internal suturing of the orifices of the sac and occlusion of the sac by packing. The chief risk of total extirpation would be uncontrollable bleeding from the dilated internal jugular at this point, and destruction of the lower cranial nerves at their exit from the skull. Most operators prefer ligation of the common carotid to ligation of the internal carotid in the treatment of these aneurysms; and in this case ligation of the internal carotid was not possible because the sac of the aneurysm began at the bifurcation. The internal carotid was first ligated by Gurdon Buck of New York, reported in 1850, and in this connection it might be interesting to state what is already known to most of us, that the first ligature applied on the proximal side of an aneurysm was done by Dominique Anel, Jan. 30, 1710, who ligated the brachial artery for aneurysm with recovery. The most violent opposition was encountered, and as an example of the skill of detractors, they claimed, first, that it was not the brachial artery that was tied; secondly, that the ligature did not cure the aneurysm, and thirdly, that cure was by lucky chance only. The old operation had been practiced in small aneurysms previous to this, which was to open the sac and ligate all bleeding points within the sac. Morel attempted this operation in an aneurysm of the carotid in 1687, and lost his patient on the table from hemorrhage. It was interesting to note in looking up the history of aneurysms that the femoral artery was not first tied for popliteal aneurysm by John Hunter, Dec. 12, 1785, but that Desault had performed the same operation successfully January 22 of that year.⁹

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THE CHARCOT-MARIE-TOOTH TYPE OF PROGRESSIVE NEUROMUSCULAR ATROPHY

WITH A REPORT OF TWO CASES *

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Charcot and Marie,¹ in a joint contribution in 1886, first described this type of atrophy, which they considered in the nature of a dystrophy. Tooth² in England in the same year described it independently, practically giving this affection a similar summary. In 1889, however, Hoffman discovered a neurotic atrophy in the peroneal nerves, which immediately removed the affection from the category of the dystrophies and placed it in the class of primary neural degenerations. Since these notable contributions, American neurolo-

gists, notably Sachs³ and Spiller,⁴ have described cases confirming the clinical syndrome of this condition. The literature on the subject, although not very voluminous, is apparently divided among American, English and French authors, with an occasional case reported by Italian observers. German observers, in a number of reported cases, have a tendency to include this distinct neurologic condition among the spinal atrophies, which Maslianka⁵ deprecates very much, as not in accord with a true conception of the pathology of the disease.

Although textbooks and monographs dwell on the rarity of the affection, Maslianka refutes the idea that it is exceptional in occurrence. He believes that it is a fairly common disease, and that a great many more cases would be found if our clinical acumen was somewhat sharpened. Either his contentions are correct or the disease is rare in this country.

No known cause has been formulated. A number of observers state that their cases followed a febrile disturbance. One of my cases followed such a course. Gowers⁶ would class this affection among the abiotrophies, that is, a tendency for nervous tissue to suffer early decay and death.

The pathology of the disease was in a chaotic state following Charcot and Marie's monograph, as it was then thought to be a dystrophy; but Hoffman, Bernhard, Siemerling, Sainton,⁷ Déjerine and Armand-Delille, in necropsy material and from a study of the recorded cases, came to the conclusion that the lesions consisted of a degeneration of the muscles, nerves and posterior columns of the spinal cord, involving the sensory and motor sides of the nerves peripherally and centrally.

Although the hereditary factor is commented on strongly by most authors, isolated cases have been described in which heredity played no rôle in the disease. My cases lacked this distinguishing feature.

Occurring in families in which the hereditary factor is strong, brothers and sisters are equally affected; but if we are to include isolated cases, we find that males are five times more susceptible than females.

The extreme age limits of described cases are 2 and 39 years. Most cases have had their onset between the tenth and twentieth year. My cases commenced at 16 and 20 years, respectively.

CLINICAL COURSE

The onset is slow, although in one of my cases it was rather rapid. The patient may not appreciate the atrophy until function of the limbs is interfered with. Most of the cases reported in the literature mention the legs as first affected; then after a variable time, lasting from several months to several years, the upper extremities become involved. It also may remain permanently localized either to the upper or lower extremities, although this is unusual. My cases, of three to six years' duration, respectively, have so far selected the lower extremities. When involving the upper extremities, the thenar, hypothenar and interosseus muscle bundles first show atrophy; then follow the flexors and extensors. In the lower extremities, the peroneal group and antero-external part of the foot first show atrophy and diminution in muscle volume.

9. In addition to the references already given, the following will be found of interest:

Schmidt: Beitr. z. klin. Chir., 1913, lxxxviii, No. 2.
Balfour and Wildner: Surg., Gynec. and Obst., 1914, xviii, 803.
Levings: Wisconsin Med. Jour., 1914, xiii, 17.
Da Costa: New York Med. Jour., xciv, 253.
Frazier: Progr. Med., March, 1915.
Collier: Surg., Gynec. and Obst., April, 1915.
Halsted, W. S.: The Results of the Complete and Incomplete Occlusion of the Abdominal and Thoracic Aortas by Metal Bands, THE JOURNAL A. M. A., Dec. 29, 1906, p. 2147; Jour. Exper. Med., 1909, xi, No. 2; Ann. Surg., 1913, lviii, 183.
Cunningham, A. R. T.: Report of a Case of Gradual Occlusion of the Common Carotid Artery in the Treatment of Pulsating Exophthalmos, THE JOURNAL A. M. A., Jan. 31, 1914, p. 373.

* Patients presented before the Harlem Medical Society, March 1, 1916.

* From the Hospital for Deformities and Joint Diseases, Service of Dr. Henry W. Frauenthal.

1. Charcot and Marie: Rev. de méd., 1886.

2. Tooth: Brain, x, 243.

3. Sachs: New York Med. Jour., 1888.

4. Spiller: Osler's Modern Medicine.

5. Maslianka: Thèse contribution à l'étude clinique de l'amyotrophie Charcot-Marie.

6. Gowers: Text Book of Nervous Diseases.

7. Sainton, M. Paul: Thèse de Paris, 1899.

A distinguishing feature of this atrophy is its symmetry and its distal character. The proximal portions of the limbs are well preserved and show their normal contour, in striking contrast to the wasted distal portions.

As a result of the atrophy, the extensors give way, thus giving us various degrees of claw hand, foot drop and equinovarus deformities. The atrophy and paralysis are absolutely parallel, which condition naturally influences the gait of the patient or the use of the hands. In moderate grades of wasting, there is very little interference with function of the limbs, although the gait may readily show impairment, or the hands loss of power for finer movements. In extreme grades of wasting, total helplessness supervenes. Bony atrophy is absent and constitutes a singular feature of the cases. Face, chest and trunk muscles are normal, and remain unaffected throughout the course of the disease.

Fibrillary contraction constitutes a persistent feature of the affection. It exists only in atrophying muscles, and stops when they are completely wasted. My cases did not show this markedly, but the extreme atrophy present in both cases readily explains its absence.

The reflexes in most cases reported are abolished, although Maslianika insists that they are variable, either normal, diminished, lost or increased. One of my cases showed normal patellar reflexes, while the other case showed them markedly exaggerated. The last condition may indicate lateral tract involvement, as particularly emphasized by Spiller. Ankle clonus has been described in one case. The cremasteric abdominal and upper arm reflexes have been constantly reported as normal.

Electrical reactions naturally depend on the grade of atrophy. In extreme atrophy, there is no response either to faradism or galvanism. My cases showed an almost insignificant response in both tibialis anticus muscles with the strongest galvanic current.

The sensibility is not very much disturbed subjectively. Forms of cramps and paresthesias have been described, but violent and continuous pain is not a feature of the disease. In contrast to these accepted observations, one of my patients developed such severe pain in one leg that she applied for admission to a hospital where a diagnosis of osteomyelitis was made and an amputation performed below the knee. A small tarsal bone was subsequently removed from the other foot, but without relief to the patient in her remaining leg. Objective sensibility is not altered. The muscular sense is intact, and hyperesthesia is rare. Vasomotor disturbances are, however, a marked feature. The limbs are cold, cyanotic and erythematous, and at times show violaceous patches. One of my cases showed this in striking fashion.

Sphincteric troubles are absent, and evidently do not belong to this malady. Organs of sense are intact and show no special disturbances. The psychic state is good and the general health is remarkably well preserved. The evolution of the disease is so slow and encompasses so long a period that it is quite compatible with long life and preservation of function. An intercurrent illness usually closes the scene.

CASE REPORTS

CASE 1.—E. C., woman, aged 26, Russian, is the sixth child in a family of ten; seven sisters and brothers are dead of various causes. The parents are living and well. Two brothers are in good health. There are no similar conditions in any member of the family. The patient had the usual infantile

disturbances, but is quite sure that she never had any acute or serious illness. She is under the impression that her legs have always been thin, but she was able to use them with perfect freedom up to the age of 20, when she commenced to suffer a good deal of pain in both feet. This was followed by gradually increasing weakness in both legs. The patient at about this time observed the atrophy, which progressed gradually for about five years, then suddenly stopped, and for the past year has been practically stationary. The pain in both feet persisted from the onset of the malady, so much, in fact, that it became quite unbearable, necessitating her admission to a hospital in this city. A diagnosis of osteomyelitis (?) was made and an amputation below the knee performed on the left leg. The pain persisting in the other leg, a small tarsal bone was next removed. These operative procedures did not improve her condition, and at present she gets about fairly well with an artificial limb and brace.

The general physical and laboratory examinations are uniformly negative. The upper extremities show no abnormalities, either on inspection or with regard to function. The right leg and foot below the knee joint reveal an extreme atrophy which contrasts strangely with the well preserved contour of the thigh. This emphasizes the distal character of the atrophy and the preservation of the proximal part of the limb. There are no objective sensory disturbances elicited. The limb has a marked cyanotic hue and is covered with irregular violaceous patches. Foot drop and equinovarus are present and quite evident on account of extreme shrinking of the foot. In fact, it is extremely difficult, except by a liberal stretch of the imagination, to associate this small atrophic infantile foot with an adult. The reflexes are present on both sides and equally exaggerated, the response in the stump of the amputated leg appearing as a grotesque and startling phenomenon. Under extreme galvanic stimulation, we get an insignificant response in the tibialis anticus. All other muscles fail to respond with the strongest currents. Muscle fibrillation is absent. The patient's general health is excellent. She manages to get about fairly well, and is in no way depressed in spite of her distressing condition.

CASE 2.—J. B., man, aged 19, loom fixer by occupation, had the usual diseases of childhood. He has never had any acute illness except that in connection with his present affection. His habits are good. He does not drink, and is a moderate user of tobacco. All venereal infection is denied. The family history has no bearing on the patient's present complaint, nor are there any other members of the family similarly affected. The patient, as heretofore noted, was perfectly well up to the age of 16, when he had a febrile illness of unknown etiology and classification lasting three days. He recovered quickly and seemed quite well for two months, when the present trouble commenced. This manifested itself by an inability to walk properly. There was loss of power in both legs and feet which progressively became worse for one year; then the condition remained stationary and has remained so ever since, that is, for a period of two years. At no time were there any bladder, rectal or sensory disturbances.

The general physical examination reveals no abnormalities, and the laboratory tests are uniformly negative. The upper extremities show no involvement. Examination of the legs shows an evident atrophy which has involved both feet. Here we also note the distal character of the atrophy, the proximal portions of the limbs, that is, the thighs, are not involved and show a normal fleshy contour. There are absolutely no sensory disturbances to be elicited, either subjectively or objectively. A double foot drop is quite evident, and the gait, which is quite good, is suggestive of a "steppage." There is marked vasomotor disturbance, mottled areas of erythema and cyanosis being present in both limbs. The patellar and Achilles reflexes are normal on both sides, and there is an equal response. With the strongest galvanic stimulation, a very feeble "wormlike" response is elicited in the tibialis anticus of both sides; all other muscles fail to respond with the strongest faradic or galvanic stimulation. The general health is excellent and the mental state has always been good.

CONCLUSION

It is hoped that this study will stimulate workers in the field of neurology to recognize and isolate these neural disturbances as belonging to a distinct clinical entity and not to class them with the dystrophies with which they are often confounded.⁸

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STREPTOTHRIX IN BRONCHOPNEUMONIA OF RATS SIMILAR TO THAT IN RAT-BITE FEVER

A PRELIMINARY REPORT *

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Bronchopneumonia is frequent in the white rat, and occurs also in the gray rat. In the course of a study of this condition, especially as it occurs in the white rat, a streptothrix was found which may be of interest in connection with rat-bite fever in man.

Sixty white rats showing acute or chronic bronchopneumonia have been examined. A long, fine, straight or wavy filamentous organism was observed in smear preparations or by dark field illumination in fifty-six. Three lesions in which no organisms were seen were chronic. The organisms are most abundant in acute lesions. It is a gram-negative organism and stains fairly distinctly with carbol-gentian-violet and the Giemsa stain. It is distinguished from cilia by its greater length, more pointed ends and its occasional wavy form. In the dark field I have observed once or twice a slow wormlike motion, and one organism showed a corkscrew motion. They are barely visible in the tissues stained with methylene blue, but are distinct in tissues impregnated with silver nitrate according to Levaditi's method. Here, they appear more wavy and more fragmented than in other preparations. These organisms were not observed in twenty-four normal rats.

A streptothrix resembling these organisms was cultivated from twenty rats, and isolated in pure culture thirteen times. Cultures from thirty-three rats remained sterile. Why successful cultures were obtained from some rats and not from others is undetermined. The character of the lesion does not seem to make any difference. Successful cultures were more frequent in the case of sick rats and from lesions in which other bacteria were present. The other organisms isolated from twenty-two rats were *Streptococcus viridans* and *pyogenes*, pneumococcus, staphylococcus, diphtheroid bacilli, anaerobic spirilla, and a profusely growing gram-negative bacillus which was probably a contamination. Seven of these were isolated from cultures in which the streptothrix did not grow. Successful cultures were grown on human blood agar or ascites-goat-blood-agar. The various mediums for growing spirochetes were used, but no spirochetes were cultivated. This streptothrix is a facultative anaerobe, growing best at 37 C. (98.6 F.) Slight growth appears at room temperature after sev-

eral days' incubation. Growth generally appears in from forty-eight to seventy-two hours as discrete, colorless or grayish pin-point colonies. At first they appear dull, but later become glistening and increase slightly in size. The medium is not changed. The growth in the fluid of condensation and in ascites broth is white and flocculent, the medium remaining clear. The growth on Loeffler's blood serum is similar to the growth on blood agar, but does not always occur. There is no growth on plain and dextrose agar, ascites dextrose agar, in plain and dextrose broth or in milk.

In cultures the organism is slender, branching, straight or wavy, filamentous, varying greatly in length and showing bacillus and coccuslike forms. True branching is seen in young cultures, but is not especially frequent. They often show spindle or irregular shaped swellings. Twisted and wavy forms are more frequent on solid mediums than in ascites broth, where they appear generally as long threads or chains of bacilli. They do not show a radial arrangement at the periphery of the colony. They stain with ordinary stains. They are gram-negative, except the swellings, and are not acid fast. The organism here is nonmotile.

An increase in opsonins and agglutinins for this organism has been observed in infected rats.

Young healthy rats injected intraperitoneally with cultures show acute lesions in the lungs. The organism has been isolated in pure culture from the heart's blood and lung.

This streptothrix appears to be the same as *Streptothrix muris ratti* isolated in pure culture from the blood of patients with rat-bite fever by Schottmüller¹ and Blake,² and seen in the blood during the paroxysms by Tileston.³ Futaki⁴ and his associates describe a motile spirochete in the skin and lymph node of two cases of rat-bite fever, but details of experiments and cultures are not available. Some of the spiral forms in my Levaditi specimens closely resemble the spirochetes shown in their drawing. Rats causing rat-bite fever have not been examined as far as known. I have examined twenty-eight wild rats, and found one infected. The lesions in the lung were the same as those observed in the white rats, and showed the same organism. As the trachea of infected rats is full of mucus containing large numbers of the organisms, it is readily seen that a bite from such a rat might be infectious.

1. Schottmüller: Dermat. Wehnschr., 1914, lviii, Suppl., p. 77.

2. Blake: Jour. Exper. Med., 1916, xxiii, 39.

3. Tileston, Wilder: The Etiology and Treatment of Rat-Bite Fever, THE JOURNAL A. M. A., April 1, 1916, p. 995.

4. Futaki: Jour. Exper. Med., 1916, xxiii, 249.

8. In addition to the references already given, the following will be found of interest:

Pediatrics, Naples, 1912, xx, 133.

Ponticaccia: Riv. ven. d. sc. med., 1912.

Souques: Icon. de la Salpêtrière, 1914, xxvii, 175.

Jour. Nerv. and Ment. Dis., 1915, p. 570.

Virchows Arch. f. path. Anat., cxxxii, 259.

Arch. f. Psychiatrie, xxxi, 105.

* From the Memorial Institute for Infectious Diseases.

Tuberculosis in Madrid.—On the basis of a census of all known cases of tuberculosis in Madrid during the last four years, according to the *Siglo Medico*, Dr. Codina, at a recent meeting of the Academia de Medicina, stated that of the 1,300 streets in the city, over 79 per cent. had had one or more cases of tuberculosis, and over 26 per cent. of the houses sheltered tuberculous inmates on a given day, and over 60 per cent. had had one or more tuberculous inmates in the course of the four years. That is, over three fifths of the houses of Madrid have sheltered tuberculosis in the last few years, and there are fifty-two houses that have each had from eleven to thirty-one cases. He stated further that 92.69 per cent. of the tuberculous have less than a peseta --20 cents—a day to live on; 7.11 per cent. have from 1 to 2 pesetas, and only 0.2 per cent. as much as from 2 to 4 pesetas. Overcrowding and illiteracy are shown anew to be potent factors in tuberculosis; only 35.14 per cent. of the tuberculous in Madrid can read.