develop up to the required standard on devoting themselves to the drills should be accepted. On the other hand, all who would be likely to break down at the first severe test must be rejected. Besides the exact physical condition of the recruit, his family and personal history must be investigated and the diseases from which he has suffered considered. With these favorable, we may, after a careful physical examination and accurate measurement of height, weight and chest description and measurement, predict very accurately what the average youth of 18 will be at 22. Upon this postulate I shall base the following outlines. At 22 he may be expected to be from one to two inches taller in total height. The distance from the center of the symphysis pubis to the upper border of the breast bone (chest fully expanded) is a most important measurement, and one which, taken with the girth at the navel and horizontally at the angle of the scapula at inspiration, forms the basis for a very accurate calculation of the capacity of the space occupied by the organs of circulation, respiration and nutrition. This sterno-pubic measurement has the advantage of but a slight variation between 18 and 22 years of age. The chest at inspiration will average 1 1/3 inches more at the latter age, and the girth of the abdomen will have increased slightly less. The total height may be expected to increase about 1 1/2 inches, mainly by the natural growth and ossification of the epiphyses (chiefly the lower epiphysis of the femur and the upper epiphysis of the tibia and fibula). Since complete union of these epiphyses does not always take place before the age of 25, height may be increased by lengthening of the legs up to that age.

The average weight for the American male at the age of 22 will be estimated by allowing two pounds for each inch up to sixty-seven inches, and five pounds for every inch above this. After twenty-three years the same rule holds true except that seven pounds per inch above sixty-seven must be figured. About twenty-five pounds above and below these averages seems to be incompatible with good health and physical vigor; yet when the recruit's weight approaches either of these extremes his physical examination should be made most circumspectly, particularly if the younger man approaches the maximum or the older one the minimum. If the minimum figures are approached without other explanation, analysis of the urine should be made to exclude diabetes, and symptoms of tapeworm should be looked for. In approaching the maxima, the ratio of adipose tissue to muscle should be estimated.

Actuaries of life insurance companies have made a close study of the relations of height to weight in reference to longevity in civil life, and their most approved table is given below.

Height.	Minimum Weight.	Maximum Weight.
63 inches.....	106	160
64 inches.....	111	167
65 inches.....	114	170
66 inches.....	116	174
67 inches.....	118	178
68 inches.....	124	186
69 inches.....	130	194
70 inches.....	135	203
71 inches.....	139	209
72 inches.....	142	214
73 inches.....	147	220
74 inches.....	151	226

In applying these figures to military use, it must be remembered that these are taken in ordinary clothing, and a reduction of about one-eighteenth must be made to allow for the clothes.

THE TREATMENT OF ANEURYSMS BY SUBCUTANEOUS GELATIN INJECTIONS.

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The year 1898 added still another to the many methods that have been advanced to the treatment and cure of aneurysms. To Lancereaux of Paris is due the credit of having introduced this method to the medical profession. The treatment in question consists in the injection of sterilized solutions of gelatin into the subcutaneous tissues.

The method is based on the experimental work of Dastre and Floresco¹, who studied the effect of gelatin solutions on the coagulability of the blood. These observers went only so far as to show that the coagulability of the blood was increased when the gelatin solution was brought into direct contact with it, whether this be the circulating blood of the animal or the blood of the animal after removal. They found that the injection of gelatin solutions into the blood-vessels of dogs and rabbits caused a rapid coagulation of the blood. They employed for their experiments 0.8 gram of gelatin per kilogram body weight of the animal, in 5 per cent. solution, 0.8 per cent. sodium chlorid solution being used as the dissolving medium. The gelatin solution, however, did not possess the power of neutralizing the anticoagulative action of oxalates and other strong salt solutions. A definite antagonism existed between the coagulative effect of the gelatin and the anticoagulative effect of the proteoses and propeptone. The coagulative action of the gelatin was to the anticoagulative action of Witte's peptone as 1 is to 3.

Camus and Gley² were able to confirm the observations of Dastre and Floresco. They did not believe that the increased coagulability of the blood was due to any specific action of the gelatin, but rather to the acids which the gelatin contained. By neutralizing the acidity of the gelatin with sodium carbonate, they claimed that it lost its coagulative action, and that this action was increased by increasing its acidity. According to Camus and Gley, the antagonism of gelatin and propeptone is due to the acidity of the former and the alkalinity of the latter. Floresco³ agreed in part with the explanation of Camus and Gley, but still insisted that the effect of gelatin was not due to the acid it contained, though in large part to a specific action which it possessed.

Although Dastre and Floresco were the first to demonstrate that gelatin increased the coagulability of the blood when brought into direct contact with the latter, Lancereaux was the first to show that the same effect could be obtained by the injection of the gelatin into the peritoneal cavity and subcutaneous tissue. He proposed to use this action of gelatin as a therapeutic agent in the treatment of aneurysms.

Lancereaux⁴, in association with Paulesco, first brought this method of treatment before the members of the Academy of Medicine, in Paris, in June, 1897, and subsequently in October, 1898. They⁵ reported five cases in which they had adopted the treatment.

Technic of Giving the Injections.—Lancereaux gives the following directions for the making of the gelatin solution and the giving of the injections. The solution is made by dissolving 4-5 grams of white gelatin in 200 c.c. of 0.7 per cent. sodium chlorid solution, and steriliz-

*Presented to the Section on Practice of Medicine, at the Fiftieth Annual Meeting of the American Medical Association held at Columbus, Ohio, June 8-9, 1899.

ing thoroughly at 120 C. The flasks are kept for several days at a temperature of 38 C., and any in which the gelatin becomes turbid or fails to harden in the cold are discarded.

For giving the injections he uses a 500 c.c. sterilized flask, with a tight-fitting rubber stopper through which two glass tubes pass. One of the glass tubes extends to the bottom of the flask and is connected by rubber-tubing, with a proper-sized needle. To the other short glass tube a stiff rubber inflating-bulb is attached. In order to purify the air a glass bulb filled with absorbent cotton is interposed between the rubber bulb and the flask. The temperature of the gelatin solution must be 37.6. According to Lancereaux, no pain should be produced by the injections. With proper asepsis and antisepsis there should be no general nor local reaction. After the injection the patient should have absolute rest, and palpation of the aneurysm must be avoided. The injections are made at intervals varying from two to fifteen days. Lancereaux thinks that best results are obtained by giving them every sixth to eighth day. He states that, generally speaking, ten, fifteen or twenty injections are necessary to effect a cure. He advises injecting the gelatin solution into the subcutaneous tissue of the thigh, and never into or in the vicinity of the aneurysmal sac.

Huchard emphasized the importance of aneurysm patients taking the proper sort of diet. An essential point in the treatment is the lessening of the arterial tension. For this reason all sorts of food which tend to produce toxins having a vasoconstrictor action must be avoided. Bouillon, fat soups, meat, fish, particularly sea-fish, and cheese must not form a part of the patients' dietary. Alcohol, tea, coffee and tobacco are also forbidden. A strict milk diet is preferable, but fruits and leguminous foods may also be permitted. Drugs which cause a dilatation of the blood-vessels, such as iodids and nitrites are also useful.

Of Lancereaux's five cases, three were reported as being cured. In these cases the aneurysm was saccular in form. The other two, which terminated fatally, were instances of diffuse dilatation of the arch of the aorta.

In order that the effect of the injections in Lancereaux's cured cases may be better appreciated, I purpose giving a brief summary of the cases and the effect of the treatment.

MALARIA. AORTITIS WITH ANEURYSM OF THE ARCH OF THE AORTA; SUBCUTANEOUS INJECTIONS OF GELATIN. CURE.

CASE 1.—The patient was a man, 50 years of age, with malaria nine years ago; no syphilis nor arteriosclerosis. For three years he had an aneurysm of the ascending aorta; right intercostal neuralgia and angina pectoris for six months; visible pulsating; tumor to right of sternum for one year; second to fourth costal cartilages and the greater part of the sternum eroded; definite systolic expansile pulsation. On auscultation both heart sounds were audible, but no murmurs. The radial pulses were equal. The patient could lie only on the right side; change in position caused cough, huskiness of the voice, and a sense of anxiety and feeling of oppression in the chest. There had been rapid growth of the aneurysm and ecchymoses had occurred in the skin over the aneurysm.

Jan. 20, 1898: Subcutaneous injection of 250 c.c. 5 per cent. gelatin solution. On the following day the aneurysm was firmer. For several days it diminished in size and then became larger and soft.

February 10: A second injection of 150 c.c. 1 per

cent. solution of gelatin. The aneurysm again became smaller and firmer. Pain disappeared and angina pectoris ceased. He could change position without discomfort.

From February 10 to May 12, twelve injections were given, with the following result: Marked diminution in size of the tumor and cessation of the pulsation. The patient was able to work. After one year, intercostal neuralgia again returned, and the lower part of the tumor again began to grow and become soft. After two injections these manifestations subsided and the aneurysm became firmer. After the lapse of one month the pain and pulsation again returned, to disappear again after a single injection. The last two pulsations which appeared were not due to a return of the pulsation in the original aneurysm, which remained hard and free from pulsation, but to the development of two new aneurysmal dilatations beneath it.

Although Lancereaux regards this case as having been cured, the result is not so satisfactory as one would desire to have it.

ANEURYSM OF THE ARCH OF THE AORTA. CURE.

CASE 2.—The patient was a man 48 years of age; eight months previously he had suddenly felt something burst in the upper part of the chest, and expectorated a small quantity of blood. Since then he had complained of severe pain and a sense of oppression at the same point whenever he lifted anything heavy. The veins were dilated over the right side of the thorax; pulsation in the second right intercostal space, where a soft systolic murmur was audible. Both carotids and radial pulse equal. On May 20 he was given an injection of 200 c.c. of a 2 per cent. gelatin solution; up to August 1, ten such injections were given, one each week. The systolic murmur, the pulsation, the dilatation of the veins and the subjective symptoms disappeared. Two injections were given subsequently and the patient was discharged cured.

ANEURYSM OF THE RIGHT SUBCLAVIAN ARTERY.

CASE 3.—A coachman, 50 years of age, in July, 1898, suddenly began to experience a creeping sensation in the right arm. During the following days he suffered intense lancinating pain and still later the motor power of the right arm became impaired. He had never had lues. Beneath the right clavicle, to the outer side of the scalenus anticus muscle, a distinct pulsating tumor, the size of a nut, was visible; no pulsation in brachial or radial artery; the right arm felt warm, the last phalanges were thick and the finger-nails deformed.

Jan. 18, 1898: Subcutaneous injection of 200 c.c. of a 2 per cent. gelatin solution. Up to April 9 eleven injections had been given. After the first injection the aneurysm became harder; following the third, two soft murmurs were audible, which were not previously present; the pain disappeared. The patient was permitted to move his arm and the aneurysm again began to soften, pulsate and grow larger. After two subsequent injections the aneurysm became firm and the pulsation disappeared. From May 1 to June 20 the patient received nine injections. On July 5, a weak but definite pulse was felt in the right radial. The radial pulse became subsequently inappreciable, to appear again after two injections were given. The patient left the hospital on August 13, able to work.

As already stated, the other two cases were instances of diffuse dilatation of the aortic arch, and, although they were given several gelatin injections, no improvement resulted and both terminated fatally. One died

of coma and in the other the aneurysmal dilatation ruptured into the posterior mediastinum.

In all five cases there was no local reaction following the injections; there was no elevation of the temperature and the injections were not painful. In the two fatal cases no serious consequences occurred which could be attributed to the gelatin injections.

That the gelatin injections are not entirely without danger to the patient is suggested by the cases reported by Boinet and Barth.

Boinet's patient, a man aged 33, had an aneurysm of the ascending portion of the aortic arch. Not having improved under the iodids, he was started on the gelatin injections. As a result, fibrin was deposited in the lower part of the aneurysmal sac, leading to compression of the pulmonary artery. This compression, in the opinion of Boinet and Huchard, led to double-sided pulmonary tuberculosis. Three months later evidences of compression of the superior vena cava appeared, and a few days subsequently the patient died. The autopsy showed that the lower part of the sac was coated with a layer of firm coagulum 6 cm. thick. There was a deposition of fibrin in the adjacent portion of the pulmonary artery and the lumen of the artery was markedly narrowed.

In Barth's case, referred to by Huchard, the aneurysm was also situated in the ascending portion of the arch of the aorta. After the sixteenth injection, the temperature became elevated and a large abscess developed at the seat of inoculation. Two months after the treatment had been started the patient suddenly felt suffocated, anxious, weak, and fainted. She remained in a semi-comatose condition until her death. The autopsy showed that the aneurysmal sac was completely filled with a clot easily separable from the sac wall. Firm clots had also extended into all the branches of the aorta, excepting the left subclavian, causing an acute anemia of the brain, and sudden death.

Huchard⁸ thinks that these two cases show not only the remarkable coagulative power of the gelatin, but also the danger of the method. For the latter reason and from the fact that in one of his own patients the injections of the 2 per cent. gelatin solution caused intense pain, he recommends the substitution of a 1 per cent. gelatin solution injected at intervals of not less than eight to ten days. Absolute rest on the part of the patient is very essential.

Lancereaux would not agree that Boinet's and Barth's cases died as a result of the effect of the injections. He stated that the coagulation in the aneurysmal sac, in Boinet's case, should diminish rather than increase the compression on the pulmonary artery. In Barth's case he believed that the symptoms preceding death were those of uremia and that the clots in the aortic branches were agonal or post-mortem in formation.

In the opinion of Lancereaux, the subcutaneous injection of gelatin solutions is followed by the absorption of the gelatin into the circulation with the result that the blood coagulates much more easily. With this increased coagulability of the blood, there exists in the aneurysmal sac two conditions which predispose to the coagulation of the blood, viz.: a slowing of the blood-current and an unevenness of the vessel wall. The contraction of the clot thus formed leads to a diminution in the size of the aneurysmal sac, following which there is a disappearance of the compression symptoms. If the clot becomes separated from the sac wall, then the blood forces its way between the sac and the clot, and the aneurysm again begins to grow. In diffuse dilatations of the aortic arch, such as occurred in the fourth and fifth

cases of Lancereaux, there is little or no slowing of the blood-current and clot formation does not occur even with the gelatin injections.

Lancereaux's report before the Academy of Medicine, in Paris, of his method of treating aneurysm, created considerable discussion. The main point at issue was whether the gelatin was actually absorbed, and if so, in what manner? The views advanced were very conflicting. Laborde holds that the gelatin solution is not really a true solution but a suspension of the gelatin in very fine particles, as can be demonstrated with the microscope. If absorption takes place it must be of the nature of a diapedesis. He is inclined to support the view that the repeated injections lead to the absorption of large amounts of fluid, which, through a change in the blood-pressure or from some unknown change in the blood itself, influence its coagulability. He thought that possibly a peptinization of the gelatin occurred before absorption. He advises that the gelatin injection should be made into the sac itself, or into its immediate vicinity. Lancereaux insisted that the gelatin was an actual solution and did not think that the amount of fluid absorbed with each injection could have any influence on the blood-pressure. He thought that the injection of gelatin solution direct into the aneurysmal sac would be exceedingly dangerous. He believes that the gelatin is absorbed from the subcutaneous tissue by way of the lymphatics.

Camus and Gley⁹ injected gelatin into the peritoneal cavity of rabbits and, contrary to Lancereaux's results, found no increase in the coagulability of the blood. They further held that even two hours after the injection was made, practically the full amount could be recovered from the peritoneal cavity. Lancereaux again repeated and confirmed his experiments and showed that the substance recovered by Camus and Gley was not gelatin solution but a fluid rich in albumin and fibrin. When these are first precipitated it will be found that only a fraction of the original amount of gelatin injected can be recovered.

It will be seen from the above that the results of the experimental work in gelatin injections have been most conflicting. The opinion of one good observer is pitted against that of another. There seems little doubt, however, but that the gelatin injections do cause a distinct increase in the coagulabilities of the blood.

Sorgo¹⁰, who had recently impartially reviewed the literature on the subject, states that there is little doubt that the gelatin injections cause a rapid and sure coagulation of the blood in saccular aneurysms. This is attended by no serious dangers when the patient observes the prescribed rules for dieting and rest.

With the object of giving the gelatin treatment a trial, Dr. Osler commenced its use in a series of aneurysm cases admitted to the medical wards of the Johns Hopkins Hospital. Following Lancereaux's latest directions, we have used 250 c.c. of a 1 per cent. solution of white gelatin in physiologic salt solution at each injection. In the early cases the injections were made every other day, but subsequently they have been given every fifth day. They have been given either into the subcutaneous tissue of the thigh or into that of the abdominal wall. Frequently the injections were much less painful in the latter than in the former situation. Instead of following the technic of Lancereaux, we have used, as a satisfactory substitute a 50 c.c. syringe, five syringefuls being injected, care being taken not to introduce any air. The injections were made under the strictest aseptic precautions. The solution must be in-

roduced slowly, otherwise it will cause considerable pain. It is not absorbed so readily as normal salt solution.

Since October, 1898, the treatment has been commenced on nine aneurysm cases in all. In only the first six of these patients had the injection been given sufficiently long for the treatment to have had a fair trial. In all the cases the blood coagulation time was taken by means of Wright's coagulation tubes immediately before and six hours after each injection was made.

ANEURYSM OF THE ARCH OF THE AORTA.—SIX SUBCUTANEOUS GELATIN INJECTIONS.—SUDDEN DEATH BY RUPTURE OF THE ANEURYSM INTO THE LEFT BRONCHUS.

CASE 1.—J. B., a laborer, aged 27, was admitted to the Johns Hopkins Hospital, for the second time, Oct. 7, 1898, complaining of severe pain over the precordial and scapular regions. Cough, difficult swallowing and huskiness of the voice were prominent subjective symptoms. A distinct saccular aneurysm of the aortic arch projected forward in the first, second and third left interspaces, causing a distinct tumor which possessed an expansile pulsation. There was dulness on percussion in the upper left interscapular region, posteriorly. An interesting physical sign was the presence not only of a palpable but also of a visible tracheal tugging.

From November 2 to November 15, six gelatin injections were given. The majority were attended by intense agonizing pain at the seat of injection, lasting up to and most intense six hours after the injection. Those made into the abdominal wall gave least pain. The blood coagulation time was taken only once in this case, namely, before and four hours after the sixth or last injection, on November 15. The coagulation time before the injection was seven minutes, and after it was only four minutes, showing a reduction of three minutes. At 8 p. m., November 16, the patient died of a severe attack of hemoptysis, about 600 c.c. of blood being expectorated.

The autopsy revealed a general dilatation of the aortic arch with a localized saccular aneurysm at the junction of the transverse and descending portions of the arch. At the point of pressure of the sac on the left bronchus there had been a perforation causing the hemoptysis and sudden death.

ANEURYSM OF DESCENDING THORACIC AORTA; FIFTY-SIX GELATIN INJECTIONS; MARKED DIMINUTION OF THE PAIN; DIMINUTION IN SIZE OF THE ORIGINAL ANEURYSM. PATIENT STILL UNDER TREATMENT.

CASE 2.—U. C., a laborer, aged 42, was admitted to the hospital for the third time, Nov. 5, 1898, complaining of severe pain in the abdomen and back. There was considerable pulsation over the lower left submammary region, and a quite marked pulsation in the lower part of the left interscapular and upper subscapular regions. The patient suffered intense pain in the left submammary region, and usually lay on his face with a pillow pressed against the epigastrium. A diastolic and systolic murmur had been heard over the pulsation in the back, on a previous admission. There was cardiac hypertrophy and considerable extension of the cardiac flatness to the right of the sternum. The first gelatin injection was given on November 9, and was followed by an elevation of the temperature to 100 F. After two other injections, the second and thirty-fourth, the temperature also became elevated, reaching to 101.7 and 100.6 F. respectively. After the thirty-fourth injection there was also a distinct rigor. There was no local reaction.

From Nov. 9, 1898, to May 21, 1899, the patient had received fifty-six injections. There had been almost an immediate diminution in the pain as soon as the injections were started. The pulsation in the front and back had distinctly lessened, but during the last three months either the same or another aneurysm has pushed the heart forward and now has caused a distinct bulging and pulsation in third and fourth right interspaces, between the lateral, sternal and mammillary lines. In the majority of instances there was a diminution of the coagulation time, after the injections. An interesting feature of this case is that for several days during the treatment the coagulation time, both before and after the injections, was markedly delayed, as compared with normal, the average time being about twenty minutes. This was the case at the time of the twenty-third injection on Dec. 30, 1898. On this day the fresh blood was diluted with Hayem's solution, and examined for platelets and none found. On January 5, when the coagulation time had dropped to seven and one-half minutes, the blood contained numerous platelets. These observations seem to suggest a definite relationship between the coagulation time and the number of platelets. Although this patient has gained twenty-five pounds since the treatment was commenced, and although the pain has been much less, we can do no more than state that the original pulsation has diminished and the subjective symptoms have lessened. The number of injections given, fifty-six, was nearly three times the maximum number regarded by Lancereaux as necessary to effect a cure.

ANEURYSM OF THE ABDOMINAL AORTA; TWENTY-ONE GELATIN INJECTIONS; NO APPARENT IMPROVEMENT.

CASE 3.—O. G., a farmer, aged 47, was admitted to the hospital for the third time, on Oct. 23, 1897, complaining of pain in the right side of the abdomen, just below the margin of the ribs, and of pain shooting down into the hips. He also suffered intense pain in the left lumbar region of the back. He was in the hospital for the first time, in October, 1896, with mitral and aortic insufficiency. The pain already described had been complained of for eight months previous to his admission. He was admitted a second time in March, 1897, when an aneurysm of the abdominal aorta was diagnosed. On the third admission there was marked cardiac hypertrophy with mitral and aortic insufficiency. In the epigastrium, slightly to the left of the median line, there was a distinct pulsation of an expansile character. There was no palpable thrill, but a distinct systolic bruit over the pulsation. A definite, visible and palpable pulsation was present in the lower part of the left back. The first gelatin injection was given on Nov. 9, 1898. After the second injection the temperature rose to 101.9 F.; there was no local reaction. Following two subsequent injections there was a distinct rigor with an elevation of temperature to 100.4 and 101.1 F., respectively. Up to Feb. 11, 1899, the date of the last injection, twenty-one injections had been given. Owing to the injections having been painless, and as there had been no material diminution in the size of the aneurysm, the treatment was stopped. The coagulation time was distinctly reduced after nearly every injection. One hour before the first injection the coagulation time was four minutes, forty seconds. Five hours after injection it was reduced to two minutes, five seconds.

DIFFUSE DILATATION OF AORTIC ARCH; THIRTY-FOUR INJECTIONS; NO IMPROVEMENT.

CASE 4.—C. L., colored, a laborer, aged 48, was admitted to the hospital on Oct. 14, 1898, complaining

of pain in the lower left side and in the back. He had distinct cardiac hypertrophy. There were no endocardial murmurs. The second aortic sound was ringing and accentuated. There was a distinct diastolic shock over the base of the heart. The manubrium was prominent, and with each cardiac systole there was a distinct heaving over the upper part of the thorax, with definite lifting of the manubrium and both clavicles. There was no thrill nor murmur over the area of pulsation. The first gelatin injection was given on November 9, and the last, or thirty-fourth, on March 14, 1899. This patient usually suffered intense pain for several hours after the injections. On several occasions there was considerable elevation of temperature after the treatment. After several of the injections made into the abdominal wall sensitive nodules, the size of a hickory nut, developed. These lasted for six to eight days and then disappeared. None of them suppurated. The patient gained seven pounds under the treatment, but the pulsation was not diminished. The coagulation time was reduced after nearly every injection.

ANEURYSM OF THE ABDOMINAL AORTA; EIGHTEEN GELATIN INJECTIONS UP TO DATE; DIMINUTION IN SIZE OF THE ANEURYSM AND CESSATION OF PAIN; PATIENT STILL UNDER TREATMENT.

CASE 5.—W. G., an oysterman, aged 36, was admitted to the hospital on Feb. 9, 1899, complaining of severe pain in the abdomen, which radiated around the whole body. Pain, the first symptom, began nine days before admission. In the left half of the epigastrium there was a distinct visible pulsation. On palpation, a definite tumor, possessing a pulsation, having an expansile character, could be grasped between the hands. There was no thrill, but a harsh systolic murmur was audible over it. The first injection was given on February 13. This and the subsequent one were very painful, and both were followed by rises in temperature to 99.8 and 101.5 F., respectively. After the sixth injection the patient began to suffer much less pain, referable to the aneurysm, and since then has been quite comfortable. Following several of the injections an appreciable diminution in the size of the tumor could be made out several hours later. Up to June 2, eighteen injections had been given. The pain has now disappeared and the aneurysm is distinctly smaller.

Most of the following patients received but one or two injections owing to their being unwilling to remain in the hospital.

ANEURYSM OF TRANSVERSE PORTION OF AORTIC ARCH; SEVERE PAIN IN LEFT INTERSCAPULAR REGION; ONE GELATIN INJECTION; NO IMPROVEMENT.

CASE 7.—L. D., a clerk, aged 51, was admitted to the hospital on Dec. 28, 1898, complaining of pain in the left side and back. There was a distinct visible lifting of the manubrium and of the sternal end of the right clavicle. Tracheal tugging was appreciable. There was faint diastolic shock over the pulsation; no thrill; no audible murmur. The patient was given a gelatin injection on December 18. The pain at the seat of injection was so intense that the treatment was not continued. There was no relief of the original pain complained of.

ANEURYSM OF ASCENDING PORTION OF AORTIC ARCH; SEVEN GELATIN INJECTIONS FOLLOWED BY TEMPORARY IMPROVEMENT AND THEN A RELAPSE OF SYMPTOMS.

CASE 6.—J. T., a sea-captain, aged 51, was admitted to the hospital on April 24, 1899. There was a marked bulging of the manubrium area of the first and second

left interspaces and second rib. He had had pain, cough, dyspnea, difficulty in swallowing, and dysphagia. The first gelatin injection was given on April 27. This was followed by a chill and an elevation of the temperature to 103 F. The subjective symptoms were relieved after the first three or four injections, but subsequently the pain returned, and when the patient left the hospital the aneurysm had increased in size. The coagulation time was reduced after the injections.

ANEURYSM OF TRANSVERSE PORTION OF THORACIC AORTA; TWO GELATIN INJECTIONS; RELIEF TO SUBJECTIVE SYMPTOMS.

CASE 8.—J. N., a laborer, aged 51, was admitted to the hospital on May 13, 1898. There was an aneurysm of the transverse portion of the aortic arch causing slight lifting of the manubrium and marked subjective symptoms of dyspnea, cough, pain, huskiness of the voice and dysphagia. Two injections were given, the second followed by a chill and an elevation of the temperature to 103 F. After the injections the subjective symptoms were much relieved. The patient refused to remain in the hospital and was discharged.

ANEURYSM OF TRANSVERSE PORTION OF AORTIC ARCH; ONE INJECTION; SLIGHT IMPROVEMENT OF SUBJECTIVE SYMPTOMS.

CASE 9.—J. C., a sailor, aged 39, was admitted to the hospital on May 18, 1899. There were no physical signs of an aneurysm, excepting slight dulness over the manubrium and appreciable tracheal tugging. As subjective symptoms there were dyspnea, cough, pain and huskiness of the voice. He received one gelatin injection, after which the subjective symptoms were appreciably less. Not being able to remain longer in the hospital he was discharged.

The following conclusions may be drawn from our experience with the gelatin treatment in these nine cases:

1. In not a single instance has the aneurysm been cured, although in one case (No. 5) the abdominal aneurysm has diminished considerably in size and the case is still under treatment.
2. In seven of the nine cases there was an appreciable diminution in the subjective symptoms referable to the pressure of the aneurysm.
3. It seems quite certain that the subcutaneous injection of gelatin solution does materially increase the coagulability of the blood.
4. Contrary to the statement of Lancereaux, we have found that the gelatin injections are frequently very painful to the patient, the pain lasting and being most intense often as late as six hours after the injection.
5. Although Lancereaux states that with strict antiseptic and aseptic precautions there should be no elevation of temperature, we have found the contrary. In several instances the injections were followed, two to four hours later, by a distinct chill, with an elevation of temperature reaching at times as high as 103 F. In no case did we have any local suppuration, and in only one case (No. 4) was there even any local reaction.
6. Notwithstanding the fact that we have not yet a case which can be reported as cured, I am convinced that there is some merit in the treatment, and that it deserves a further trial.

BIBLIOGRAPHY.

1. Dastre and Floresco: Action coagulante des injections de gélatine sur le Sang. Arch. de Physiol., 1896, p. 402.
2. Camus and Gley: Action du serum sanguin et de solutions de propeptone sur quelques ferments digestives. Arch. de Physiol., 1897, p. 764.
3. Floresco: Action des acides et de la gélatine sur la coagulation du Sang. Arch. de Physiol., 1897, p. 777.
4. Lancereaux and Paulesco: Du traitement des Aneurysms en Général et de l'aneurysme de l'aorte en particulier par des injections sous-

tanées d'une solution gélatineuse. Bull. de l'Acad. de Med. de Paris, 1897; session on June 22.

5. Lancereaux and Paulesco: Nouvelle methode du traitement des aneurysmes (exposé de la méthode, observatione, Technique opératoire) Jour. de Méd. int., Oct. 1, 1898.

6. Lancereaux and Paulesco: Traitement des aneurysms par le gélatine en infections sous-cutanées. Bull. de l'Acad. de Méd. de Paris, No. 41, Oct. 11, 1898.

7. Boinot: Revue de Méd., 1898, No. 6, p. 509.

8. Huchard: Bull. de l'Acad. de Méd. de Paris, No. 43, Oct. 26, 1898.

9. Camus and Gley: Compt. rend. de la Soc. de Biolog., 1898, No. 35, p. 1041.

10. Centralbl. f. die Grenzgebiete der Med. und Chir., Bd. ii, 1899, No. 1, p. 10.

CONTAGION IN LEPROSY AS OBSERVED IN SAN FRANCISCO.*

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There are quite a number of lepers in San Francisco, many more than the eighteen or nineteen who are at present in the pest-house. The important question, however, before the city itself and before the United States is whether San Francisco and the Pacific Coast is merely a temporary abiding place for a few lepers who have come to it by accident, or whether this part of the United States is really becoming a leper focus where the disease may be contracted.

The difference between these two conditions is very great. London, Paris and Berlin, for instance, have always a number of lepers who have come to them either as returned officials or merchants who have acquired their disease in a leper country, such as Tonquin or India, or as patients seeking medical advice, but it is not considered that any of these cities constitute leper centers where leprosy is contracted¹, whereas Iceland, the Hawaiian Islands, the Province of Kwang Tung in China, for example, are undoubted leper centers where the disease is contracted not alone by the natives themselves but by immigrant strangers. To which class does San Francisco belong?

By San Francisco is meant the whole Pacific Coast, as the city is only mentioned because it is the point of view of the writer, and besides, being the largest port on the coast, it is the locality where the largest number of lepers is found. If San Francisco and the Pacific Coast constitute a district where leprosy may be contracted, the condition becomes infinitely graver than if the leprosy was altogether imported. It would appear from some of my observations that leprosy may be contracted on this coast.

In April, 1892, I published the case of an American, who died of tubercular leprosy in the San Francisco pest-house, and who, as nearly as I could find, had acquired his disease from the Chinese either in Nevada or California. This man was born in Massachusetts, and had never been out of the United States, except for a few hours in passing from Buffalo, N. Y., to Detroit, Mich., on a railroad. He had cohabited a great deal with Chinese, and at one time had had charge of a gang of Chinamen on the Central Pacific Railway, in Nevada. He died Feb. 29, 1892. He had noticed the first symptoms of his disease as areas of brown discoloration on the body and limbs about seven years before. His case has, up to the present, remained unique in my experience as being a native-born American whose malady was evidently contracted west of the Rocky Mountains. I have, however, run across several alien-born patients

who, on account of their long residence in the United States before showing symptoms of their disease, might therefore be suspected of having acquired their leprosy here. A notable instance of this was a man named Samie Maiken, a Hindu, and a leper of the anesthetic type, who died in the San Francisco pest-house July 9, 1895, at 69 years of age. He had lived in San Francisco for about ten years when he went to Virginia City, Nev., where he first noticed his hands were affected. He, like the before mentioned American, had consorted much with the Chinese, working with them as a laundryman. He had also cohabited much with Chinese prostitutes.

As far as the Chinese themselves are concerned, I have only found five who were long enough in America before the development of symptoms to allow one to infer that possibly they had acquired their disease in this country. One of these was a prostitute, 29 years of age, who came from the village of Sun Ning in the See Yup district of the Province of Kwang Tung. She told a rather romantic story of how, in a raid of the Hak Kah, she had been stolen at 15 years of age, and sold into slavery and brought to San Francisco, where she remained for six months. She was afterward sent to Salt Lake City, Utah, where, after a time, she bought herself free. She arrived in America in 1877, and it was not until 1888 that she first noticed the disease, which appeared as a small tubercle on the nose. She is still alive, a horrible picture of tubercular leprosy, in the San Francisco pest-house.

A Chinaman, named Chung Kan Foke, a native of the Province of Kwang Tung, came to San Francisco in 1876, where he remained for eight years. He then went to Nevada and worked in a silver mine, and it was in that state, in 1892, sixteen years after leaving China, that he first noticed tumefactions in the face, the first symptom of leprosy. When I examined him in February, 1894, he was suffering from tuberculo-anesthetic leprosy.

Another Chinaman, named Ah Lung, from the village of Sang Chow, in the district of Sun Ning, Province of Kwang Tung, by occupation a waiter, came to America in 1882, and it was not until 1895, thirteen years after he arrived, that he first noticed discolored patches in his face, the first symptoms of his disease. When I first saw him, in March, 1897, he was suffering from leprosy infiltrations and neural lesions.

Leong O You was a leper of the anesthetic type, 45 years of age, who, when first seen in December, 1897, said that he had first noticed the disease, which at first affected his hand, in March of the same year. He had come to America twenty-eight years before.

Quan Chew, a cook, aged 44 years, and a native of the village of Clack How, in the district of Hoy Ping, Kwang Tung, had come to America twenty-five years before, at 19 years of age. He was a leper of the anesthetic type, with commencing leprosy infiltration in the region of the left eyebrow. He had noticed the first symptom of the disease as a pain in the left knee-joint, extending down the front of the leg. This pain had come on after he had been in America nineteen years.

In drawing inferences from the foregoing aliens, consideration must be given to the long latency of leprosy. According to Hallopeau, even thirty-two years may elapse between contracting the disease and its first manifestations². Such very long latencies must surely be exceptional, however.

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¹ Hallopeau: Annales de Dermatologie et de Syph., vol. viii, p. 996.

² Hallopeau: Ibid, p. 997.