

the following will give some account: Alcohol and tobacco caused the trouble between 20-30, 5; between 30-40, 9; between 40-50, 15; between 50-60, 10; between 60-70, 1. In seven cases tobacco alone was the cause, and the ages are disposed as follows: Between 20-30, 1; between 30-40, 2; between 40-50, 1; between 50-60, 3. Alcohol alone was responsible in three cases, whose ages range as follows: Between 50-60, 1. between 60-70, 1; between 70-80, 1.

Of those cases in which mention is made of the color-sense, it was impaired in cases of alcohol and tobacco 11 times; tobacco alone, 3 times.

The color-sense usually impaired is that for red and green, as the following will show: Alcohol and tobacco, red 1, red-green 2, green 3, no color-sense 1. In tobacco alone the color-sense was lost for green and red-green. In alcohol and tobacco the field of vision was contracted in 9 cases.

No. 1. Visual field, concentric limitation; acuity, R., $\frac{2}{30}$, L., $\frac{2}{60}$; treatment, ars., pot. iod., strychn.; time, 6 weeks; result, none.

No. 3. Visual field, central scotoma; acuity, $\frac{2}{30}$, both; treatment, pot. iodide; time, 2 weeks; result, does not change.

No. 4. Visual field, yellow-blind; acuity, $\frac{6}{30}$, $\frac{2}{60}$; treatment, pot. iod.; time, 4 weeks; result, $\frac{2}{30}$, $\frac{2}{30}$.

No. 9. Visual field, green-blind, central scotoma; acuity, $\frac{2}{10}$, $\frac{2}{20}$; treatment, pot. iod.; time, 1 year; result, color restored, $\frac{2}{30}$, $\frac{2}{30}$.

No. 11. Visual field, green-blind, restricted down and in; acuity, $\frac{1}{20}$, $\frac{1}{50}$; treatment, abst.; time, 2 months; result, none.

No. 12. Visual field, yellow-blind, concent. limited; acuity, $\frac{2}{30}$, $\frac{2}{30}$; treatment, pot. iod.; time, 2 months; result, $\frac{2}{30}$ u.

No. 15. Visual field, limited downward and cent. scot., both; acuity, $\frac{2}{10}$ u.; treatment, strychn. pot. iod.; time 18 months; result, blind.

No. 17. Visual field, restricted inward, central scotoma; acuity, $\frac{2}{30}$, $\frac{2}{30}$; treatment, pot. iod.; time, 6 weeks; result, $\frac{2}{30}$ u.

No. 19. Visual field, limited concent. and central scotoma; acuity, $\frac{1}{20}$, $\frac{2}{30}$; treatment, strychn., pot. iod.; time, 4 months; result, $\frac{2}{10}$ L.

No. 27. Visual field, color sense impaired; acuity, $\frac{2}{30}$, $\frac{2}{30}$; treatment, strychn.; time, 1 year; result, none.

No. 28. Visual field, restricted in and down in both; acuity, $\frac{2}{30}$, $\frac{1}{30}$; treatment, strychn., pot. iod.; time, 2 months; result, $\frac{2}{30}$ u. Improved when strychnine was used.

No. 31. Visual field, restricted downward and in, central scotoma; acuity, $\frac{2}{30}$, $\frac{2}{10}$; treatment, strychn.; time, 6 months; result, none.

No. 35. Visual field, R., cent. inward and down, L., normal; acuity, $\frac{2}{30}$, $\frac{2}{30}$; treatment, strychn.; time, 6 weeks; result, $\frac{2}{30}$, $\frac{2}{30}$. Never drinks.

No. 52. Acuity, $\frac{1}{20}$, $\frac{2}{30}$; treatment, pot. iod., strychn.; time, 7 months; result, $\frac{2}{30}$, $\frac{2}{30}$.

No. 53. Visual field, central scotoma; acuity, $\frac{2}{30}$, $\frac{2}{30}$; treatment, strychn.; seen once. Saloon keeper.

No. 66. Acuity, $\frac{2}{30}$, $\frac{2}{10}$; treatment, strychn.; time, 2 months; result, $\frac{2}{30}$, $\frac{2}{30}$.

No. 71. Visual field, central scotoma; acuity, $\frac{2}{30}$ u.; treatment, strychn.; time, 2 mos.; result, $\frac{2}{30}$ u.; never drinks.

No. 81. Visual field, central scotoma; acuity, $\frac{2}{30}$, $\frac{2}{30}$; treatment, pot. iod., strychn.; time, 2 months; result, $\frac{2}{30}$, $\frac{2}{30}$.

No. 84. Visual field, central scot.; acuity, $\frac{2}{30}$ u.; treatment, pot. iod., strychn.; time, 3 months; result, $\frac{2}{30}$ u.

No. 94. Visual field, central scot.; acuity, $\frac{1}{20}$, $\frac{2}{30}$; treatment, strychn.; time, 2 mos.; result, $\frac{2}{30}$ u.

No. 104. Visual field, central scot., R.; acuity, $\frac{2}{30}$, $\frac{2}{30}$; treatment, strychn.; time, 6 weeks; result, $\frac{2}{30}$, $\frac{1}{20}$.

No. 105. Visual field, con. limited, cent. scot.; acuity, $\frac{1}{20}$ u.; treatment, strychn.; time, 3 weeks; result, $\frac{2}{30}$ u.

No. 106. Visual field, red-green blind, central scot.; acuity, $\frac{1}{20}$ u.; treatment, strychn.; time, 8 months; result, $\frac{2}{30}$ u.

No. 107. Acuity, $\frac{2}{30}$, $\frac{2}{30}$; treatment, strychn.; time, 3 months; result, $\frac{2}{30}$ u.

No. 108. Visual field, central scotoma; acuity, $\frac{2}{30}$ (?) u.; treatment, strychn.; time, 10 days; result, $\frac{2}{30}$ u.

There are a number of cases in this report in which the patient was seen but once, and as the result of whatever treatment instituted was not reported, I have thrown them out altogether. In some cases there was spinal trouble also, and injuries and central troubles, so all such cases were eliminated from my report.

A PRECISE METHOD OF EXCISION OF CLAVICLE, SCAPULA AND HUMERUS.

Read before the Chicago Medical Society, January 21, 1889.

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I am induced to present this case to you this evening both because of the rarity of such cases, and because it affords a very good example of the recovery of the human body from terrible injury. I will at the same time show you the specimen, which displays the disease *in situ*, and the amount of affection there was present.

Before doing this operation I, unfortunately, had not inquired very carefully into the subject; had not read much about it, and hence did not know much of the history of the operation, nor the circumstances under which it was adopted. But I have since been enabled to collect a little history of this operation, and will read what I have collected, mainly an abstract from a paper

read before a society in Berlin by Professor Adelman. These cases come to the attention of the surgeon under three circumstances: first, the operation is done for the surgeon by machinery or some accident previous to the patient coming under his charge; second, the surgeon does a series of operations, removing first one part of the member, then another part, and finally a third or fourth part, until the patient dies of recurrence; and third, the primary removal of the entire extremity as soon as the disease is recognized—the heading under which this case will be placed.

Professor Adelman addressed the Surgical Society of Berlin, June 4, 1888, concerning the operation for the removal of the upper extremity, together with the scapula and a part or whole of the clavicle. His address contains the history of the operation, placing the date of the first reported case at 1808. The operation was next performed, between 1830 and 1840, five times; between 1840 and 1850, five times; during the next decade, three times; during the next, seventeen times; during the next, thirteen times; and since 1880, twenty-six times; making in all 70 reported cases.

He discusses the statistics of Paul Berger, comprising 51 cases, and his method of operation. Adelman makes three classes: (1) cases in which the operation was performed after traumatism; (2) cases in which the operation was performed for benignant tumors; (3) cases in which the operation was performed for malignant tumors.

In the first class are 14 cases with 9 recoveries; in the second class, 3 cases with 3 recoveries; in the third class, 50 cases with 24 recoveries. This third class is subdivided into *sarcomata*, of which there were 26; *enchondromata*, 7; encephaloid tumors, 4; the remaining number bearing different names in different languages.

Of the 50 cases with malignant tumor, in 25 the entire operation was completed at one sitting; among these 25 cases there were 10 recoveries. Of the 25 cases having more than one operation each, 19 cases were operated in two sittings with 10 recoveries, 4 cases had three operations each with 3 recoveries. Of 2 cases with six operations each 1 recovered. These recoveries apply simply to the operation itself; deaths from recurrence after healing of the wound are not counted in the statistics. Among the 25 cases in which several operations were performed there are 17 in which the arm was primarily removed, but having recurrence it was found necessary to remove the scapula and clavicle. Professor Adelman remarks that this should induce us in the future to perform the entire operation at once, as these cases were all seen early, and the chances for radical cure must necessarily have been good. As it was, only 5 of all these 25 cases remained free from recurrence for years after—one

after 30 years, one after 20 years, two after 6 years, and one after 3 years.

In the 15 cases of death after one operation, 7 cases were due to the operation or to the low condition of the patient at the time of operation; 2 to shock; 3 to hæmorrhage; 1 to gangrene of the flaps; 1 to purulent pleuritis; and 1 to secondary hæmorrhage.

In 8 further cases in which the wound was entirely or almost entirely healed, the patient died from recurrence, five times in the lungs, the time of recurrence varying from three years to four months after the operation. In view of the frequent occurrence of secondary tumors in the lungs, the author advises careful examination of this organ, and considers an evidence of the presence of tumors in the lungs as a contra-indication for operation. The percentage of recoveries from this operation for malignant tumor is a little less than 50. Many methods of operation have been adopted by the different operators, but the plan of ligating both the subclavian artery and vein primarily seems to be advisable.

I will show the case as rapidly as possible, in order to let the patient get out of the room. You see the wound is healed, except this one spot of granulations. The boy, from his general appearance, is much healthier and stronger than previous to the operation. You will notice that there are quite a number of little pleats here, as if the sawing had not been very well done; there is apparently a superabundance of flap at the upper part which might have been used to close this gap of ulceration. This resulted because I had not a plan in view before the operation and made my flaps a little too redundant, so that when the lower flap was brought in contact with the upper one its fullness caused the foldings during apposition.

This case came before the clinic at Rush Medical College; a boy much reduced from pain, displaying merely an enlargement of the upper end of the humerus, implicating the shoulder-joint. The growth surrounded the bone, but was not uniform in development. Manipulation showed seeming fluctuation, both on the anterior and posterior aspect of the tumor, so much so that friends who sent him supposed that to open an abscess would be all that was necessary. But the appearance of the patient and the general aspect of the tumor rendered me suspicious, and, therefore, I introduced an exploring needle; instead of pus, I got only blood. The exploring needle went through the soft tissues to the bone, calling attention to the fact that there was not only implication of the soft part, but also disease of the bone itself. It seemed evident that it was a case of *sarcoma* of the shoulder-joint itself, probably commencing in the capsule and passing from it to the tissues around it, and that it would be very likely to recur after amputation, or other

simpler operation upon the shoulder-joint. I explained to the father that as it was a malignant tumor the only thing that seemed to me feasible was the complete removal of the shoulder. He consented to the operation.

From the report I have read you will understand that the immediate danger of the operation is hæmorrhage. There is another danger—the introduction of air into the veins as they are divided. In all operations about the large vessels of the neck or axillary space, where the veins are apt to be patulous, there is a source of anxiety to the surgeon from this cause. To overcome these immediate dangers, primarily to any incision for amputation, the circulation must be controlled by ligation of the subclavian artery and vein. This vein contains a large mass of blood and if divided without control of it much blood is lost aside from the danger of the introduction of air. Not having seen the reports of Paul Berger's method, I proceeded with this idea in view, and made the first incision above the clavicle, uncovering the subclavian artery, which was ligated close up to the side of the *scalenus anticus* muscle. The incision was then carried directly over to the top of the shoulder, the same as for amputation at the shoulder-joint. This incision was prolonged to the axillary space and along the line of the axillary border of the scapula. As soon as the axilla was opened the pectoralis major and minor muscles were divided and the axillary vein was included between two hæmostatic forceps and divided—the main trunks of the brachial plexus were then divided. The arm was then drawn over the front of the body and this incision adopted for excision of the scapula—following the spine of the scapula, so that the posterior flap was divided into two portions. These two flaps were dissected off until the posterior part of the scapula was uncovered; raising it from the chest wall, the muscles were divided and the extremity removed. All bleeding points, together with the axillary vein were now ligated and the flaps united.

This operation was not made upon any specific plan. Following the suggestion of Mr. May, who, in the last issue of the *Annals of Surgery*, reports two cases of this operation, I have looked through all the books in my library and have not found any specific method given. It remained for Paul Berger to give a plan for it. He was led to the plan he suggests after several trials upon the cadaver. The quickest and easiest method of doing the operation and securing the blood-vessels is according to his plan of procedure. He makes his first incision from the inner extremity of the clavicle outward to the top of the shoulder, immediately uncovers the clavicle and turns it out of the way; this leaves the subclavian vessels exposed so that they are easily secured. You all remember well as a result of past experience

that as the front of the axillary space is uncovered there is always to be seen a ridge across it produced by the raising of loose tissue upon the external thoracic nerve. It is easily found, and I call attention to it because passing outwards this nerve leads directly to the interval between the artery and vein, and hence to them. With the clavicle out of the way the vessels are superficially situated, easily isolated and free from diverging branches. The artery should be tied in two places, an inch apart, and divided; and the vein also; then the circulation is absolutely under control. May advises that just before the vein is tied the arm should be elevated for a few minutes to allow the venous blood to drain from it, thus saving as much blood as possible for the patient. In my second case I applied the Esmarch bandage up to the axilla. As soon as the arteries are secured in this position, by a rapid cut with the scissors, the brachial plexus can be divided and the pectoralis major and minor be severed.

The flap portion of the operation is done in this way: Commence at the center of the anterior incision and carry the knife directly across the anterior part of the axilla and inner arm to the lower angle of the scapula; then from the outer edge of the incision, posteriorly, carry the knife behind the joint to the same point; rapidly reflect the posterior flap; then all the muscular attachments should be divided and the extremity removed without any trouble. This gives a perfectly even anterior and posterior flap, coming together easily and nicely, and avoids the unseemly appearance of the anterior part of this wound which was caused by the too redundant anterior flap.

This operation was done six weeks ago, and after the first few days there was no time when we felt particularly anxious about the patient's recovery. The patient's perfect recovery has been interfered with by an accident, the effect of which you notice, the sloughing of the flaps, leaving this ulcer. In dissecting up the flaps one is compelled to keep close to the surface, diminishing greatly the nourishment of this immense piece of skin. The danger is increased if the post-scapular artery is wounded; so it is necessary to bear in mind the direction of these incisions in order to secure as neat a stump as possible.

Prof. Adelman's goes on to show that an artificial extremity can be applied to these cases, which overcomes the lack of symmetry, and which can also be made quite useful.

The second case came in about two weeks after this first, demonstrating the assertion that all cases come in couples. A man 37 years old came in one afternoon, with a tumor on the top of his shoulder, occupying the situation of the supra-spinous fossa. It had all the indications, so far as external appearances, of a fatty tumor. A surgeon in charge of a clinic labors under this

disadvantage in all his cases; he has no opportunity for previous examinations, and hence is apt to go into a case without as complete an examination as it is entitled to. This tumor was examined hastily and the history hastily passed over, and the suggestion made that, in all probability, it was not a fatty tumor but, from the rapidity of its growth, would prove to be malignant, and that it was connected with the superficial tissues of the spinous fossa. As soon as the incision was made and it was exposed we saw the mistake. It proved to be a tumor that grew primarily from the shoulder-joint, and particularly from some part of the capsular ligament, crowding out from beneath the supra-spinous fossa and developing as large as a cocoa-nut upon the man's shoulder. The man had not consented to so radical an operation as entire ablation of the upper extremity, so only a temporizing operation was done; the removal of the tumor so far as external manifestations were concerned. He afterward had the nature of the growth explained to him and, after consulting with his friends, decided, in about three weeks, to submit to the operation. It was done; but he died fifty-six hours after the operation. He was slightly shocked by the operation, but recovered from that and for twenty-four hours was quite well, with only a slight elevation of temperature and pulse; he was then taken with delirium and died in a comatose condition.

I do not know exactly what was the cause of death, but I am inclined to think that it was poor policy to do this severe operation so soon after the primary interference. The man was still depressed and in great fear of the severity of the second operation. All these facts were against him. In this case the operation, after the method I have described as advocated by Paul Berger, I am sure was more quickly done, and with more satisfaction to the operator and, if he had lived, to the patient.

This second case properly comes under the head of secondary operations.

It is quite noticeable from the report read that the cases done by machinery are all reported as recovering, and it is questionable whether they have a place at all in the classification of this operation; because the deaths after such accident are not reported at all.

THE PRESENT STATUS OF BACTERIOLOGY.

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From the time of the first discovery of bacteria by Leeuwenhoeck during his examinations of saliva in 1675, bacteriology made no progress until about the middle of the present century, when Ehrenberg described several varieties of microorganisms, and Cohn, recognizing in these

minute beings the lowest forms of the vegetable kingdom, classified them into bacilli, micrococci, and spirilla.

Although Pollender, in 1849, described fine rod-like formations as occurring in the blood of animals dead of anthrax, to Davaine (1863) belongs the honor of having first proven the causal connection of these bacteria with the disease, and we must therefore recognize in the latter the first discoverer of a pathogenetic microorganism. Then followed the well-known experiments of Pasteur and his school on anthrax and chicken-cholera, but still the advances of this new science were slow.

Bacteria had now been discovered in the blood and secretions of diseased animals, but they could not be demonstrated in the organs. Well-planned experiments had determined the exact conditions favorable or otherwise to the development of these minute organisms, and the wonderful resisting power of the spores had been demonstrated. The harmlessness of the diseased blood when the bacteria had been removed by filtration was known. Cultures had even been made, but it was almost impossible to prevent unwished-for guests from entering the test-tubes and contaminating their contents. The hay-bacillus was known, but with the imperfect methods then in use, it was difficult to distinguish it from the anthrax-bacillus, and hence arose the false and dangerous doctrine of the transformation of species, which caused good observers to teach that the former, perfectly innocuous though it is, could, under certain conditions, take on the virulent properties of the latter.

These difficulties were dissipated almost at one stroke when the wonderful genius of Robert Koch popularized the use of the homogeneous immersion, when it gave us his improved methods of isolated staining of bacteria in the tissues, when it pointed out the correct way of using the Abbé condenser to wipe out the "structure-picture," and bring into bold relief the "color-picture" when it devised the solid culture-media, the boiled potato, the meat-peptone-gelatine, the agar-agar, the blood-serum. Now we can take a fluid containing a dozen different varieties of microbes, plate it out, so that as many different kinds of colonies spring up peacefully side by side, each containing only one kind of bacteria, and finally we can transplant a colony of each kind into a separate test-tube, where it will develop into a pure culture, and we can then study at leisure its distinguishing characteristics as to rapidity of growth, shape of colony, demand for or abhorrence of oxygen, formation of gas, color, odor, liquefaction of gelatine, etc., and when we inoculate an animal with such a culture, we know that we are experimenting with only one kind of microorganism. Can we help admiring that rare combination of brilliant genius, impartial self-criticism, and unerring judgment,