of the attending physician was not of sufficient weight to have warranted a modification of judgment. On the other hand the breast was so extensively involved that which portion to excise was difficult to determine. However, this should have been done. A well-formed breast could have been left. A suspicion is never an adequate excuse for operation, for "suspicious" cases are inversely proportional to the diagnostic acumen of the clinician.

CASE 3.—A housewife aged thirty-seven comes because of a tumor of her breast.

History.—The patient has had two children. She nursed both of them without incident. Three months ago she began to notice a dull pain in the left breast. It has not increased since that time. She discovered a tumor after the first sensations of pain were felt. The discomfort is most marked just before the menstrual period. She has been advised to have a radical operation done "to be sure," but having pride in her personal appearance, she regards such a contingency but little better than a fatal carcinoma.

Examination.—The patient is a well-developed woman of excellent general health. The breasts are symmetrical and neither shows abnormalities. The flat hand does not reveal any tumors in either breast. By picking up the breasts between the thumb and fingers the mass is found to be increased. At the site complained of the thickening was perhaps a little more pronounced. There was no limitation or dimpling of the skin or retraction of the nipple.

Diagnosis.—The general thickening is that of interstitial mastitis. There is no evidence of malignancy. The relation of the skin to the mass beneath was carefully tested out, both by manipulation and by changing the position of the patient. Both breasts being almost equally affected lessens the likelihood of malignancy. Since a small
malignant focus deeply situated can not be excluded, a diagnostic incision is advised.

*Treatment.*—An elliptical incision was made along the upper margin of the chief thickening. The suspected area was incised in various directions, but no suspicious areas were found. The tissue everywhere was elastic, both to the feel and to the knife.

*Pathology.*—On section the cut surface is mottled with pinkish white and fatty tissue (Fig. 166). In some areas grayish white dots can be seen. These dots are seen on section to be the ducts with some proliferation of the walls (Fig. 167). The homogenous tissue is fibrillar elastic tissue in astonishingly large amounts.

*After-course.*—Recovery was uneventful and has been permanent.

*Comment.*—This type of breast trouble is most difficult of all lesions to differentiate with certainty from malignancy. One can be sure only that that part of the breast which is incised is free from
malignancy. Yet one does not want to mutilate a large number of women in order to give a slightly increased chance for the few which do show malignancy. It has been my experience that plump women, before the menopause, with large breasts invariably have recurrence, no matter how early the operation or how radical. To operate on many who do not have malignancy to be sure of operating early the few that do have is too much like rejoicing over the one gone astray and disregarding the ninety and nine innocent. That may be good theology, but it is poor conservative surgery.

**CASE 4.** — A man aged eighteen came because of a growth in his left breast.

*History.* — The patient has always had good health. Four months ago he had some pain in the left breast and some thickening de-
veloped. This increased to a certain degree and then remained stationary. He has consulted a surgeon and a dermatologist both of whom diagnosed cancer and advised radical operation.

*Examination.*—There is a hard disc occupying the whole of the diminutive breast. It is as though the whole breast had been infiltrated with paraffin. The skin is freely movable over the breast, and the breast moves freely over the underlying tissue. The breast gives the sensation of a huge hard chancre.

*Diagnosis.*—The elasticity and extent stamp it as an interstitial mastitis.

*Treatment.*—The patient was thoroughly alarmed by his previous
consultants and he strongly desired operation. Enucleation of the whole gland was done.

**Pathology.**—On section the breast is made up of radiating bundles of fibers. These interlace in the body of the gland and radiate to the nipple (Fig. 168). It is everywhere elastic. Microscopically there is much increase in the interstitial tissue, and some increased tinnitorial reaction of the cells to basic dyes but they are nowhere increased in number (Fig. 169).

**After-course.**—The patient has remained well.

**Comment.**—These interstitial mastitides in boys are by no means rare, and if unmolested, disappear spontaneously in the course of three to six or more months. Excision is justified only to prevent some one from doing a more radical operation. In middle-aged males excision should be the rule. Local excision cures them. Sometimes these show duct epithelium that is prominent and deeply staining but I have never seen one invading the surrounding tissue or recurring after local removal. Most of the cases at least recorded as carcinoma in the male belong to this class.

**CASE 5.**—A maiden lady aged thirty-eight came to me because of peculiar stinging pains in the right breast.

**History.**—She had menstrual disturbance her whole life, but otherwise has had no special complaints. She has had pain in the breasts at each period as long as she can remember. Recently she has had stinging pain in the right breast at times other than the menstrual period. She locates the offending area lateral to the nipple.

**Examination.**—The patient is tall and slender with sallow complexion and apprehensive look. The breasts small and flat. General irregularities are palpable in both breasts with the finger tips. Lateral to the left nipple is a small area harder than the surrounding nodules. In the right breast, the one complained of, there are no areas more conspicuous than others. The area complained of shows no palpable mass. There are no retractions of the skin or nipple.

**Diagnosis.**—The history of irritation of the breasts at the menstrual period associated with a dysmenorrhea in a neurotic subject suggests an interstitial mastitis. The presence of very small nodules indicates an associated cystic degeneration. None of these nodules are irregular and there is no fixation of the skin. The only factor suggesting malignancy is the recent appearance of stinging pain in the
breast between the periods. This indicates that there is some process active enough to produce an intermenstrual pain. A developing cyst sometimes produces a sense of uncomfortable fullness, less often of stinging discomfort. Stinging pain on the other hand, particularly if intermenstrual is often the first evidence of malignancy.

**Treatment.**—It was proposed to the patient to explore the breast, and should a malignant area be found the radical operation would be performed. The breast was exposed and after numerous incisions had been made, a small area in the outer upper quadrant was discovered which cut readily and showed a pink area dotted with small greyish points (Fig. 170). This area felt hard to the touch. Radical operation, therefore, was performed.

**Pathology.**—The diminutive breast shows many small patches of interstitial mastitis, and but one tiny patch that is more dense than the surrounding patches as noted at the operation. There were no cysts in the interstitial tissue. A few of the acini were filled with cells which showed no invasion of the surrounding tissue, however. The area in question showed definite invasion of the surrounding tissue. The axillary contents presented no affected glands.

**After-course.**—The patient was free from recurrence five years after operation.

**Comment.**—This type of person rarely has malignancy follow interstitial mastitis. Only by incision could the malignant area be discovered. Careful search of such breasts must be made lest small
areas be overlooked. I have seen such breasts harbor areas of malignancy no larger than a grain of wheat. This is the type in which a diagnosis by the microscopist often leads to error, because the involved area is missed and the pathologist can diagnose only what he sees.

CASE 6.—A housewife aged forty-six came to me because of a slight pain in her right breast.

History.—The patient has had no children. For a year and a half she has had a fullness of both breasts and for the past few weeks has had slight pain in the right one. Her health has always been excellent.

Examination.—The patient is a large, stately woman with well-formed breasts. No tumor is palpable in either breast with the flat hand. Finger palpation shows a small round nodule at the outer border of the right breast near the border of the pectoralis major. It seems to be circumscribed but does not glide under the finger. The remainder of the gland is thick and firm, but somewhat elastic. Over the nodule above mentioned the skin is less freely movable than over the remainder of the breast. When the patient is turned on the left side the skin dimples at this point. The left breast likewise is much thickened but without localized tumefaction and without involvement of the skin.

Diagnosis.—The indefinite tumor and the limitation of movement of the skin suggests malignancy and the dimpling on change of position well nigh proves it so. The remainder of the breast, as well as the opposite breast, is evidently involved in a marked interstitial mastitis. Marked mastitis in a woman of this build is always an object of deep apprehension.

Treatment.—Preliminary diagnostic incision showed the suspected area to be a cyst with a small area of malignancy just below it. A radical removal was done. There were no enlarged glands in the axillary tissue removed. The left breast showed as extensive interstitial mastitis as the right, but no malignancy. The patient wished that if one breast required removal, the other be removed also. She explained that her esthetic problems could be more easily solved if both breasts were removed than if she were deprived of one and retained the other. The left breast was, therefore, removed.

Pathology.—The right breast showed a cyst the size of a hickory nut and above it a small area of malignancy (Fig. 171). It was this
Fig. 171.—Carcinoma in interstitial mastitis of breast.
cyst and not the malignant area that was palpable. The skin fixation, however, was due to the retraction of the malignant area. This area shows unusually well the fine grayish white cancer nests contrasted with the pinker connective tissue. It is the density to touch, and the ease with which it yields to the knife, in comparison to the more rubber-like consistency of the interstitial mastitic areas, that particularly characterize the malignant area. The remainder of the breast shows mastitic patches with large intervening lobules of fat.

After-course.—A year and a half after the operation she began to have symptoms of mediastinal involvement and died at the end of another six months under symptoms of mediastinal compression. There was no local or glandular metastasis.

Comment.—Young women or those at or about the menopause who have large, well-formed breasts give a bad prognosis. The reason for this is not clear. This type of person with patchy interstitial mastitis should be subjected to resection of the involved area and if malignant areas are discovered radical operation should be done. The prognosis is exceedingly bad in such cases, no matter how early, apparently, the operation, or how radically it is done.

ENCAPSULATED TUMORS OF THE BREAST

If a tumor of the breast is encapsulated, it is but a simple matter of local excision. It is either a simple fibroadenoma or an intracanalicular fibro-adenoma. One need only to keep in mental reserve that in rare instances do these tumors develop malignancy. If the epithelial elements become malignant, small, hard elevations appear at some part of the surface. If the fibrous elements become malignant, a rapidly enlarging expansile tumor results.

CASE 1.—A school teacher aged twenty-four came to the hospital because of a tumor of the breast.

History.—She noticed a tumor in her left breast about a year ago. The discovery was accidental, for it has given her no trouble, and she has noticed no change in the tumor since it was first discovered. There never has been any trouble in that breast that she can remember. Save for a slight pain at the beginning of menstruation her health is uniformly good.

Examination.—There is a hard, freely movable, sharply defined tumor, the size of a walnut in the upper outer quadrant of the left
breast. The surface contains a number of low bosselations. These are not attached to the surrounding tissue. The whole mass is dense and elastic.

**Diagnosis.**—The innocent nature of the tumor is apparent from the lack of discomfort and from its mobility. The irregular bosselated surface distinguishes it as an intercanaliculitary fiber adenoma instead of a simple fibroadenoma, the latter being characterized by a smooth surface free from bosselations. The question of secondary malignancy is decided in the negative because none of the bosselations are hard and adherent as they would be were there any malignant processes going on.

**Treatment.**—The tumor with its capsule was removed under local anesthesia.

**Pathology.**—The gross appearance presents a surface smooth but with many secondary nodules (Fig. 172). The cut surface presents a clear white plane with fine fissures and little nodules here and there. The slide shows an abundance of fibrous tissue with various sized cavities filled with developing fibrous tissue (Fig. 173).

**After-course.**—Recovery was permanent.

**Comment.**—The intercanaliculitary fibroadenomas rarely become ma-
lignant through epithelial development. When they do manifest malignant growth it is the fibrous tissue elements. There is no sharp line of separation between these tumors and the typical fibroadenomas. In fact it is not uncommon to find tumors representing each type of tumor. In rarer cases cartilage is found in them and quite commonly myxoid tissue is observed. These factors bring them into close relationship to the mixed tumors. This relationship is further emphasized by their course when they take on rapid growth. Though they may become cellular, they show a very low malignancy, little deserving the term, sarcoma, usually applied to them when they reach this state. "Mixed tumors" is a term that at once covers their varying structure as well as their clinical behavior. Local excision together with the capsule which contains them is sufficient to bring about a radical cure.

**CASE 2.—A doctor aged twenty-four came because of a tumor of his breast.**

*History.*—For three months the patient has been annoyed by a gradually developing tumor beneath the left nipple. There has been no actual pain, but he has been conscious of its presence.

*Examination.*—A flat mass an inch and a half in diameter and half an inch thick lies in the center of the breast. It is dense, some-
what bosselated and not completely encapsulated, yet not closely attached to the surrounding tissue. The breast about the tumor seems free. The nipple is not involved.

Diagnosis.—The general physical characteristics suggest intercan-

![Fig. 174.—A gross appearance of intracanalicular tumor of the male.](image)

![Fig. 175.—Epithelial proliferation of the ducts.](image)

alicular fibroadenoma. It is more closely attached to the surrounding tissue than is usual in this type of tumor and the situation just beneath the nipple is unusual. On the contrary, the pad-like shape of the tumor and its situation, together with its relation to the surrounding tissue suggests an interstitial mastitis. It has no definite
attachment to the skin, neither is there fixation and retraction of the nipple, nor is the age that common in carcinoma.

Treatment.—The tumor was resected together with the tissue immediately attached to it.

Pathology.—The surface is irregular and is adherent to its capsule (Fig. 174). The cut surface is dense and fibrous, pink in color, with very fine white dots. These dots on section are seen to be ducts with somewhat hypertrophied epithelium. The connective tissue is much increased and cellular. The duct glands nowhere escape their normal boundaries though there is some plasma cell infiltration about the basement membrane (Fig. 175).

After-course.—The breast has remained free from recurrence after six years.

Comment.—These growths seem closely allied to interstitial mastitis often observed in young males. Their course is that of a mastitis though the microscopic picture gives no evidence of an inflammatory reaction. The change is that of a connective tissue hypertrophy. These tumors when locally removed do not recur, but when left alone do not disappear spontaneously as the interstitial mastitis in young males does. These are usually called duct cancer of the male. There is little evidence that they become malignant. I have done a conservative operation on a goodly number of these without recurrence.

CASE 3.—A maiden governess aged forty-six came to the hospital because of a huge tumor of the breast.

History.—A nodule was first noted in her left breast five years ago. It grew slowly until last summer, when it began to grow rapidly. It has not been painful. Her general health has always been good.

Examination.—A nodulated, bosselated tumor the size of an adult head occupies the site of the left breast. It is fairly firm, but elastic, particularly in certain rather indefinite areas. The axillary glands are free and the tumor glides freely over the fascia. The tumor has ulcerated through the skin over an area the size of a watch. The skin is unattached to the tumor either about the ulcerated area or elsewhere. The nipple rides high on the surface of the tumor reminding one of a diminutive steeple of a village church. The skin is obviously destroyed by pressure erosion and not by infiltration.

Diagnosis.—The huge size, its bosselated exterior and the manner of destroying the skin stamps it as a mixed tumor. Its rapid growth
Fig. 176.—Mixed tumor of the breast (so-called cystic sarcoma).
Fig. 177.—A. Connective tissue with spindle form nuclei. B. Mixed cells.

Fig. 178.—Encapsulated carcinoma of the breast.
indicates that the connective tissue elements have taken on a marked proliferation. When this state exists, the tumors are sometimes called sarcomas, a cognomen their history justifies but it is not borne out by their clinical behavior.

Treatment.—The tumor was removed by a colleague who, fearing possible glandular metastasis, cleared out the axillary space also.

Pathology.—The tumor is made up of a pinkish white material showing a disposition to wave formation (Fig. 176). This is interspersed with numerous cysts. In certain areas distinct cysts are seen. In structure the bulk of the tumor consists of mixed cells (Fig. 177-A) with equally extensive areas in which bundles of fibers with small nuclei are found (Fig. 177-B).

After-course.—The patient has remained well.

Comment.—These tumors when they grow rapidly are very ominous affairs. However, they are expansile in growth and seem never to invade surrounding tissue or to form metastasis. Local removal is all that is required. I have never seen a recurrence after such treatment. The capsule should be removed along with the tumor, and not merely the tumor shelled out.

CASE 4.—A matron aged fifty-six came for consultation because of a painless tumor of the breast.

History.—The patient has had six children all of whom she nursed without disturbance of the breasts. Six months ago she noticed a tumor of the left breast. It was as large as a hen’s egg when she first noticed it. She thinks it must have come suddenly or she would have observed it earlier. It has caused no pain and she seeks advice only at the earnest solicitation of her family. She passed the menopause eight years ago and her health is good in every way.

Examination.—The patient is well-nourished and has well-developed mammae. A prominence is visible in the left breast in the upper outer quadrant. On palpation a tumor the size of an egg is easily palpable. It is spherical and rolls freely under the examining fingers. On closer examination it is seen that the encapsulation is only apparent. The skin can not be lifted from the tumor, neither can the gland be slid over the surface of the tumor. The tumor is hard and fine granular bossellations can be felt here and there over the surface of the tumor. Firm pressure causes slight pain. There are no palpable glands.
Diagnosis.—The density and pseudoencapsulation stamp this tumor as a carcinoma. It resembles most closely a mixed tumor of the fibroadenoma in general outline, while the consistency suggests malignancy. Mixed tumors rarely appear as late in life, are more elastic, and less painful on pressure and the encapsulation is definite. Mixed tumors sometime show small bossellations but they are elastic and do not stick out into the surrounding tissues as malignant ones do.

Treatment.—Radical operation was done.

Pathology.—The section of the tumor shows a fine granular surface, uniform throughout the tumor (Fig. 178). This slide shows it to be an adenocarcinoma.

After-course.—The patient is free from recurrence after five years.

Comment.—These tumors usually occur in the breasts of women after the menopause and follow a rapid, painless course. They initiate an expansile growth and are the least malignant of the breast carcinomas despite their rapid growth. Their low malignancy is due to the fact that they retain an adenoid structure. This accounts for their relatively slight disposition to metastasize. This is the type that grows to large size and eventually ulcerates through the skin.

Cystic Tumors of the Breast

Cysts in the breast are usually retention affairs due to occlusion of the ducts by proliferated interstitial tissue. These not infrequently show proliferations in their interior, which are sometimes malignant. On the other hand, malignancies sometimes show broken-down interiors. When a cyst is discovered in the breast, the interior must be inspected.

CASE 1.—A matron of forty-six came because of a tumor of the breast.

History.—The patient has noticed a small tumor of the breast for six months. It has caused some stinging and uneasiness but no real pain.

Examination.—The patient is tall, thin and nervous. Lateral to the left nipple is a rounded mass the size of a hickory nut. The breast in this region is thickened. The nodule is smooth and glides about under the finger tips.
**Diagnosis.**—The physical character of the mass suggests a cyst and the bordering tissue is elastic and there is no attachment to the skin.

**Treatment.**—The cyst and the thickened tissue were resected.

**Pathology.**—The cyst is attached to the breast tissue at one pole (Fig. 179). The cyst was lined with a simple epithelium. The surrounding tissue presents a simple interstitial mastitis.

**After-course.**—Recovery has been permanent.

**Comment.**—This type of person is the normal habitat of cystic mammae. Resection is attended with less risk of missing a malignant area than in a breast of the same physical characters in a better nourished patient.

**CASE 2.**—A maiden school teacher aged forty-six came because of a tumor of the breast.

**History.**—Maiden school teacher of good general health. She has noticed a tumor of the breast for four months. She has put off seeking relief until she should finish the school year. She has no actual pain but there is a sense of fullness which is worse just before and during the first few days of menstruation. Her nervous system shows the effects of twenty-five years of the school room.
Examination.—The flat hand shows a tumor the size of a hulled walnut just above and external to the nipple. There are smaller nodules lateral to the main tumor. The larger tumor is smooth and elastic. The breast tissue surrounding it is not much thickened. The opposite breast shows fine round nodulation, likewise without notable interstitial thickening.

Diagnosis.—The larger smooth elastic tumor is obviously a cyst. The smaller nodules likewise are cysts. The absence of interstitial thickening makes the presence of malignant areas unlikely.

Treatment.—The cyst-bearing area was resected.

Pathology.—The larger and smaller tumors are cysts filled with a clear fluid. There is a little thickening of the interstitial tissue.
lateral to the outermost cyst (Fig. 180). This is elastic, uniformly pink with a few areas of very small white dots. These on section are seen to be little changed gland acini (Fig. 181).

After-course.—The patient is free after ten years. The opposite breast, which at the time of operation showed many fine cysts, has atrophied into a flat, smooth breast.

Comment.—A cyst-bearing area, when well defined, is subject to ready resection. A cystic breast without interstitial thickening may be with safety allowed to go untreated.

CASE 3.—A matron of forty-two came to me because of a tumor in her breast.

History.—For several months the patient has noticed a lump in her left breast. There is sometimes a stinging sensation but no real pain. She has three children whom she nursed without incident. There are no pelvic symptoms.
Examination.—The breasts are both large and firm. Lateral and above the left nipple is a globular mass the size of a walnut, which is quite firm. It seems smooth, yet does not move freely about the tissue. There is no retraction of the nipple or skin or limitation of movements in the change of position.

Diagnosis.—The firmness and roundness suggest a cyst. The fixation differentiates it from a fibroadenoma. The age of the patient likewise favors a cyst. The stinging sensation makes one apprehensive of malignancy, but there are no physical signs indicative of it.

Nevertheless, exploratory operation must be undertaken with grave apprehension.

Treatment.—The patient was told the trouble probably was benign, but that, should the lesion prove otherwise, the radical operation should follow at once. A wedge-shaped piece of the breast including the tumor was removed.

Pathology.—A cyst the size of a walnut made up the tumor (Fig. 182-A). The portion of the breast removed along with it was elastic, pink for the most part, with fine points intermingled. These fine points were seen to be groups of gland acini. The cells of these acini
are deeply staining and the basement membranes are intact and there is no round-celled infiltration (Fig. 182-B).

After-course.—The patient had an annoying hemorrhage, a hematoma formed and continued to drain for a number of days following the operation. The hemorrhage was controlled with difficulty with pad compresses and adhesive strips.

Comment.—The fact that this woman is of the buxom type with large breasts makes conservative operating particularly disquieting. Coupled with this was the complaint of stinging pain, usually indicative of early malignancy. Adding to the apprehension was the annoying hemorrhage, a thing calculated to stimulate to malignancy if there is a tendency thereto. In resecting breasts, particularly if done under epinephrin-adrenalin, every precaution possible should be undertaken to prevent hemorrhage into the space left by the portion of breast removed. This can best be done by transplanting a flap of fat from the neighboring subcutaneous tissue or by pulling the remainder of the breast together by catgut sutures. If the job does not result satisfactorily, a small drain for a day or two will do no harm. A hematoma is a very annoying thing, for it must either be removed or absorption awaited, which may require several months. This gives time for the asking of many questions which may even be directed to the surgeon who counseled radical operation.

CASE 4.—An unmarried woman of thirty-eight came to the hospital because of a tumor of the breast.

History.—She was struck in the left breast a year ago by a child. Two days later she noticed blood oozing from the nipple. This kept up at intervals since. Once there seemed to be pus coming from the nipple. During many months there was no pain. Four months ago she noticed a swelling which would disappear for weeks at a time, then reappear. It is now larger than ever before and has become painful. The whole breast is swollen and sore and there is more blood escaping now than ever. Her general health is good. Menstruation is regular and but little painful. The laboratory findings are negative.

Examination.—The left breast is larger than the right as noted by inspection. The nipple is not displaced or retracted, but a fine droplet of watery blood oozes from the nipple without the application of pressure. By palpation an irregular mass is felt medial to the
nipple. It seems to shade off gradually into the surrounding tissues. The mass is made up of irregular nodules with smooth surfaces. The whole mass gives one the sensation of tense elasticity. The nipple is not retracted and traction on it does not change the position of the mass. The axilla is free. The opposite breast is thickened and hard and many small smooth nodules can be felt.

Diagnosis.—The spontaneous escape of blood from the nipple signified a cyst of the breast containing a papillary outgrowth. It is the papilla that furnishes the blood. The injury from the child’s head evidently was sufficient to cause bleeding in a papillary growth already present. The rather sudden appearance of a tumor mass with a general enlargement of the breast with pronounced pain may be ascribed to hemorrhage into the cyst with associated reaction of the surrounding tissue. If the increase in size were due to malignant degeneration, the growth would have been less rapid, the pain not so great, sticking rather than bursting in character, and the consistency would have been hard rather than tense elastic. Some surgeons regard the appearance of blood in the nipple as pathognomonic of malignancy, but this view has been abundantly disproved.

Treatment.—The affected area was rather widely excised taking in the major portion, but not all of the thickened tissue. Some portions of interstitial mastitis were allowed to remain. Since the other breast was similarly affected, this was not regarded as of moment.

Pathology.—On gross examination the cut surface shows a general pale pink background intermingled with many small cysts. These cysts are in part empty and in part filled with deep red tissue or blood clot (Fig. 183). There is some infiltration of the surrounding tissue about one of the cysts. The intercystic tissue is everywhere elastic. The section shows that some of the cysts are partly filled by a proliferation of cells (Fig. 183) and in part by papillary outgrowths (Fig. 184). In none of these is there any escape through the basement membrane, though in some places there is a round-celled infiltration. This is particularly true in the region where hemorrhage has taken place into the surrounding tissues.

After-course.—Healing was uninterrupted and no recurrence has appeared.

Comment.—The central factor in this case is that of justification of conservative treatment. It is not malignant—now. The areas in which the chief disturbing processes were going on have been removed. The
Fig. 183.—Mammary cyst partly filled with cells.

Fig. 184.—Mammary cyst with papillary projections into the cyst cavity.
portion of breast remaining presents no changes other than those found in the other breast. There is as much excuse for removing the other breast as for removing the remainder of the breast operated. The conservative operation made the restoration of the breast contour possible, making the esthetic loss nil. The patient believed that the loss of the whole breast would destroy her chances for marriage and the bearing of children. She is willing to assume the risk of malignancy rather than this loss. Those who have children will not fail to regard her viewpoint with sympathy. She has had the benefit of a careful clinic and microscopic examination to safeguard her and the surgeon is not justified in refusing to assume the modicum of responsibility that necessarily accrues to him in such instances.

CASE 5.—A housewife aged thirty-nine came to the hospital because of a tumor of her breast.

History.—The patient has one child eleven years old, but has had no miscarriages. Her menses are regular, lasting two or three days and are always painful. She has had a dragging pain in the pelvis for six years. It is worse when she is much on her feet. She has been tamponed at various times and experienced some relief from the treatment. Six months ago she noticed some lumps in the left breast. She does not think they have grown since she discovered them. She has occasional twinges in the breast, but no actual pain. These twinges are not confined to the menstrual period. She is not conscious of any unusual sensations in the breast at the menstrual period either at the present, since the tumors have appeared, or at any time in the past. She had inflammation in both breasts at the time she was nursing the baby, but neither came to abscess.

Examination.—There is a medium laceration of the perineum and cervix. The breast is made up of a conglomeration of cysts. They are round, tense, and seem to be circumscribed. There are several as large as a walnut and many smaller ones. These tumors are spherical and seem well circumscribed. The nipple and skin are unattached and the whole breast glides freely over the underlying fascia. The larger one is definitely tense elastic and seems attached to the breast tissue at one point.

Diagnosis.—The multiplicity of the nodules in the breast stamps it as a cystic condition. They are less freely movable, lack bosse-
lations, and are more numerous than one would find in fibroadenomas or mixed tumors. The only problem is whether or not a malignant condition has been engrafted on the cystic condition. The occasional twinges of pain she speaks of strongly suggest the possibility of a beginning malignancy. The breast, like its fellow, is made up of a pad of fibrous tissue resembling much a cook's first attempt at making a pancake—flat and tense elastic. On the affected side the cysts are embedded in this. There is nowhere an increased density of the background, though its existence can not be excluded. The clinical diagnosis, therefore, is interstitial mastitis with cyst formation.

Treatment.—The breast was exposed and excised in various places. The larger cyst contained a milky fluid (galactocele) while the smaller ones contained a clear fluid. The interstitial tissue everywhere was pale pink and elastic. Because the breast was so evidently cystic, extensive section was not done. The entire breast was excised. There was not enough fat on the chest to make a new breast. The cervix and perineum likewise were repaired.
Pathology.—The interstitial tissue nowhere showed epithelial infiltration but many small cysts. The slide made by the technician showed extensive interglandular proliferation and numerous small cysts without epithelial proliferation. The acini stained deeply but showed no proliferation. The accompanying photograph of the gross specimen (Fig. 185) however, showed a definite area of malignancy just below the larger cyst. A section from this area showed malignancy (Fig. 186).

![Image of Pathology](https://via.placeholder.com/150)

**A.**

**B.**

Fig. 186.—Beginning carcinoma of the breast. *A.* Epithelial cell nests. *B.* Acini of interstitial mastitis.

After-course.—Healing was uneventful and recovery has been permanent.

Comment.—When one breast shows cystic degeneration, any pelvic disorder should be corrected, for by so doing the unaffected breast is less likely to become cystic. Ordinarily, a cystic breast can be managed by the excision of the breast. In cystic breasts the occasional appearance of twinges of pain should cause apprehension. The development of cysts alone, however, may cause unpleasant feelings of distension but usually not twinges of pain. Such breasts always demand careful search at the operating table. Had that been
done in this instance, this smaller area would not have been overlooked. Even careful palpation should have discovered it.

CASE 6.—A housewife of thirty-seven came to the hospital because of a tumor of the breast.

History.—The patient has had a tumor of the breast seventeen years. It developed before weaning her second and youngest child.

Fig. 187.—Cystic carcinoma with collapsed walls.
She weaned the baby because she thought it was a "caked breast." It continued to be inflamed, however, and increased in size. After a time the reddening and pain lessened though the size of the tumor did not diminish. Seven months ago it began to enlarge and it is now as large as a fist. It has caused her no pain but the rapid increase in size alarmed her.

Examination.—The left breast is represented by a large globular mass, dense, elastic to the touch. Careful palpation shows slight bossellations at several points on its surface. The skin is adherent over the surface, and lateral to the nipple it is red and infiltrated. It is not freely movable over the pectoral fascia. There are no axillary lymph glands palpable. It is slightly tender on palpation. The skin over the surface is decidedly reddened.

Diagnosis.—The history of beginning at the end of lactation with a long dormant stage suggests a chronic abscess. Evidently some secondary process has become active, either renewed inflammation or a malignancy. The irregular character of the surface suggests malignancy, but the suggestion of elasticity hints of a cavity with a thick wall. Were it not for the history one would think of colloid...
carcinoma approaching the skin as is manifest by the reddening. The history of recent rapid development with the small nodules on the surface were deemed to dominate the picture and malignancy was diagnosed.

Treatment.—The radical operation was done. It was necessary to excise a wide area of skin. The deficit was replaced at once by skin grafts from the thigh.

Pathology.—On section the tumor mass was found to contain a cavity filled with a granular milky fluid and some colloid material. With the escape of the fluid the walls collapsed (Fig. 187). The wall was covered with an irregular colloid mass. Surrounding this, particularly on the lateral border, was a mass of colloidal tumor tissue showing definite evidence of malignancy (Fig. 188). The skin overlying this area was reddened.

After-course.—The operation wound healed promptly, but the patient died a year and a half afterwards from general systemic metastasis.

Comment.—Generally speaking this type of tumor gives a fairly good prognosis, and when they do return, the recurrence is apt to be local. The systemic metastasis came as a surprise.
CHAPTER IX

DISEASES OF THE UPPER EXTREMITY

Affections of the upper extremity have to do with diseases dangerous to life, painful affections and affections which tend to limit movement. The first group comprises neoplastic diseases and some infections; the second neuralgias and some infections, and the last the result of some disease or trauma.

DISEASES OF THE SHOULDER REGION

Aside from frank traumas, such as fracture and dislocation, the chief diseases are arthritides and affections of the bursae and neuralgias. The former most often is characterized by limitation of motion with pain, the latter by pain with limitation of motion by muscle spasm only.

CASE 1.—A matron of forty-eight came to the hospital because of a painful shoulder.

History.—Since last April there has been a gradually developing pain when she attempted to raise her left arm. This was particularly noticeable when she attempted to comb her hair. There was a dull pain and aching in the left shoulder most of the time but it was much increased on trying to raise her arm. Her general health is pretty good most of the time. She had one attack of pain in the left hip twelve years ago which lasted eleven weeks. It was called sciatica. A lipoma was removed from her left shoulder fifteen years ago.

Examination.—There is a spot tender to pressure near the end of the acromion process. The x-ray shows a shadow external to the acromion and about the head of the humerus and independent of both (Fig. 189). Pressure over this point with passive motion causes an increase of pain. Pain is made worse by active motion made against resistance.

Diagnosis.—The history is that of a bursitis. The x-ray suggests that bony changes have taken place in it. The disability is great enough to induce the patient to accept any means that offers relief.

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Treatment.—The bursa was exposed, the wall found thickened but no bony changes. It was removed.

Pathology.—The capsule was thick and showed hyaline changes.

After-course.—The patient was completely relieved and full motion restored.

Comment.—The only certain treatment for bursitis is removal. It is more expeditious and more certain and less dangerous than injection. In recent mild cases immobilization with compression may give relief.

Fig. 189.—Bursitis with apparent bony formation or calcareous deposit.
CASE 2.—A schoolboy aged nineteen came because of pain and stiffness in his shoulder.

History.—The patient has had a painful shoulder for a year and a half. It has never been swollen to speak of but all movements are painful. No other joints have been affected. He has had no venereal disease and no history of infection or trauma.

Examination.—The arm muscles were atrophied and the deltoid was flat. The shoulder joint was not thickened and not tender upon gentle examination. When passive movement was attempted loud protestations were offered. The little movements that were permitted gave rise to a grating sensation. All other joints were free.

Diagnosis.—Being monoarticular, arthritis deformans was unlikely. He seemed to be telling the truth when he denied venereal infection. There was no evidence of septic infection and since the onset was gradual this may be excluded. It had the roughened feel of a bone tuberculosis, hence a dry tuberculosis may be diagnosticated. The patient was observed before the days of the general use of the x-ray.

Treatment.—On the advice of an older colleague the shoulder was resected through the surgical neck.

Pathology.—The point of attachment of the muscles about the great tuberosity was partly undermined by granulation tissue. The
whole head was denuded of cartilage and about the anatomic neck patches of granulation tissue elevated the periosteum (Fig. 190). This granulation tissue was not distinctive of tuberculosis but an emulsion of it injected into a guinea pig brought a positive result in five weeks.

Aftercourse.—The wound healed with good passive and fair active motion. The patient was lost sight of.

Comment.—I believe resection should not have been done in this case. I have seen good results in young persons by conservative treatment in equally unpromising conditions. Should I meet the same condition in a patient in middle life, however, I should resect, for experience has taught that but little can be expected in the healing of tuberculosis of the joint after the epiphyseal line has become obliterated. I regard a correct diagnosis in this case as a mistake in clinical logic, a happy guess. It was observed long before general knowledge of septic joint infections was as disseminated as it is today. Should I see a like condition today, I should not have the courage to make such a diagnosis, and had not tubercle bacilli been stained in the tubercles of the guinea pig I should be skeptical. It is well to know that such lesions do occur. I saw a similar case in the practice of J. N. Jackson a few years previously.

CASE 3.—A child aged six was brought to the hospital because of a swollen arm.

History.—Ten days ago after a period of vigorous play in the yard on Christmas day she became feverish and complained of general pains. There was no tonsillitis and no known injury. A week ago she began to complain of pain in the arm between the shoulder and elbow and two days later swelling in this region appeared. She has been feverish and listless.

Examination.—The arm is swollen, very sensitive, but despite this one perceives fluctuation. The shoulder and elbow joints are painful on manipulation. The pulse is 140, the temperature 103.6.

Diagnosis.—The physical findings leave no doubt as to the diagnosis, acute suppurative osteomyelitis.

Treatment.—Free incision in the soft parts and a wide opening into the medulla was made. There was much pus about and within the bone. The wound was loosely packed.

After-course.—There was some improvement in the general symp-
toms for a day, but after that the general hebitude returned and gradually increased and she died on the sixth day.

Comment.—Early incision would have greatly enhanced the chances of saving this child's life. Pain and tenderness of a long bone attended by fever in a child is sufficient cause for action.

CASE 4.—A farmer aged forty came to the hospital because of a painful swelling under his arm.

History.—The patient's trouble began ten days before with chills and fever which rose to 103.6°. The chills and fever recurred on the third and fifth days. His physician diagnosticated malaria and gave quinine. Since then he has had no chills and the temperature has remained lower, but more persistent, however, so that now it varies between 101° and 102.5°. At this time he had a deep pain in the left chest and shoulder and marked tenderness in the axilla. He is much prostrated, has no appetite and complains of constant pain in front of the left shoulder and axilla, chiefly, but the whole side is sore.

Examination.—The patient is a huge man bearing evidence of the use of alcoholics, though not now under its influence. The left humerus is held slightly abducted from the chest and the forearm is supported by the right hand. He asks caution when the left arm is grasped by the examiner. The axilla is swollen. The posterior border of the axilla is less markedly protuberant. On palpation he protests vigorously. The area above indicated is enlarged, no definite tumor mass can be made out and no fluctuation, merely an enlargement that is exquisitely tender. On query he exhibits a small abrasion of the index finger now nearly healed which he states he received by striking against the side of a box ten days ago. It did not give him any trouble then or since, he is sure.

Diagnosis.—The onset with chill, and intermittent fever simulating remittent fever, is not uncommon in generalized infections and until there was evidence of a localized process, its nature might easily have been overlooked. The lack of fluctuation, or of a palpable mass or glands in the presence of unmistakable evidence of axillary suppuration indicates an abscess of the axilla below the deep axillary fascia. This fascia prevents the appearance of a definite tumor as well as of fluctuation. The old injury is in line with the chief trouble and may safely be indicted as the offending factor.

Treatment.—A free incision was made along the outer border of the
pectoralis major tendon and the deep fascia incised. A large amount of a semitransparent colorless pus escaped with some force. The finger entered a cavity as large as a goose egg extending well up into the axillary triangle under the clavicle to above the first rib. A large rubber tube was introduced.

Pathology.—This pus showed staphylococci and short rods not more closely identified.

Comment.—Several months elapsed before the large cavity was finally obliterated. These cases before they localize are very disconcerting. The leucocytosis often is high and then some sort of infective process may be suspected, a suspicion heightened by the absence of any evidence of malaria. The presence of the small abrasion on the finger should have cleared up the diagnosis on the very first evidence of axillary infection. Early incision with free drainage is desirable.

CASE 5.—A clergyman aged thirty-six came to me because of a painful lump in the axilla.

History.—For three months he has been aware of a painful swelling in the axilla. He knows no cause for its appearance. He has had no other enlarged glands and he knows of no family tuberculosis. During the past month it has been so painful as to greatly discommoded him.

Examination.—A mass the size of an apple occupies the axillary space causing a marked bulging. It is hard, tender to the touch, and firmly fixed. There are no supraclavicular glands palpable. The hand gives no evidence of a past infection. Laboratory examinations are all negative.

Diagnosis.—Because of the indolent character of the growth pus microbe infection is unlikely. An isolated mass is unusual in syphilis. The conglomerate adhesion of the various parts speaks for tuberculosis, as against Hodgkin’s disease. On the other hand, the development is rapid for tuberculosis and the degree of pain unusual so that a mixed infection is not beyond the possibility.

Treatment.—The entire axillary contents were blocked out.

Pathology.—When the mass is cut through, numerous glands are seen to be embedded in masses of indurated periglandular material (Fig. 191). Whitish gray well-circumscribed points are readily made out in some of the glands. The larger one of the glands is lique-
fying but shows a few of the areas above mentioned. The slides show typical tuberculoses.

After-course.—The wound healed readily. He has remained free from any further glandular infection.

Comment.—Whenever an isolated tubereulous lesion can be clearly dissected out, this presents the ideal method of treatment. The more acute the process is in its origin and the greater the periglandular infection, the better the prospect that the local excision will secure results. In the acute infections all the glands involved give evidence of the infection. In the chronic infections glands but slightly involved may escape the examiner’s touch, but after the lesions have been removed they develop, not because of the operation but to this preexisting condition. Again the lesions are central, well walled in by reaction on the part of the periglandular tissue, and miliary dissemination is less likely to take place than in the more chronic processes. The acute processes, too, are more apt to occur in robust individuals.

CASE 6.—A man aged forty went to Bell Hospital because of a swelling on his back.

History.—The patient’s general health has always been fair. He has had some pain in the left side for a year or more. During the
past six months he has noticed a swelling in the back which has gradually increased to its present size.

Examination.—An oblique, slightly lobulated tumor extends from the angle of the scapula to the lower border of the twelfth rib (Fig.

Fig. 192.—Abscess following tuberculosis of a rib.
192). It changes its position slightly as the position of the patient changes. On palpation it is found to be distinctly fluctuating as though a thin fluid were confined immediately beneath the skin.

**Diagnosis.**—From inspection I at once suspected a lipoma. Palpation, however, showed that it must be a sac containing a thin fluid. A quantity of fluid so great in this situation is very unusual. The history of pain in the side for a year or more suggested a burrowing empyema, but the thoracic cavity was free from fluid and burrowing empyema would have perforated the skin before attaining this size. A subscapular bursitis is more tense, and none so large has been recorded. This seemed to me to be the probable diagnosis, however. A cold abscess from a tuberculous rib tends to follow the intercostal spaces toward the front.

**Treatment.**—The late Dr. Walter Sutton operated on the patient and discovered a tuberculous rib, which he resected.

**After-course.**—The patient’s after-history is not known.

**Comment.**—Rib tuberculosis may occur independently of any other tuberculous lesion or from extension of a pleural affection. I have never seen any other in which the exudate was so large or one which failed to follow the rib in front. It is my opinion that the subscapular bursa became involved, and that it was in fact the sac that attained this huge size.

**CASE 7.**—A housewife of fifty came to the hospital because of a tumor on her shoulder.

**History.**—For several years the patient has had a tumor on her back. It has caused no inconvenience save for its size.

**Examination.**—The region of the lower angle of the scapula is occupied by a soft semifluctuating tumor (Fig. 193). It slides readily over the underlying structures and is not attached to the skin. The border is serrated.

**Diagnosis.**—The soft semifluctuating character of the tumor together with the irregular lobulations makes the diagnosis of lipoma plain.

**Treatment.**—Removal under local anesthesia.

**After-course.**—Relief, of course, was permanent.

**Comment.**—The site is typical for lipoma and the diagnosis is easy. Occasionally other conditions are found that bear a certain resemblance.
CASE 8.—A school girl of thirteen was brought to the hospital because of imperfect motion of the arm following a fall on the shoulder.

History.—Six weeks ago the patient fell from a horse, striking on the right shoulder. The shoulder began to pain immediately and she could not move the arm. A local doctor said the shoulder was sprained, and he put the arm in a sling. A few days after the injury the skin along the inner side of the arm became discolored. A week and a half after the injury an osteopath pronounced the shoulder dislocated and set (?) it under ether. After this maneuver there was no change in the range in mobility and the pain was much increased.

Examination.—The patient carries her arm in a sling and expresses apprehension when examination is attempted. The skin near the shoulder shows faint traces of yellowish-green discoloration. The arm is thinner than its fellow. The axis of the humerus points more medially than that of the opposite side. There is a flattening but not a hollowness below the olecranon. All movements of the arm are limited, whether by muscular action or bony limitations it is not pos-
Fig. 194-A.—Fracture of neck of humerus.
Fig. 194-B.—Fracture of neck of humerus. Replaced and nailed.
sible to determine and at the same time maintain the good will of the patient. Slight abduction and limited rotation only is possible. The x-ray shows a fracture about the epiphyseal line with an over-riding of the fragments and an inch of shortening of the humerus (Fig. 194-A).

Diagnosis.—The position of the fragments as demonstrated by the x-ray indicates that the limitation of movement is largely muscular. Consequently with full recovery from the reaction incident to the injury and from the manipulations of the osteopath a much increased range of movement may be anticipated. However, the position of the lower fragment is such that the complete restitution of function, particularly that of bringing the arm forward, is not to be anticipated.

Treatment.—Fracture cut down on, fragments separated, and ends approximated. Lower fragment was nailed to head with an 8 penny finish nail, the head of the nail having been left just under the skin, where it will be accessible for removal later (Fig. 194-B). The wound was closed with a gauze strip running down to the nail head. A moulded plaster of Paris shoulder cap was put on running around the elbow. A pad was placed in the axilla.

After-course.—The nail was removed in a month. After three months the function was fully restored.

Comment.—With this degree of displacement, function would not have been restored without operation. When in such cases the operator has difficulty in holding the fragments after the drill is removed and the nail is being placed, the technic is expedited by leaving the drill in place in lieu of a nail. The bone here is fragile and care must be exercised lest displacement recur in spite of the nail. Nothing short of a well-fitting plaster cast will secure this result.

CASE 9.—I was called to see a woman aged sixty-eight because of swelling of her right arm.

History.—This patient was operated on three years ago for carcinoma of the breast. For two years she was quite free from disturbance. Nearly a year ago she noticed that her arm had begun to swell. Later on it became painful. The condition has gradually grown worse up to the present time.

Examination.—Though feeble the patient does not show cachexia. Her right arm is enlarged to half a dozen times the size of its fellow
The swelling is hard, but pits slightly on pressure; firm pressure causes pain. A large scar occupies the location of the breast and a marked puckering fills the axilla. Because of this the arm can not be elevated and the attempt to do so causes pain. There are numerous small, hard glands in the supracleavicular fossa. No tumor can be felt in the axilla.

Diagnosis.—The swelling obviously is due to a compression of the axillary vein. The density of the scar and its retraction makes a local recurrence of the tumor likely. Because of the denseness of the arm the compression of the lymphatics likewise may be assumed.

Treatment.—Anodyne for pain was advised.

Comment.—Some surgeons recommend interscapulothoracic amputation for this condition. I do not believe it is warranted.
Case 10.—A widow aged fifty-eight came to the hospital because of pain in her elbow.

*History.*—For several months she had had pain in her left elbow. It is not constant but seems worse at night. Recently there has been some stiffness in the joint. No other joints have been affected. Her

![Fig. 196.—Metastatic carcinoma of the humerus.](image)
general health has been good save that she has had much backache lately.

*Examination.*—In small range the joint surface seems free. The limitation of motion seems due to muscle spasm. The bony landmarks are well defined and there is no exudate into the joint. The bone above the joint is sensitive to pressure. She has a scar in her right breast which she admits came from a removal of a breast eight years ago. The x-ray (Fig. 196) shows an extensive area of involvement of the shaft of the humerus.

*Diagnosis.*—Obviously the pain is due to a carcinoma, a metastasis from the breast carcinoma. The pain in the back suggests a possible spinal metastasis, though the x-ray does not show any definite foci.

*Treatment.*—Anodynes were ordered for the pain. Amputation would relieve the present source of pain but likely other foci will soon appear.

*After-course.*—Spontaneous fracture took place a few weeks later. The pain in the back has increased until she is incapacitated.

*Comment.*—Whenever a patient has had a malignant disease any source of pain must be assumed to be due to metastasis until the contrary is proved. Often fear deters patients volunteering the information that they have been operated on for malignant disease until a specific question is put to them.

**DISEASES OF THE ELBOW AND FOREARM REGION**

The affections of the elbow that cause the surgeon the most trouble are the fractures. With the aid of the x-ray, which insures exact diagnosis, and the courage to remedy defects once discovered, this chapter of surgery has lost many of its annoying features. The occasional appearance of contractures the result of too tight bandaging reminds us to be cautious. The most frequently neglected disease of this region is the malignant tumors. A tumor in this region that is not a lipoma should be regarded as a sarcoma until negative evidence is obtained.

**CASE 1.**—A girl aged twenty consulted me because of a pulsating tumor in her forearm.

*History.*—A year ago while scuffling with a friend who was holding an open penknife in his hand, she received a stab in the bend
of the elbow. Six months later a pulsating tumor developed in the region of the injury.

**Examination.**—The bend of the elbow is occupied by a pulsating tumor 3 by 6 cm. The veins below this region are distended and pulsate. This seems to be the cause of the dull ache of which she complains (Fig. 197).

**Diagnosis.**—Distended veins which pulsate must be connected with the lumen of an artery, hence an arterio-venous aneurysm.

**Treatment.**—The union was between the median or the profunda

![Fig. 197. Arterio-venous aneurysm showing the point of union between the artery and vein.](image)

vein and the radial artery just below the division. The opening between the artery and vein was exposed and doubly sutured by a harness-maker’s stitch with fine silk, and cut between.

**After-course.**—The condition was relieved.

**Comment.**—The treatment adopted was scientifically correct and modern, but unnecessary. Ligation of both artery and vein would have secured good results.

**CASE 2.**—A merchant aged twenty-three comes because of an un-united fracture of the forearm.

**History.**—The patient’s mother died of tuberculosis three years ago. Two sisters have died of the same disease since that time. The
patient had tuberculosis of the hip in boyhood. Recovery followed in three years with a good joint, but with 2 inches of shortening. Following this his health remained fairly good, but he has periodic spells of coughing.

He fractured his ulna fifteen months ago. Healing appeared to be normal. After four months swelling without pain began. This continued without pain until four months ago when the abscess was opened. There was no pain in the abscess before it was incised. The incision was made merely because the doctor detected fluid at that point. It has continued to drain since that time.

Examination.—The bones of the arm are intact and all movements both active and passive are unimpaired. Near the center of the shaft of the ulna is a discharging sinus. The bone beneath seems thickened. There is no pain.

Diagnosis.—A simple fracture which healed without note followed by a swelling terminating in pus production four months later, without pain or temperature, in a patient himself tuberculous and of tuberculous heredity, suggests the possibility of a tuberculosis of the shaft of the bone. A suppurative infection must have expressed itself more vehemently long ago. Tuberculosis of the shaft of long bone is excessively rare, yet knowing this family, I felt sure that if tubercle bacilli ever had a chance they had it here.

Treatment.—The sinus was excised and the bone freed from spicules of bone and a quantity of granulation tissue. The wound was treated with carbolic acid and alcohol and the wound closed.

Pathology.—The wall of the sinus showed several polymuclear giant cells with caseated centers and nuclei located about the periphery, evidently tubercular giant cells.

After-course.—The wound closed without disturbance and has remained so now nearly twenty years.

Comment.—This patient represents my total experience with tuberculosis of the shaft of the bone. The history detailed was sufficient to cause me to suspect the proper diagnosis. The attendant who first incised the abscess made no attempt to relieve the bone condition. Had the diagnosis been properly made, operative treatment would have been indicated, since conservative measures are less necessary than when a joint is involved.
CASE 3.—A school girl aged seven was brought to the hospital because of a mass the size of the fist just below the elbow joint on the outer side of the left forearm.

History.—Her parents noticed an enlargement just below the elbow the size of a hazel nut about one year ago. It grew very slowly at first. In six months it was as large as a walnut. Since then it has grown more rapidly. It has never given any pain. There is no history of previous injury. Her general health has always been good. She has lost no weight. She had measles two years ago and mumps six months ago.

Examination.—Patient has the appearance of a perfectly normal child, rather large for her age. There is a mass on the outer side of the left forearm just below the elbow about the size of a small fist. It is firm but not hard and seems movable in the deeper parts. The superficial veins near and over the tumor are very prominent. The x-ray shows the tumor to be free from ossifying centers and shows no attachments to the bones beneath. The tumor does throw a denser shadow than the surrounding soft parts (Fig. 198).

Diagnosis.—The location and the rapid enlargement with ever increasing momentum indicates that it is malignant. Such a tumor could only be a fascial or a periosteal sarcoma and the x-ray as well as the mobility of the tumor declare the bones to be free. Tumors of this sort are incurable by any means. Local resection might give the little one a few months of bliss, and amputation could do but little more.

Operation.—The tumor was removed, taking most of the skin covering it. It was underneath the muscle and firmly adherent to the capsule of the elbow joint. The capsule of the joint was opened up in removing the mass.

Pathology.—The cut surface of the tumor is uniformly pink and glistening. The slide shows a mixed-celled sarcoma.

After-course.—The wound healed by primary union. For the first few days there was considerable edema of the hand and arm but this was gone by the end of the first week. Permanent wrist drop is present. She has the power of pronation but not of supination. Grip in the left hand is noticeably weaker than in the right. She can extend and flex the fingers and there is no disturbance of sensation. She returned six months later with a metastasis above the
site of the operation. The patient's father suggested amputation but it was refused.

Comment.—These fascial sarcomas are always fatal. In the interest of surgery any operation should be refused. The x-ray sometimes reduces them for a time, at least its use does not add to the patient's suffering.

Fig. 198.—Mixed-celled sarcoma of the forearm. The x-ray shows the growth to be free from the bones.
Fig. 199.—X-ray of an osteosarcoma of the forearm showing extensive ossification.
CASE 4.—A farmer aged thirty-four came for relief from a tumor of the forearm.

**History.**—He has had a tumor on his right arm for four years. It began as a small growth in the bend of his arm, the size of the end of his thumb. It gradually enlarged until it attained the size of an egg. It remained stationary for a time until he injured it, after which it grew rapidly. It is now painful especially at night. His general health is good.

**Examination.**—A large tumor mass occupies the antecubital space extending into arm and forearm. The x-ray shows extensive ossification network throughout (Fig. 199).

**Diagnosis.**—The rate of growth and its situation stamp it as a sarcoma. The x-ray adds the prefix "osteo." There is no prospect of a cure, but an amputation will relieve him of a burden.

**Treatment.**—A shoulder disarticulation was done.

**After-course.**—He regained his general health and a year after operation is free from recurrence.

**Comment.**—It will come back.

CASE 5.—A man of thirty-five came for advice about multiple tumors on his arms.

**History.**—He does not recall just when he first noticed his tumors, but he is quite sure they have increased in both size and number during the past few years. They cause him no trouble.

**Examination.**—Distributed quite uniformly along both arms and forearm are a number of tumors varying in size from a pea to a walnut (Fig. 200). They are soft, attached to the skin, but move freely on the underlying tissue. They are not painful unless subjected to firm pressure.

**Diagnosis.**—Their uniform distribution, their consistency and their close association with the skin stamp them as neurolipomas. The absence of pain and the freedom of the trunk differentiate them from Dercum’s disease.

**Treatment.**—None was advised.

**After-course.**—He remains in status quo.

**Comment.**—Occasionally these tumors become so large that the patient desires to get rid of them for mechanical reasons. Occasionally, too, they are painful enough to cause the patient to desire their removal.
Fig. 200.—Multiple lipofibrosis of the forearm.
CASE 6.—A farmer aged forty-three came to the hospital because of a swelling of the elbow.

*History.*—He has noticed a swelling about his elbow for about two years. It was not painful at first but pains a good deal now. Eight months ago a doctor diagnosed pus and made an incision; only blood escaped. The opening made did not heal and the tumor began to grow rapidly and a number of ulcers formed beside the site of incision.

*Examination.*—A large spindleform mass occupies the site of the left elbow. At the top are five defects in the skin in which dark reddish, granular masses present (Fig. 201). Flexion is limited by the mass of the tumor, but the joint surfaces do not seem to be eroded.

*Diagnosis.*—The situation of the tumor indicates that it springs from a tissue continuous across the joint. Since it unquestionably is a sarcoma, it is fair to assume that it springs from a fæsia. Its density suggests a cystic state, but from the color of the mass it is likely that a hemorrhage has occurred in the substance of a rapidly growing tumor.

*Treatment.*—Exarticulation of the shoulder joint.

*Pathology.*—The bone is free from tumor attachment. The tumor is a mixed-celled sarcoma containing hemorrhagic areas near the ulcerous openings.

*After-course.*—He died in fifteen months from visceral metastasis.

*Comment.*—Amputation in such cases has for its purpose the riddance of a mass which intoxicates and depresses the patient. By
so doing, life is made more pleasurable and may be prolonged, but they all die from the disease.

CASE 7.—A girl of sixteen came to the hospital because of a small tumor on her arm.

**History.**—As long as she can remember she has had a small brown spot on her arm above the elbow. Because she regarded it as a disfigurement, she had it burned out with a caustic two years ago. It healed, leaving a scar as large as a quarter. During the past few weeks she has noticed the development of a tumor in the same situation. During the past ten days it has bled a little several times.

![Image of the arm with a tumor and scar](image)

**Fig. 202.**—Beginning melanosarcoma of the arm.

**Examination.**—Just below the insertion of the deltoid is a soft scar $2 \times 3$ cm., near the upper border of which is a nodule the size of a hickory nut (Fig. 202). The whole surface is reddened and near the grooved center is a scab, the removal of which causes bleeding. The tumor and scab are freely movable over the underlying fascia. The tumor is firm to the touch and painless on manipulation. The axillary glands are not palpable.

**Diagnosis.**—The appearance of a mass after the cauterization of a brown spot at once suggests a melanoma developing after the partial destruction of a pigmented mole. The consistency of the tumor, together with the tendency of the surface to ulcerate, confirms this opinion.
DISEASES OF THE UPPER EXTREMITY

Treatment.—The scar with the tumor was excised, including all tissue down to the fascia.

Pathology.—The tumor is made up of large cells containing large nuclei arranged in alveolar form with little connective tissue between. It is, therefore, a melanoma.

After-course.—The patient has remained free from recurrence now four years.

Comment.—Melanotic tumors particularly those located about the shoulder are very prone to develop malignancy when irritated, particularly when the irritation is produced by a cautery. Wide excision should always be practiced. When such an area once has shown a disposition to grow a guarded prognosis should be given. No matter whether there is evidence of metastasis or not, secondary tumors may appear in after years. Microscopic examination of the tumor does not assist in making a prediction. I have seen hepatic and mediastinal tumors appear in cases where there was no more evidence than here that such was likely to take place. If such metastasis does not take place within three years, there is little likelihood that it will occur at a later date.

CASE 8.—A railway mail clerk aged thirty-two came because of an ulcer of his forearm.

History.—When thirteen years old he was kicked in the forearm by a mule. No bone was broken, but the soft parts were extensively bruised. A growth gradually developed over the bones raising up the skin but was not attached to it. It continued to enlarge gradually,
and five years ago a small place grew up to the skin, but was not attached to it and it was not reddened. If the tumor was struck, it seemed to paralyze his hand. He was operated on soon after by a surgeon who cut out the growth and reunited the skin. The wound healed, but a year later the growth had grown through the skin. The tumor, ulcerated area of skin, and all were removed and the skin again reunited, but healing did not take place. He was operated on again a year later. The hole was cut out leaving a larger one. A large ulcer has remained since. The border becomes inflamed and causes some pain, but it is never severe. After one

Fig. 204-A.—Ulcer of the forearm. The epithelium ends abruptly with little tendency to extend into the depth.

part has pained for a time it subsides, and some other part begins. The pain at no time is severe.

Examination.—An ulcer four inches long by three broad occupies the midportion of the flexor surface of the forearm (Fig. 203). It extends down to the bones. The bones are covered by a layer of firm granulation tissue and are nowhere bare. When the hand is rotated, the bones move over each other without causing the patient pain. The border of the ulcer is irregular with an overhanging ledge of skin which shows some evidence of attempts at healing. In some areas evidence of breaking down may be seen. The ulcer is sensitive only on deep pressure. A thin secretion forms on the
surface when irritated. It does not bleed readily on manipulation. A section removed for examination shows the epithelial layer ending abruptly at the border of the ulcer (Fig. 204-A). There is some fibrous tissue proliferation and extensive round-celled infiltration (Fig. 204-B). The vessels are somewhat, but not markedly thickened. Bacterial examination fails to show anything noteworthy. Repeated examinations gave negative Wassermanns.

**Diagnosis.**—There is no clue as to the character of the alleged tumor which was removed. The tumor has the appearance of a Marjolin's ulcer. The border does not show any epithelial proliferation.

![Image](image.png)

*Fig. 204-B.*—Some plasma-celled infiltration, and but little thickening of the vessels.

There is no evidence of syphilis and a syphilitic ulcer does not remain stationary so long. If it is not a Marjolin's ulcer I do not know what it is.

**Treatment.**—Despite a negative Wassermann he was given salvarsan without result. The x-ray and fulguration has caused marked improvement but not healing.

**After-course.**—By persistent use of the x-ray the major portion of the ulcer has healed.

**Comment.**—The first operator threw the tumor removed into the can and with it the best material for the solution of the problem. I am unable to make a diagnosis.
DISEASES OF THE WRIST

The serious affections of this region are diseases affecting the carpal bones and the tendon sheaths. The most serious disease aside from acute infections, is tuberculosis. Gonorrhea infections are more rare. Fractures no longer cause perplexity, thanks to Roentgen.

CASE 1.—A farmer's wife thirty-six years of age, came to the hospital because of a painful swelling of the hand.

History.—Fifteen months ago she noticed a swelling and some pain when closing her hand. Later the swelling increased, but the pain decreased. In the past few days the enlargement has been more rapid and the pain is greater. The patient knows no cause, and save for a maternal aunt, she knows nothing of tuberculosis in the family.

Examination.—For a distance of two inches or more above the palm is a swelling which bulges more to either side than in the midline. The palm of the hand also is more prominent than its fellow. The tumor is elastic, soft, and when the mass above the wrist is pressed in, that part of the palm becomes more prominent, and vice versa. Deep pressure causes a little pain. Flexing the fingers causes no pain unless the growth is pressed upon while the fingers are being flexed. Upon deep pressure a grating is felt like the moving of several roughened bodies on each other. The wrist joint seems free, an impression that is confirmed by the x-ray (Fig. 205).
Diagnosis.—A cystic mass appearing above the annular ligament connected with one in the palm is nearly always pathognomonic of tuberculosis of the tendon sheath. This is doubly so when the so-called rice bodies can be palpated. Ganglions do not grow so large and do not form communicating cysts.

Treatment.—The entire sac was dissected out. The anterior annular ligament was cut through and the flexor tendons dissected free throughout the area involved by the cysts.

Pathology.—The contents of the cyst was a glairy fluid holding in suspension many grayish pearly bodies. The walls of the cyst were smooth for the most part, but with some elevations in the palmar portion of the sac.

After-course.—The wound healed without incident. Flexion of the fingers was much limited in the beginning, but persistent manipulation restored nearly full function. Recovery has been permanent.

Comment.—The requirements in operation are that asepsis be maintained and that the operation be complete. If infection occurs or if the operation be incomplete, disaster is likely to follow. The operation should be undertaken only by a skilled dissector.

CASE 1-A.—A matron aged thirty-six was brought to the hospital because of an infection of the forearm.

History.—For nine months she has had pain in the wrist. At first it became painful only on prolonged use or by some unusual or violent movement. Four months ago she noticed a swelling in front of the wrist. Her physician applied iodine which helped for a time. A month ago after a violent wrench she had acute pain and the swelling increased. She consulted a surgeon who diagnosed pus and made an incision. Some fluid she did not see ran out and she felt better for a few days. On the fourth day after the operation she had a chill. The whole arm began to swell and the discharge from the wound became more profuse. This has continued to the present time. The fever has been constant and she has no appetite. She does not think she has any lung trouble. She was left an orphan at the age of six and knows nothing of her family. She was born in a foreign country.

Examination.—The whole forearm is reddened and the fingers are flexed in a claw-like manner. In the midline just above the annular ligament is an opening half an inch long from which a thin purulent
fluid escapes. The lower half of the forearm is swollen, reddened and very sensitive to the touch. The axilla and the superficial lymphatics seem to be unaffected. She is thin and emaciated and there is some dullness in the left upper chest and various sized rales. The temperature is 103, pulse 120, respiration 28.

**Diagnosis.**—She had a synovitis which became infected after an ill-advised incision. The nature of the synovitis is the problem. A child born in a foreign country, left an orphan at the age of six years likely has a tuberculous aneistry. The history of nine months' duration substantiates this. An optical lesion confirms it. Tuberculous tendon affections are always serious, and when they become complicated by a mixed infection the gravity is much increased. Considering this, amputation seemed advisable.

**Treatment.**—Amputation four inches below the elbow was done.

**Pathology.**—The wrist tendons were surrounded by a granular tissue and a moderate amount of free pus. The granulations showed typical tubercles.

**After-course.**—The wound healed without trouble. Bacilli were demonstrated before she left the hospital. She died six months later from a typical lung tuberculosis.

**Comment.**—Likely she had a lung tuberculosis before she had the wrist trouble. It is questionable whether amputation is ever justified because of pus microbal infection, but when they are added to a preexisting tuberculosis, I believe such a radical procedure is demanded. Incision of tuberculous lesions, under a mistaken diagnosis of pus infection, is one of the common and most inexcusable errors observed in consulting practice.

**CASE 2.**—A farmer aged twenty-four came because of a series of ulcers on his arm.

**History.**—He first noticed an inflamed area on the back of his thumb six or eight weeks ago. It began as a lesion as big as a grain of wheat. It gradually enlarged until it was as large as a dime. At this time he noticed a series of lumps up his arm extending a hand-breadth above the elbow. Within a week these lumps reached the surface and began to ulcerate and gradually to spread. The largest above the wrist, is still spreading while the remainder seem to be stationary. They are but moderately painful. His general health is unaffected. He states that his brother is similarly affected and
that they have been engaged in operating on lumpy-jawed cattle and he fears that they have become infected. He has been applying iodine at irregular intervals for several weeks, but has not noticed any improvement.

Examination.—Just above the thumb is a lesion as large as a dime. This, the oldest, is indurated, involving both the skin and the deeper structures. It is sensitive on deep pressure. It appears as though an indolent ulcer were lying just beneath the skin, gradually destroying it. Above the wrist is one as large as a dollar (Fig. 206). This extends less deeply in the tissues, does not seem so dense on pressure, and is less painful. On deep pressure, pus can be made to exude at several points. Following a line to the bend of the elbow are six similar but smaller lesions, less deeply situated and less painful. A series of smaller, more deeply-seated lesions extend above the elbow along the bicipital groove (Fig. 207). The axillary lymph glands are free from ulcers but there are palpable glands that are tender. No other part of the body is affected. The white blood count was 11,000. The pus obtained from the lesions was searched
for actinomycoses and likewise blastomycoses, neither of which were positively demonstrated. Staphylococeci were present in abundance.

**Diagnosis.**—The fact that his brother was also affected and that they had been operating on lumpy-jawed cattle made the possibility of actinomycotic infection the first thought. This disease does not travel along the lymphatics in this manner however. Sporotrichosis follows the lymphatics in this manner but spores could not be demonstrated. The development was too rapid for tuberculous lymphangitis, though this possibility was considered since it was regarded as possible that he had been dealing with tuberculous instead of lumpy-jawed cattle. The clinical appearance seemed to warrant a diagnosis of sporotrichosis.

**Treatment.**—In harmony with the presumptive diagnosis he was placed on 20 grains of potassium iodide three times a day and the wound covered with boric acid ointment. At the end of a week no improvement was noticeable. The earliest lesion was excised for histologic examination and the wound cauterized with carbolic iodine åä. The proximal lesions were injected with iodiform-glycerine.

**Pathology.**—The secretions obtained from the cut section showed spores in abundance. Slides of the tissue removed showed a simple granuloma.

**After-course.**—After iodiform-glycerine had been injected about, beneath, and into the lesions, they disappeared with amazing rapidity, being almost completely healed in a week.

**Comment.**—The appearance of this lesion was pathognomonic. Needless apprehension was caused by the alleged association with lumpy-jawed cattle. Whether or not infections obtained about cattle are apt to lead to sporotrichotic infections I do not know, but one of the cases which came under my observation followed an injury obtained while dehorning cattle. Some of the lesions in this case were deep, luring one to a needless incision perhaps, though I am not sure. After they break down, it seems they recover more quickly after the escape of the liquid contents. Perhaps it is because the remedial agents are then able to come in more direct contact with the offending organism. Potassium iodide internally and an air excluding ointment locally usually suffice to cure these in a few weeks. If an indolent lesion is encountered, it may be speedily cured by the use of 5 per cent iodiform in glycerine. The most recent treatment is the use of some one of the aniline dyes. Methylene blue is usually used.
CASE 3.—A matron aged forty-eight consulted me because of a tumor of her wrist.

History.—For ten days she has had pain just above her wrist. She has some pain when she closes her hand. A week or so ago she discovered a tumor at the site of pain. She recalls that she struck her hand against the corner of a trunk before the beginning of the trouble but does not recall just where. She states that all her life she has had black and blue spots from slight injuries that would not affect most people.

Examination.—The patient is stout, apparently in good health. She has prominent capillaries in many regions of her body. On the flexor surface of her wrist, three fingers above the annular ligament, is a low rounded tumor (Fig. 208). It is not definitely circumscribed, is boggy to the touch, and is slightly sensitive to pressure. It does not move with the tendons, and no friction is felt when the fingers are flexed and extended. At several points near the circumference of the tumor the skin is bluish black and at one border is a streak of yellowish green. Otherwise the examination is negative.

Diagnosis.—The feel of the tumor is less elastic than a cystic tumor connected with the synovial sheaths and the borders are not well circumscribed. The tumor apparently is not attached to the tendons. The fact that there is a discoloration of the skin, that she has been subject to hemorrhages following slight bruises, and that a bruise is
remembered to have preceded the appearance of this trouble makes a diagnosis of hematoma seem warranted.

**Treatment.**—None.

**After-course.**—In the week following the yellowish green area extended. In a month she was free from pain and tumor.

**Comment.**—Not infrequently hemorrhages about movable structures cause reactions which for a time simulate infective processes. The tenderness is less marked and the local heat characterizing infections is absent.

**CASE 4.**—A farmer aged thirty-four came to the hospital because of a swelling on the back of the wrist.

**History.**—Several years ago he noticed a small swelling on the back of his wrist. When he first noticed it, it was as large as a hickory nut and caused pain only when he used his wrist a great deal. It has gradually enlarged, but has not caused him any more discomfort than when it was smaller.

**Examination.**—A soft cystic mass the size of half an apple occupies the back of his wrist (Fig. 209). It is free from the skin but is deeply attached. The tendons move freely and there is no limitation of the wrist joint. Its soft character and large size indicate a connection with the wrist joint.

**Diagnosis.**—Simple ganglions are smaller and harder. Tuberculous processes are little likely to occur on the back of the hand and since no rice bodies can be felt in this tumor a diagnosis of hygroma can be made.

**Treatment.**—The sac was liberated from the skin and tendons. In making the deeper dissections the sac was ruptured and a thin, viscid fluid escaped. There were no loose bodies to be found.

**After-course.**—Recovery was uneventful and permanent.

**Comment.**—Large cavities filled with synovial fluids go out either from tendon or joint. The same condition is often observed in the larger bursae. In this case the cyst seemed to be in direct communication with the joint. The exact point of origin of these tumors is still a matter of doubt, some regard them as springing from the joint capsule, others from the tendon sheaths, others, again, as developing as cysts in the paratendonous connective tissue. My observation has been that smaller ones are attached to the tendon sheaths and the larger ones with the joints. At least these respective cavi-
ties are opened into immediately when their removal is undertaken. Their cure is best effected by dissection, though many are cured by aspiration and iodine injection. In this situation the use of iodine is not permissible because of the liability of causing adhesions about the tendons.

CASE 4-A.—A farmer aged fifty-eight came to the hospital for consultation because of a mass on his thumb side of the right wrist.

History.—About thirty years ago he sprained the right wrist in a scuffle. He thinks the present trouble dates back to this. The wrist was somewhat painful and swollen for a few days but soon com-
pletely recovered. It gave him no trouble until ten years later after a day's work on a farm, during which he used a marking lever all day, the wrist became swollen and painful and remained so for a week. When the swelling went down, it left a soft oval tumor in the middle of the back of the right hand over the middle finger tendon. This gave him no trouble. One year ago, after using a post digger all day, he had severe pain in the left hand and wrist. He worked one more day and then had to stop on account of pain and swelling. There was no injury or abrasion of the skin, of any sort. This continued, and four days later a diagnosis of infection of the hand was made. The hand was opened by a physician in the fol-

![Fig. 210-A.—Nonspecific granuloma of the wrist.](image)

lowing places: between the metacarpal bones of thumb and index finger from dorsal to palmar surface; over the metacarpal of middle and ring fingers from dorsal to palmar surface; over the metacarpal bones of middle and ring fingers from dorsal to palmar surface, and along the side of the metacarpal bone of the little finger. The tumor on the dorsum of hand was cut through and straw-colored fluid obtained. Two days later the hand and arm were swollen to above the elbow and a red streak ran to the shoulder. The hand drained a little pus. The hand and arm were kept in hot packs. The wound healed in about 30 days but a swelling remained on the side and back of the right wrist. It has remained so since. It causes no pain now, but there is a tenderness to pressure over the lower inner part of it. His general health is good. It has been di-
agnosed as sarcoma by three surgeons independently, and amputation was advised by all. The Wassermann was negative.

Examination.—The general appearance is that of a well-nourished individual. Over the right wrist on the thumb and dorsal side is a rather dense mass extending from the root of the thumb to two inches above the radiocephal joint (Fig. 210-A). It is not tender, does not fluctuate, and there is no discoloration of the skin over it; the feel is rather boggy elastic. There are scars as indicated in the history from the previous opening. There are several other scars on the dorsal and palmar surface of the hand not mentioned above. Flexion and extension of the fingers is good but the fingers cannot be tightly flexed.

Diagnosis.—Evidently he had a recurrent synovitis. The diagnosis of infection evidently was wrong. Only straw colored fluid was obtained at this operation. The pus came later and there is no doubt but that there was then an extensive infection with a lymphangitis. The wound healed, however. The appearance is that of a tuberculosis of the tendon sheath, but these, once they are cut

Fig. 210-B.—Slide from a nonspecific granuloma of the wrist.
into and become infected, are not prone to heal. Nevertheless, the peculiar boggy feel resembled nothing else so much as tuberculosis. A recurring attack of tuberculosis would be unusual at this time of life, particularly in an individual in such excellent general health. He desires the question of diagnosis be settled definitely, since he does not like to think of the diagnosis of sarcoma already made. It is agreed, therefore, that the tendon shall be freed from the growth.

Treatment.—The tumor was dissected from around the dorsal wrist tendon. An extensive dissection was required. The tendons on the radial side of the wrist were freed from their sheaths for a distance of four inches. The subcutaneous fat was sutured over and as far as possible between them.

Pathology.—The tissue removed is a brownish red, firm, elastic tissue. It is elastic and rolls under the knife while being cut. It is not fragile like tuberculous tissue. It cuts like the tissue in interstitial mastitis. The slide shows many vessels with much thickened walls. Some of the vessels are not so thickened and have many plasma cells about them. This part of the tissue represents elephantiasis, the thickened vessels suggest syphilis (Fig. 210-B).

After-course.—There was considerable postoperative pain with swelling in the lower arm and hand the first twenty-four hours following operation. This subsided and the patient could flex the fingers without pain on the fourth day. The wound healed by primary union except at the lower end, where it discharged some liquid blood. On dismissal, eight days after operation, the wound was healed with the exception of a place in the incision 1.5 cm. in length which was still draining some bloody serum. The wrist was swollen and hard but there was no tenderness to pressure. Patient could flex the fingers without pain, but did not have much wrist action. The subsequent report is that the recovery has been complete with little impairment of function.

Comment.—Two expert pathologists who saw the slides suggested syphilis as the likely diagnosis. The Wassermann was negative, however, and it seems to me that the best diagnosis is chronic fibrosis following an infected granuloma. There was no primary pus formation—that is quite evident. The fact that the attending physician hacked the hand in more than half a dozen places indicates that he was working in a wholly aimless manner. Syphilitic tissue is not so elastic as this and there is no evidence of tuberculosis either
local or general. Likely if the wrist had been mobilized instead of being cut into, the pain would soon have subsided.

**CASE 5.**—A farmer boy of eighteen came because of a painful swelling of the wrist joint.

**History.**—For three or four months he has had pain in his left wrist. At first it was noticed only at intervals, but recently pain is present constantly on movement and sometimes there is spontaneous pain. For the past several months there has been a gradually increasing swelling. Save for tonsillitis he has always been well. There is no tuberculosis in the family.

![Fig. 211.—Tuberculosis of the wrist joint.](image)

**Examination.**—The wrist is held stiff and the fingers are held claw-like. There is a spindleform enlargement in the region of the carpal bones. The forearm seems atrophied. The wrist feels boggy and is tender to pressure. There is voluntary and an involuntary limitation of motion. There is no crepitation. The laboratory examination is negative (Fig. 211).

**Diagnosis.**—The gradual onset, the peculiar enlargement and the limitation of motion suggest tuberculosis. The onset is too slow for rheumatism and it is monoarticular. The pain is not severe enough and the enlargement too spindleform for gonorrhea. There is no evidence of a pus infection.

**Treatment.**—Aspiration secured a few c.c. of a greenish yellow fluid.
A 5 per cent iodoform emulsion was injected into the wrist joint and repeated at intervals of three weeks for eight injections. Pain disappeared after a month or two and the swelling subsided. A palmar splint was fashioned out of sheet steel and used to immobilize the joint for nearly a year. Adhesive straps were used for several months longer.

After-course.—The recovery after two years apparently was complete. He took up professional baseball and played first base for a number of years. No disturbance in the wrist appeared.

Comment.—This evidently was a synovial tuberculosis. This type of trouble in young persons may be expected to respond satisfactorily to iodoform-glycerine injections with immobilization.

CASE 6.—A boy aged four was brought to the hospital because of a tumor of the forearm which was deforming his hand.

History.—When six months old it was noticed that there were some swellings in the left forearm above the wrist. It caused no inconvenience but grew slowly. When he was three years old it was noticed that the growth was pushing the hand to one side. This has been particularly noticeable in the past three months. Aside from this the lad had always been well.

Examination.—An elongated, bosselated mass occupies the flexor surface of the wrist from near the elbow to the palm of the hand (Fig. 212). It is more prominent over the radial border particularly at the wrist. The result is an ulnar flexion of the hand. The tumor masses are dense, elastic, confluent, and quite painless to pressure. Though the hand is mechanically displaced, the fingers can be moved painlessly through a normal range. The size is not lessened by pressure. The skin and subcutaneous tissue is not involved.

Diagnosis.—Its early appearance and steady growth stamped it as of congenital origin. Its dense elastic feel suggests fluid within cavities. Since pressure causes no diminution of their size, the vascular system may be excluded. Besides it has the peculiar firmness of lymph cysts, particularly notable in the smaller nodules. A cavernous cystic lymphangioma was therefore diagnosed.

Treatment.—The nodular mass was exposed throughout its entire extent. The tumor was intimately attached to the sheaths of the flexor and supinator muscles and more particularly to their tendons. The attachment in the palm of the hand was particularly close. Here
many very small cysts were found which could not be palpated before. The palmar fascia was opened. The median nerve was preserved with great difficulty.

Pathology.—The tumor mass was made up of mucous cysts which when hardened were filled with a firm, colloid mass. The contents of the smaller cysts were more fluid. The walls of the cysts were lined by a low cuboid epithelium.

After-course.—Healing occurred promptly and the movements of the fingers were preserved. The hand gradually receded to its prop-

er position. Six months later small cysts developed in the lower portion of the palm and in the finger. Since these caused no inconvenience, removal has not been attempted.

Comment.—These are rare tumors. They do mischief only by pressure and displacement. They are unaffected by x-rays.

**DISEASES OF THE HAND**

Aside from infections, the surgical diseases of the hand are relatively unimportant. Carcinoma of the dorsum is the only common malignant tumor.

**CASE 1.**—A widow aged sixty-four consulted me because of an ulceration of the thumb nail.

History.—A year and a half ago, resulting from a slight injury she believes, an ulceration began along the outer border of her left thumb nail. It was painted with iodine and various salves were applied without result. After a year the greater extent of the nail
bed was involved and the nail was removed. Despite this the spreading continued. The pain has never been severe, but it has annoyed her continually. Sometimes there has been a pronounced dull pain, particularly after she has used her thumb more than usual. Recently it has pained at night and disturbed her sleep.

Examination.—The patient is a well-kept, motherly old lady who regards her thumb with a sort of mild satisfied annoyance. The nail is absent, the entire nail bed being occupied by a bluish-black, granular area showing here and there islands of unaffected nail bed epithelium and small hemorrhages in the more pronouncedly affected parts (Fig. 213). To touch the nodules are firm and do not tend readily to bleed and are but slightly sensitive to light pressure. There are no palpable lymph glands in the drainage area and the general examination is negative.

Diagnosis.—The slow spreading of a granular area about the nail bed suggests a periungualitis. The obvious covering of epithelial cells and the limited reaction and absence of secretion excludes this. The process evidently goes out from a subepithelial proliferative process. Its deep blue-black color suggests a melanotic character.

Treatment.—Amputation was done at the midphalangeal joint.

Pathology.—The section shows a considerable increase of the epider-
mal layers (Fig. 214). Going out from the deeper layers are finger-like projections of cells which have in a measure undergone a change in cell type and tinctorial reaction and there is abundant round-cell infiltration. In the connective tissue surrounding these columns are large cells with prominent ovoid nuclei. Some of these cells contain a brownish pigment.

After-course.—There has been no recurrence.

Comment.—The occurrence of a malignant growth about a nail bed is a distinctly rare occurrence. Its early diagnosis requires an attention to detail. Jonathan Hutchinson calls these "melanotic whitlows" and classifies them as sarcomas. He regards them as the least malignant of the melanotic tumors.

CASE 2.—A school girl aged nine was brought to the hospital because of a tumor of her finger.

History.—For several years it was noticed that a tumor was developing on her index finger. Lately the finger has become deformed. Otherwise her health has always been good and the family history is irrelevant.

Examination.—The front finger presents a tumor as large as a hickory nut (Fig. 215). It causes a deviation of the finger of about 30 degrees. The tumor is immovable and painless to pressure. The
X-ray shows the tumor to be attached to the bone, but that there is a sharp line of demarcation between the bone and the tumor and also that the tumor has a well preserved layer of periosteum covering it (Fig. 216). The tumor itself is mottled with darker and lighter areas.

**Diagnosis.**—The well-marked demarcation between tumor and bone and the well-formed covering of periosteum marks it as a tumor fairly well separated from the normal bone, and not invading the surrounding tissue and it is, therefore, most likely benign. The mottling of the tumor is likely due to an intermixture of cartilage and bone.

![Fig. 215. — Enchondroma of the index finger.](image)

**Treatment.**—The bulk of the tumor was cracked off with a mastoid chisel and the base vigorously curedtted with a mastoid curette. This left a base of apparently normal bone.

**Pathology.**—The tumor was made up of bone structure well approaching normal intermixed with cartilaginous areas which were very cellular. There was no evidence, however, that there was any development of the cartilage areas at the expense of the bony areas or soft parts. No effort was made to correct the direction of the finger.

**After-course.**—Healing was prompt and the relief permanent.

**Comment.**—Bony tumors containing cartilage, as well as pure cartilage tumors, are always matters of some concern. When such tumors
are covered with bosselations the size of a wheat grain to that of a pea or larger it is evidence of local independent proliferation. These are usually malignant. When the bone elements show an arrangement radiating from the bone, the growth is likely malignant. These clinical data may present a warning when microscopic study fails to show malignancy.

CASE 3.—A housewife aged thirty-six came to the hospital because of a small growth on her finger.

History.—Three weeks ago she injured the second finger of her left hand with a can opener. A little bleeding followed and the finger became painful. After a week she noticed a small tumor appear which has continued to develop until the present time. It is less sore than at the beginning.
Examination.—A spherical tumor the size of a large pea is situated at the outer border of the root of the nail (Fig. 217). It is fairly soft, is hyperemic, and is somewhat constricted at its base. The tissues about the base are not affected, neither is there any extension upward.

Diagnosis.—Its rapid development following a trifling wound, its vascularity and well circumscribed base stamps it as a pyogenic granuloma.

Treatment.—The tumor was excised.

Pathology.—The tumor is made up of granulation tissue, round, plasma and polymorphonuclear cells with many large blood vessels.

After-course.—In this, as in all cases, local destruction was followed by a cure.

Comment.—These little growths because of the size of the vessels and the intimate relation of the cells to the vessels cause them to be mistaken sometimes for more important lesions.

CASE 4.—A boy of twelve was brought to me because of a swelling of his hand.

History.—When the boy was a few months old the mother noticed a swelling of the outer border and back of his hand. As the boy
grew this grew apace, and in the past year or so the mother thinks it has grown faster than the rest of the boy. He has played as other boys and does not seem to be materially inconvenienced by it. He has no other defect and has had no disease of any consequence.

Examination.—Beginning proximal to the wrist a serpiginous elevation may be seen swung down toward the back of the hand. Lower the elevations are much more complex, so that their identity is lost in the general enlargement (Fig. 218-A). The palm shows a thickening, but no individual elevations can be made out (Fig. 218-B). He flexes and extends the fingers and wrist without hindrance. On palpation the mass is felt to pulsate over the entire enlarged area. The larger of the serpiginous elevations pulsates only by transmitted wave. The entire mass may be compressed, but when the pressure is released the former size is at once resumed.

Diagnosis.—The character of the growth is made clear by its compressibility. The fact that it pulsates implicates the arterial system; the large, nonpulsating channels empty proximately when lightly

Fig. 218-A.—Dorsal surface of angiomatous elevation of the hand.
compressed, hence must be veins. It is, therefore, an arterio-venous tumor.

_Treatment._—Both the radial and ulnar arteries were ligated an inch and a half above the annular ligament.

_After-course._—When examined two months later no pulsation was present and the mass had shrunk to a third its former size. It was my intention to remove the dilated vessels at a second sitting, but

![Fig. 218-B. Palmar surface of angioma of the hand.](image-url)
the mother was so well satisfied by the result that she deferred it.

Comment.—This disorder is a congenital deformity inasmuch as there is no evidence that new vessels were formed after birth. It is to be expected that as the collateral circulation is more fully established the channels will become more fully distended. A resection, therefore, at the maximum period of collapse is indicated. This is usually in about ten days.

CASE 5.—A man aged fifty-six was brought to me because of an ulcerative lesion of the back of his hand.

History.—Fifteen months ago he noticed a thickened sealy patch on the back of his right hand. It caused little pain but it continued to spread. He was treated by x-rays for a number of months and the lesion healed. In three months it reappeared and spread rapidly despite the use of the x-rays. It has not been elevated as before and he thinks the border is healing. Two months ago he began to have a swelling under the arm which was painful. He does not believe this trouble has anything to do with the hand lesion, because while the hand lesion is getting better the tumor under his arm is more painful.

Examination.—An ulcer the size of a dollar occupies the outer border of the back of the hand (Fig. 219). The border for an area of 4 or 5 mm. is bluish pink, giving a basis for the patient’s belief that the ulcer is healing. The base of the ulcer is made up of low, fairly firm, shiny elevations which do not bleed readily on touch. Here and there dirty scabs are attached which when removed leave small bleeding points. The ulcer is not attached to the deeper structures, but can be made to glide over the tendons. The movements of the fingers are not limited and movement is not painful. There is a hard, irregular mass in the axilla making an aggregate mass as large as a small apple. The skin is red and the tissues about it edematous. It is tender to pressure and is attached to the surrounding tissue. It lies below the axillary space. His general state is undisturbed and his leucocyte count is not abnormal.

Diagnosis.—From the history and the lesion on the back of the hand a diagnosis may be put down as unquestionably a carcinoma; because of the edema and general evidence of reaction, the question of a complicating infection of the axillary lymph glands seems probable. However, since the tumors of the back of the hand are prone to make metastases which tend to break down, judgment is reserved.
Treatment.—Since the axillary mass is causing no constitutional reaction and there are no signs of a breaking down, treatment is not indicated.

After-course.—In a few months the axillary mass broke down, producing a huge ulcerating mass, now plainly carcinomatous. The hand ulcer also rapidly extended. He died six months later of exhaustion.

Comment.—This case illustrated well the capacity of tumors of this sort to form metastases even while the local lesion appears to be healing. The x-ray is wholly untrustworthy in the treatment of this class of tumors on the back of the hand. When seen early, local
excision may secure relief, but usually nothing, not even amputation, is able to stay the course.

**CASE 6.**—A retired farmer seventy years of age came to the hospital because of inability to fully open his hand.

*History.*—For several years he has been conscious of an inability to fully stretch out his fingers. At first the second finger only was affected, but now others, particularly the little one, are becoming affected. He has no pain.

*Examination.*—When the patient presents his hand the fingers remain half closed. Even in this position prominent ridges may be seen which begin in the middle of the palm and extend upward to be lost midway up the fingers (Fig. 220). When an attempt is made to forcibly extend the fingers, these ridges are accentuated.

![Fig. 220.—Dupuytren's contraction.](image)
They are firm, hard, and scar-like. The skin overlying them is firmly adherent to their surface. The joints seem unaffected. The other hand is free from involvement.

**Diagnosis.**—The spontaneous origin, the firm, scar-like nature of the elevation make its recognition as a Dupuytren's contraction, clear.

**Treatment.**—No treatment was advised.

**After-course.**—Contrary to the usual course, there was no tendency for the disorder to progress, neither did the other hand become involved.

**Comment.**—Had he been an active individual, the operative correction would have been attempted. The lesion was so extensive here that a complete removal of the scar-like tissue would have necessitated the removal of much of the attached skin. That would have required skin grafting. Since Thiersch's grafts are not suitable, a pedunculated skin flap would have been necessary. This is at best an irksome procedure, and in an old man, not without its dangers. Some writers hold the view that there is some relation between Dupuytren’s contraction and gout. The patient was a very tall, rawboned pioneer, little acquainted with the epicurean feasts that are supposed to produce gout.

**CASE 7.**—A farmer aged fifty-two came to the hospital because of a disabled hand due to fracture.

**History.**—Seven months ago he was thrown from a wagon and sustained a fracture of both bones of his forearm. Steel splints were at once placed on the bones. He suffered much pain after the operation and the hand swelled. When the cast was removed, he was unable to use his hand. Massage was applied but improvement did not follow. It was discovered that the bones had not united and a splint was applied. The same condition applies at the present time.

**Examination.**—The flexor muscles of the forearm are much atrophied. There is marked mobility in the lower third of the radius, some at the middle of the ulna. The fingers can not be extended when the hand is extended but can be extended when the wrist is flexed at right angles. The x-ray shows a line of separation in the radius, but it does not show in the ulna, probably because the fracture is oblique (Fig. 221). General examination is without interest.

**Diagnosis.**—Evidently there is nonunion with a Volkmann's contraction. An operative procedure is required to secure union, and
Fig. 221.—Ununited fracture of both bones of the forearm.
while this is being done, the bones can be shortened, thus vicariously lengthening the flexor tendons, permitting extension of the fingers with the hand extended.

_Treatment._—The steel plates were removed and the ends of the fragments removed so as to shorten the bones about five-eighths of an inch. The ends of the bones were brought together with bone pegs but without plates.

_After-course._—Union occurred promptly. The fingers could be extended as was planned, but flexion was not restored because the muscles would not contract.

_Comment._—It now occurs to me that the state of contractility of the muscles had not been studied with sufficient detail. They were obviously converted into fibrous tissue by a fibrosing myositis, whether due to the trauma of the operation or from the cast, I do not know. Obviously the lengthening of the tendons can be of no service if the muscles have lost their capacity to contract. If the myositis is local, leaving a part of the muscle capable of contraction, operative procedures may be of avail. In a case of this sort with the wrist flexed and the fingers extended, forcible flexion of the fingers is not possible, operation is useless. It has not been sufficiently emphasized that there is a difference between a localized myositis due to a cut or a gunshot wound and one in which the entire muscle is destroyed from compression, a true Volkmann's contracture. In this case judging from the length and sites of the scars and the inexperience of the operators, it is quite likely that the myositis was due chiefly to operative traumatism.

**CASE 8.**—A merchant aged thirty-six came because of stiffness of his fingers.

_History._—A year ago he injured his left index finger while driving a taxi. He was not annoyed until the morning of the third day. At this time the finger became painful and began to throb. He began to feel sick all over and to lose his appetite. The inflammation spread rapidly and he had a fever. On the seventh day his physician made an opening in the finger near the point with a sharp knife after freezing the skin. Some pus escaped and the finger felt easier, but the swelling extended above the wrist. He was given an anesthetic and the hand was opened in four places and a tube drawn through the palm to the back of the hand. Pus discharged
freely, and the pain was somewhat relieved. Four days later he was given another anesthetic and several openings were made above the wrist. All these various openings discharged pus for several months, then they healed one after the other. The hand remained much swollen and he could not move his fingers. He bathed his hand in hot water and had it rubbed. The swelling gradually went

Fig. 222.—Late result in a case of palmar infection inadequately drained.
down, but the fingers became drawn. At no time was he able to bend them. He is now free from pain, but save for slight movement of the thumb, the fingers are motionless. His physician advises him to have the tendons lengthened. His general health has always been good. During the time the hand was inflamed he had an attack of articular rheumatism. The left knee and the ankle joints were most affected.

Examination.—The hand is claw-like, the fingers being held rigid by scar-like contractions. These cannot be extended or flexed either by the patient or by the examiner. The small muscles of the hand are all atrophied. The feel of the fingers when one attempts to extend them reminds one of a Dupuytren’s contraction (Fig. 222). The wrist can be slightly flexed. No less than thirteen small scars can be counted where small punctiform openings had been made.

Diagnosis.—Obviously the tendons became irreparably damaged during the prolonged suppurating process. The contractures are due to scar formation in the granulations arising in the inflammatory area. Most likely the tendons largely liquefied and were extruded. Nothing can be done to restore the function of the fingers.

Treatment.—None.

After-course.—There has been no change.

Comment.—There is but one operation that cannot be done under local anesthesia: the opening of an infected hand. Whenever there are multiple openings one knows at once that the operator is timid or incompetent, most likely timid because incompetent. This hand should have been incised from the tip of the finger to the annular ligament at the time the first punctiform incision was made.

CASE 9.—I was called to see a business man aged thirty-four because of an infected hand.

History.—Four days ago he injured the tip of his right index finger. The next morning he had pain and the finger was swollen. He applied a bichloride pack, the pain and swelling continued, and the whole forearm and hand was placed in a hot water pack. His pain increased and he had fever as high as 104°. Last night he had a muttering delirium most of the night.

Examination.—The hand is twice its normal thickness. The palm bulges and the dorsum is edematous. The flexor surface is hard, red,
and edematous to within a handbreadth of the elbow. He had a temperature of 102°, pulse 130, and respiration 28.

Diagnosis.—The palm is tense and elastic. The forearm is likewise tense and hard, indicating involvement high above the wrist. General intoxication is extreme and wide opening is needed.

Treatment.—Under ether an incision was made from the tip of the index finger to the annular ligament. The ligament was spared, but the skin incision was continued to the junction of the inflamed and normal skin, about 3 inches from the elbow. The tendons were exposed and were found bathed in pus. There was pus between the profound and sublime flexors of the forearm. The whole wound was loosely packed with gauze.

After-course.—The temperature subsided in a few days. In a month the wound was covered with granulations and the edges were approximated by adhesive strips. In another month the wound was almost completely healed. He had good function in about six months.

Comment.—Bold action was required here in order not only to save the hand, but even the life of the patient. In limited infections above the wrist, transverse drainage is preferable, but in such extensive infections in the forearm a wide split in the midline is preferable. The split in the tissues must in all cases be so extensive that the edges lie apart of their own accord.
CHAPTER X

DISEASES OF THE LOWER EXTREMITIES

The diseases of the lower extremity are most commonly those that have to do with function. Diseases dangerous to life are mostly neoplastic and the vast majority of these are sarcomatous. Infections are less common than in the arm. The painful affections are preponderatingly inflammations of the joint and synovial surfaces. The painful affections concern often the great sciatic nerve, but the primary disease is usually some joint surface.

DISEASES OF THE HIP

Affections of the hip are chiefly tuberculous; Pershing's disease; septic arthritis and coxa vara in the young; fracture and hyperplastic arthritis in those of more advanced years. Affections of the bursae and referred pains are less common.

CASE 1.—A physician aged forty consulted me because of a painful bruise of his hip.

History.—The patient was thrown from a street car, lighting squarely on his hip. The hip was painful but he continued his journey, and save for a soreness he got about very well for a few days. The pain became more intense, particularly on movement, not only by the act of locomotion, but by the jarring of a conveyance. The pain involved the region of the hip, but was particularly severe over the trochanter. Pressure over the neck of the femur in front increased the pain. The pain on movement was acute and lancinating so that on making certain movements he would nearly collapse. An x-ray was taken, but failed to show any lesion. A month after the injury, the pain still continues without notable abatement.

Examination.—The patient as compared to his former self looks haggard and has lost twelve pounds in weight. The chief point of tenderness is below and behind the great trochanter. Tenderness over the joint is elicited only when the soft parts of this region are pulled on. Flexion and outward rotation causes great pain. There are no
constitutional disturbances, the loss in weight being due apparently to the suffering incident to the attempt to meet the requirements of his practice while undergoing great suffering.

Diagnosis.—The character of the suffering, the nature of the injury, and the points of maximum tenderness stamp this as an inflammation of the subgluteal bursa. A week later a distinct swelling in

![Fig. 223.—Hydrops of the subgluteal bursa.](image)

this region appeared (Fig. 223) which when aspirated yielded an ounce of straw-colored fluid.

Treatment.—At the first visit the painful area was tightly strapped with adhesive which gave considerable relief. After the exudate appeared, aspiration was done and the adhesive replaced.

After-course.—Some pain remained for some months but this disappeared and there was no recrudescence.

Comment.—These affections are more common than diagnosed, the pain generally being ascribed to inflammations of the joint capsule.
Because of the depth of the bursa the location of the inflammation may be difficult to establish. An injection of quinine urea hydrochloride four drams of a 1 per cent solution is more effective than the treatment used in this case.

CASE 2.—A farmer lad was brought to me because of pain in the left hip.

**History.**—His general health has always been good. He has done the manual work of the farm. He remembers no injury. He has always been well until one year ago when he noticed a pain in the left hip. The pain grew more intense despite counterirritants, and in the last few months he has noticed a pain in the left thigh. In the last few months he has noticed a gradual impairment of motion.

![Fig. 224.—Coxa Var.a. A shows direction of neck in this case. B, the normal.](image)

His mother has a myoma of the uterus and a brother has a mitral stenosis following rheumatism.

**Examination.**—The patient is large for his age and his bony framework is correspondingly massive. His hands and feet are cold and cyanosed and his general musculature is somewhat flabby. The knee shows the marks of rigorous counterirritation. The leg is rotated outward and crosses the midline of the body. An attempt to abduct the leg meets with a sudden limitation before its axis becomes parallel with that of the body. Attempts at internal rotation likewise receive a sudden check as soon as the foot reaches the vertical. The rotation outward, on the contrary, and adduction are not limited. Extension is not limited and flexion but slightly so. There is some fullness in Scarpa's triangle and some tenderness at this point. As the leg is flexed on the thigh and the thigh on the trunk the foot automatically crosses the midline of the body toward the unaf-
fected side. The affected limb is 94 cm. long while its fellow is 2 cm. longer. There is no muscular tension anywhere and no pain unless an attempt is made to force the range of motion beyond the limits above described (Fig. 224).

Diagnosis.—Limitation of abduction and internal rotation is characterized by a bending downward of the neck of the femur, as evidenced by the shortening of the leg, therefore a coxa vara. Since there is no history of trauma, it must be classed as of the static type.

Treatment.—The patient was placed in bed and a weight of eight pounds attached to his leg.

After-course.—The treatment lessened the pain but did nothing toward correcting the deformity. After three months' trial the treatment was abandoned. He was examined recently, fifteen years after the onset of the trouble, and while the deformity remains, he has no pain and is not inconvenienced, save that he finds it impossible to ride a horse.

Comment.—The result of treatment in the cases I have observed since that time has been about the same. If there is pain, extension will sometimes relieve it. I have never seen the deformity increase while under observation or decrease under treatment, and I have come to believe that a division of the cases into static and traumatic is purely an academic one.

CASE 3.—A laborer of twenty-six came to the hospital because of pain in the hip.

History.—Ten years ago after being sick for a week, with an ailment which his physician did not name, while walking up town he became suddenly very sick. He remembers nothing save that he felt very sick and had a tendency to fall over backwards. He remained in bed a few days only and while again walking up town he felt a sudden pain in his right hip, most severe on the inner side. He was able to walk home but he remained in bed six weeks. He was constantly under his doctor's care but was never told the nature of his trouble. After this he was able to do farm work, but the pain never left the hip and a year later the pain became so severe that he again remained in bed six weeks. He went to work again but was in constant pain. Some time after this he had a sudden pain in the hip attended by severe pain in the inner side of the knee. These intermittent pains continued without change for several years and after
about four years he noticed that the muscles of this thigh had shrunk. This state existed until two months ago when he slipped in going down a basement steps. He kept himself from falling entirely down by catching the railing. He wrenched his hip, however, and the pain became so severe that he had to use crutches afterward. For the past few weeks he is able to get along without them, but the pain is

Fig. 225.—Exostosis on artricula head of the femur.
severe, particularly if he attempts to carry any load. There has never been any swelling in the hip that he knows of. He had a fever during the first spell with his hip but he does not know whether he had any during his first illness or with the subsequent attacks with his hip. He had whooping cough as a child and smallpox a year ago, but he has not had typhoid, rheumatism, or tonsillitis. His general health has always been good.

Examination.—The patient is a husky young man who bears no evidence of suffering or general ailment. His tonsils are injected and ragged and he has a pyorrhea of his lower front teeth. Heart and lungs are negative. The legs are of equal length. The reflexes are normal and there is no difference in musculature though the right thigh and leg are an inch less in circumference. Abduction is limited, but internal rotation is not. External rotation causes some pain when forced. The x-ray shows an irregular acetabulum and femoral head (Fig. 225). At the upper border of the articular surface is an exostosis which apparently is the cause of the limited abduction and pain. All laboratory examinations are wholly negative.

Diagnosis.—The initial disease can not be determined with certainty. One may suspect tonsillitis. His sudden sickness and tendency to fall backward was probably due to general circulatory changes. At any rate they were fleeting and no focal lesion appears to have developed. If a thrombotic process was present, it was of temporary importance only. The pain in the hip may have been secondary to some other lesion or may have been primary and the cause of his primary sickness. Be this as it may, with the appearance of pain in the hip the picture becomes clear. It is that of a coxitis with referred pains in the region of the knee. Though this never came to actual suppuration, exudative processes evidently were sufficient to produce changes in the articular surfaces of the head of the femur and in the joint surfaces coming in contact with it. The only mechanical limitation is that of abduction. There is evidence of bony overgrowth at the upper border of the acetabulum. Movements in other directions seem to cause no pain. It seems likely, therefore, that the removal of this part may overcome his disability and permit one to secure the offending lesions which from the prolonged course of the disease must lie within the bone.

Treatment.—The hip joint was exposed by an incision from the crest of the ilium over the highest point of the great trochanter. An
exostosis was uncovered on the border of the articular surface of
the head of the femur, larger than one expected from the x-ray pic-
ture. This was removed with the chisel. The edge of the acetab-
ulum had many excrecescences and these likewise were removed. This
done, there seemed to be no limitation to the movements of the joint,
neither was there any grating to be felt as the manipulations were
carried out. The neck of the femur was opened into and a cavity as
large as a small hickory nut was found. This was filled with a
rather firm granular material which came out en masse when loos-
ened with the curette. The cavity was thoroughly gouged out and
iodine applied. The joint capsule was closed with 20-day chromic
catgut and the soft parts in layers with pyoktanin gut.

Pathology.—The bone removed had an irregular eburnated sur-
face, but the cartilage was nowhere defective and the center was
composed of cancellated bone. The granular material obtained from
within the neck showed no bacteria and was made up of well-organ-
ized granular material, the walls of the vessels being thick with
hyaline changes and the round cells were few.

After-course.—The leg was kept in position with sand bags; neither
weights nor splints were used. The leg was moved early and he
was about on crutches in two weeks and was allowed to leave the hos-
pital on the seventeenth postoperative day.

Comment.—From the nature of the granulation tissue it seems
likely that the first attacks of pain only were due to the infectious
process, the subsequent difficulty being due to the results of the early
proliferation. That the whole disease was due to a central focal
infection of a source unknown, there can be but little doubt.

CASE 4.—A school boy aged eighteen was brought to the hospital
because of pain in the hip.

History.—Aside from frequent attacks of tonsillitis he has had
fair health. Two years ago he fell from his bicycle, striking on his
left hip. It felt bruised for some days but he continued to ride his
bicycle as before. A year later he began to have pains in the hip
which gradually increased until he was no longer able to ride. The
pain was most severe when the thigh was flexed to the extreme point
in pedaling. He rode the street cars to work for some months but
gradually the pain became too great to permit walking for more than
short distances and soon he was no longer able to remain at work.
Examination.—The boy is somewhat pale and undernourished, but examination outside of the hip showed no abnormalities. The left thigh is 2 cm. less in circumference than its fellow. There is no shortening. Internal rotation and adduction is limited as is flexion.

Attempt to exceed the acceptable range causes pain. There is no roughening apparent on passive movement.

Diagnosis.—The free abduction excludes coxa vara though the limited internal rotation suggested it. The lack of shortening also spoke
against coxa vara. The location of the pain and the manner of onset and the age of the patient argued against tuberculosis though this seemed a possibility. The x-ray alone could decide the matter (Fig. 226). The radiogram showed a marked lipping of the lower border of the head and some roughening of the articular surface on the lower half. An infective arthritis seemed the proper diagnosis.

*Treatment.*—The patient was placed in a cast which was changed at intervals of two months. The tonsils were removed.

*After-course.*—At the end of a year he was free from pain and got about very well, but there was still the lipping of the head of the femur and some limitation of movement.

*Comment.*—Chronic arthritic changes, particularly of the milder degrees are often overlooked in young persons. When present, fixation is the best treatment, as it gives the necessary rest.

**CASE 5.**—*A matron of sixty came to the hospital because of pain in the hip joint.*

*History.*—Four years ago she fell down a flight of stairs but got up and walked about without much difficulty. A day later she began to have pain in the right hip. It was not severe at first and she paid little attention to it, but it gradually grew worse and for the past year it has been severe. The pain extends along the inner side of the thigh to the knee and along the back of the leg to the foot. There is some shrinking of the muscles and shortening of the leg for the past two years she thinks. The pain is increased by being on her feet a good deal and is worst in the act of sitting down. She had whooping cough in childhood and had frequent attacks of tonsilitis up until 9 years ago. Her general health is good, but she is annoyed sometimes by bladder irritation. She has had four healthy children and no miscarriages.

*Examination.*—She appears a well-nourished, contented person, well preserved for her years. Heart and lungs are negative and the tonsils are atrophic. When she lies on the table the right malleolus lies two inches higher than its fellow. Measurements show this to be due to tilting of the pelvis. The alleged atrophy of the muscles could not be substantiated. The movements of the hip joint were limited, particularly abduction. All movements caused more or less pain. The extremes caused a grating feeling. The x-ray shows an irregular articular surface with many pronounced exostoses (Fig. 227). Her
blood pressure is 162-100. The urine is turbid with many leucocytes, otherwise negative.

Diagnosis.—The senile coxitis is apparent both on physical examination and from the x-ray. The apparent shortening is due to the limited abduction. Whether the injury initiated the process or brought to light an already existing process is unanswered by the appearance of the other side. It likewise shows marked changes.

Fig. 227.—Senile coxitis.
We may conclude that the injury served only to emphasize existing conditions—a factor of some medico-legal importance in some cases. The absence of real shortening negates the supposition of an impacted fracture. The duration of the articular process is hard to determine in such cases. Almost any old lady can supply a history of “chronic rheumatism” if it will contribute to amity and good fellowship.

_Treatment._—The head of the femur was removed under spinal anesthesia. Considerable difficulty was experienced because the exostosis about the rim of the acetabulum imprisoned it. After the head was removed, the acetabulum cartilage could be seen to be eroded and the border studded with many shot-like excrescences. Some of the eroded areas in the cartilage were covered by a recent fibrinous exudate.

_Pathology._—The head shows many irregularities and some erosions (Fig. 228), though on the whole the changes are less marked than in the acetabulum.

_After-course._—There was but little postoperative reaction, the highest pulse recorded being 95. An extension of from 4 to 8 pounds was applied to the leg after the first few days. At the end of the second week some bloody pus was discharged from the lower end of the wound. At the time of discharge from the hospital on the fifty-sixth day she had no pain, the leg was 2 inches short, but she was not yet able to bear her full weight on the leg. It now developed that she
had suffered much from the other hip and that this was now hindering much her locomotion.

Comment.—This ever present malady does not kill, is but little influenced by remedial or hygienic measures, and its surgical management is unsatisfactory. With spinal anesthesia the operation has lost its danger, but the results are problematic. These patients are often hypercritical by nature and anything short of a normal joint will not satisfy. This can not be accomplished, for there is always shortening and if the other hip is likewise affected, the necessary compensatory tilting of the pelvis may cause the unoperated side to give more pain than the operated one did before treatment was begun. Where the pain is very great, where the x-ray shows changes predominatingly confined to the side complained of, and the patient is intelligent enough to understand that the surgeon's powers are limited, operation may be advised. When the patient is loquacious, hypercritical, and shows a bilateral lesion by the x-ray, operation should be denied by all except young surgeons whose rough corners need polishing down as much as the joint surfaces of the patient.

CASE 6.—An elevator attendant aged thirty-eight was brought to the hospital because of a fracture of the hip.

History.—On Nov. 3, 1917, he was struck on the right hip and thigh by a steel wheat conveyor. He continued to work for fifteen days, suffering nothing more than a general soreness. On this day while at his work in making a sudden turn he felt something snap in his right hip and he fell. After this he was able to walk only with the aid of crutches. On June 21, 1918, nine months after injury of the right hip, while walking he felt as if he would fall, and in throwing his weight back in order to secure his balance his left hip snapped. Since then he has not walked. He admits having a chance eighteen years ago. For two years he has had no sexual desire whatever. Since then he has had some shooting pains in the legs. For a year he has had some difficulty in controlling his urine and he has had difficulty in maintaining his balance while walking in the dark.

Examination.—The patient is unable to walk, but he can flex his thighs on the abdomen and flex and extend his legs on his thighs. He has a right foot-drop. The patellar and Achilles reflexes are absent. He has an Argyll Robertson pupil and there is some diminution of sensation in the feet and legs. There is an abnormal mobility
in the hip joint. Movement is not attended by any pain. The x-ray shows a fracture in the neck of each femur (Figs. 229 and 230). There is no rarefaction in the region of the fracture; on the contrary, there seems to be a condensation immediately about the site of fracture. The head of the femur is much widened and with it the ace-

Fig. 229.—Spontaneous fracture of the neck of the left femur.
Fig 230.—Spontaneous fracture of the neck of the right femur.
The laboratory examinations were negative. Wassermann was not made.

**Diagnosis.**—The fracture of a hip from slight trauma always suggests first a metastatic neoplasm. In a male of this age a kidney tumor would be a likely source. There is nothing to indicate any affection of the kidney. The question was brought up as to whether or not there might not have been an impacted fracture from the injury, and after fifteen days the impaction was mobilized and the patient incapacitated. That a patient may get about on an impacted fracture and by his efforts dislodge it may be admitted. However, the fact that the second hip fractured without any considerable trauma, and that the fractures were painless, makes such an event unlikely. This conclusion may be reached even without the consideration of the classical signs of tabes. The presence of a condensation rather than a rarefaction at the site of fracture makes the diagnosis of a double Charcot’s hip singularly complete.

**Treatment.**—He was recommended to his family physician.

**After-course.**—The patient has continued to show a progression of the neuropathic symptoms above outlined.

**Comment.**—Within a few months of his primary injury he was a good subject for medico-legal study in determining the question of liability. Even at this time a neurologic examination would have made a correct diagnosis possible. A tabetic patient may, of course, sustain a hip fracture without having a Charcot joint. The x-ray may then be of prime importance.

**CASE 7.**—A housewife aged fifty-eight was found lying on the hospital steps.

**History.**—The patient in descending the hospital steps slipped and fell on her left hip. She could not lift the left leg and had to accept assistance.

**Examination.**—The thigh seemed in good position save that it appeared to rotate a little outward. Fearing a fracture and hoping for an impacted one, the patient was transferred gently to the x-ray table. The plate showed a fracture. There was about half an inch shortening.

**Diagnosis.**—The appearance of the plate left no doubt as to the nature of the malady. Diagnosis in these cases can not be made before a picture can be taken. When a person of middle life or be-
Fig. 231.—Impacted fracture of the neck of the femur.
yond falls and is unable to rise, a fracture of the neck of the femur must be assumed until proved otherwise by the x-ray (Fig. 231). If there is no impaction, usually there is extreme external rotation and a shortening of several inches.

_Treatment._—The leg was held in position by means of sand bags.

_After-course._—A good deal of pain in the knee was complained of for a few days, but none in the hip.

_Comment._—This case was imperfectly impacted and should have been put up in the Whitman method. When impaction is imperfect, the displacement may become gradually more marked and thus surprise the surgeon by a very bad result, unless precautionary measures are taken.

**CASE 8.—A woman aged seventy-nine fell while walking about the corridor of the hospital.**

_History._—The patient, an inmate of the hospital, fell to the floor while walking. She does not know herself just how or why she fell. She was picked up, and with the assistance of the nurses walked back to her own room, limping markedly on the right leg. She complained of a severe pain in the right hip joint and right knee.

_Examination._—The right foot is turned outward to about an angle of 45 degrees and there is two inches of shortening in the leg. X-ray examination showed a well-impacted fracture of the right neck of the femur. (Fig. 232.)

_Diagnosis._—The age of the patient, the nature of the injury, the character of the deformity, even in the absence of the x-ray plate is sufficient to warrant a diagnosis of impacted fracture of the neck of the femur. The x-ray shows very well how the crushing of the bone brings about the deformity above mentioned.

_Treatment._—She was placed in bed and the leg surrounded by sand bags. She was put upon a back rest within a few days after the injury in order to avoid hypostatic pneumonia. She suffered severe pain for about a week but after that seemed to be but little inconvenienced by the injury.

_After-course._—After four weeks she was lifted out into a chair and in an additional week or two was able to walk about her room.

She apparently has good union with about 2 inches of shortening.

_Comment._—Spontaneous impaction is the most favorable outcome
in fractures of the neck of the femur. In conveying the patient every effort should be made to preserve the relations. It is particularly desirable in these aged patients that they be placed in a sitting position as early as possible. Despite every precaution, many of them succumb to hydropstatic pneumonia.

Fig. 232.—Impacted fracture of the neck of femur.
CASE 9.—A traveling man aged forty-eight came to the hospital because of pain in his leg.

History.—In 1893 this patient had an attack of lumbago, lasting two weeks. In 1906 he was confined to bed for two weeks with pain in the knee and leg. No cause for the trouble could be given. The leg would draw up. Morphine was used for the pain for a week at this time. There was no swelling of the joints at any time. Sixteen months before entering the hospital, in May, 1915, he was thrown forward over three seats in a railroad wreck in California. The next day he was able to walk twelve blocks and had no pain except in the head. On the day following, however, he had pain in the back and left leg, but was still able to walk. This condition grew worse. He was treated by an osteopath for five weeks. During this time he got about with the aid of a crutch and cane and continued to use them for six months. Then for three months he was feeling fine and did not use crutches. One day he slipped and fell down stairs. He went to bed for a day, had pain in the back and hip. He was in bed at home for two weeks with severe pain in the right hip and back. The pain was worse at night. Twice a doctor had to give ether and manipulate the hip. The pain continued just the same for six months, up to the time he entered the hospital. It was very severe at times and would frequently run down the thigh and leg. He was able to walk only with the aid of crutch and cane.

Examination.—The physical examination of the chest and abdomen was negative. Lifting the right leg or flexing the thigh on the abdomen caused great pain in the region of the hip. There was tenderness on pressure over the sciatic nerve. Roentgenograms of the hip showed all structures normal, and the head of the femur in the acetabulum. There was a marked curvature of the spine away from the affected side. Urine negative; temperature normal, pulse 70.

Diagnosis.—The dominating feature of this case is pain in the lumbar region and back of the hip extending down the leg. The history is complicated by two distinct injuries of indefinite character. The main point, however, is the fact that he had lumbago in 1893 and was confined to bed with a pain extending down the leg in 1906. These complaints antedated both injuries. Neither injury was of a definite character and were not attended by an immediate disturbance of the motor function. He now presents pain and tenderness along the sciatic nerve. There is pain on flexion, but none on rotation, indicat-
DISEASES OF THE LOWER EXTREMITIES

The diagnosis, therefore, must be sciatica.

Treatment.—The patient was put to bed and the sciatic nerve injected with a one per cent solution of quinine urea hydrochloride. This treatment was repeated in one week. A few days after the second injection, the patient was allowed to go home with instructions to return at intervals for further treatment. He was very much improved when he left the hospital, but still had some pain. After four injections the pain was entirely gone. The patient could walk without a limp and resumed his work.

After-course.—The patient has been free from pain for two years.

Comment.—The relief from pain by the injection of the nerve is strong corroborative evidence of the correctness of the diagnosis. Had there been any skeletal injury, relief would not have followed these measures. Once a person has had sciatica, injuries of many kinds may cause a recrudescence of the symptoms.

In the presence of bony changes this treatment obviously can not be successful in removing the bony changes. Even in those cases, however, it does relieve the pain in the sciatica. It is a symptomatic cure. An acute arthritis apparently may set up a nerve pain which does not subside when the joint trouble disappears. Conversely, the nerve pain may subside when a joint inflammation proceeds to complete ankylosis.

CASE 10.—A newspaper man aged twenty-five came because of pain in his hip.

History.—His health has always been good save for an attack of inflammatory rheumatism at the age of ten. Four months ago he noticed that the left hip joint felt as if it did not work smoothly. One day he stumbled and fell, after which he was laid up in bed several days with pain in the hip and soreness in the groin. Gradually the hip became better, but it was several days before he could use it without considerable pain. Ten days ago he slipped while walking along the sidewalk and hurt the hip again. He now limps and has pain on walking. At first the pain was in the hip joint, and in the groin. Now when lying down the whole leg aches, but most in the calf. He has never noticed any swelling or redness about the hip.

Examination.—Movements of the hip joint are free. He can flex the thigh on the abdomen without pain. There is some tenderness
on pressure in the left groin. There is no tenderness over the sciatic nerve at any point. X-ray of the pelvis shows the hip joint normal but absence of shadow of the left ramus of the pubis (Fig. 233). The right shows normally.

**Diagnosis.**—The absence of the ramus of the pubes must be due to a neoplastic growth. Tuberculosis does not affect the bone so far away from a joint surface and does not destroy it so completely. The only lesion capable of producing so extensive a loss of bone substance is sarcoma.

**Treatment.**—The case was considered inoperable on account of the location of the tumor. X-ray treatment was advised and given, but without result.

![Fig. 233.—Sarcoma of pubic bone.](image-url)
After-course.—The symptoms increased in severity in spite of vigorous x-ray treatment and soon a mass appeared in the groin. When examined six months later this mass had grown to the size of a small fist. The x-ray at this time showed extensive involvement of the hip joint, head of the femur and the ileum (Fig. 234). The patient died nine months after the first examination.

Comment.—Until the x-ray was taken, the suspicion was directed against an inflammatory affection of the hip joint. The involvement of the pubic bone was a surprise.
DISEASES OF THE THIGH

Diseases of the thigh which require diagnostic judgment are the tumors of the adductor muscles and those of the sciatic nerve. The badly healed fractures and the late result of osteomyelitis tax the mechanical ingenuity rather than the scientific attainments of the surgeon.

CASE 1.—A housewife of forty-eight came to the hospital because of the development of a tumor in the site of an old scar.

History.—When eighteen years old the patient received a severe burn of the outer surface of the right thigh. After many months it healed over, leaving a large scar. Some months ago a small nodule began to develop in the center of this scar. As it grew the surface covering it became thinned and bled at times. No real pain developed, but she is conscious of a discomfort.

Examination.—Beginning just below the great trochanter is a large scar (Fig. 235). It is covered with a dry corrugated epidermis. Near the center of this are two nodules, each larger than a walnut. The covering is deep red. The lower one has become eroded and bleeding occurs when the scab is removed. The masses are hard and seem to be continuous with the surrounding skin. It can be caused readily to bleed.

Diagnosis.—A tumorous mass developing in an old scar is most sure to be epithelial in character. The tendency of these tumors to become eroded supports this general rule.

Treatment.—The large scar together with the tumors was excised. The incision extended to the fascia lata. Because of the depth of this cavity immediate grafting could not be practiced. The wound was narrowed as much as possible and the appearance of granulations was awaited before grafting was attempted. A part of the wound was treated with scarlet R while the remainder was dressed with plain gauze. No difference in the rate of healing of the areas thus differently treated could be noticed. After several months complete epidermization was obtained.

After-course.—Recovery was permanent.

Comment.—Because of the poor nutrition of the scar about the tumor masses it was deemed best to excise it in its entirety. Besides, since one tumor developed in the scar, others might have developed in other parts of it.
Fig. 235.—Carcinoma developing in an old burn scar of the thigh.

CASE 2.—A young married woman aged twenty-three came because of a tumor on her thigh.

**History.**—As long as she can remember she has had a tumor half an inch across just above her knee. Two months ago she began to have some uncomfortable feelings in it and when she examined it she noticed a small tumor growing beside the larger one. She does
not remember having injured the tumor at any time, but thinks the jumping of her baby on her lap may have irritated it. At any rate, it was during one of his performances that she first noticed the irritation that led to an investigation and the discovery of the accessory tumor.

Examination.—On the anterior inner surface of the thigh is a tumor 1.5 cm. in diameter. It is covered by a thinned corrugated skin which is closely adherent to the tumor. The base of the tumor is somewhat constricted. Just lateral to the main tumor mass is a small smooth nodule the size of a hazelnut. This tumor is redder in

Fig. 236.—Melanoblastoma of the thigh.

color and is covered with a smooth, tense skin. The whole moves freely with the skin. There are no glands palpable in the inguinal region. (Fig. 236.)

Diagnosis.—The original tumor at first glance suggests a flat bossalated papilloma which usually remain unchanged throughout life. Closer inspection, however, shows that instead of having a thickened epithelial covering it is in fact much thinned, and fine blood vessels can be seen in it. This indicates that it belongs to the melanoblastoma or fibrosarcoma group. The sudden appearance of the small nodule is evidence not only of potential but actual active malignancy. There is no evidence of proliferation in the mother tumor. The free mobility of the skin together with the tumor and the absence
of glandular involvement makes it hopeful that the process is still localized.

_Treatment._—A wide margin was excised with the tumor down to the fasaia lata.

_Pathology._—The original tumor is made up of interlacing fibro-cellular tissue, while the secondary tumor shows masses of round and ovoid cells arranged in pseudoalveoli resembling that often seen in well-developed melanoblastomic tumors of the sole of the foot.

_After-course._—Recovery has been permanent.

_Comment._—Any congenital tumor may become a source of a malignant tumor. Solitary tumors, particularly if pigmented, near the groin or axilla should be removed. Those elsewhere should be removed if they show a disposition to grow.

**CASE 3.**—A married woman of twenty-four came to the hospital because of a tumor of the thigh.

_History._—Two years ago she noticed a tumor the size of a bean on the inner side of the calf midway between the ankle and knee. It had a red surface. Some months later she developed a dull pain above the knee on the inner side of the thigh. A surgeon discovered a tumor in this region and removed it together with the little tumor below the knee. For the past six months a tumor has been developing along the thigh above where the tumor was originally removed. Her general health has always been good. She has been married five years, has two living children, one dead of pneumonia, and one premature.

_Examination._—There is a soft scar half an inch long a handbreadth below the head of the tibia. A like distance above the internal condyle of the femur is a scar two inches long. From this scar to above Poupart’s ligament is an irregular oblong tumor about 2 x 5 inches (Fig. 237). It can be moved laterally, but not longitudinally.

_Diagnosis._—The history of the small tumor with the red top below the knee, with the tumor above the knee, now recurrent, stamps the disease as a melanoblastoma. The diagnosis is concerned chiefly with the operability of the recurrent tumor. The absence of dilated veins and its rather free lateral mobility makes it likely that the growth is technically operable.

_Treatment._—The tumor was exposed at its upper pole which was found to extend 2 inches above Poupart’s ligament. The external
Fig. 237.—Recurrent melanoblastoma of the thigh.
iliac vessels were exposed. The portion of Poupart's ligament to which the tumor was attached was removed. The long saphenous vein was incorporated in the tumor and was resected. Numerous small veins ran from the tumor to the femoral vein in the region below the long saphenous opening. At one point the tumor was attached to the femoral vein and a portion of the vein wall had to be sacrificed after sewing it through and through with silk. The vein was exposed to Hunter's canal.

Pathology.—The tumor when split longitudinally showed white glistening bands with pinker areas between. The slides showed alternating fibrous and spindle-celled areas.

After-course.—The wound healed readily. She gave birth to her fifth child six months after the operation. All went well until a year and a half after the operation, when she noticed a tumor below the knee in the region of the scar resulting from the removal of the small primary tumor. This grew rapidly and in six months was the size of two fists and caused great pain. This was removed with difficulty because it was intimately attached to the peritoneum of the tibia. Other tumors as large as a walnut were located in Hunter's canal and several larger ones in the retroperitoneal space. These last were not molested. The pain ceased after the removal of the calf tumor. A year after this last operation her physician reports having just delivered her of the sixth child and that the retroperitoneal tumors are slowly enlarging, but that the patient's general health remains good.

Comment.—It is not likely that any of these operations have contributed any toward prolonging the life of the patient. The removal of the tumors of the calf relieved her of severe pain and in that finds a measure of justification. The slow, relentless progress is typical of the disease.

CASE 4.—A stockman aged thirty-three presented himself because of pain and swelling in the inner side of the thigh.

History.—He has always been well. Three months ago he was kicked on the inside of the leg above the knee while "hog tying" a steer. He has never been obliged to quit work, but the area has much interfered with riding horseback.

Examination.—Beginning a handbreadth above the inner condyle is a hard spindleform swelling which extends upward half the length
of the thigh. It is dense, immovable, and but slightly tender to pressure. Pain is caused by attempted abduction against resistance. The x-ray shows a deep shadow parallel with the shaft of the femur. It is less dense than the femur but yet has the parallel lamellae of bone.

**Diagnosis.**—The history of trauma, the gradual development of a dense swelling parallel with the bone and attached to it (Fig. 238) always suggests an ossifying myositis. The x-ray which shows the arrangement of the bone fibers parallel with the adjoining bone proves the diagnosis. These conditions are sometimes confused with osteosarcoma. In this latter condition the bone spicules radiate like a fern bush from the shaft of the bone from which they spring (Fig. 239).

**Treatment.**—None.

**After-course.**—The soreness lessened and the mass became reduced in size.

**Comment.**—The nature of the process which is able to produce bone is not understood. When attached to the bone, these processes might be ascribed to the extension outward of periosteal osteogenic cells. When not so attached, the migration of these cells or the metamorphosis of other cells must be hypothesized. The point most worth knowing, often overlooked, is that these masses notwithstanding that they seem well formed bone under the x-ray, are capable of marked reduction in the due process of time. It is seldom that operation is
indicated unless the new formed bone is so located that it impinges on a neighboring joint when the limb is flexed.

CASE 5.—I was called to see a retired business man aged eighty-two because of pain in his foot and a tumor in his thigh.

History.—A month ago the patient began to have severe pains in his right foot. It soon was noticed that the toes were cold. Subse-
quently the toes blackened and the skin was mottled above the ankles. Simultaneously with this a sausage-shaped mass appeared in the lower part of the inner surface of the thigh. He has complained bitterly of the pain and has had to have morphine for the relief of pain. He has been restless in the induced sleep and at times seems irrational during his waking moments.

![Fig. 240.—Aneurysm of the femoral artery.](image)

Examination.—The patient is an emaciated, decrepit old man whose face bears evidence of acute pain. His radial arteries are hard and beaded, his apex beat is diffused. There is a sausage-shaped mass extending along Hunter's canal reaching from the middle of the popliteal space to the lower termination of Scarpa's triangle (Fig. 240). The femoral artery pulsates vigorously but below the tumor mass no pulsation can be found. The tumor mass is 2 to 3 cm. in diam-
eter, but slightly tortuous at its lower end and dense throughout, though it is somewhat expansile. The foot is black as high as the midtarsal line and mottled blue-black nearly as high as the knee. The affected parts are dry and cold. The artery in Scarpa's triangle is hard but no plaques can be palpated.

Diagnosis.—A glance sufficed to characterize the condition as a senile gangrene. The sausage-shaped tumor occupying Hunter’s canal must needs be a thrombosed and dilated vessel. Its density indicates a clot and its expansibility still the presence of some fluid blood. The question of operability hinges on the state of the artery in Scarpa’s triangle. While hard it still seems compressible. The determination of the patient’s general state as related to the condition of the leg was desirable in order to estimate the value of amputation. It was believed that an amputation above the aneurysm would relieve the patient of his pain. His mental aberration was regarded as likely due to cerebral changes because he had had an attack which suggested a cerebral hemorrhage. It was hoped, however, that absorption from the leg might play a part.

Treatment.—Two grains of novocain sterilized for three minutes in 3 c.c. of boiled distilled water were injected into the spinal cavity between the fourth and fifth lumbar vertebrae. The femoral artery was cut down upon at the lower angle of Scarpa’s triangle and ligated with chromic catgut and linen. The spindleform mass was dissected downwards from its bed until the junction of the lower and middle thirds of the thigh was reached. The soft parts were then divided, by a circular incision and retracted to permit severing the bone at its middle point.

Pathology.—The popliteal vein was thrombosed as was the popliteal artery. The spindleform mass was hardened before sectioning. It was found to be occupied by a blood clot (Fig. 241).

After-course.—Recovery from the amputation was uneventful. He continued to complain of pain, however, and had to have codeine. His mental state was perturbed before the operation and continued so until he died of progressive weakness six weeks after the operation.

Comment.—The hope that the removal of the leg would at least produce a relief from pain was not realized. His mental state was believed to be due to changes in the central arteries and no improvement was looked for. He had had morphine before the operation and it is not possible to know to what degree his complaint subse-
Fig. 241.—Cross section of the aneurysm.
quent to the operation was due to the continuance of the pain and how much to a desire for the continuance of the drug. At least he had his way and the drug was continued. The patient was in no way benefited by the operation and his life likely was not prolonged. It did prove the one point of technical feasibility. It was a good operation, but poor surgery.

**CASE 6.—A farmer aged forty-eight came to the hospital because of pain in the stump of a thigh.**

*History.*—The patient had a midthigh amputation twelve years ago because of a compound fracture. The stump was painless for a year following amputation, but at the end of this time he began to have severe pains in the back part of the thigh. It was not constant, and for long periods he was entirely free. He has always imbibed freely of alcohol and recently he has drunk to excess. He has some pain in his other leg and occasional pains in his arms.

*Examination.*—The stump presents a puckered mass of scar at the lower and posterior extremity of the thigh bone. It is not sensitive to touch. There is some tenderness along the course of the sciatic nerve and in the lumbar region. There is some tenderness over the sciatic nerve in the other leg.

*Diagnosis.*—The history and character of the scar suggest that the termination of the nerve is embedded in the scar, possibly with a hypertrophy of the nerve substance itself, the so-called amputation neuroma. The fact that he has been a pronounced alcoholic and that other nerves in the body are sensitive to touch and spontaneously painful suggests the possibility of an alcoholic neuritis. The fact that he had pains in the stump many years before he had pains in the other extremities makes it likely that the nerve in the stump is suffering mechanical injury.

*Treatment.*—An incision was made over the course of the sciatic nerve above the scar. The nerve was isolated and severed in such a manner that a V-shaped notch remained in the proximal end. These limbs were united and the nerve allowed to retract within the wound. The scar tissue was then freed to the end of the bone. This then was sawed off two inches from its extremity. In this way the tip of the bone and the attached soft parts were removed. The soft tissues were then closed over the end of the bone in layers.

*Pathology.*—The tip of the nerve which was embedded in the scar
tissue was as large as a hickory nut and gradually thinned until the normal size of the nerve was reached three inches from its extremity. On section the clubbed end of the nerve proved to be made up of a dense tissue which consisted of masses of medullated nerve fibers intermixed with much dense fibrous tissue.

After-course.—There was little immediate improvement, but he gradually became free from pain both in the member operated on and the others as well. The patient has been free from pain eight years.

Comment.—If the scar tissue in such cases is separated from the bone and resected in the close proximity of the scar mass they are prone to reform. If the incision is made in unaffected tissue, this is less likely to take place. By excising the nerve several inches from the end, there is little likelihood of a recurrence. These precautions are more important if reoperation is done within a year or two of the primary amputation. In this case the pains no doubt were aggravated by the free imbibition of alcoholics.

CASE 7.—A hardware dealer aged fifty-eight was brought to the hospital because of a fractured femur.

History.—The patient’s general health has always been good until this illness. His wife has had no miscarriages. He has had some backache for fifteen years. About a year ago he was kicked off the sidewalk. He does not know which part of the body struck the ground, but his right thigh hurt for about ten days afterward. Some time later he slipped and fell on the ice and again hurt the right hip. He was soon able to be up and around, however. Since that time he noted that any misstep caused pain. Last August while in Colorado he noticed pains in various parts of the body, particularly in the back, arm, legs, and lower chest. He came back from Colorado five months ago and has been hardly able to get around since that time. He tried Christian Science three weeks, but quit this treatment because he knew he did have pain despite the contention of the healer that he had none. Six weeks ago the right thigh broke while turning in bed. Since that time pain has been very severe. His weight has been decreased from 240 to 180 pounds. After the thigh was fractured, the pain in the other parts of the body left for a period of several weeks. It has now begun again in both sides of the chest, both thighs and left arm. He had his teeth removed three weeks ago, because it was believed this
Fig. 242.—Multiple myeloma of the humerus.
trouble was due to oral sepsis. His appetite is poor, he sleeps badly, and he has a constant feeling of exhaustion.

Examination.—The patient gives the general impression of a once powerful man who has suffered much pain. His tissues are soft and the skin flabby and indefinitely cachectic. No tumor is discoverable. He is tender over all long bones, particularly the ribs and left humerus. The urine is 1.022 sp. gr., clear, of dark straw color. It gives a heavy milky turbidity when heated to 60 degrees. This turbidity nearly entirely disappears when the boiling point is approached. When a drop of nitric acid was added to 2 c.c. of the urine, this turbidity disappeared on shaking, but remained permanently when ten more drops of the acid were added. The x-ray shows a mottling of the long bones, particularly the left humerus (Fig. 242). The region of the spontaneous fracture shows extensive thinning of bone because of absorption from the medullary side. There seems to be an effort at healing from the surrounding peritoneal surface.

Diagnosis.—Spontaneous fracture of a long bone in a previously robust individual indicates an intramedullary new growth. The common sources of such tumors are hypernephroma in the male and breast carcinoma in the female, and occasionally the thyroid in either sex. Inspection failed to reveal a new growth. The urine showed nothing indicative of a neoplastic process. The thyroid was negative. The urine responded to the tests for Bence-Jones albumin. The presence of Bence-Jones albumin is in itself pathognomonic for multiple myeloma, though it may be remembered that this substance has been found in the urine of patients suffering from myxedema and lymphatic leukemia. There was no indication of the presence of these maladies. The x-ray examination gives valuable confirmatory evidence and serves as a differentiation from metastasis of other tumors. The multiplicity of lesions seen in this disease is not encountered in metastatic tumors.

Treatment.—Arsenic was given on general principles and anodynes and hypnotics to secure comfort.

After-course.—The patient returned home and died of progressive exhaustion five weeks later. While in the hospital for examination, he passed a slight amount of blood in the stool and likewise coughed up some. He was slightly delirious at times.

Comment.—It is ordinarily considered that the diagnosis of this
disease is a wholly simple matter. The chief difficulty is that early in the disease the Bence-Jones albumin is intermittently present, and misleading conclusions are apt to be reached if the urine is examined during the free interval. The multiplicity of pains is suggestive and may precede the appearance of the specific albumin. At this time a careful examination of the blood may be required to reach a differentiation, and it must be remembered that the blood picture in pernicious anemia may be elusive and inconstant. In fact the presence of erythroblastic cells in multiple myeloma and the nucleated reds in pernicious anemia may indicate that the diseases are in a degree related. The emaciation in myeloma, as well as the sense of exhaustion, is probably due to toxemia and the pains to pressure absorption. At least the pains complained of remind one of those described for chronic abscesses in bone. This view is substantiated by the fact that when the absorption is extreme, pain grows less. I once saw a man who had so much thinning of bone that he had countless fractures of the long bones, and the ribs were so honey-combed that even a moderately gentle palpation would produce a fracture. He complained only of complete exhaustion.

CASE 8.—A school girl aged twelve was brought to the hospital because of a badly united fracture of the femur.

History.—Five months ago while running she made a quick turn which caused her to fall and break her thigh bone about the middle. The leg was put in a posterior wire splint extending from the hip to the ankle. Beck’s extension of nine pounds was applied. She sat up in bed during the first week. After three weeks the splint and extension were taken off during the day time but reapplied during the night. After a week of this, the patient was allowed to go about on crutches. It was noticed then that the injured leg was shorter than its fellow. Her general health has always been good.

Examination.—The patient is a fine husky, energetic lassie, the very picture of health. As she walks there is apparent a marked tilting of the pelvis. Measurement shows more than two inches of shortening. The x-ray shows a corresponding overlapping of the broken ends (Fig. 243). The urine is cloudy and contains pus cells.

Diagnosis.—The condition is obvious. The degree of shortening is such as to prove disfiguring, though the patient is not disturbed otherwise.
Treatment.—The area of overlapping was approached from the lateral side near the insertion of the vastus lateralis. The upper fragment is posterior and medial to the lower. The union separated and the ends squared off. After they were approximated, a steel plate was applied. A board splint was applied from the crest of the ilium to the ankle, and a short one on the inside extending from the pubes to the knee.

Fig. 243.—Malunion in fracture of the femur.
After-course.—At the end of a week the splints were in place and the alignment of the bones satisfactory. At the end of the second week it was noticed that the lateral splint had slipped about to the anterior lateral aspect and that the bone had angulated laterally (Fig. 244). To overcome this, lateral traction was made. A weight as heavy as fourteen pounds was tolerated. The result was a disturbance of the new wound from pressure of the soft parts against the plate. The plate, therefore, was removed. The wound so produced became infected and the cast now applied had to have a large window to permit dressing of the wound. The angulation was reproduced into this window, and a considerable deformity resulted. The ends of the bones remained in apposition but the angulation was so great that a total shortening of 2 inches remained. Because of the state of the wound, enough lateral pressure could not be applied to correct the deformity, and this state was allowed to persist with the attendant shortening.

Comment.—The result of our labors to date is the approximation of the ends of the fragments and the substitution of an angular deformity instead of an overlapping. The advantage is that it is now possible by a linear osteotomy to spring the bone into place and retain it with a cast. Such a small wound will make the use of a close fitting cast possible. The primary difficulty in these cases comes from the shortening of the adductor group of muscles. Because of this shortening, there is a tendency to buckle the united fragments outward. Because the wound is placed laterally, enough counterpressure can not be applied to overcome this ten-
deney. If the incision had been made through the top, going through the rectus, as is often done, this would have been avoided, but the rectus would have been so involved in adhesions that flexion and extension of the leg would have been lessened. A section of the adductor tendons at the pubic arch was considered. The position seemed to be so well retained at the time of operation that this was deemed unnecessary. It likely would have been, had not the lateral splint slipped out of its place, allowing the bone to buckle under it. All this might have been obviated perhaps by placing a complete cast from the pelvis to the ankle at the time of operation. These large wounds are always followed by more or less exudation, which makes a change of the outer dressing desirable after a few days, which would have been impossible without making a window so large as to negate the lateral pressure effect of the cast. Perhaps a compromise might have been effected by using a removable cast so that the dressings could have been changed and the cast re-applied. My usual practice is to allow the cast to remain, the secretions being allowed to dry in the dressings. This patient being unusually nervous and unusually vivacious, and it may be added, very attractive, everything was done to lessen the irritation to which she would be subjected. The only principle to follow is to place the limb after the plate has been applied into a cast that will hold it rigid, and forget every other consideration.

CASE 9.—A farmer aged twenty came to the hospital because of a discharging sinus of the right thigh.

History.—When nine years old he became sick, with a high fever. He had a pain in his right knee. This was treated for rheumatism. He gradually improved, but the fever and pain continued. At the end of four weeks he developed a swelling above the knee on the outside. This was opened and much pus ran out. After this he improved more rapidly. The opening continued to discharge. It would close and after a few weeks would become painful and begin to discharge again. After three years he was taken to a surgeon who made an incision and scraped the bone. The wound closed except at one point where the discharge continued as before. This operation was repeated on two more occasions with the same result, the last time three years ago. When the wound
is discharging he feels quite well, but when it closes he soon begins to have pain. His health otherwise has always been good.

Examination.—The patient is a husky lad and one is rather surprised to hear such a long tale of woe. Just above the external condyle is a fistulous opening from which a small amount of thin pus is escaping. Extending upward from this is a series of scars about six inches long. The muscles of the thigh seem less firm, and less perfectly developed than those of the opposite leg. The bone, on the contrary, seems double the thickness of its fellow. His pulse the first day in the hospital varied from 70 to 80, and the temperature was normal, the urine negative. The blood count presented nothing of interest.

Diagnosis.—Obviously the patient had a much neglected osteomyelitis. The generalized thickening of the femur indicates that there must be a sequestrum involving a greater part of the femur. In the absence of the x-ray the extent of the thickening had to be accepted as the guide to the extent of involvement. There was evidently no toxic absorption going on because of the state of the blood and because of the absence of a rise in temperature. He was regarded, therefore, as being in a favorable condition for operation.

Treatment.—Under ether an incision was made, beginning below the great trochanter and circumscribing the fistulous opening above extending to the external condyle. The shaft of the bone was freed for half its circumference. It was noticed that this exposed all of the bone where the circumference was corrugated and uneven, indicating that the exposure was sufficient. With an inch carpenter’s chisel the bone was rapidly tunnelled throughout its length. This exposed a sequestrum extending nearly the entire length of the opening. This was removed with forceps. The tunnelled bone was then vigorously curetted and the cavity cauterized with carabolic acid for one minute.

Fig. 245.—Necrotic bone removed from a chronic osteomyelitis.
and then filled with alcohol which was allowed to remain five minutes. The soft parts were then closed, save for an opening two inches long at the lower termination of the wound. This was loosely packed with gauze. The amount of blood lost was not great.

Pathology.—The sequestrum was broken in several pieces during removal. It was friable and contained many uneven areas where the granulations had invaded it (Fig. 245).

After-course.—The patient was profoundly shocked. His pulse mounted to 150, the respiration to 40, while the temperature was subnormal. He was given morphone and atropine and three doses of tr. strophanthus (m xv) subcutaneously. In ten hours his pulse dropped to 120, the respiration to 22 and the temperature rose to 102°. After this, recovery was uneventful. There was considerable discharge from the wound when the pack was removed after a week. This contained staphylococci. He returned home on the twenty-fourth day with but a little discharge from the drainage wound. Three years later he returned because he had had pain in his leg for a week. The x-ray failed to show a focus and he had no rise of temperature and without treatment the pain subsided and he has remained free.

Comment.—It is important in planning the removal of large sequestra to begin the operation on a large scale that the work may be expeditiously accomplished. Where a big job is to be done, a big incision and big tools save time. Shock is the factor to be feared. The profound shock in this case caused me to search for some method to prevent it. The first step was to combine local anesthesia with ether, the last step to do the entire operation under spinal anesthesia. Shock does not follow operations done under this anesthesia.

CASE 10.—A newspaper man aged forty-two came for relief from a discharging sinus above his knee.

History.—When eleven years old he had an inflammatory affection below his left knee. After treatment for some weeks the leg was amputated above his knee. Some months later the remaining leg became inflamed about and above the knee. After an interval of a number of weeks a discharging sinus formed. This has discharged at intervals since. Despite this his health has remained good.

Examination.—There is a discharging sinus medial to the internal
Fig. 246.—Chronic osteomyelitis of the femur.
hamstring tendon. There are numerous scars above the outer condyle. The bone feels thickened throughout most of its extent. This is confirmed by the x-ray (Fig. 246). The x-ray shows involvement of most of the shaft. The examination of the heart and urine show no abnormalities.

**Diagnosis.**—The presence of an old osteomyelitis is apparent at a glance. In such long-standing processes cardiac and renal complications, often marked, are apt to develop. There is no evidence of such complications here, and he appears to be a fit candidate for operation. Because of the long duration and thickness of the bone this will be formidable.

**Treatment.**—A long incision was made along the lateral border of the thigh. The labor required to chisel open the dense bone was considerable. It was tunnelled for some 10 inches. A large quantity of necrotic bone was removed. The bone was treated with carbolic acid and alcohol. Much blood was lost while clearing out the bone bed.

**Pathology.**—The bone removed consisted of many small particles surrounded by granulation tissue.

**After-course.**—After the operation the patient became profoundly shocked and remained so for nearly twenty-four hours. It seemed he surely would die. He finally recovered and the wound healed without notable disturbance. A small sinus remained for many years.

**Comment.**—There is no class of operations so uniformly attended by shock as these thigh operations. This is in part due likely to the general systemic disturbance produced by prolonged suppuration. The use of spinal anesthesia does away with this shock and is imperatively demanded in these operations.

**DISEASES OF THE REGION OF THE KNEE**

The region of the knee is prolific of surgical affections of an important nature. The internal derangements are many and important and difficult to interpret. Loose cartilages and floating bodies must always be thought of before an inflammatory affection is diagnosed. Suppurative infections are dangerous, but their presence must be accepted with reserve lest one's efforts add what was only suspected. Cystic tumors must be considered to be connected
with the joint cavity, and solid tumors must be regarded as some form of sarcoma, and the necessary operative precautions observed.

**CASE 1.**—A farmer boy aged nineteen was brought to the hospital because of a painful swelling of his knee.

*History.*—Two days ago while out hunting he ran a hedge thorn into his knee just above and lateral to the patella. He does not know how deeply the thorn penetrated or whether or not it was broken off. During the night following injury he had a pronounced chill and the knee became markedly swollen and very painful. While hunting he became thoroughly soaked and was much chilled when he arrived home. Save for a number of attacks of tonsillitis he has always been well. He complains of a severe general aching, particularly along the spine.

*Examination.*—There is pronounced exudate into the joint. The point of entrance of the thorn is half an inch above and an inch medial to the proximal end of the patella. There is a zone of deep redness about the point of entrance. The whole knee is acutely sensitive to touch and the area about the entrance of the thorn is doubly so. No other joints are affected and his throat is not sore. The temperature was 103.5°, pulse 120, respiration 22; the leucocyte count 8,000, the polymorphonuclears not exaggerated.

*Diagnosis.*—The evidence of trauma made it appear that we had to do with an infective arthritis. However, the onset seemed too sudden and the pain too acute for an infection so early in its course unless the infection should be unusually virulent, which is usually not the case in hedge thorn infections. The leucocyte count did not support such an assumption. It was decided, therefore, to await developments for a day.

*Treatment.*—Lead acetate solution was used as a temporary treatment.

*After-course.*—During the following night he had another chill and the knee of the opposite leg became involved as did the shoulder and elbow of the opposite side. A diagnosis was then made of acute rheumatism and the salicylates were begun. There still remained the possibility that the thorn, if it did penetrate into the joint cavity, might cause a secondary infection and a multiple polyarthritis from infection. The painful joints including the one bearing the thorn prick responded promptly to the salicylates and subsequently ran
a typical course. His tonsils were removed after he recovered from his rheumatism.

Comment.—In general it may be said that there is no septic process that produces the intense suffering that a beginning rheumatic affection does. A penetrating wound requires from 24 to 48 hours to produce a considerable degree of reaction.

CASE 2.—A retired farmer entered the hospital because of a tumor on the back of his leg.

History.—Five years ago he first noticed a hard egg-shaped tumor back of his knee. It has grown steadily since. It has never caused pain, neither has the foot swollen. He has a small hard tumor below his left shoulder. This has been present many years and does not grow.

Examination.—In the popliteal space is a tumor 5 x 3 x 3 inches (Fig. 247). It is dense, elastic, and presses the hamstring tendons to one side. It is unattached to the skin, but seems to be quite firmly fixed in the depth. The veins of the leg are not enlarged. The x-ray shows the bone to be free.

Diagnosis.—The tumor lies exactly in the popliteal space, and is evidently definitely expansile in growth. It is lower and is less firm than the usual fibro-sarcomas of the sciatic nerves. The probable diagnosis seemed to be myxosarcoma. Despite the fact that it seems to be firmly fixed to the bottom of the popliteal space, the fact that
none of the veins in the neighborhood are dilated is proof that there is no invasion and that likely its removal can be effected without endangering the large veins.

*Treatment.—*Removal. When exposed, the large nerves lay on its surface. By beginning above and locating the vessels it was possible to separate the tumor from them without more injury than the tearing loose of a few small branches.

*Fig. 248.*—Fibroliposarcoma of the popliteal space.

*Pathology.*—The tumor is soft and distinctly yellow in color but there are areas of more pinkish color that are translucent (Fig. 248). Many fibrous bundles traverse the tumor, and when the tumor is cut across, many fibrous areas are seen. Section shows the yellow area to be fat, the pink areas myxoid, and fibrous areas to be fibers with but a few long spindleform cells. The tumor may be regarded, therefore, as a lipofibrosarcoma.

*After-course.*—The wound healed promptly, and the patient has remained free from recurrence.
Comment.—Tumors containing myxoid tissue in this region are very prone to recur, notwithstanding the sections may fail to show other than myxoid tissue. A guarded prognosis, therefore, should always be made, no matter what the pathologist has to say. I once saw a patient who had been operated on no less than twelve times for recurring myxoma of the adductor region of the thigh before definitely sarcomatous tendencies became manifest. These tumors, therefore, should not be "shelled out" though they are well limited against the surrounding tissue, but the capsule should be dissected out with the tumor.

CASE 3.—A housewife aged forty-eight was brought to the hospital because of a tumor back of the right knee.

History.—Her trouble began about 10 or 12 years ago. She first noticed that the space back of the right knee was larger than the left. It caused no trouble at that time. During the past year it has enlarged rapidly and caused her foot to tire on that side when she was on her feet. Six months ago the ankle swelled and she had pain which would run down to the top of the foot. There was sometimes also a burning sensation. For a month past she can not step on the leg at all, because she can not straighten it out. Her weight remains about the same as usual. She can not sleep on account of the pain. She has used morphine tablets the past week for pain.

Examination.—A tumor mass occupies the right popliteal space and extends upward about 8 or 10 inches. It is movable laterally but not upwards and downwards. The general appearance of the patient is not good; she has an anxious, apprehensive expression. Urine negative. White blood count 10,000. The x-ray shows the bone to be free from the tumor.

Diagnosis.—The position of the tumor and its recent rapid growth indicates that it is a sarcoma. The chief problem to determine is its relation to the sciatic nerve. The pain it has caused would indicate that it springs from the nerve, for a tumor as soft as this one should not cause so much pain by simple compression. The lateral mobility and its fixity in other directions point the same way. Being so the removal of the tumor most likely will require a resection of the nerve with a complete loss of nerve supply to the foot. Therefore amputation is indicated. The patient protested so strenuously
and promised to submit to amputation later if the results were not satisfactory.

*Operation.*—Resection of the tumor mass under spinal anesthesia was done. It shelled out fairly well except when the nerve was approached. The peroneal and posterior tibial nerves were cut below in removing the tumor and the sciatic above. The large vessels were not involved.

Fig. 249.—Myxosarcoma of the sciatic nerve.
Pathology.—The tumor was a large, soft, lobulated mass (Fig. 249) which in parts was grayish white, in others pink and almost translucent. The cut surface showed lobulations, being in part pale pink and translucent, in part grayish white. When the former came in contact with the nerve, the fibers seem to be but pushed aside, but when it was in contact with the grayish parts there was evidence of invasion. The slides showed a typical myxoma for the pink area and a more cellular area where it was present. Fig. 250 represents the borderline between the two areas. It is a myxosarcoma.

After-course.—Healing was uneventful. Sensation was lost over the dorsum of foot and the lower outer aspect of leg, plantar surface of foot. There was foot-drop and the foot swelled. She was unable to use the foot.

The patient returned after three months with a swelled, useless limb. She is unable to bear weight on it because there is no sensation and she can not tell when it is rightly placed. She returned six months after operation and there was a recurrence in the lower angle of the incision. She now desired amputation. There was a mass the size of a hen's egg in the suprACLAVICULAR fossa and further treatment was refused.

Comment.—Primary amputation should have been insisted upon. The patient was so insistent that local removal be tried and having
never observed a leg in which the sciatic nerve was severed I was not wholly unwilling to accede to her wishes. I reasoned that being a myxoma there would at most be a local recurrence which would admit of amputation and the patient would only be put to the inconvenience of a second operation. I did not anticipate a constitutional metastasis.

**CASE 4.**—A laborer aged thirty-six came because of ulcers on his knee.

*History.*—Six weeks ago his knee below the knee cap became sore and two weeks ago formed ulcers. The ulcers are somewhat painful, but not markedly so.

*Examination.*—Over the tuberosity of the tibia is a reddened area

![Fig. 251.—Gummas of the knee.](image)
as large as the palm of the hand. Within this area of redness are four ulcers the size of a butter bean and several smaller ones. The two largest are reniform (Fig. 251) punched-out with soft walls and dirty bases. The conglomerate arrangement of these forms a kidney-shaped outline.

**Diagnosis.**—The form of the individual lesions and the grouping of the whole is characteristic of gumma.

**Treatment.**—Mercurial plaster locally and potassium iodide internally until the lesion heals, then mercury.

**Comment.**—The method employed probably interfered less than any other with the pursuance of his daily tasks. It is quite possible that mercury still presents our most reliable ultimate cure for syphilis. At any rate, one should not be regarded as culpable if he fails to use salvarsan.

**CASE 5.**—A merchant aged fifty came to the hospital because of a painful and stiff knee.

**History.**—While stepping over a fence two feet high six years ago he slipped, and in the effort to prevent a fall, he felt a pain in his left knee. He had some pain for a few days following, and as the pain ceased he noticed that the knee was swollen. For four years following this he was able to use the leg, but at irregular intervals the leg became locked so that he was unable to move it. After a few moments of intense pain he would be able to walk again. At intervals during this period the knee swelled. Four years ago while the knee was swollen more than usual he consulted a surgeon who aspirated several ounces of fluid. He diagnosed a loose body and opened the knee. No loose body was found. Following the operation the knee became quite stiff and a year later the joint was moved under an anesthetic. The movement improved some, but there was constant pain instead of pain only occasionally as before the operation. Subsequently the tissues about the joint were injected by an irregular practitioner. The patient was told that the fluid did not enter the joint. He is certain of the fact only that much pain and inflammation followed these injections. Two years ago he consulted an eminent surgeon who drew off some fluid and injected iodoform emulsion. This was repeated three times at intervals of a month. The joint became more painful and the movements more limited.
Diseases of the Lower Extremities

His general health has always been good. There is no tuberculosis in the family and there have been no joint infections.

Examination.—The appearance of the patient is that of good health. The knee is moderately swollen and both the thigh and calf are smaller and more flabby than the opposite leg. The leg can be extended to within 25 degrees of full extension and can be flexed about 30 degrees. Flexion is limited by muscular spasm, while extension seems to be checked by fibrous bands. Other than this he moves the leg voluntarily and is able to deliver a vigorous kick. He indicates the upper border of the tibial tuberosity as the site of his initial pain at the time of the primary injury. At the time of examination the entire patellar condyle region is complained of as being painful. This area is sensitive to deep pressure. When the leg is passively manipulated, a grating sensation is imparted to the examining hand laid over the medial side of the joint. The tissues about the joint are but little thickened, the enlargement being only apparently due to the atrophy of the soft parts above and below the joint. The maximum circumference is but an inch greater than the sound knee. No fluid can be demonstrated.

Diagnosis.—The initial injury came while the joint was subjected to an unusual strain while in an unnatural position. The site indicated is that of the medial semilunar cartilage. The exudate is in harmony with a possible dislocation of this disc. The fact that there was a similarity of the site of locking of the joint at the periods of pain subsequent to this is in harmony with this. The first surgeon was not warranted in diagnosticking a floating body because none had ever been located at the time of the pain, and floating bodies do not first appear when the leg is in an unnatural position. His failure to locate the hypotheeced floating body is against his theory. The second surgeon based his diagnosis apparently on the thickened joint and the grating sensation felt on passive movement. The thickening of the joint is not as great as one sees in tuberculosis of the adult, and the grating sensation is more localized than is felt in this disease of the knee joint. Furthermore, the joint has no doubt suffered much from previous efforts. Notwithstanding the opinion of this eminent authority, the diagnosis of tuberculosis can not be accepted. The failure to secure results from the iodoform injections can not be counted against this theory, for such therapeutics are uniformly unsuccessful in tuberculosis of the adult. The one outstanding feature
available for diagnosis is the history of the primary injury—sudden pain while the leg was in excessive strain in an unnatural position. The diagnosis must be a dislocated semilunar cartilage.

_Treatment._—A long incision was made over the joint parallel with the long axis of the leg. The joint was exposed by a wide retraction of the tissue. The semilunar cartilage was entirely loosened except for less than an inch at its posterior extremity. The anterior portion was represented by mere fragmentary bands while the middle portion was rolled up and lay behind the condyle of the femur. Flexion of the leg on the thigh forced this mass upward against the condyle. The articular surface of the femur in this region was partly destroyed and it was the movement of this injured cartilage that caused the grating sensation detected on the first examination. The entire cartilage was removed and the incision closed without drainage.

_Pathology._—The ball of tissue removed was an exceedingly dense fibrous tissue without any definite structure but without any calcareous deposit.

_After-course._—The patient was free from pain after he recovered from the operation and the range of motion slightly increased, but full extension was never attained.

_Comment._—A careful history in joint affections is of as great importance as the physical examination. A loose body should not be diagnosticated unless its presence has been actually demonstrated. Even though one feels sure of a loose body the semilunar cartilages should be identified and examined before a search is instituted for the floating body.

**CASE 6.**—An oil man aged thirty came to the hospital because of swelling of the right knee joint and pain in the right leg.

_History._—Past history is negative. The present trouble was caused by the penetration of a steel jacketed 32 automatic bullet through the thigh just above the knee joint and just back of midline of the thigh. The bullet entered the outer side of the thigh and came out on the inner side. One bullet also went through the quadriceps muscle above, on the right thigh, and one on the left. No particular swelling or trouble developed and the wound healed completely without infection.

One month after injury, the knee began to swell and he had pain in the right leg and foot. The knee was plastered with antiphlogis-
tine and in two weeks the swelling began to subside, but a week elapsed before it was entirely gone. This swelling took four to five days coming on. He got up and walked around after the swelling went down. A week before entering the hospital he walked around in some slippery mud, leading horses, and that night had some pain in the knee. The next morning he had a big swelling back of the knee extending around the thigh on both sides. This came on during the night and never became larger. He could not walk on the leg and foot. Very little pain in the knee itself. General health excellent. No other trouble.

Fig. 252.—False aneurysm of the right popliteal artery.

*Examination.*—There is a large swelling in the right popliteal space which extends around on each side (Fig. 252). When taken in the flat hand a distinct pulsation can be felt in the swelling. Listening over it with a stethoscope a loud bruit is heard. The x-ray shows the bones to be normal.

*Diagnosis.*—The active pulsation proves it to be an aneurysm and having developed after a trauma it most likely is a false one. Were it an abscess, as the family doctor thinks, the pulsation would not be so marked and there should be evidence of absorption. Furthermore, abscesses in this region do not remain so circumscribed. At any rate, when in doubt, look out for aneurysm.
Treatment.—An incision was made just above the mass in the popliteal space and then carried down over it. The artery was found and ligated with silk. The mass was then carefully opened. It was a very large clot of blood. This was scooped out and the artery followed down the popliteal space. A hole was found in the artery about 3/8 of an inch in length. The hole was oval shaped, the long axis parallel to the long axis of the artery. A ligature was placed below this opening. The blood was all cleaned out, a large gauze pack inserted in the cavity, and the wound closed. A bullet had grazed the artery probably burning it and the artery had eroded through, or rather the piece had necrosed out later. The neighboring connective tissue effectually held the blood.

After-course.—The circulation of the leg seemed to be little impaired by the ligation of the artery. The foot was warm the next day and showed no circulatory disturbance. The wound healed rapidly without infection, and he was up and on his crutches in ten days. In three months he was fully recovered without any evidence of trouble whatever.

Comment.—The chief difficulty was in avoiding the vein. The artery stands ligation without trouble, but the vein is quite another thing.

CASE 7.—A broker aged forty came to the hospital because of a swollen knee.

History.—The patient is said by his physician to have had an abscess of the prostate ten years ago which ruptured into the bladder. A year later he had a painful testicle. This was diagnosed as tuberculosis and was removed. A year following this the remaining testicle became similarly involved and was dealt with in like manner. The incision from this operation did not heal for many months. Two and a half years ago the patient bumped his knee. The joint became painful and he was unable to walk for a number of days, but after a time it improved and remained quite well for a number of months. It became sore again a year ago and he consulted a surgeon who found the joint capsule distended and aspirated the fluid and injected some 4 per cent formalin and glycerine. The fluid withdrawn was said to have been bile colored. This procedure was repeated in ten days and the leg was kept in a cast for the succeeding six months. Despite this treatment, the knee continued swollen and painful. His general health has remained good.
Examination.—The knee is much enlarged, feels boggy and semifluctuating. There is no tenderness on manipulation but there is some pain on movement. The leg can be flexed to about 50 degrees. There is some grating as the knee is flexed. The muscles both above and below the joint are flabby and atrophied which emphasizes the enlargement of the joint.

Diagnosis.—The testicular affection probably was tuberculous, for the surgeon who had him in charge is competent. The primary trouble with the knee likely was traumatic, and the free interval represents the period the lesion was developing. The character of the fluid removed and the feeling of grating as the knee is flexed suggests tuberculosis. Villous arthritis can be excluded because of the erosion of the surface of the cartilage manifest by grating as the knee is flexed.

Treatment.—Tuberculosis involving so large a joint in an adult rarely admits of conservative treatment. Hence the knee joint was resected. The bones were held in apposition with nails and the leg enclosed in a cast.

Pathology.—The capsule was more than a centimeter in thickness and showed many villous prolongations into the joint cavity. The cartilage showed regions of erosion which extended down to the bone. Microscopic section of the villi showed edematous fibrous tissue with plasma cell infiltration.

After-course.—Healing was without event. An area of tenderness remained on the inner surface over the tuberosity of the tibia which disappeared after a time and he has remained well.

Comment.—It is well in all instances as was done by his first medical advisor to treat such a joint conservatively. Probably it will not cure a tuberculous joint, but it aids the diagnosis, for simple arthritides will recover under such treatment. The diagnosis of swelling of the knee with thickened or apparently thickened capsule is not easy. The demonstration of tubercle bacilli in such lesions is a task for skilled enthusiasts with plenty of leisure.

CASE 8.—A railway conductor came to the hospital because of a swelling above the knee.

History.—Seven years ago he injured his leg by being pinched between two boxes in a freight car. The knee was sore for several weeks following, but he continued with his work. Some years later
he noted a swelling just above the knee. It swelled but very slowly and caused him no pain and he neglected to seek advice. He still has no disturbance, but the enlargement has been more rapid in the last few months and this has excited his apprehension. His general health has always been good.

Examination.—The movements of the knee are perfectly free. There is a thickening immediately above the knee beginning about the

middle and lower thirds of the femur and it gradually enlarges to attain a maximum size about six inches above the condyle (Fig. 253-A). It is very dense, the surface smooth, not painful on pressure, and evidently continuous with the shaft of the bone. The cutaneous veins over the tumor are much thickened. The movements of the joint are free and unhindered. Otherwise the examination is negative.

Diagnosis.—The development of an enlargement of a bone following trauma always suggests the possibility of sarcoma. In this case no enlargement was noticed until two years after the injury.
The enlargement must have been very gradual for after seven years the size is still inconsiderable. The physical characters are those of a pure osteoma without evidence of any soft tissue. However, an osseous tumor involving the entire shaft of the bone usually contains malignant elements. The localized character of the growth without any evidence past or present excludes any infective process.

Treatment.—Amputation in the upper third of the thigh was done.

Pathology.—When sawed in two the tumor is seen to be composed of radiating columns of bone going out from the shaft. The radiating columns seem to be of the same structure and to be continuous with the shaft of the femur (Fig. 253-B). The medulla is unaffected. The surface of the growth was covered with a periosteal-like membrane, and though thicker, and more closely attached than the normal periosteum of the shaft above, contains no evidence of malignancy. Examination of decalcified sections of the bone showed nothing suggestive of malignancy.

After-course.—The stump healed promptly and there never was
any sign of a local recurrence. He had an acute sickness a year and eight months after operation which his doctor diagnosed as pneumon-ia. After a few week there followed a slow febrile process which was diagnosed as tuberculosis. He traveled in the south without benefit, but on the contrary with gradually failing strength and appetite. Because of this he returned to the hospital.

He now, twenty-two months after the amputation, has superficial respiration and slight cough with dullness below the fourth rib, which does not change by change of position. Vocal fremitus is lessened and respiratory sounds are absent. There are dilated veins over the lower right chest. The left lung is negative. The leucocyte count is 38,000 of which 92 per cent are polynueneaers and the temperature ranges between 101 and 103.5°. Notwithstanding the history and probable diagnosis of metastatic sarcoma, respect for the opinion of his physician who in addition to obtaining pus on aspiration, argued that pneumonia followed by failing strength and high leucocytosis made empyema certain, I resected a rib. The chest was found to contain a solid greyish white tumor. The patient died in two months. At autopsy the lower lobe of the right lung was found to have been wholly displaced by a small round-celled tumor with very little intercellular tissue, hence very friable. A large amount of milk-like fluid escaped from the cut surface. The mediastinum was not affected. The pleura was nowhere attached, not even about the site of the useless rib resection.

Comment.—Notwithstanding that there was no histologic evidence of malignancy, the clinical course proved it to be such just as one could confidently predict from its clinical appearance. When clinical and microscopic do not agree, the clinical should be followed. The acute illness may have been a pneumonia, most likely it was. Certainly the tumor increased rapidly in size following. One can hardly conceive of a more favorable circumstance for rapid growth in a neoplasm than the fibrinous environment of a pneumonic lung. The consideration of empyema should never have been entertained, for when a patient once harbors a sarcoma, any subsequent illness should be regarded as a recurrence until it is proved otherwise. The high leucocytosis obfuscated my better judgment. The high polynueneaer count was confusing. The "pus" obtained by his doctor by aspiration probably was fluid from the substance of the tumor.
CASE 9.—A school girl aged seventeen came for treatment for rheumatism in the right knee.

History.—The patient has had rheumatism for eleven years. Had trouble at six years in knee. No pain since that time to amount to anything. Last attack at age of six, was in bed one year, had fever, knee swollen, painful, could not move leg. The leg has remained flexed since that time, no tenderness. At that time she had an operation, scraping of bone. The patient has had no throat trouble, no cough. Has had pertussis and chicken pox but no other children’s
diseases. Menstruation began at age of fifteen, every thirty days but sometimes irregular, flow every three months, no pain, lasts three days.

**Examination.**—Patient well developed, well nourished, does not look acutely ill. Eyes react to light and accommodation. No discharge from ears, no tophi, teeth in fair condition, tonsils small, crypts prominent, tongue large and thick. No palpable glands in posterior triangle of neck, thyroid palpable. Hyperresonant chest, respiration free, equal, no rales. Heart extends 11 cm. to left, apex sounds faint, clear, no murmurs. Base sounds normal, no murmurs. Abdomen negative. Right leg flexed on thigh about 45 degrees, immovable, shows old operative areas, one on lateral surface lower thigh, one medial surface knee, two anterior medial upper tibia, one back of knee. Leg can be moved about 5 degrees and stops with a shock. Knee appears swollen in comparison with rest of leg, leg atrophic, k.k. not obtained, no Babinski, no clonus. The x-ray shows marked bony deformity (Fig. 254). Left leg movements free. Blood pressure 140-90. Hg 70 per cent, white blood cells 19,600; red blood cells 5,680,000.

**Diagnosis.**—Ankylosis of the right knee joint, the leg being at an angle of about 135 degrees with the thigh.

**Treatment.**—A V-shaped incision was made extending from the insertion of the quadriceps tendon upward. The patella was firmly adherent to the femur and was chiseled off and entirely removed. A portion of the inner condyle of the femur and inner head of the tibia had to be removed before the leg could be extended. A flap of fascia from above the knee was turned down into the joint and sutured to the crucial ligaments and the joint capsule. The quadriceps tendon was reunited and the joint closed. Two gauze subcutaneous drains were left.

**After-course.**—The patient showed no evidence of postoperative shock and did not suffer much from ether sickness. She has not complained much of pain and rested comfortably the first night of the operation. The second postoperative day the temperature was 101°, pulse 102 and she complained of severe burning pain in the knee. This lasted through the following day, but temperature was but 100.5°, pulse 100. Temperature did not rise above 99.2° the rest of her stay in the hospital—the gauze drains were removed on the tenth day through a window made in the cast over the incision. The
wound was healing very slowly and the sutures were allowed to remain until the twelfth day when five were removed. Temperature was normal at that time. The cast was removed on the eighteenth day, there had been a good deal of rotation of the foot outward in the cast. The foot was brought into right angle with the leg and in the proper position and a posterior cast molded to the lower half of the thigh, the leg and the foot with the patient in a prone position. The wound was dressed and the remainder of the sutures removed. The new posterior splint caused no pain in the knee, but the patient complained of a pain along the tibia. The skin looked normal over the pain area and there was no swelling. On dismissal one month after operation the wound was entirely healed except for two or three areas about the size of a dime along the line of incision where the skin sloughed. The pain in the knee and leg was entirely gone, temperature and pulse were normal. The extremity was straight, the leg being in a line with the thigh. The patient had been up and around on crutches for about a week. The right lower extremity measuring from the anterior superior spine of the ilium to internal malleolus is about one inch shorter than the left. The x-ray plate at dismissal showed no bony union between tibia and femur. The tibia was set back so that the anterior articular surface of the tibia came to about the middle of the articular surface of the femur.

**CASE 10.—A man aged thirty-one came to the hospital because of an injury to his knee.**

**History.**—He relates that while riding in a Ford two hours ago with the top down, he had a head on collision with an automobile. The impact threw him over the windshield of his own car and he alighted on his knees on the radiator of the attacking car. When he attempted to get up he found he could not bend his knee and he fell to the ground.

**Examination.**—The right knee is swollen and fluctuating and moderately sensitive to pressure. There are a number of superficial abrasions. A mass can be felt above the intercondylar groove and one over the tibial tuberosity. There is a defect in the normal site of the patella. The x-ray shows the right patella to be broken into three fragments (Fig. 255-A).

**Diagnosis.**—Obviously from the physical findings and from the x-ray there is a fracture of the patella. Fluid free in the joint cavity.
two hours after injury can be but blood. An open operation on a joint full of fresh blood is a hazardous procedure. Hence any method that will produce coaptation of the fragments without opening into the joints is to be preferred.

*Treatment.*—A steel pin was passed through the skin and through the quadriceps tendon above the upper fragment. A similar pin was passed in like manner through the tendon below the lower fragment. The two pins were then drawn together and held with adhesive tape (Fig. 255-B). This brought the fragments in apposition (Fig. 255-C).

*After-course.*—The pins were allowed to remain in position for six weeks. The knee was manipulated from time to time and the

![Fig. 255-A.—X-ray of the fractured patella some hours after the injury. There is moderate displacement of the upper fragment.](image-url)
muscles massaged. Complete function was restored. There was no limitation of motion at the time he left the hospital and he began at once to do the hard work of the farm.

Comment.—The advantage of this method consists in the fact that it can be used by anybody anywhere. A couple of steel pins and a few drops of a local anesthetic is all that is required. The pins employed in this case were long slender bone drills and the handle was used in pushing them into place. The pins can be held together by adhesive plaster or a gauze bandage. I first saw this method used by Dr. G. A. Nickelson of Plains, Kansas. So far as I know, the method was original with him.
DISEASES OF THE CALF

The surgical affections of the region of the calf are chiefly traumatic and infectious. The tumors of the soft parts are usually sarcoïd and those of the bone, giant-celled sarcoma. The ulcerous lesions require careful considerations as to their etiology before they are attacked. One of the most common and distressing errors of judgment is dependent on the failure to distinguish between static ulcers due to common varicose veins dependent on a damming back of the blood-stream in the veins incident to child-bearing or to prolonged standing in those with inherent weakness of the walls of the
DISEASES OF THE LOWER EXTREMITIES

veins of the legs, and those due to a preceding obliterating phlebitis affecting the deep veins in the leg. The one is cured, the other made worse, by operation.

**CASE 1.**—A housewife aged fifty-four came to the hospital because of an ulcer of the leg.

*History.*—The patient has had an ulcer on her left shin for a dozen years. At first it healed at intervals under treatment, but for

![Fig. 256.—Varicose ulcer of the leg.](image)

the past six years it has been constantly open. Two years ago she had an erysipelas of the leg which started at the ulcer. The ulcer is exceedingly sensitive to touch so that she protects it with an ointment. She has had nine children and since her early pregnancies she has had dilated veins in both legs. Her general health has been good.

*Examination.*—She is a large, corpulent woman, apparently in good general health. The long saphenous veins are dilated, particularly in the region of the knees. On the mesial surface of the right tibial region is an ulcer 1-1/2 x 2-1/2 inches. The borders are
cicatrized and dense (Fig. 256). The floor is smooth and hard and covered by small excrescences. The borders slightly overhang the base. The border and floor of the ulcer are firmly adherent to the bone beneath. The floor of the ulcer was exquisitely sensitive to manipulation.

*Diagnosis.*—The history and the presence of varicose veins make the diagnosis easy. The border is smooth and glistening and dense elastic, nothing that would lead me to suspect malignancy. The type of ulcer is evident from this dense border and the smooth glistening floor. This type does not heal by any treatment save excision.

*Treatment.*—The veins were resected for about six inches below the saphenous opening, and a spiral nine or ten inches long was dissected out below the knee. The entire ulcer was then resected and the defect filled with a Thiersch graft.

*Pathology.*—The slides showed only fibrous tissue in which were sparse, thick-walled vessels.

*After-course.*—Recovery was prompt and permanent. The patient was afterward operated on for procidentia.

*Comment.*—Many ulcers in this region may be cured by local treatment. Once the border becomes thickened and the floor smooth and glistening, nothing short of the removal of the ulcer is effective.

**CASE 2.**—A farmer aged twenty-eight came because of an ulcer of his leg.

*History.*—Two years ago a red spot appeared on his leg just above the ankle. Within a month an ulcer formed. This continued to enlarge until it attained its present size. It is so painful at times that he is unable to work. It oozes much of the time, which when it dries, forms a scab, and this increases his suffering. Light touch is usually more painful than heavy pressure. His leg swells more or less, especially when he is much on his feet. His trouble began when he had typhoid fever ten years ago. He was in bed ten weeks. He had severe pain in his leg. It became swollen at that time, and remained so for many weeks. The other leg is not, and has never been affected. His general health is good.

*Examination.*—The leg is moderately swollen below the knee. The veins are swelled but not beaded or knotted. The opposite leg is not affected. An ulcer 5 x 3 cm. is located on the mesial surface a hand-breadth above his ankle (Fig. 257). It is surrounded by a hard,
almost cartilaginous wall. It is serrated and somewhat undermined.
The base of the ulcer is pale red and shining, almost dry except at the
proximal end, where a clear, thin fluid covers it. Fine papilliform
projections protrude from the surface, especially at the lower part.
It is these projections that seem most sensitive to touch. The border
is but little sensitive.

Diagnosis.—This is no doubt a congestion ulcer caused by the deep
thrombosis which complicated his typhoid fever. That it is so is
proved by the fact that when the leg is emptied of blood by elevating
it and then compressing the long saphenous vein, then lowering the
leg the veins refill at once. The fact that the opposite leg is unaffected
also suggests a unilateral causation. This fact makes it likely that
an attempt to cure the ulcer by ligation of veins as is done in the
case of static varicosities would result only in destroying the remain-
ing venous return. The tendency of the leg to swell can not be con-
trolled by operation. His chief complaint is of pain. By removing
the ulcer, the pain will be removed at least temporarily, and if he
will lie with his leg elevated two weeks, a graft will heal and he will
be temporarily relieved of his ulcer.

Treatment.—The ulcer was resected by an oval incision and the
defect covered by Thiersch grafts.

Pathology.—The section shows a pearly white gristly surface. The
slide shows a dense rather palely staining connective tissue with some
plasma cell infiltration.

Fig. 257.—Chronic ulcer of the leg following typhoid fever ten years ago.
After-course.—The healing was prompt, and five years after, the ulcer has not re-formed.

Comment.—This patient has done uncommonly well. The results are usually in proportion to the patient's intelligence and willingness to cooperate. In spite of all caution the ulcer may return. It would be desirable if he could change his occupation to a less laborious one, though he is better off in one requiring locomotion rather than one which would require standing without movement.

CASE 3.—A farmer aged twenty-two came because of an ulcerated leg.

History.—He has had swelling of his left leg below the knee for five years. Four years ago he was operated on for the removal of enlarged veins. Following this operation the leg swelled more than before, and soon an ulcer developed. This has persisted and is so painful he is quite incapacitated. He had typhoid fever before the development of the swelling.

Examination.—The left leg below the knee to near the ankle is as large as the leg above the knee. It is very firm and can not be made to pit save about the ankle. It is a deep bluish red in color. This is most marked just above the ankle. At this point there is an ulcer the size of a watch. The ulcer is superficial with an irregular border with small secondary ulcers about it. These also are very superficial. There is some sensitiveness about the ulcer.

Diagnosis.—The cause of the disease originally is a typhoid thrombosis. This was aggravated by ill-advised removal of the superficial veins.

Treatment.—Amputation was advised but not accepted.

After-course.—A year later the condition was still the same.

Comment.—In viewing the dilated superficial veins after deep thrombosis the surgeon should heed the placard advice sometimes posted over the fiddler in the frontier dance halls "Don’t shoot the fiddler he is doing his durndest." The return flow of blood will not be aided by removing the only remaining channels. There are cases in which a judicious removal of veins, in these cases following deep thrombosis, may be done, but care must be exercised not to destroy the main channel.
CASE 4.—A woman of fifty-six came to the hospital because of ulcers and swelling of the legs.

History.—For twelve years she has had swelling of the legs. She has been troubled for the most of this time with an ulcer of the left ankle. The swelling is less intense when she is off her feet. She had a double milk leg following her fifth confinement twelve years ago. Her physician diagnosed varicose ulcers and requests that she be operated.

Examination.—The patient is a large woman apparently in good general health. Her thighs are disproportionately large even to her

![Varicose ulcers of the leg.](image-url)
generous trunk. Over the lower abdomen and thighs, and particularly over the buttocks, are large prominent veins. These are prominent when the patient lies down. A handbreadth above the left ankle is an ulcer the size of a dollar (Fig. 258). The walls are sharply defined by a hard heavy sear. Bordering it the skin shows scarring and the skin is hard and fixed. The same site on the other leg is occupied by a similar scar but there is no ulcer. Over the right hip is a cicatricial area in which the skin is firmly attached to the underlying tissue. The veins are less prominent over this area, but surrounding it they are larger than elsewhere in this neighborhood. The skin of the whole lower abdomen and thighs is thickened and the underlying tissue is dense and elastic. There is no pitting and the size of the veins is not materially influenced by the change in position. The general examination is without interest.

Diagnosis.—The condition is due to general varicosities. The history of double milk leg is significant. Because the veins of the lower abdomen are involved obliteration at least as high as the external iliac veins must have taken place. The fact that there is no notable change in the degree of filling of the veins on the change of position indicates that the collateral circulation is still inadequate. The degree of cicatricial formation about the ulcer is rather surprising considering the degree of venous stasis and indicates a less degree of actual impairment than would appear from inspection. The scarred area over the right hip obviously occurred from an obliterating phlebitis in times past. The physician’s diagnosis is correct, but his request for operation must be interdicted.

Treatment.—None.

After-course.—She remains the same.

Comment.—When varicosities are due to the obliteration of deep veins of the leg, removal of the superficial ones but takes away what little there remains of return channels and the condition so far as the disposition to ulceration is concerned is but aggravated. The thickened subdermal tissue indicates that the lymph vessels have been at least partly involved. Usually the history of a preceding phlebitis is sufficient to cause one to suspect this variety of varicosity, but curiously enough patients seldom volunteer this information. If the ulcer is out of proportion to the extent of the visible vessels, or if the subcutaneous tissues are thickened, and to a less degree if the vessels are palpable rather than visible, a preceding phlebitis should always
be suspected. Patients who can give as much time as necessary and who have intelligence enough to understand the difficulties involved, may be operated with a fair hope of curing the ulcer. The prospects are particularly good in women past the active period of life who are content to spend much time with the leg supported on a stool.

**CASE 5.—A laborer of sixty came to the hospital because of an ulcer on his leg.**

*History.*—He has had an ulcer on his leg for sixteen years. For a number of years before that time he had trouble with an ulcer, but it would heal at intervals. At first it gradually enlarged but now for a time it remained stationary. It causes some pain but it is the annoyance of the dressing chiefly that distresses him.

*Examination.*—He has varicosities of both legs and eczema of the right. On the left leg just above the malleolus is an ulcer 2 1/2 x 3 inches in extent. The border is irregular and hard. At some points there is an effort at healing while at others the disease seems to be advancing by a degeneration at the border of small circular areas. Small dots are seen in these areas. The base of the ulcer is covered with dirty, shiny, grayish-white granulations. The skin about the ulcer is atrophic and seems adherent to the deeper structures. The patient has fairly good health; arteriosclerosis; a blood pressure of 180; and a trace of albumin. (Fig. 259.)

*Diagnosis.*—The varicosities of the leg carrying the ulcer, as well as of the other one, suggest a persistent varicose ulcer. The peculiar eating, serrated border suggests something different. The small whitish dots suggest epithelial pearls. The name Marjolin's ulcer has been applied to this condition and it has been generally subjected to amputation.

*Treatment.*—Amputation 4 inches below the knee.

*Pathology.*—A cut section across the ulcer shows dense fibrous tissues without evidence of epithelial proliferation at the border. The slide shows proliferation of epithelium and some changes in cell type. There is no definite nest formation.

*After-course.*—There has been no recurrence.

*Comment.*—The malignant features of this disease have been unduly emphasized, and amputation advised on the strength of it. This, my first case, supplied me material which resulted in the adoption of a conservative policy. A wide excision followed by skin
Fig. 259.—Marjolin's ulcer of the leg.
grafting results in a permanent cure. In selecting the line of incision one must be governed by the state of the skin as well as by the border of the ulcer. A skin capable of supplying a good circulation must be reached. In covering the defect, if a base with a blood supply is reached, Thiersch grafts may be used as after the removal of a simple varieose ulcer. If the nutrition does not seem ample, a sliding graft from the calf of the leg may be used or skin from the opposite side may be requisitioned.

CASE 6.—A dentist aged forty-two consulted me because of a tumor on the calf of the leg.

History.—For a number of years he has noticed a small tumor on the calf of his left leg, half way between the knee and ankle. Recently it has annoyed him somewhat because of the rubbing of his trousers against it.

Fig. 260.—Bald-headed sarcoma of the calf. A. gross appearance. B. Slide of the same.
Examination.—The tumor now is the size of a small hickory nut, (Fig. 260-A) spherical in form, and closely attached to the skin. The surface is reddened, giving it an appearance as though the covering were mucous membrane. The skin is not movable over the surface of the tumor.

Diagnosis.—The reddened mucous membrane-like covering stamps it as a type of tumor usually seen over the trunk which is sometimes sarcomatous, sometimes epitheliomatous in histology.

Treatment.—The tumor was excised with a 1 cm. margin of healthy skin about the border of the tumor and extending down to the fascia.

Pathology.—The cross section of the tumor is a uniform pale pink color. On section the tumor is made up of heavy bundles of fibrous tissue with a considerable number of large ovoid cells with large ovoid nuclei. (Fig. 260-B.)

After-course.—No recurrence has taken place.

Comment.—The known clinical fact that these tumors tend to return has more to do with arriving at a diagnosis of fibrosarcoma than the histologic appearance of the tumor.

CASE 7.—A farmer aged forty-five entered the hospital because of a swelling of his left knee.

History.—The patient had always had good health and save for the present illness has never consulted a physician. Two years before he had complained of pain in the region of the left knee, and had been treated for rheumatism. The pain continued, however, especially when the patient was walking. There was very little pain when he sat still. For several months he had used a cane in walking. About four months before entering the hospital he noticed an enlargement just below the knee joint on the outside of the leg. This had slowly increased until it was about half the size of an egg. The patient thought he had lost some weight. There was no history of injury.

Examination.—Just below the left knee joint on the outer surface of the leg, just anterior to the tibio-fibular articulation was a rather soft tumor mass half the size of an egg. There was a tendency to bow-leg on the left side, none on the right. Physical examination otherwise negative. The x-ray showed destruction of a considerable portion of the upper end of the tibia (Fig. 261). Only a thin plate of bone was present below the joint. There was normal bone on the
inner surface of the tibia. Urine negative; hemoglobin 70 per cent by the Tappquist scale, white blood count 8,000, temperature 98.2, pulse 72.

Diagnosis.—A slowly growing medullary tumor gradually de-

Fig. 261.—Sarcoma of the head of the tibia.
stroying the surface of the bone could hardly be other than a sarcoma. Nearly all of these are giant-celled in character.

Treatment.—At operation the tumor mass was removed and the bone thoroughly curetted, care being taken not to go through the thin plate of bone into the knee joint. The cavity was then packed with gauze and the incision closed except at one point for drainage. The patient did not take the anesthetic well, and showed signs of shock after the operation, but was in good condition the next day. He was kept in bed with the leg splinted for twenty-four days. Then the leg was put in a cast, and he was allowed to go home. In removing that portion nearest the joint, the thin plate of bone lying beneath the joint cartilage only was allowed to remain. On the median side of the tibia also only a thin shell of bone remained. The remainder of the shell covering the tumor was removed. After the operation was completed, there remained only a plate of bone "L"-shaped to form the basis of the new bone. The amount of involvement was much greater than I was led to expect from the study of the x-ray plate.

Pathology.—The material removed was reddish and granular, showing spicules of bone about the border. Many giant cells were found on microscopic examination, particularly in that portion of the tumor lying nearest the bone.

After-course.—He returned at intervals for observation. Roentgenograms taken at these times showed advancing growth of bone. Up to the present time, three years after the operation, the patient walks without a limp and there has been no sign of recurrence.

Comment.—Nearly all of these circumscribed bone tumors are giant-celled in character and are cured readily by local operations. Nearly, but not all. I once saw inguinal metastasis in a patient on whom local resection had been done, when from the appearance of the x-ray plate it seemed a permanent cure must result. Whether a resection, not a curettage, is more apt to be followed by a recurrence, I do not know. The operation was done by a competent surgeon. In cases, such as the one recounted here, if only the merest shell of bone remains, new bone will form. It is doubtful whether mere loss of bone alone can form an excuse for amputation.
CASE 8.—A boy was brought to the office because of a peculiar swelling of the calf.

History.—This child is the youngest in a family of four, the other members of which are healthy and without blemish. The parents likewise are healthy. The father relates that when the child was born the cord was wrapped about its left leg. It was noted at that time that the calf below the encircling cord was somewhat puffed. Nothing more was noted until the child was a year old when it was observed that there was a swelling in the calf. This enlarged to the size of a hen’s egg in three weeks. It extended upward and downward until it covered the posterior surface of the calf muscles. When the child was fifteen months old he was taken to a surgeon
who diagnosticated a lipoma and made an incision to remove it. When the tumor was exposed, he discovered the error of his diagnosis and closed the incision. It is now five months since this event. During this time the tumor has grown apace with the child but probably but little more. He seems perfectly well otherwise.

Examination.—The boy is a perfect sample of a boy save that the calf of the right leg is augmented by a tumor mass (Fig. 262-A). It is coextensive with the belly of the gastrocnemius muscle and at first glance reminds one of a pseudohypertrophic muscular dystrophy. On palpation the mass is firm, but movable on the muscle beneath and the skin is not freely movable over it, neither is the skin directly attached to the tumor. The surface of the tumor is firm, slightly lobulated as though tense globules had been submerged in a mass of equal consistency. It was incompressible and nonpulsating. The leg measures 14½ inches in circumference at this point. The normal blood vessels could be felt in their natural situations.

Diagnosis.—The congenital appearance, the close relation to the fascia of the calf muscles, the tenseness of the small lobules together with the incompressibility stamp it as a cystic lymphangioma.

Treatment.—From experience with cystic lymphangiomas of the neck it was assumed that the x-ray might be of service. Treatment was given by a competent roentgenologist at intervals for a period of ten months.

After-course.—Soon after the treatments were discontinued the tumor underwent a violent reaction. It became intensely inflamed so that it measured 22 inches in circumference. It was hard to the touch. The child's temperature rose to 103-105 and remained so for many weeks. The temperature could be reduced only by packing the leg in ice. The child was stuporous at times. The fever gradually subsided at the end of seven weeks without suppuration. Following this the leg became smaller than before the acute inflammation set in. Now six months later it is much reduced in size. It is firm, the skin is more intimately attached to it than at the first examination and the small bosselations are not to be made out. On the contrary, the whole mass feels leathery and inelastic and the skin is attached to it. Just within the past few weeks there is a recrudescence of the inflammation at the lower pole so that it seems hot and manipulation pains the child.

Comment.—Evidently this mass underwent an inflammatory re-
action as is commonly observed in like lesions of the tongue. Fortunately, unlike the lesions of the tongue which increase with each exacerbation, this lesion seems to have been markedly reduced. From the character of the process, spontaneous cure is not likely, and in consequence the father has been advised that the growth should be removed when the child has become a few years older and is able to withstand the operation better, for because of the intimate relation of these tumors to the surrounding growth the dissection is tedious and time consuming.

Re-entrance.—Nine months after the above was written the child was brought back. He had been suffering intense pain for a number of months. The mass was smaller than when last observed (Fig. 262-B). The mass was dense and in numerous places black points were protruding from the skin, presenting the appearance of a cutaneous
hemorrhoid when being shelled out through a small incision. It was hoped that these were blood clots though the resemblance to melanotic masses was painfully close (Fig. 263-4). Removal of the mass was advised and carried out. The entire affected area was excised and the wound packed. No attempt was made to cover the defect. The tissue removed presented a lobulated pinkish white mass with blackish areas between (Fig. 263-B). The black areas proved on section to be blood clots. The mass of the tumor was made up of large mononuclear cells and large ovoid nuclei. These occurred in long chains and were for the most part separated by strands of connective tissue (Fig. 264). The lad died six months later of exhaustion due probably to visceral metastasis.

CASE 9.—A bookkeeper aged twenty came to the hospital because of an ulcer on his ankle.

History.—The patient has always had good health until October, two years ago, when he began to have a sense of tightness and pain in the left side of the chest, with cough, moderate expectoration, fever and loss of weight. He was in bed for six weeks. During January and February he had night sweats and in May coughed a moderate hemorrhage. After this he began to improve. During March he began to have pain in his left ankle with swelling. After several
weeks a small incision was made into the swelling by his physician, but no pus was found. Following this there was a spontaneous opening in several other places and the site of the incision has remained open.

Examination.—The ankle is swollen, particularly about the external malleolus. Just over this point are three ulcers. They vary from .5 to 1.5 cm. in diameter (Fig. 265). Their border is soft and undermined, the base is fine, granular, and produces but little pus. None of these appear to communicate with the joint. The ulcers are sharply defined, somewhat undermined, and the floor is covered with fine granulations. They give off a thin, watery discharge. The skin about the border of the ulcer is a deep cyanotic color. The movement of the ankle is limited somewhat, but the joint surfaces seem unaffected. There is dullness and a prolonged expiratory sound in the left apex. No sputum could be produced. Laboratory examination was negative.

Diagnosis.—The patient had an acutely developing lung tuber-
eulosis and this process coming on during its height at once suggests the possibility that this is of like nature. The form of the ulcer and the color of the skin bordering them appears to justify this suspicion. The seat of the infection evidently was extracapsular or at least extra-articular.

_Treatment._—The lesions were treated with balsam of Peru and the joint moderately fixed with adhesive strips.

_After-course._—Healing was complete in five months and has remained so.

_Comment._—The recovery of the lesion would no doubt have been expedited had iodoform-glycerine been injected into the tissues about the ulcer. His occupation was such as to make the use of this drug objectionable.

**CASE 10.**—A man aged forty-eight came because of a small growth on his leg.

_History._—The trouble has been present for twenty years. There is a small nodule on the outside of the leg below the knee. He has pain in the foot.

_Examination._—A tumor the size of an olive is situated in the course of the superficial peroneal nerve. The slightest pressure causes pain in the foot. It has gradually increased in size and with this an increase in the degree of pain.

_Diagnosis._—Because pain is caused in the region of the distribution of the superficial peroneal nerve when the tumor is pressed on it is evident that the growth involves this nerve. Alcohol injections having failed to give relief, and the pain having become too intense for endurance, removal seems to be indicated. This will mean a sensory disturbance on the outer side of the foot.

_Treatment._—The nerve and tumor were exposed. There seemed to be no way of removing the tumor without sacrificing the nerve, so the tumor and a section of the nerve was removed.

_Pathology._—The gross tumor is as large as a hickory nut (Fig. 266-A). It is firm to the touch and on section shows a pinkish-white, glistening surface. The slide shows mostly fibrous tissue with but little cellular increase (Fig. 266-B).

_After-course._—A year after the operation the patient writes that he has been free from pain since the operation. There is some numbness on the outer side of the foot. This he regards with satisfaction.
because it reminds him of the relief he has from the long-continued pain.

Comment.—The destruction of a cutaneous nerve supplying the hand is a matter of some moment. For this reason I feared to re-

Fig. 266-A.—Neurofibroma of the superficial peroneal nerve.

Fig. 266-B.—Slide of the preceding, made up of fibrous tissue with some connective tissue cells but without nerve or malignant elements.
move the tumor surrounding the peroneal nerve. In this case, at least, the results were satisfactory.

CASE 11.—A student aged eighteen came because of a stiff ankle and a scar on the posterior surface of his right leg.

History.—Two years ago he was on a bob sled which hit a Ford and he suffered a broken right femur and bruised the calf of his leg. The "Volkmann's contraction" of the calf muscles started immediately after the injury. The leg was subsequently immobilized for three months. When he was seen two years later there was a fixed equinus deformity of the ankle and a marked shortening of the leg. The ankle was completely immobile and the patient was unable to walk on his toes. The scar on the posterior surface of the leg was still visible, but the skin was normal. The peroneal nerve was not paralyzed in this case.

Fig. 267.—“Volkmann’s contraction” of the calf muscles.
right leg. He wore a splint, and a weight was applied. In five
weeks the dressings were removed and it was found that abscesses
were forming in several places. Nine openings had to be made be-
fore healing finally took place. Small sinuses persisted for more
than a year. The little toe became infiltrated and was removed.
After healing was complete it was found that the ankle was stiff
and the toes pointed downwards.

Examination.—The foot is extended (Fig. 267), but there is no
bony ankylosis, dorsal flexion being due to the shortening of the ten-
don. A deep scar occupies the middle of the lateral side of the
calf. Smaller scars are on the medial side and about the tendon
near the ankle. The calf muscles are firm and scar-like. The skin
is inelastic and is intimately attached to the skin, particularly near
the ankle.

Diagnosis.—Obviously there was an inflammation involving the
muscles which resulted in suppuration. A fibrosis has resulted
which has destroyed the contraction powers of the muscles. The
lengthening of the tendon, therefore, cannot restore function and
all that can be done is to provide a better position of the foot.

Treatment.—The tendon was lengthened by plastic. The head of
the astragalus was removed. In forcing the foot to a right angle
the skin above the ankle ruptured because of its inelasticity and
contracted state. The foot was held at right angles with a splint.

After-course.—Some flexibility in the ankle remained but no vol-
untary motion was restored. The spring in the ankle resembles that
in the ankle of an artificial leg.

Comment.—Suppuration is not usually a concomitant of Volck-
mann's contraction. The muscle changes and the history of tight
bandaging warrants the placing of the ease in this category. Once
a fibrosing myositis has taken place, restoration of function is not
possible.

DISEASES OF THE FOOT

Gangrenous affections of the foot are common. Wide early ampu-
tation is important. Chromatophoric tumors must always be sus-
ppected when there is a tumor or ulcerous lesion. The painful affec-
tions may be either inflammatory or static, or both.
CASE 1.—A man aged seventy-six came because of blackening and of pain in the right foot.

History.—Two months ago he began to have pain in his right foot. He noted that it had a numb feeling despite the pain. A month ago

Fig. 268.—Diffuse dry gangrene of the foot.
he noted that a black area had formed about the nail of the great toe and above the ankle. Following this, the other toes became black and the lateral border of the sole as well. Because of the pain, he has been obliged to remain in bed. His appetite is indifferent.

Examination.—The blackened portions of the foot (Fig. 268) are hard to the touch. The remaining part of the foot has a peculiar soft feel. The black area extends in addition to the areas above noted, along the tibial crest to near the knee. He complains bitterly when the foot is moved in the slightest degree. No pulsation can be made out below Scarpa's triangle. The patient presents a general arterial sclerosis with a blood pressure of 190.

Diagnosis.—The slow onset and the dried state of the extremity align this ease with the senile gangrene.

Treatment.—Amputation at the junction of the lower and middle thirds of the thigh was done under spinal anesthesia.

Pathology.—The vessels were much thickened and calcareous, particularly in the popliteal space. A thrombus extended from this to far down the tibial and popliteal arteries. There was no bleeding from the articular vessels during the course of the operation.

After-course.—The patient promptly recovered his appetite and general strength. There was some disturbance in the wound healing because of necrosis of one corner of the flap.

Comment.—The fact that the progress was fairly rapid and the area of changed nutrition widely distributed made it imperative that the amputation be done high up. The fact that one corner of a flap became gangrenous following operation indicated that the operation was done at the very lowest possible limit.

CASE 2.—A man aged seventy-two came to the hospital because of a general blackening of the toes of the right foot.

History.—For some years the patient has had pain in the feet, particularly in the soles. These pains were not continuous. Recently he noted that this pain was more severe and predominately in the right foot. Ten weeks ago the great toe began to blacken. This has gradually spread until now it extends up half the distance to the ankle. There is now a general soreness but the pain is less.

Examination.—From the tarsometatarsal region distalward the foot is coal black, dense and dry (Fig. 269). The line of demarcation between the black area and the unaffected area is very sharply
defined. The skin on the proximal side shows a slight reaction as if an attempt were being made to cast off the dead portion. The patient has a pronounced arteriosclerosis, a moderate prostatic enlargement, and abundant urine of low specific gravity.

**Diagnosis.**—The sharp line of demarcation indicates a localized vascular disturbance. This makes amputation possible at a lower line than would be the case if the gangrene were patchy as in the preceding case. There is no excuse, however, for amputating lower than the junction of the upper and middle thirds of the calf.

**Treatment.**—Amputation under spinal anesthesia was done four inches below the knee.

**Pathology.**—The popliteal and tibial vessels were occluded with a clot but the articular vessels were free as were the muscular. There was marked thickening of the plantar vessels.

**Comment.**—The prodromal pains were long drawn out and during this period the use of Ringer's solution might have averted the major disturbance. The fact that the disturbance of nutrition advanced so slowly and particularly because the line of demarcation was

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**Fig. 269.**—Localized dry gangrene of the foot.
sharp it was evident that the nutritional disturbance was local. This admitted of a lower amputation than would have been the case had the demarcation been less sharp.

CASE 3.—The patient suffers from mental aberration, swelling, and blackening of the foot.

History.—Age sixty-four. While prospecting in the hills the patient evidently lost his way. So far as can be determined he was without food for several days, when found he was unable to account for his whereabouts. It is not possible to state whether he lost his way and became delirious from exposure or whether he became delirious and because of this lost his way.

Examination.—The patient is unable to lie down because of dyspnea. His apex is bounding and diffuse, displaced three finger-breadths downward and outward. The rate is about 90 and intermittent. There is some dullness at the bases of both lungs with moist small and medium-sized rales throughout the lungs. Both feet are swollen. The right is black and the skin has separated over wide areas (Fig. 270). Fluid oozes from the areas so exposed. Manipulation of the leg seems to cause but little discomfort.

Diagnosis.—It is not possible to state whether the condition was due primarily to exposure or to vessel occlusion. The fact that the other foot is equally swollen but not gangrenous gives warranty to the supposition that had he not been subject to the exposure he would not have had gangrene. The affected part is moist for the most part, but the toes are beginning to mummify which indicates the difference in the condition is due to the rapidity of the onset and not because of a difference in the nature of the process. This removes it from the class of the moist gangrene, synonymous with infection.

Treatment.—Amputation in the midthigh under spinal anesthesia. Because of the dyspnea the amputation had to be done with the patient in the sitting position. The flaps were held in position by two loose silkworm-gut sutures and the remainder of the wound packed with gauze. He was given tr. strophanthus.

Pathology.—Both veins and arteries were filled with blood clots as high as the upper border of the popliteal space. The tissue was edematous and infiltrated with a bloody fluid. The tissues about the toe nails were beginning to mummify.
Fig. 270.—Rapidly developing dry gangrene of the foot.
After-course.—The wound healed promptly and the dyspnea and cardiac dilatation subsided, and a year later the patient seemed in good health.

Comment.—He has no memory of the last days of his wandering, but obviously he was lost and his subsequent disturbances were the result of exposure. The cardiac and associated lung condition also were due to exposure. The fact that his feet had been wet and cold accounts for the deep changes with associated vascular changes, though the feet at no time were actually frozen. This conclusion seems warranted, since now three years after, he is fully recovered. Neither the heart, lungs, nor remaining foot gives any evidence of the past serious condition. In this case spinal anesthesia was extremely valuable. A general anesthesia was quite out of the question and in a leg in the state of this one, local anesthesia would have been extremely difficult.

CASE 4.—A housewife aged sixty-one was brought to the hospital because of dyspnea, a distended abdomen, and pain in the side and back.

History.—The patient was not rational, due, a daughter stated, to a tablet given by the local doctor in order to make it possible to move her to the hospital. The following history was given by a daughter:

She has had shortness of breath and weakness at intervals for a number of years. She has had more or less chronic cough. Swelling of the feet noticed six months ago. Since two weeks she has had swelling of the abdomen and pain in the right side and back. Past illnesses not known. Has had eight children, seven births. No miscarriages. One child died at one month, cause unknown, one at nineteen years of typhoid.

Examination.—The patient is sitting up in bed, threshing the arms about, and talking very irrationally. She continually rubs her nose. The skin all over the body pits on pressure. The face is cyanosed and the breathing rapid. The pupils are moderately dilated. There is a wide area of pulsation over the chest wall, but the apex beat is not discernible. The heart is rapid, about 170 per minute and arrhythmic. The area of dullness extends to the axillary line. No murmur could be made out.

The bases of the lungs are dull with crepitant rales on both sides. Abdomen very much distended with dullness in both flanks. Liver
margin can not be made out but there is marked tenderness in the upper right quadrant. The pulse is as given, 170, the respiration 30, the temperature 101. The urine is 1.010, albumin a trace and a few hyaline casts.

**Diagnosis.**—The patient evidently has a marked myocardial decompensation. Its exact duration could not be learned from her companion. The pain in the abdomen is of relatively recent date. It is not possible to establish the coincidence of the decompensation with the advent of the upper abdominal pain. Because of the state of the patient an accurate state of the liver and abdominal wall could not be determined. There was free fluid in the lower abdomen, however, decompensation is probably the cause of the pain in the right upper quadrant. At any rate, a conservative plan is the only one possible.

**Treatment.**—She was given digitalin.

**After-course.**—For a few days following the temperature varied between 96° and 100.5°, the respiration 30 to 34 and the pulse was uncountable for the most part. At the end of the week the temperature varied 98° to 99°, the pulse 92 to 120 and the respiration 22 to 28. She was quite rational and fairly comfortable. Suddenly she complained of great pain in the right foot and leg. When this extremity was examined it was cold and bluish. The femoral artery pulsated vigorously, but the popliteal and those below could not be discovered. Obviously there was thrombosis of the popliteal artery. On the fourth day the end of the big toe began to become dry and blue-black spots appeared on the instep and above the ankle. On the eighth day the foot had become quite black and mottling appeared above the ankle. The pain was still severe. The temperature at the time the embolism occurred dropped to 96° and for ten days following varied from 97° to 101.5°. The pulse remained around 90. At this time the albumin was much increased and there were many casts, but the specific gravity was 1.020.

Thirty-three days after the onset of the embolism, demarcation was complete. Amputation of the leg was done under spinal anesthesia with the following technic: One tablet of novocain containing 2 1/4 grains was sterilized in 3 c.c. of water. At the time of use 4 drops of adrenalin were added from the bottle and the whole injected into the spinal canal, after withdrawing 3 c.c. of the spinal fluid. In order to make the shock as little as possible I started to amputate
below the knee, but finding the blood vessels thrombosed, amputation was done above the knee. There was no shock, and no pain. In fact the patient did not know the amputation had been done. Following this, improvement was rapid and compensation was restored in large measure.

Comment.—This was one of my first cases of amputating for gangrene under spinal anesthesia. Now I should not wait for demarcation in the hope of being able to amputate below the knee but would amputate at once above the knee. In the management of these cases the spinal anesthesia has solved the question of shock. I have repeatedly amputated when the patient was so dyspneic she could not lie down. When gangrene begins, if from thrombosis, after the immediate shock subsides, the sooner the amputation is done the better. The retention of a necrosing protein can but jeopardize a heavily burdened patient.

CASE 4-A.—A boy aged seven was brought to the hospital because of a swelling of his ankle.

History.—For more than a year the mother has noticed that the inner side of the ankle was enlarging. It has continued gradually to enlarge to the present time. The lad has had no discomfort from it. His health has always been good.

Examination.—The site of the internal malleolus is occupied by a prominence the size of half an egg. The skin over it is not discolored. It is hard to the touch and is not sensitive to pressure. The lower half moves with flexion of the foot while the upper does not. The x-ray shows an outgrowth on the outer malleolus and from the astragalus. The masses show trabeculations similar to that of the bone from which they spring, but the trabeculae are larger (Fig. 271-A).

Diagnosis.—The mottled appearance of the x-ray suggests some bony outgrowth without any cartilaginous admixture. Since some of these growths manifest malignaney, their removal is indicated.

Treatment.—The upper half of the astragalus and the tibia below the epiphyseal line were removed.

Pathology.—The growth is porous osteoma. No cartilaginous elements can be found.

After-course.—The wound healed without incident, and locomotion became unhindered. Now for four years after operation there
is inversion of the foot due to elongation of the fibula, while the tibia remains stationary. To correct this it will be necessary to reduce the outer border of what remains of the astragalus.

Comment.—These osteomas of the tarsal bones usually respond to local resection. I believe it would have been proper to have removed the hyperostosis from the astragalus, only leaving the epiphyseal end of the tibia. This would have prevented the now

Fig. 271-A.—Chondroma of the astragalus.
annoying shortening of that bone. The irritation manifest in the tibia probably was due to the irritation from the growth in the astragalus. The preconceived notion that it might contain cartilage proved to be erroneous. Past mistakes sometimes leave a substratum of caution that cause us to make others of an opposite character.

CASE 4-B.—A housewife of thirty came because of a club foot with swelling and pain when walking.

History.—The foot gave little trouble up to ten years ago. While she was pregnant with her first child the foot began to pain. It would swell up towards evening and hurt a great deal, but she did nothing for it and it was always better the next morning. In December, 1918, she had an attack of influenza and since that time there has been such a continuous pain in the foot that she could hardly walk. Her general health is good.

Examination.—The left foot is clubbed. There is a large cyst-like mass on the dependent outer border of the foot (Fig. 271-B). It is spherical with a firm wall. It is not painful to pressure. The x-ray shows the usual picture of an extreme equino-varus. The cyst wall casts a dark shadow (Fig. 271-C).

Diagnosis.—Because of the marked deformity and the persistence of the mass amputation seems better than any attempt to restore the normal outlines of the foot. The mass beneath seems to be but a large bursa with dense walls.

Treatment.—The foot was amputated just above the ankle joint.

Pathology.—The cyst was filled with a clear fluid. The wall was very dense and fibrous, but no calcareous matter was demonstrated to account for the dark shadow on the x-ray picture.

After-course.—The wound healed by primary union. There was considerable serous fluid oozed from the wound and this was still present at the time the patient was allowed to go home. The skin was under considerable tension so the sutures were allowed to remain. The patient insisted on going home nine days after operation, against advice. She was allowed to go without removing the sutures, under promise to come back in five days for examination. The wound was healing well at this time. Later she returned with a large ulcer on the end of the stump. No local cause was apparent and a testing of the sensation showed it to be markedly diminished.
Fig. 271-B.—Cyst complicating a club foot.

Fig. 271-C.—Calcareous deposit in the wall of the preceding.
Examination of the sacral region showed a soft fatty tumor. Re-amputation was done five inches below the knee.

Comment.—The amputation was made in the wrong place. The artificial limb makers like them done about five inches below the tuberosity of the tibia. The long stump left in this case interferes with the construction of the ankle. A unilateral foot deformity or one of any unusual degree calls for the search for an occult spina bifida. Possibly the presence of this deformity was responsible for the disturbance of the foot during pregnancy. No mass could be felt in the pelvis, however.

**CASE 5.**—A farmer aged twenty came to the hospital because of a swelling over his ankle joint.

*History.*—For a year he had noticed a swelling over his ankle joint. It caused him but little trouble but recently it has developed more rapidly and he has had some pain. His general health has always been excellent.

*Examination.*—Anterior to and just below the external malleolus of his left foot is a soft fluctuating swelling (Fig. 272). It is
not painful, and does not seem to communicate with the ankle joint. The movements of the foot are not impaired. No dense bodies can be felt in it.

**Diagnosis.**—Its soft fluctuating feel distinguishes it from a ganglion and the absence of rice bodies excludes it from tuberculosis. It must be, therefore, a hydrops of the peroneal tendon.

**Treatment.**—The sac was dissected out and in the process the peroneal tendons were exposed for a distance of two inches.

**Pathology.**—The tissue removed was a simple synovial sac without thickening of any sort.

**After-course.**—Motion was unimpaired after a month.

**Comment.**—These conditions must be operated on with the most careful attention to detail both as to asepsis and technic or impaired function will result. They are not suited for office or dispensary practice.

**CASE 6.**—A housewife aged thirty-six came to me because of a sore toe.

**History.**—Nine months ago she noticed a low pimple on the inside of her right toe. It did not pain much but she regarded it as a soft corn. As it began to develop more rapidly, exceeding the confines of a corn, her physician sent her to a dermatologist who treated her with injections and later with radium. Since this did not slow up the disease, she was advised to see a surgeon.

**Examination.**—On the lateral side of the left great toe is a flat mass, \( \frac{3}{4} \) inches across. It is a mottled grayish white and red. It is low fungoid in outline and gives the appearance of pushing out through the skin (Fig. 273-A). The bordering skin is rolled out and does not appear to be connected with the tumor. The tributary lymph apparatus is free. Her general health is good.

**Diagnosis.**—The mottled appearance of the tumor and its independence of the skin stamp it as a melanosarcoma or a giant-celled sarcoma of the tendon sheath. The latter is unlikely, since the sarcomas do not ulcerate unless molested. How much the efforts of the dermatologist may have contributed to this end can not be determined. The patient's early diagnosis of a corn would seem to count against such possibility. The previous diagnosis of syphilis is untenable since the trouble is evidently a proliferative one, the skin being destroyed by the growth of the mass. An amelanotic melanoma
DISEASES OF THE LOWER EXTREMITIES

seems, therefore, to be the only diagnosis possible. If the above conclusion is correct, no treatment will be of avail.

Treatment.—A metatarso-phalangeal amputation was done.

Pathology.—The tumor is a fungoid mass which on section shows a mottled appearance. The slide shows large ovoid cells in columns independent of the epidermal epithelium intermingled with fibrous tissue (Fig. 273-B).

After-course.—The patient returned in three months with numerous small tumors scattered over the dorsum of the foot and the inguinal lymphatics were enlarged. In the succeeding months all these extended and masses appeared in the abdomen which increased until she died.

Comment.—Possibly an earlier amputation would have prevented these recurrences on the dorsum of the foot. Logie would seem to
favor such a conclusion, but experience fails to find facts to substantiate it.

**CASE 7.**—A man aged sixty-four was sent to me because of an ulcer below his ankle.

*History.*—For several years he has had an ulcer below his left ankle. It began as a small irregular ulcer and gradually extended around the edge. It has gradually enlarged. It has caused no pain and little inconvenience. He has been treated for a month with the x-ray without results other than to destroy the skin about the tumor and make it stand out more clearly. He thinks this is evidence that the "roots" are being loosened. His general health is good.

*Examination.*—There is a defect in the skin below the external malleolus about an inch in diameter (Fig. 274). There is a zone about this defect from which the epidermis is exfoliated, likely the result of the x-ray treatments. There is a globular mass protruding through the skin defect. This mass is deep red, finely granular, elastic and
clean and does not bleed on touch. It appears to lie independent from the skin. The lymph glands are free and his general health good.

*Diagnosis.*—The tumor is one which progresses slowly but gradually and while independent of the skin, tends to destroy it. It must, therefore, be malignant. True sarcomas developing from the fascia do not occur in this part of the foot. This fact together with the dry glazy, granulating surface characterizes it as a melanoma.

*Treatment.*—Amputation was done midway between the ankle and the knee. Amputation was done because the area that required

![Spindle-celled melanoblastoma of the foot.](image)

removal was so large that skin grafting would have been required. The patient did not care to submit to this.

*Pathology.*—The gross section shows the tumor to be uniformly pinkish white with a suggestion of bundle formation in the center. The section shows a spindle-cell structure in the center portion (Fig. 275) while at the periphery the alveolar form shown in a previous case may be seen.

*After-course.*—A year and a half after the amputation the inguinal glands began to enlarge and reached the size of an egg. The patient applied iodine vigorously and the glands regressed almost completely, contrary to my prediction. These glands did not enlarge again. In another year and a half, however, masses could be felt along the spi-
nal column. These gradually enlarged and attained the size of grape fruits before he died, some four years after the operation.

Comment.—At the time of the amputation the growth seemed localized, but notwithstanding radical treatment, metastasis had already taken place. The peculiar feature of these tumors is that despite the obvious fibrous character of the center of the original growth the metastasis was, as is the case in all of these tumors, by way of the lymphatics. This case presents two distinct types of arrangement of the cells, the plain fibrillar and the alveolar.

Summary.—The study of these tumors has convinced me that the component cells are always mesoblastic in origin. In some of the earlier tumors there is an apparent connection between the cells and the epidermal cells. The connection is that of secondary contact. It is common knowledge due to tissue culture experiments that wherever there is a fibrinoid degeneration of the connective tissue, whether from cellular growth or from bacterial infection, epithelial cells tend to follow fibrin bundles now. By using dyes specific for fibrinoid bundles the epithelial cells can be traced down these fibrils into the group of chromatophore cells. The use of the path of metastasis, by way of the lymphatics, as an argument that pigment cells are epithelial is wholly unwarranted. The only answer required is the simple statement that tumors derived from chromatophore cells metastasize by way of the lymphatics, just as epithelial celled tumors do.

This group of tumors besides being of intense scientific interest, are likewise of great practical importance. If their nature is recognized in their incipiency and the proper treatment applied the cure is certain. If this period goes unrecognized and improper management is instituted, certain disaster results.

CASE 8.—A farmer aged fifty came to the hospital because of an ulcer on the sole of his foot.

History.—Three years ago the patient noticed a black spot on the sole of the foot in front of the heel. It has grown gradually he thinks. It has not caused any pain. The secretions annoy him, somewhat. It is because of its persistence that he seeks medical advice; he is afraid it may become a cancer. The patient has been a heavy drinker but has had good health until recent years when he began to have shortness of breath and pains in the extremities.
Examination.—An ulcer the size of a dime is located as seen in Fig. 276. Its border is irregular and undermines the skin. The base of the ulcer is made up of coarse granulations of a deep red, glistening color. These granulations are elastic rather than dense and do not tend readily to bleed on manipulation. The reflexes are increased in this leg, but not in the other. The sensation in the affected side seems to be markedly lessened. There is a general arteriosclerosis and evidence of a chronic nephritis. He was given potassium iodide internally and balsam of Peru locally and instructed to return for further observation. When he returned after two months, it was noted that in the border of the ulcer small granular masses seemed to be destroying the skin by growing through it from beneath. The granulations in the floor of the ulcer had become augmented in size. The inguinal lymph glands were not enlarged.
Diagnosis.—The slow onset and indolent character of the ulcer together with evidence of disturbed sensation of the foot caused me at first to think of a perforating ulcer. The chief point against this diagnosis was that it did not perforate. On the second visit a close inspection of the small nodules at the periphery above noted and the evident proliferative character of the floor of the ulcer made this diagnosis untenable. Besides his previous habits, the facts of which I had obtained in the meantime, made his peripheral nerve disturbance capable of another interpretation. The character of the ulcer and its mode of spreading fit with the usual characters of tumors springing from pigment cells and the diagnosis should have been made at the first visit.

Treatment.—The ulcer was widely excised under local anesthesia.

Pathology.—From the gross appearance it is apparent that the growth is independent of the epidermis. The section shows it to be made up of groups of oblong cells, without chromatin, arranged in alveolar groups, but with a distinct intercellular stroma (Fig. 277).

After-course.—The wound healed readily. In a year and a half he returned with a series of nodules in his calf, a few along Hunter's canal and a number of glands in the groin. A year later nodules appeared along the spine and in six months more he was dead. The foot remained free from recurrence.
Comment.—This case was typical for this class of affections. The occurrence along the course of the lymphatics, in the groin, and finally in the retroperitoneal glands, is wholly typical. No matter what the treatment may be, or how early instituted, the results are the same; inevitable recurrence in the lymphatics of the leg, the groin and finally in the retroperitoneal glands. Local excision of these preserves for them the use of their legs a few years. Amputation seems not to prevent or delay recurrence. I have seen patients live as long as eight years both with local excision and with amputation.

CASE 9.—A man aged fifty-four was sent to me because of a tumor of the groin.

History.—For a number of months the patient has noticed a tumor in his right groin. Recently it has been developing more rapidly and has caused considerable pain. He consulted a surgeon a few days ago who diagnosticated infection and incised the larger mass. Some blood flowed out but nothing more. Otherwise he is well. He has had no injury or other trouble with his foot and knows no cause for the swelling.

Fig. 278.—Melanoblastoma of the foot.
Examination.—The right groin is occupied by a bosselated mass made up of nodules the size of a hickory nut to that of a walnut. They are located for the most part below Poupart’s ligaments. They are firm, elastic, somewhat matted together. The tumors are fixed. At the summit of the larger one is an incision from which bloody fluid is still oozing. In Hunter’s canal are other tumors the size of hazelnuts. These are not painful, but discrete and hard. On the sole of the foot is a superficial ulcer made up of a dry scaling epidermis and a dry granulating mass in the center (Fig. 278). This center is deep red in color and resembles the granulations in an old ulcer, save that the surface is drier. About the border the new growths seem to destroy the surrounding skin by growing up through it. The affected area is nowhere tender and can not be made to bleed by manipulation.

Diagnosis.—The location of the glands below Poupart’s indicates that the source of trouble is in the leg. The glands in Hunter’s canal prove it. The duration of the adenopathy and their density and painlessness are strongly suggestive of secondary malignancy. The finding of the granular ulcer in the sole of the foot confirms the suspicion. The granular base, and the tendency to peripheral extension marks it as a melanoblastoma.

Treatment.—The glands were treated by x-ray without result.

Pathology.—The patient did not care to satisfy our curiosity by allowing us to excise the ulcer to permit a microscopic examination.

After-course.—The glands were gradually extending when last heard from.

Comment.—In this case the patient did not regard the condition in the sole of the foot of sufficient importance to mention it. Enlarged glands below Poupart’s always call for a careful inspection.

CASE 10.—A woman aged fifty-six came to the hospital because of an ulcer of the foot.

History.—The patient first noticed a small black spot five years ago. It grew scarcely at all for a long time and it is only recently that it has annoyed her by sticking to her stocking. Her general health has been good.

Examination.—Under the tarsometatarsal joint of the second toe there is a defect in the skin presenting to view a deep red, firm granular area (Fig. 279). At the periphery the skin seems to be de-
stroyed by the granular area below growing up from beneath. The growth is quite painless to irritation.

*Diagnosis.*—The slow painless growth, its irregular border and tendency to destroy the surrounding epidermis characterize it as a member of the chromatophore group.

*Treatment.*—Local excision was done by an intern.

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![Fig. 279. Melanoblastoma of the sole of the foot.](image1.png)

![Fig. 280. Melanoblastoma of the sole of the foot.](image2.png)
Pathology.—This specimen shows the relation of the growth to the surrounding epidermis unusually well and is worthy of careful study. The general architecture of the growth is distinctly alveolar. At the periphery the epidermis grows out in long finger-like processes surrounded by round cell infiltration. Between these finger-like processes are large ovoid cells containing an abundant pigment. It seems to be these pigment-bearing cells that produce the tumor growth (Fig. 280). Whether they do this directly or stimulate other cells to do so is a question, for tumors of this type are seen without there being any pigment cells present. The only point that seems well established is that the source is subepithelial. The question of the origin of pigment cells is foreign to the present discussion. In this case the pigmented cells seem to bear a close relation to the epithelial cells and in many instances such is not the case. Moreover these tumors grow independently of the epidermis and destroy it. The mere fact that they invariably spread by lymphatic metastasis does not enter them into the epithelial group. The broader view that pigment cells are mesoblastic conforms to the general facts in oncology, however, it may go counter to some concrete facts in certain subdermal tumors.

After-course.—The patient did not report after leaving the hospital.

Comment.—The area excised as shown in the figure was wholly inadequate, yet such a small area seems sufficient to prevent local return and metastasis seems inevitable even with amputation.

CASE 11.—A man aged thirty-four came because of a painful area on the sole of his foot.

History.—For several years he has had a hard spot on the sole of his foot which caused pain when he walked. He has applied corn eures and pared the surface, this together with the wearing of a bunion ring has made walking tolerable. The area does not increase in size.

Examination.—Near the lateral border of the great toe at the level of the tarsometatarsal joint is a thickened area in the center of which the epidermis is thickened and in part defective (Fig. 281). The defective area is 5 x 7 mm. In the center is a pinkish nodule on the surface of which the lines of the plantar epithelium can not be made out, but the feel suggests epithelium. The border is made up of hard epidermis apparently in the process of exfoliation. Deep pressure causes some pain. Otherwise examination is negative.
Diagnosis.—The painfulness and slow growth suggests a corn. The ulcerous appearance as though a granular surface were seeking exit suggests a melanoblastoma. Since there has been little change in several years and because the outline is fairly regular it is accepted as benign.

Treatment.—The area was excised to the fascia and the wound closed by subcuticular sutures. The skin was avoided by the sutures to lessen the wound pain.

Pathology.—The thickened area is made up of much thickened epidermis. There is no tendency of the epidermal cells to invade the deeper tissue and, what is of greater importance, there are no chromatophoric cells (Fig. 282).

After-course.—Recovery has been permanent.

Comment.—The disability of this condition is often very great, greater in fact than in the malignant condition, for the thickened epidermis causes pressure on the surrounding tissues. These growths

Fig. 281.—Corn of the sole of the foot.
are essentially epithelial warts which project through the surrounding epidermis. The confusing factor is that the epidermis of the new growth is not continuous with the surrounding epidermis. Wide excision is sufficient for a cure. A microscopic examination should always be made after removal. The possibility of malignancy must always be weighed.

**CASE 12.** A school girl aged sixteen came because of a growth under the nail of her great toe.

*History.*—For a year or more a growth has been coming under her toe nail. It has been painless but its size interferes with the wearing of her shoe.

*Examination.*—Protruding from under the nail of the left great toe is a mass the size of a large pea. It elevates the nail, folding it sharply backward. It is globular, hard, and is fixed to the bone. The skin is closely attached over it (Fig. 283).

*Diagnosis.*—Its density and firm attachment to the terminal phalanx indicates that it is a part of it. Its form and constricted base
is evidence enough of its benign nature. Summing up these characteristics, the diagnosis of subungual exostosis is unavoidable.

*Treatment.*—The attachment of the growth to the phalanx was severed with a mastoid chisel.

*Pathology.*—The mass was made up of eburnated bone.

*After-course.*—The patient has been free from trouble now twenty years.

*Comment.*—This curious condition is exceedingly rare.

![Subungual exostosis](image)

**Fig. 283.**—Subungual exostosis.

**CASE 13.**—A boy four and a half years of age was brought to the hospital because he limped.

*History.*—The mother says the lad jumped from a chair several weeks before. The limping began gradually and increased for several weeks. A sprain was diagnosticated and the foot was strapped. Marked improvement followed this treatment and in several weeks he seemed to have recovered and the treatment was discontinued. Within a few weeks he began to limp again. Because of this a more serious condition was suspected. The lad has been subject to frequent attacks of tonsillitis following which he developed a heart infection. His tonsils were removed a few weeks prior to the beginning of the foot affection. Following the removal of the tonsils he had a high fever which lasted several days.

*Examination.*—The lad is not well developed, being both thin and pot-bellied with some other evidence of rickets. The heart is dilated, the apex being in the axillary line and a systolic murmur is heard everywhere in the cardiac region. The second sound is accentuated. There is some puffiness of the whole foot. The ankle joint moves without limitation and without pain. When the foot is
grasped pain is complained of in the instep. The tissues seem to be indurated and feel inflamed.

_Diagnosis._—Evidently a strain does not account for the trouble because it did not begin at once after the alleged trauma. Once improved a sprain should not light up again. Koehler described a disease affecting single bones, usually the scaphoid of the left foot. This

Fig. 284.—Koehler's disease.
seems to suggest such a condition. The x-ray showed the scaphoid of the left foot smaller and more dense than the corresponding foot of the other side. (Having lost the picture of the case under discussion, I venture to append figures obtained from a case in the practice of Dr. A. S. Risser—Fig. 284.)

Treatment.—The foot was again supported by adhesive straps and the lad sent to the country. His general health improved much and since his return he has not complained of his foot. He is much improved, but still has some evidence of valvular disease.

Comment.—There is no agreement as to the etiology of Kochler's disease. All cases reported have been in boys. Most writers believe that it is of traumatic origin. A number believe it is a compression fracture. Rickets have been present in a number of cases. The answer to the traumatic theory is that in some cases there has been no trauma and in a number of cases in which a trauma played a part the impaired function did not manifest itself until some time after the receipt of injury. In this case the disease was preceded by the removal of the tonsils. That there had been a generalized infection at some time is manifested by the heart affection. The only theory that harmonizes with all the facts is that of metastatic infection. The irregular outline of the bone and the increased density as noted in the x-ray harmonize with this theory.

CASE 14.—A farmer aged forty-two came to the hospital because of stiffness in the right shoulder and right foot.

History.—About one and one-half years ago he had an acute suppurative otitis media on the right side which ruptured through the drum. Four days later the right foot and ankle began to swell until the skin was tight and shiny. Following this he had multiple abscesses all over the body, especially the right side. No abscesses in the left leg or left side of the body, but several in the left arm. The skin abscesses were lanced and the foot was lanced in a number of places. The right shoulder was not lanced. He was treated with autogenous vaccines for a time with no seeming benefit. The abscesses were three months in running their course and he was in bed for several months after that.

When he got up his foot and ankle were stiff and the foot extended and turned in. It has remained so up to the present time.
shoulder is stiff so that he can not raise his arm except by moving the shoulder with it.

Examination.—The entire right arm is much atrophied. Sears are seen about the elbow and about the ankle. They were barely a fourth of an inch in length—evidence that the attendant had an imperfect notion about the opening of such infections. All joints are movable save the shoulder. This is ankylosed. The right likewise is much smaller than its fellow. The foot is in marked equinovarus and the ankle is ankylosed, apparently bony. The X-ray pictures show the bones of the foot and ankle joint have undergone a bony ankylosis. The shoulder joint shows a fibrous ankylosis.

Treatment.—A wedge-shaped piece of bone was taken out of the top and side of the foot with no attention paid to joint planes. The foot was then pulled up in position and a ten-penny nail driven through the os calcis into the end of the tibia. The foot was then held by splints. The adhesions in the shoulder were broken up while the patient was under ether.

After-course.—After two weeks the nail was withdrawn and the foot placed in a plaster cast for six weeks. At the end of this time the foot was found firmly united and in good position. Two years later he reports the foot still in good position and that he is able to work without hindrance. The shoulder is still stiff.

Comment.—Evidently the suppuration involved the tarsal as well as the ankle joint. Possibly the resection of the astragalus might have produced a partially movable ankle. The remainder of the foot was in such bad position that any sort of a serviceable foot seemed all that could be hoped for. This patient is an excellent example of multiple infections from a distant focus. Had the joints been opened early and wide, less destruction likely would have resulted.