

antrum. In these instances healing took place, under treatment, as readily as if the opening had been through the alveolar process. It is my experience that pulpless teeth producing antral trouble yield to treatment as readily as though they discharged into the mouth. On the other hand, recent experience has caused me to believe that disease of the alveolar process from calcareous deposits is more largely to blame for antral trouble than are pulp lesions. It never has been my experience in examination either of skulls or of patients to see a bicuspid that came very near the floor of the antrum. I have seen these openings referred to by Dr. Gilmer. I fail to recognize any condition about the pulp of a vital tooth which would cause antral disturbance. Arsenic is a favorite remedy of mine. I have used it almost ever since I have been practicing, and it is my habit, if I feel that I have failed in perfectly opening a root canal, to insert some arsenic as far into the canal as possible and leave it there, expecting it to continue to produce asepsis and prevent future trouble. I have done this a great many times and have yet to see antral trouble produced. I do not, however, use arsenic to any degree in destroying pulps.

DR. H. E. BELDEN, New Orleans—In view of the fact that you use arsenic at all, what is your objection to using it in destroying pulps?

DR. FLETCHER—If enough is used to destroy the pulp in a reasonable time it is sufficient to cause trouble afterward. As to the use of zinc and other medicaments which destroy bone, I have seen carbolic acid destroy a large area of the alveolar process, but I never have seen arsenic do that. Arsenic, however, if applied to live tissues will destroy a small zone. In my experience it never has produced necrosis, as that term is accepted in pathology. It may produce destruction of tissue, but the condition may be compared to traumatic injury. The tissues do not continue to die progressively as in ordinary necrosis. It has also been my experience that the tissues will remain sore for months if the application is short of destruction of tissue. There is, however, in these cases no septic condition, no necrosis, no pus. The arsenic stops this process.

DR. GILMER—Have you not seen the destruction of bone between the teeth from the use of arsenic?

DR. FLETCHER—I never have.

MR. CONSTANT—I have on three occasions.

DR. GILMER—I have seen it many times.

DR. FLETCHER—The essayist has distinguished between a cystic condition and that of empyema. I have to stretch my imagination considerably to think of a tooth producing the cysts as he has described.

MR. T. E. CONSTANT, Scarborough, England—In my experience it has been very exceptional to find a case in which disease of the antrum could be definitely traced to the tooth. In regard to determining cause and effect, I am sure that to consider many cases of so-called empyema as due to abscess connected with the tooth is putting the cart before the horse. I can recall two cases in which empyema of the antrum was supposed to be due to trouble in the first molar. When the first molar was removed it was found possible to evacuate the pus and that was taken as proof that the tooth caused the trouble. I could not convince myself that the tooth was the cause of the trouble. I think the fact that the apices actually went into the antrum made it easy to get the discharge in that way. I agree with Dr. Fletcher that it is far more common to find the apices of teeth bare within the antrum than to find them covered. A great number which I have examined in England show that.

DR. M. L. RHEIN, New York City—I feel convinced from a careful study of this subject that the cases in which the teeth are the primary etiologic factors are very rare. The tooth generally becomes involved through pathologic conditions arising between the end of the root and the antrum. I think it is wise to emphasize this point.

DR. FLETCHER—Dr. Talbot and I found that the molar teeth produced this trouble in about 5 per cent. of cases.

DR. A. E. BALDWIN, Chicago—I firmly believe that arsenic can seldom if ever affect the tissues beyond the pulp of the

tooth. Dr. Gilmer has referred to the septum being lost by the careless application of the arsenic by the particles getting down between the teeth.

DR. GILMER—I spoke of the particles on the sides of the root which I have found and have been able to pick off.

DR. BALDWIN—Years ago I suspected that arsenic or arsenious acid might act beyond the pulp and I made several examinations in this way: In a central incision I would make application to the pulp of the tooth, and after a sufficient time remove the pulp. I then took several sections of the pulp, but could find no evidence of the arsenic in the several parts beyond the point of contact. I do not think, therefore, that the pulp could convey the arsenic to the adjacent tissues. I think a great deal of the injury is done by the careless application of the arsenic and the ease with which it gets outside of the tooth, causing the destruction of bone and soft structures.

DR. G. L. CURTIS, New York City—I think there are very few diseases of the antrum of a primary nature, and that a large proportion of the diseases of the antrum are caused by affections of the teeth. Tuberculous conditions are sometimes responsible for the absence of success in treating these cases. The cystic condition usually found in the antrum is, I believe, largely due to alveolar abscess, or to septic conditions of the pulp or of the canal of the tooth. I have seen some cystic tumors where there was extended absorption of the bone, and where the periosteum of the antrum was so crowded toward the opening at the nares that there was practically no antrum left. The reproduction of the bone in such cases is a most difficult task.

THE X-RAY AS A THERAPEUTIC AGENT:

WITH ESPECIAL REFERENCE TO CARCINOMA.*

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In attempting to arrive at a correct estimate of the x-ray as a therapeutic agent we are confronted at the outset with a number of difficulties: (1) By the fact that this force has been known but a short time and that little is known of its exact nature, so limited is our knowledge that we can not even measure with any degree of accuracy the amount which we are employing in a given case. (2) The agent has been employed but a very short time as a therapeutic agent, and sufficient time has not elapsed to enable us to determine the permanency of the results obtained. (3) Although an enormous amount of work has been devoted to the subject and an enormous number and variety of cases have been treated during the last three years, still for the most part this has been done in a haphazard way by all sorts and conditions of medical men, on all sorts and conditions of patients, and little reliance can be placed on many of the reports made.

I think that it would be safe to say that up to the present most of the x-ray work has been done by two classes of men—enthusiasts whose statements and reports were made unreliable by their enthusiasm, and, second, by physicians who simply saw in an x-ray apparatus a means of increasing their professional incomes, and did not hesitate to cry loudly the value of their wares.

We do not lack evidence on the subject of the therapeutic value of the x-ray. We have before us an enormous mass of evidence. The difficulty is to separate the truth from the error. We have before us, however, a certain amount of scientific well-observed work, done by well-qualified men, whose reports and opinions command general acceptance, from which we can determine

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approximately at least the present status of the *x*-ray as a therapeutic agent—its value, and its dangers and limitations.

Very shortly after the discovery of the *x*-ray I became interested in the subject as a means of diagnosis, and very early became familiar with the peculiar power which it possesses of destroying living tissues, especially epithelium, as shown by some extensive *x*-ray burns. As early as 1898 I employed it in a case of lupus, which has recurred after extirpation and skin grafting, but without benefit. We obtained a marked *x*-ray reaction in this case after a few exposures, but we could not see any evidence of improvement, and we discontinued treatment.

When my attention was again called to the subject by favorable reports in cases of lupus and epithelioma I was exceedingly skeptical—I might say brutally skeptical. I had shortly, however, an opportunity of seeing cases of lupus and epithelioma and recurring carcinoma of the breast, which had disappeared under *x*-ray exposures, and I began experimenting with similar cases in my own service. I was greatly impressed by the cases of recurring breast carcinoma, where nodules of considerable size, and demonstrated by the microscope to be carcinoma, disappeared under the treatment.

Everyone who has watched such cases must have been convinced that in the *x*-ray we possess an agent of great power and great possibilities in the treatment of malignant disease.

In 1902, at the Saratoga meeting of the American Surgical Association, I made a report of my early work, and again, at the last meeting of the American Surgical Association at Washington, I presented a paper in which, from the evidence at hand, I attempted to estimate the value and limitations of the *x*-ray as a therapeutic agent in carcinoma. I shall quote rather freely from this report. I desire to say that in the last year and a half nothing strikingly new has been added to our knowledge in this department. The experience and evidences obtained during this period have been rather of a kind which demonstrated to us the marked limitations of the agent, and demonstrated the dangers associated with its employment.

I shall confine my statements to classes of cases which I have had the opportunity of personally observing. I shall not mention the many skin lesions in which the *x*-ray has been employed, with reported favorable results, as I have little personal knowledge of this side of the subject with the exception of blastomycetic dermatitis, and I shall refer to this because it has some bearing on a point which I shall later bring out.

Several years ago when I first suggested the internal use of iodid of potassium in blastomycosis in a case reported by Hyde, Hektoen and myself, it was found in this and later cases that the iodid profoundly influenced the disease. It was noted, however, that some resisted the treatment, and that although a decided improvement was obtained, the lesion often did not clear up entirely, and recurred after cessation of the treatment. It has since then been found by Hyde, Montgomery, Pusey and others, that the combined action of the iodid internally and the *x*-ray is successful in curing these obstinate cases where neither alone would suffice. I regard this as a very instructive and suggestive point, which, as I have stated, I shall refer to later.

In lupus the evidence is somewhat conflicting. The *x*-ray does cure lupus, but the experience of the majority of workers in this field seems to speak in favor of the

Finsen treatment as the treatment of choice. In our hospital we are now using a modified Finsen lamp instead of the *x*-ray in our lupus cases.

In Hodgkin's disease uniformly favorable results have been obtained as far as decrease or disappearance of the enlarged glands is concerned. In some cases this has been accompanied by profound toxemia, resulting apparently from poison introduced into the circulation from the rapidly breaking down glands. Sometimes this has been fatal. In some of the cases with the disappearance of the glands there was no general improvement, the patients growing weaker and the cases terminating fatally after a considerable period. In others the glands, after disappearing, have later recurred. In some cases, however, the glands have disappeared, the patient's condition has improved to a point where they were apparently cured, and this has occurred in a sufficient number of cases to warrant the careful use of the *x*-ray as an important, if not the most important, factor in the treatment of this disease.

In leukemia, in both the spleno-medullary and lymphatic types, marked diminution of the spleen and involved glands has been observed after the use of the *x*-ray, with improvement in the blood condition. The evidence here, however, is as yet not sufficient to warrant the drawing of any conclusion.

In tuberculosis, outside of lupus, as tuberculosis of lymphatic glands, bones and joints, peritoneum and intestines, the reports are very conflicting. In a personal communication one of the men who has had a wide experience in *x*-ray therapy and who has followed his work most thoroughly and scientifically, informs me that he believes he is curing 90 per cent. of tuberculous lymph glands. Our own limited personal observation, on the other hand, has given us small encouragement.

We have not employed the agent in tuberculosis of bones or joints. In tuberculosis within the abdomen, of peritoneum and intestines, we have had the opportunity of noting some interesting results. One case of hyperplastic tuberculosis of the descending colon, with circumscribed abscess from perforation, was operated on and the abscess drained. A fecal fistula remained. This was closed by a second operation, and the patient placed under the *x*-ray every other day for a period of five or six months. During this period moderate doses—75 grains a day—of potassium iodid were employed. Under treatment the patient has gained 40 pounds in weight, has regained his strength, and returned to his work (manual labor), and the fist-sized mass in and about the colon has almost entirely disappeared. We can not, of course, establish a definite relationship between the *x*-ray treatment and the improvement. I simply report the facts for what they are worth.

Several cases in the service of Dr. Frank Billings of peritoneal tuberculosis with tuberculous masses and with large amounts of fluid in the peritoneal cavity, which I had the opportunity of observing, have, while under rest and the *x*-ray, improved greatly, the masses and fluid both disappearing.

In regard to this whole subject of tuberculosis, outside of lupus, I should say that we must regard the question as still open, and as a promising field for future experimentation. Sarcomas have been made to melt down and disappear under the *x*-ray. The evidence on this point I think can not be doubted. However, as a treatment for sarcoma the *x*-ray has been most unsatisfactory in our hands. Sarcomas from the position from which they spring, i. e., mesoblastic layer, are

essentially deep-seated. If we could spread out the cells of a sarcoma as a thin layer on the surface of the skin I have no doubt that the *x*-ray would destroy them as it destroys the epithelial cells in epithelioma, or if we should leave a great open wound after the removal of a sarcoma so that we could directly, without much intervening tissue, apply the *x*-ray to the cells which might remain after operation we might obtain favorable results. As an example of this point, I want to refer to a glioma of the orbit which recurred after operation in which the *x*-ray could be brought in immediate contact without intervening tissue and where disappearance of the growth and an apparent cure was obtained.

I think the same conclusions can for the most part be applied to sarcoma as apply to deep-seated carcinoma, which we shall later discuss.

In regard to the effect of the *x*-ray on carcinoma, we may speak with more confidence and say that the facts which are to-day fairly well established are the following:

1. The *x*-ray will destroy the epithelial cells of carcinoma superficially situated as in epithelioma. The *x*-ray seems to possess a selective action on the epithelial cells of carcinoma, due probably to their possessing lower resisting powers against the agent than that possessed by normal epithelial cells. When superficially situated so that the furthest cells are within a centimeter of the surface, a mass of carcinoma melts down under the *x*-ray, the individual cells dying become granular and are absorbed without gross evidence of necrosis or of tissue change, beyond that of reddening of the surface and the so-called *x*-ray reaction. Sometimes, however, where a large mass of carcinoma is attacked, it may soften and break down, and be separated from the normal tissues something like the breaking down of a gumma.

When the carcinoma is very thin and very superficial, as an epithelioma of the face, of the rodent ulcer type, not yet involving the tissues underlying the skin, the disappearance of the lesion and the restoration of the surface to almost normal, with slight evidence of scar tissue, can confidently be looked for after about 20 exposures of 10 minutes daily or every other day, with a soft tube from 30 to 110 volts and 2 to 4 amperes.

When the epithelioma is a thick mass of new tissue, as an epithelioma of the lower lip as thick as the finger, the *x*-ray will produce extensive change with destruction of many of the carcinoma cells, and sometimes of all of them with resulting cure. More frequently, however, even under the treatment the process will extend and the lymphatics become involved.

In recurring carcinoma of the breast with recurrence in and about the scar, with nodules in the skin and immediately beneath this, the *x*-ray will produce an absorption of the masses even of considerable size—the size of an English walnut. If these masses are the only locations of carcinoma in the body, a cure might be hoped for with their disappearance, but, unfortunately, with these masses are usually masses in the mediastinal and other lymph glands, and, in spite of the disappearance of the skin masses, the patient goes on to death from general carcinomatous invasion, apparently, however, being benefited to some extent both locally and generally by the treatment.

In cases of deep-seated carcinoma such as stomach, larynx, superior maxilla, mouth, etc., I have seen no evidence of benefit beyond the statement of the patients that they felt better, had less pain, etc., some improve-

ment in general condition. In every case the lesion extended, and in none was a cure obtained.

In estimating the value of the *x*-ray in the treatment of carcinoma there are three facts which must be especially considered and which seem to control largely the results:

1. The situation of the lesion, whether superficial or deeply situated.

2. The rapidity of the growth of the cells and the resisting power of the carcinoma cells in the particular case.

3. The size of the new growth.

In regard to the first, the destructive action of the *x*-ray on cancer cells is in direct proportion to their superficial position, i. e., the more superficial, the greater the destructive effect; the deeper, the less the destructive effect. The depth at which the destructive effect (of the *x*-ray on cancer cells) can, with our present technic, be with any confidence expected does not seem to greatly exceed a centimeter. In regard to the vitality of the cancer cells in the particular case, I think it is quite clear that the cancer cells differ markedly in different cases in regard to their resisting power to the *x*-ray. The rapidity of the growth seems to be a fair index of their resisting power to the *x*-ray, the very slowly-growing cancer having less, and the rapidly-growing greater, resisting power. Depending on the differing resisting power and the superficial or deep situation, some lesions disappear under the *x*-ray treatment, some remain stationary and some continue to grow even while under treatment, apparently unaffected by it. The size of the lesion is of importance and the value of the *x*-ray varies in inverse proportion to the size of the growth, the smaller the growth, the more evident the effect, the larger, the less effect. A small superficial epithelioma is readily destroyed; a thick, large epitheliomatous mass, with difficulty or not at all, by any amount of the agent which it is permissible to employ, and even though many of the cells in such a growth may be destroyed, enough remain to bring about regional infection, which may become evident even during treatment.

The question which has been asked, i. e., whether under some circumstances the *x*-ray stimulates the growth and dissemination of the cancer cells, is one which it is at this time difficult to answer. Personally, I have seen no evidence of this. I have seen, to be sure, cases of cancer grow with great rapidity and widespread dissemination occur while the cases were under treatment, but we see the same thing happen frequently in cases which are not under any form of treatment, and I have interpreted the cases, when rapid growth occurred while under the *x*-ray treatment, simply as being cases which were not influenced in any way by the agent and believed that the same rapid growth and dissemination would have occurred with or without the *x*-ray treatment.

What should be our position in regard to the use of the *x*-ray as a therapeutic agent in carcinoma?

It is, I believe, the treatment of choice in slowly-growing superficial epitheliomas, the rodent ulcer type, especially those of wide extent without regional involvement, and especially lesions of this kind situated about the face and eyelids where a radical removal of the lesion with the knife would result in marked disfigurement and deformity from the resulting scar, even when skin grafting is employed. In all other forms of carcinoma, where the lesion is of rapid growth or

more deeply situated than the skin, or even when limited to the skin is of considerable thickness, the case should be treated by extirpation and followed by a course of *x*-ray treatments, probably, as a rule, about 20 exposures immediately after the healing of the operative wound.

I think that this position—this combination of the knife and the *x*-ray—is logical on the following grounds:

1. With the exception of the carcinomas of the rodent ulcer type above described, little can be expected from the *x*-ray in the treatment of primary carcinoma, therefore no time should be lost with its use, and, where conditions warrant, the carcinoma should be widely extirpated in accordance with approved surgical methods.

2. As has been repeatedly shown (especially in cases of breast amputation for carcinoma where recurrence has taken place in and about the scar), these secondary masses can be made to disappear with the use of the *x*-ray. There can be but little doubt that these secondary nodules, masses of epithelial cells the size of a bean or a walnut, were at the time of the operation very small collections of cancer cells which gradually grew from microscopic to macroscopic proportions, and it is reasonable to suppose that if the *x*-ray can destroy these bean-sized and walnut-sized cancer masses it could much easier have destroyed the microscopic masses of cancer cells from which they developed. I believe, therefore, that we should give this post-operative *x*-ray treatment a thorough and extended trial in our carcinoma cases, and believe that we shall considerably increase our number of permanent cures after cancer operations by this means.

The most interesting question, to my mind, in connection with the action of the *x*-ray on cancer cells is this: Would it not be possible in some way to so extend the action of this agent which has the power of destroying cancer cells under certain conditions—that is, at certain depths and cells of certain resisting powers—to a point where it can destroy them under all conditions? The fact that under certain circumstances, as Hodgkin's disease and lymphatic leukemia, the *x*-ray does produce effects on masses of cells of low resisting power at great depths, might encourage us to hope that under certain favorable conditions it might affect cancer at great depth.

Of course, if this could be accomplished our cure for carcinoma would be found. As it is to-day, the *x*-ray as a cure for carcinoma has, as we have seen, a very limited field. In answer to the last question, I have thought that the desired result might be accomplished in one of two ways, or possibly both. First, that physicists might so improve our *x*-ray apparatus that we could obtain the destructive effect on the cancer cells at all depths, and yet without too great danger to the intervening tissues, and, second, that it might be possible to so diminish the resisting power of the cancer cells by some means, as, for instance, the ligation of the arteries supplying the region, thus shutting off the blood supply, or by means of some chemical agent introduced either into the general circulation or locally injected, that even with the *x*-ray as at present developed we might obtain destructive effects at greater depths. In connection with this last proposition my mind naturally turned to iodine and arsenic as the agents which have shown evidence of power to affect deep-seated masses of new cells of low vitality, as iodine in syphilis, actinomycosis and blastomycosis, and arsenic in malignant lymphoma (Hodgkin's disease).

In working out this idea we have made some experiments to determine the effect of the *x*-ray on solutions of iodide of potash to determine whether it would produce any chemical change and set the iodine free.

The first experiment was simple, and interesting in its results. We took a solution of starch and iodide of potassium and submitted it to a 10-minute exposure of the *x*-ray, such as we used for therapeutic purposes. We had control solution under the same conditions minus the *x*-ray. It was found that the *x*-ray liberated about twice as much iodine as was liberated from the control solutions.

After all, however, the clinical test of such a therapeutic scheme is the important test, and we have employed this method of treatment, which, I think, should be called radiochemic therapy, in a number of cases. In a case of inoperable mouth carcinoma I ligated both external carotids, and placed the patient on iodide of potassium internally, and the *x*-ray. The tumor was diminished greatly in size, and almost disappeared. The patient died four months later of pyemia, and the post-mortem showed a mere remnant of the original growth, and no regional or general involvement. Two of the most striking cases of benefit from this method of treatment have, however, not been in carcinoma, but in other conditions—one a case of actinomycosis of the neck, which cleared up surprisingly rapidly under the *x*-ray and iodide of potassium, and the other a tumor of the colon, already referred to, almost certainly tuberculous, which has almost disappeared under the same treatment. In our carcinoma and sarcoma cases we have combined with our *x*-ray either iodide of potassium or arsenic, and, although I have been encouraged by the results, the cases are too few and the difficulties in the way of determining the value of this combined treatment are so great that it is impossible at present to draw conclusions. I have, however, no hesitation in presenting this suggestion of composite therapy, with the hope that others may be sufficiently interested to investigate its possibilities.

It does seem plausible, however, that, given an agent which will destroy carcinoma cells and not the cells of the surrounding tissues under certain favorable conditions for its action, i. e., superficial situation and low resisting power of cancer cells, it is quite possible we may find some way of enhancing its action so as to reach cancer cells at all depths and of all degrees of resisting power and secure in this way a carcinoma cure.

In conclusion, the *x*-ray at present is indicated as a therapeutic agent:

1. In the superficial epitheliomas above described.
2. As a post-operative treatment in most of our carcinoma cases.
3. In our inoperable cases, as a justifiable piece of experimental work in the hope that this line of investigation may possibly lead to valuable results.

The dangers of the *x*-ray as a therapeutic agent are two, and these dangers should be especially pointed out to the general profession. The first danger is the possibility in all cases of producing a serious *x*-ray burn. This possibility can be reduced to a minimum by a thorough understanding of the technic, but can not be entirely done away with, as burns will occur even in the hands of experts of the greatest experience. The second danger, and the more important one, is the using of the *x*-ray in cases where it should not be used, where its use is of no benefit to the patient, where its use means valuable time

lost, where its use prevents the patient receiving the greater chances of cure offered by radical surgical removal of the disease. That this danger is a very real one is shown by the increasing number of easily operable carcinomas, such as epithelioma of the lip and cancer of the breast, which now come to us after a futile and extended trial of the x-ray treatment. This means that in each one of these cases valuable time has been lost, and the chances of permanent cure diminished by the ignorant use of the x-ray. I have no hesitation in saying that the amount of damage for which the x-ray is responsible in delaying and preventing operation in carcinoma cases far outweighs the good it has so far accomplished. In discussing this subject this fact can not be too strongly emphasized.

PERISINUSAL ABSCESS OF THE LATERAL SINUS,

WITH METASTASIS IN LIVER AND STERNO-CLAVICULAR JOINT.*

GORDON KING, M.D.
NEW ORLEANS.

Aug. 1, 1901, there came for treatment in the Eye, Ear, Nose and Throat Hospital E. A., a white boy, 14 years of age, suffering with a chronic suppuration of the left ear which began in early childhood. The boy was of healthy parentage, and had been subject to very little illness during his life.

Six years previously he was operated on at the hospital for postnasal adenoids, but did not continue attendance at the clinic for the treatment of his ear, which had been carelessly neglected by his parents. In the latter part of July, a week before returning to the clinic, he had begun to complain of pain in the left side of his head about the ear and in the left temple, accompanied by fever and occasional irregular chills. He was dull and listless, and appeared to be in a state of febrile depression. His mental condition was good, however, the pupils normal, and no manifestations of cerebral disorder were apparent. No evidence of inflammation about the mastoid nor tenderness on pressure. Otoscopic examination revealed a large round perforation in the tympanic membrane and a small quantity of thick fetid pus in the ear canal. No granulations or polypi and no swelling of the canal walls. The pain he complained of was intermittent, deep-seated and at times very intense. Instructions were given to syringe the ear thoroughly three times a day with warm boric acid solution, instill ten drops of a bichlorid-alcohol solution after each cleansing, and to keep the patient under close observation.

He left the clinic, however, and was not heard from until four or five days after, when I was called by the family physician, Dr. Ernst, to see him at his home. His condition then was as follows: Decided typhoid state—dry, brown, coated tongue, sordes on teeth, considerable emaciation and debility. Bowels constipated and some enlargement and tenderness of the liver as elicited by percussion and palpation. Temperature ranging between 100 and 103 F., with slight chills at irregular intervals. Left hemicrania becoming more constant and aggravated, very slight ear discharge. Fearing phlebitis of the lateral sinus and jugular on the side of the affected ear, as an explanation of the pyemic course of the temperature, I made careful search for any sign of inflammation about the mastoid and the course of the jugular in the neck, but could find none. We decided to wait a day longer for the possible appearance of some localizing symptom. When next seen the patient showed no change excepting an increase of the hepatic tenderness. We decided at once to make an exploratory aspiration of this organ, but while Dr. Ernst had gone in

search of his aspiration needle the patient had an evacuation of a large quantity of pus and blood from the bowels. Examination of the stool showed it to be characteristic of liver pus. Evacuations of this nature continued in diminishing quantity during the next few days with some relief to the local pain and the high temperature. The headaches still continued, however, and the asthenic condition of the patient increased. Consent was at last gained to have him removed to the hospital for exploration of the mastoid and sinus for focus of pyemic infection.

Operation.—On his arrival there, August 13, temperature was 102 F., pulse 96 and respiration 28. Being much fatigued by transportation, he was allowed to rest until the following day when, after a free exposure of the mastoid, the antrum was laid open and a small mass of granulation tissue and pus removed. The bone otherwise appeared healthy. The lateral sinus was next exposed in the posterior aspect of the mastoid opening and pus began to ooze from between the sinus wall and the upper part of the wound. This when traced up was found to come from a cavity containing about a drachm of creamy yellow pus in contact with the membranous wall of the sinus. This was freely exposed, evacuated of pus and a gauze drain applied. The sinus seemed to be normal otherwise and exploration brought out a flow of pure liquid blood. There was no evidence, therefore, of thrombophlebitis.

The operation was well endured, but a severe chill came on three hours later and the boy complained of pain about the left sternoclavicular joint. Some swelling and tenderness were discovered at this point. On the following day, August 15, he appeared much brighter, with temperature 99.8, pulse 86, respiration 24; no further complaint of headache. Noticeable redness and swelling at sternoclavicular articulation; also marked tenderness over region of spleen. Hepatic tenderness still persisted and bloody stools continued.

August 16, another chill and rise of temperature to 103 F. Pain in splenic region more intense. August 17, emesis of dark bloody matter. Hepatic and splenic tenderness much diminished. Clavicular joint much inflamed. Mastoid wound dressed and pus cavity thoroughly irrigated. Favorable progress up to August 19, when the occurrence of sharp pains in chest caused me to make a close examination of lungs. Nothing abnormal was found. The clavicular joint became so painful that an incision was made into it, but no pus was evident. August 21, again slight hematemesis. Convalescence thenceforth was uninterrupted and rapid, and in three weeks patient was pronounced completely well.

My chief object in relating the clinical history of this case is to elicit your interest and to evoke some discussion on a subject which, in recent times, has been receiving considerable attention in otologic circles, particularly among our French and German confrères. It is that of septicopyemia of otitic origin in its relation to thrombophlebitis of the lateral sinus.

As time and the occasion do not permit me to enter into a thorough review of such a broad subject in all its phases, I shall limit my remarks to that point on which there has been much discussion, with various theories, and which is still a mooted question in the pathology of one of the gravest complications of middle ear suppurations. That point is the mechanism or the route of infection of the blood current in that class of cases where pyemia develops without apparent involvement of the lateral sinus or the jugular vein. Until very recent years but one form of otopyemia was generally known, characterized by irregular and frequent chills, marked oscillations of temperature and the development of metastatic abscesses, coming on in the course of a purulent otitis media, and which indicated a thrombophlebitis of one of the large venous channels coursing in the vicinity of the temporal bone, usually the sigmoid sinus or the jugular vein.

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