service, one author preferring the faradic current, another the galvanic, and still a third the static form or franklinization. It is seldom, however, when this agent is used intelligently that we do not obtain, if not a cure, certainly a temporary and sometimes a lasting alleviation.

Measures that are directed toward the relief of the physical conditions associated with morbid fear pertain largely to the removal of the cause. If the general health is depressed or found suffering from any toxic condition such as lithemia, auto-infection and similar states, the use of the salicylates, alkalies and saline cathartics, with proper diet, are often attended with marked relief. In the practical therapeutic realm of neurology and psychiatry no symptom at times offers more obstinate resistance to all kinds of treatment than morbid fear; but in the majority of cases, if the principles referred to are intelligently, persistently and scientifically applied, much can be done towards its permanent alleviation.

In conclusion, I desire to acknowledge my indebtedness to the recent able articles by Dr. Thompson³ of Vermont, and Dr. Angell⁴ of Rochester, N. Y.

Altman Building.

TEN CASES OF INFECTIOUS MULTIPLE NEURITIS, WITH TWO DEATHS.*

W. A. JONES, M.D.

MINNEAPOLIS.

From the 15th of February to the 15th of March, 1901, there was an unusual series of cases of multiple neuritis in the city of Minneapolis. As near as I can learn there were probably from twelve to fourteen cases under observation, ten of which it was my fortune to see. This series includes the general types, but does not consider the forms of neuritis involving one extremity only, of which there were several.

The onset of the disease, as well as its occurrence at a time when influenza was epidemic and when other diseases of irregular type were prevalent in the city, suggests that the influenza bacillus was responsible for cases of neuritis, especially as six of the ten occurred within one week and three or four of the six within two days. During this period the number of deaths resulting from typhoid fever was greater than former health reports had shown. There was also an increased number of pneumonias and mild bronchial infections, as well as a large increase among the exanthematous diseases.

CASE 1.—Miss N—, aged 27, domestic, family history good—the father, five brothers and six sisters living and well; the mother died at 67, of a chronic stomach disorder. The patient was ill at 17, and spent three successive summers at some hot springs in Norway. For the past seven years she has been well, except for occasional menstrual pains and constipation, with resultant headaches.

On the morning of March 10 she awoke with headache, general lameness and diminished power in all her extremities. She could not get up from the bed or a chair without great effort, but once on her feet she was able to go about and do the ordinary work of a cook. The grasp in both hands was feeble, and she was unable to lift more than two or three pounds; there was no loss

of sensation; coördination was good; knee-jerks were preserved; there was no evident tenderness of nerve trunks. She made a practically complete recovery in three weeks without remaining in bed. At the end of five weeks she recovered her strength, and resumed her heavy work.

CASE 2.—Mr. B—, aged 52, seen in consultation with Dr. F. A. Dunsmoor, February 20; mother and father living at advanced ages; one sister living, a nervous invalid. The patient is a tall, spare man, long of bone, but has a muscular system of great vigor. He is an esthetic neurotic, and suffers from headaches brought on by fatigue. He has always been an active and fairly successful business man. During the month of February he was under annoying business strain, but was as well as usual on the morning of February 17. During the day he felt unusually weak, walked with difficulty in the afternoon, and in the evening was unable to get about. The following morning he was decidedly weaker, and later in the day his arms and legs were practically helpless, yet he could feebly move his fingers and toes, flexion and extension being preserved. If placed on his feet and supported, he could walk short distances. At this time he complained of no pain, but experienced a tingling in the fingers and soles of the feet. He was not incoördinate, as far as could be demonstrated. The loss of power gradually increased until it completely involved all of the extremities. The knee-jerks were abolished. For ten days his condition was unchanged, except that he suffered pain in the calves of the legs, in the thighs and over the lower part of the back. There was no anesthesia, but rather a hyperesthesia of the toes and fingers. When an attempt was made to place him in a reclining-chair, he became cyanosed and exhibited a few general convulsive movements. His improvement dated from this time by a return of the smaller movements of the hands and feet. Although there was some atrophy of the interossei muscles, the muscles of his arms and legs were flabby. Improvement was rapid in spite of a partial reaction of degeneration. The extensor muscles of the back and thighs were the last to recover, as was shown by his inability to get out of bed or rise from a sitting position without the "climbing up" method of the progressive atrophies. He resumed his business May 1, ten weeks after the onset of the neuritis. His knee-jerks are present although not active, and he is able to walk several blocks, complaining only of fatigue and heaviness of his feet.

CASE 3.—Mrs. McD—, widow, aged 40; occupation, nurse; seen by Dr. F. E. Strout, who referred her to me March 6, 1901. Her general physical condition was good in spite of years of hardship. She was moderately neurotic in appearance and history. She had been working very hard for four weeks before this illness, and was sleeping badly. On the morning of March 5 she awoke as well as usual. On attempting to rise from a chair she fell to the floor, but rose immediately without assistance. During the forenoon she complained of pains in the back, and down the legs. The following day there was diminished power in the hands and arms and a feeling of heaviness in the legs. She could stand and walk if placed on her feet. There was no Romberg sign; the knee-jerks were present and normal. She complained of a dulness of sensation on the outer side of the thighs and over a small area in the lower dorsal region. There was some difficulty in swallowing, coughing and sneezing; the breathing was decidedly diaphragmatic. All of these symptoms cleared up in three or four days, leaving no disturbance of sensation, and no respiratory incon-

3. Journal of Medicine and Science, September, 1900.

4. Journal Nervous and Mental Disease, August, 1900.

* Read at the Fifty-second Annual Meeting of the American Medical Association, in the Section on Nervous and Mental Diseases, and approved for publication by the Executive Committee: Drs. Frederick Peterson, Hugh T. Patrick and H. A. Tomlinson.

veniences, although she could not elevate her tongue or maintain an upright position of the head and neck. On March 9 a facial paralysis appeared in the lower right face, and extended rapidly until it became bilateral, involving all of the muscles. On the next day a Babinski great toe phenomenon in the right foot was present. At no time was there a rise in temperature, or continued pain or tenderness of the nerve trunks.

The patient was confined to bed for four weeks, and although never absolutely helpless, she was unable to help herself in turning or moving. She began to improve in two weeks, and in six weeks was up and about with a limited extensor paralysis of the thighs and back. The paralysis of the left face cleared away in two months, and at the present time the paralysis on the right side is disappearing. Her general muscular strength is good, and she has resumed her work. The urine was examined occasionally, but contained no abnormal products.

CASE 4.—Mrs. J——, aged 35; mother of two children. Her parents are living and in good health, although the mother is a neurotic. The patient also is a neurotic. An illness ten years ago, accompanied by pain in the back of the neck, confined her in bed for a month. Following this she was weak and tremulous in the extremities for nearly a year, but made a good recovery. In February, 1901, she had an attack of influenza of mild type. She made what she thought was a good recovery. At least she was able to attend to her household duties, which were unusually burdensome, but she admitted that the fatigue which followed was unnatural. I saw her March 10, in company with Dr. Strout, her attending physician.

She complained of pain in the back of the neck, behind both ears and down the sciatic nerves. There was diminished power in all the extremities, and an inability to turn the head and body from side to side, but she could stand upright if placed on her feet. There was also slight embarrassment in coughing, swallowing or sneezing. There was no loss of sensation, no marked tenderness over the nerve trunks after the first few days, and no rise in temperature. One week after the onset of the polyneuritis the left face became paralyzed, but this and the respiratory disturbances cleared away in ten days. The knee-jerks were abolished. She made rapid improvement, and is now able to go down town, and walks with ease. The right knee-jerk has returned, but the left is absent. The left leg is weaker than the right, and fatigue causes a tremor of the hands.

CASE 5.—Miss L——, aged 33; seen in consultation with Dr. T. S. Roberts, March 8. The patient is of neurotic stock, and has a history of previous nervous attacks, simple and functional in character. About March 1 she complained of vague disturbances of sensation and power, and was sleepless and nervous. She apparently recovered in two or three days, thus suggesting that the attack was hysterical. On March 4 the symptoms returned, and with them a weakness of the extremities, back and thighs. She was unable to keep her head from falling forward or backward, and she could not rise from the bed or a chair, but could stand and walk if placed on her feet. There was also a transient difficulty of swallowing. On March 11 a bilateral paralysis of the face appeared. There were no disturbances of sensation, and no tenderness of the nerve trunks of importance. The knee-jerks were normal. She improved rapidly, and is now practically well, although there is still a tendency to fatigue on overexertion. The facial paralysis has disappeared.

CASE 6.—Miss H——, aged 23; seen with Dr. H. K. Read April 3; a strong, healthy girl with a good family record. During the latter part of February and the early days of March, 1901, she was exposed to street draughts from the doors of a department store where she was employed. She complained of the usual symptoms of influenza, headaches, pain in the bones, cold hands, clumsy and awkward fingers. She could not execute quick or fine movements of the fingers, such as writing, tying parcels or adjusting box covers, neither could she stand on her toes or the ball of the foot in reaching shelves. The diminished muscular power increased until all the muscles of the arms supplied by the brachial plexus, except those supplied by the musculocutaneous nerve, were involved. Power in the legs also diminished until the patient was practically helpless, but she could walk if placed upright. There was no disturbance of sensation. The deep reflexes were decidedly diminished, and partial reaction of degeneration was present. After four weeks there was some muscular atrophy in the hands and legs. At this writing she has gained rapidly, particularly in the right arm, the left arm being still weak and its movements limited. She can go up and down stairs with but little assistance, but she can not rise from a sitting position. There was slight tenderness over the nerve trunks.

CASE 7.—Mrs. G——, aged 22; seen in consultation with Dr. Matchan March 14; a decided neurotic of neurotic history and parentage; has never been seriously ill before. During the early part of February, 1901, her menses had ceased, and she sought and gained relief through the kind offices of an abortionist. The menses appeared February 27. Three days later, after becoming chilled, she noticed that her wrists and hands were weak. She was unable to pick up small articles or to execute fine movements. The following day her arms grew worse, and in attempting to get up from a chair she fell to the floor. The loss of power became complete in all extremities on the third day, and was associated with a left facial paralysis and a difficulty in swallowing, coughing and sneezing. Abdominal respiration was present, and there was a paralysis of the muscles of the neck supplied by the cervical plexus. She complained of grinding, aching pains, but there was no loss of sensation, and no bladder or rectal disturbance. There was marked tenderness over the nerve trunks and muscles. It was difficult to estimate the amount of pain and tenderness, as the patient was decidedly hysterical; yet I believe there was some pain. There was an occasional rise in temperature, which was probably due to incidental conditions rather than to the neuritis. The facial paralysis and the respiratory distress disappeared in about one week. I saw her March ——. She had slightly improved, and can now raise and lower her hands and use both arms, although recovery of the left is not as far advanced as in the right. She can elevate her trunk, and can extend and flex the toes and feet. There is atrophy of all of the muscles in the four extremities, and reaction of degeneration is still present.

CASE 8.—Mr. S——, married, aged 37, Burbank, Minn. I saw him in consultation April 7, with Dr. Alex. Ridgway and Dr. Christian Johnson, the latter of whom reported the case in detail in the *Northwestern Lancet* for May 1, 1901. The patient is an active, nervous man, in good health usually, except for slight attacks of muscular rheumatism after severe labor and exposure. The parents were of nervous temperament.

About the middle of February, after working hard on his farm, he came to Minneapolis, from which place he

drove to his home, a distance of one hundred miles. The weather was severe, and he suffered from exposure. On February 27 he had a "splitting headache," and in the evening was exhausted. On the following morning, February 28, after working a short time, his legs became weak, and his power in the arms diminished. On March 1 he was unable to get up or dress himself. The evening of the same day he was completely helpless; his breathing was labored and wholly abdominal; there was severe pain and tenderness over the plexus and nerve trunks, with paresthesia. Tactile sensation is preserved and areas of hyperesthesia and thermohyperesthesia are present, but no anesthesia. The reaction of degeneration is marked in practically all of the muscles, and the knee-jerks are abolished. The bladder and rectum are not involved in the paralysis, and there has been no rise in temperature or pulse.

At this time, June 1, Dr. Johnson writes me that the patient has recovered motion in the trunk muscles, the biceps of the left arm and the right extensor femoris, as well as slight motion in some of all of the regions involved. The patellar reflexes are nearly normal.

The following two cases are of an apoplectic type, and so rapid was the onset and progress of the disease that the diagnosis may be questioned; they were among the first cases seen. I did not make a diagnosis until later, after a study of the milder forms.

CASE 9.—Miss S—, aged 26, bookkeeper; seen in consultation with Dr. W. A. Hall March 4; family and personal history good; typhoid six years ago, from which she fully recovered; has worked steadily for years, but has been well. On the afternoon of March 3, she spoke of a soreness and stiffness between the shoulders, but continued her work until evening. At 7 p. m. there was a rapid loss of power in the right hand and arm. At 3 a. m. the following day she awakened, and found both arms powerless. She became alarmed and sent for her physician. Later in the morning she lost power in the legs; there was embarrassment in coughing and swallowing, and the breathing was abdominal. At noon she was moved to the hospital, and soon afterward had a temperature of 100° F. As there had been no rise in temperature before, it is probable the rise was due to the journey. At no time was there pain, disturbance of sensation or tenderness of the nerve trunks. When I saw her, forty hours after the onset of the disease, she was unable to speak above a whisper, could breathe only with the head lowered, and was unable to swallow. The saliva accumulated in the mouth to such an extent as to require constant removal by cotton plungers. During the same afternoon she became cyanosed, but was temporarily revived by oxygen inhalations. She grew worse rapidly, however, and died at midnight, having lived less than sixty hours from the onset of the disease.

CASE 10.—Mrs. McN—, aged 40; patient of Dr. E. S. Kelly; a person of large frame and overfat, but with a good personal, and a negative ancestral, history. During February, 1901, she had an attack of influenza, accompanied by fever and pains of moderate severity. She recovered in ten days. On March 4, in the evening, she had a paresis of the right hand and arm, which disappeared in a few hours. The following day, or twenty-four hours later, there was a return of the paresis in the right arm, and a partial loss of power in the left leg. The third day all extremities were helpless, except slight movements of flexion in the fingers and toes; the breathing was diaphragmatic, and swallowing was difficult. There was no loss of sensation, and no pain. Death

occurred on March 7, three days after the onset of disease.

I regret that no autopsy was permitted in either of these cases, although I am convinced that they were fulminating forms of multiple neuritis.

Contrast these cases with the ordinary types of polyneuritis due to overwork and exposure, and secondary infection, with a weakness beginning in one extremity, gradually extending, and accompanied by marked tenderness and severe pains, anesthetics, changes in the skin and nails, atrophy of muscles, prolonged paralysis and slow repair. One or two of the cases cited correspond to the usual descriptions found in the text-books. The majority, however, are not typical, as is shown by the prominence of the motor symptom; the ability to stand and walk, even though the patient is unable to rise from the recumbent or sitting position; the frequent absences of trunk pains, tenderness, paresthesia and anesthesia; the evident involvement of the cervical plexus, as demonstrated by the inability to control the muscles of the neck and the implication of the phrenic nerve; the minimum muscular atrophy and the rapid improvement in most of the cases.

Many of these cases, notably the two that were fatal, and a few of the others in which the typical pains, anesthesia and tenderness were not present, suggest Landry's paralysis, and yet it is not probable that many of the cases reported as Landry's paralysis are cases of multiple neuritis, in which the infection or inflammation of the nerves of the extremities extends to the sacral, lumbar, brachial and cervical plexus, and from there to the roots of the cranial nerves? If the patient dies within a few days, the presumption seems clear that death is due to the implication of the vagus; should he live for weeks or months it is fair to presume that the degeneration of the nerve trunk extends beyond its superficial origin, to the cells from which it springs.

Rowden, in the *Lancet* (London), recently reported a case of Landry's paralysis in a child, in which the symptoms began by a progressive, symmetrical motor paralysis of the neck, arms, forearms, chest and legs; with the sensation not involved until within a few hours before death, and then only slightly; with no rigidity, twitching, pain or spasm; and with the mental functions unimpaired and no bladder or rectal disturbance. Although this case is supposed to be one of descending type, I believe it could more wisely be classed as multiple neuritis.

The treatment of the foregoing cases was mainly symptomatic. Free elimination was established, salicylate of soda in full doses was given; strychnia and iron, to overcome the anemia which was marked in all of the more profound cases. Faradism, massage, salt baths and forced feeding completed the care and treatment.

DISCUSSION.

DR. HUGH T. PATRICK, Chicago—Such a remarkable series of cases should not be allowed to pass without comment. The idea suggested to me primarily by the paper was the close similarity of the symptoms in some of these cases to the disease known as Landry's paralysis and to inferior encephalitis. Although the discovery of the neuron as a histological entity has added nothing to our knowledge of the physiology and pathology of the nervous system, I think it is sometimes of value as an aid in the expression of our ideas on these subjects. When a motor neuron is affected by a certain poison, it is reasonable to suppose that the motor cell, with its long process, the motor nerve fiber, is acted upon as a whole. In the cases reported by Dr. Jones it is reasonable to suppose that those individuals, or their motor neurons, were particularly susceptible to the poison of influenza, and that such poisoning would

be very apt to cause symptoms which could be partly explained upon the theory of peripheral disease and partly upon that of central or nuclear disease. Probably a combination of the two was present. The term multiple neuritis is convenient, but I regard it as a misnomer. Certain neurons are peculiarly susceptible or vulnerable to the action of certain poisons, and the poison in Dr. Jones' cases must have particularly affected certain parts of the motor system. The process is one of poisoning, not inflammation at all. I have seen three cases, one of them being still under observation, which I think showed very graphically the intimate relationship between this peripheral nerve degeneration and the acute nuclear affections. Two of my cases, which came to autopsy, presented the symptom of weakness of the lower face, neck and shoulders, with some impairment of power in the arm, but with very little involvement of any motor structures below the shoulders and no sensory disturbance to speak of. In one of the cases, I have thus far examined 800 sections from the medulla and pons; they show nothing but what could be interpreted as the result of an intoxication acting upon the nervous structures. I think we would be better able to understand the so-called acute multiple nuclear affections, Landry's paralysis and myasthenia gravis, if we looked upon them as forms of intoxication having an affinity for the neurons of certain individuals or, as I think it is better expressed, toxic paralyzes due to the peculiar susceptibility of certain neurons to certain poisons.

DR. HAROLD N. MOYER, Chicago.—In continuation of Dr. Patrick's remarks, I would emphasize the conception of the neuron as applied to this class of lesions. It is sometimes impossible to distinguish between peripheral and nuclear lesion. In the cases which we have just heard reported I think some were peripheral while others were nuclear. A pure peripheral lesion is really one that is extra-nervous in its origin. The nerves are liable to the same conditions as are other organs. For example, they may be the seat of cloudy swelling and exudate, with edema in the sheath and consequent pressure symptoms. That, to my mind, is a clear conception of a peripheral nerve lesion. With a nuclear lesion the body of the cell is involved, including the neuro-axon.

DR. W. A. JONES, in reply—I agree with Dr. Patrick that multiple neuritis is not a very good name for the disease under discussion—that intoxication neuritis or infection neuritis is perhaps better. My belief is that the more profound infections of this type are associated very soon with a central lesion, and yet some of these cases, although comparatively severe, showed a remarkable and rapid recovery. One or two of my cases have recovered completely, and the rest have so far recovered that we may call them practically cured. Those cases, I think, were not of central origin. The axis cylinder or the outside of the neuron was probably only partially implicated and the repair was very rapid. It seemed to me that those cases which resembled Landry's paralysis illustrated the uncertainty of Landry's pathology, and I think we should classify them under one general head and not attempt to divide them into different types.

THE INCREASING STERILITY OF AMERICAN WOMEN.

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CORRECTION OF DIVORCE STATISTICS.

In my recent paper on *Sterility*¹ I have introduced the subject of *divorce* as one of the factors correlated with sterility and parallel with it in a general way. In reviewing the article at my leisure I find some very palpable statistical errors in my discussion of this subject, and whilst the result remains the same and the subject is in itself of no especial interest to the profession, these errors must be promptly remedied lest they lead to farther mistakes and entanglements. Divorce records are

believed by statisticians to fall far short of scientific accuracy, and in collating these uncertain data I have repeatedly placed incompatible figures side by side (Table 4 of this paper) comparing the ratio of "*divorces to marriages*" with that of "*divorced to the married*," the relative proportion in the different states and countries is practically the same, but this is incidental and the error of such comparison is so patent that it must *apparently invalidate all that has been said; actually nothing is altered* as far as the increase of divorce and my comparison between divorce and sterility among different groups is concerned; nevertheless, I desire to correct the error by recalling all statistical data on divorce contained in my recent paper and will here present the correct figures and comparisons.

In that admirable work on "*Marriage and Divorce*," Carroll D. Wright* says: "It has been exceedingly difficult to arrive at a reasonable, legitimate conclusion for a comparison between divorces granted and some other condition or status . . . the comparisons made in a few states between marriages celebrated and divorces granted is worth simply what it has been given for, but it is essential for a just consideration of the whole matter that a comparison should be made between the married couples existing and the divorces granted." This I have done, and in addition I have presented the ratio between divorces granted and marriages performed in the same year (Rhode Island), and also the ratio between divorced persons and married persons, using whichever seemed to serve the purpose best. Approximately the same errors must occur by use of the same method in different states and among different classes of our population, so that regardless of the precise accuracy of the data the *relative values* and the *relative ratio of increase or decrease* can not be questioned.

CORRECTED TABLE IV.—DIVORCE.

A.—RATIO OF DIVORCES TO MARRIAGES.¹

	Registration Year.	No. of Divorces to 100,000 Marriages.	No. of Marriages to One Divorce.
Indiana	1900	17,000	5.7:1
Rhode Island	1898 1899	8.0:1 12,000	8.2:1
Ohio	1899	9,174	10.9:1
Michigan	1898	8,928	11.2:1
Connecticut	1899	6,330	15.8:1
Massachusetts	1898	5,347	18.7:1

B.—RATIO OF DIVORCED TO MARRIED COUPLES.²

	No. of Divorces to 100,000 Married Couples.	No. of Married Couples to One Divorce.
Michigan	1874 306	326
Michigan	1894 418	240
United States	1880 203	490
United States	1890 540	185
Switzerland	195	513
Denmark	184	543
France	80	1,250
Germany	77	1,300
Sweden-Norway	27	3,704
New South Wales	26	3,846
Russia in Europe	11	9,090
Italy	10.6	9,434
South Australia	10.4	9,615
United Kingdom	8.6	11,600
Canada	1.6	63,000

C.—INCREASE OF DIVORCE AS EXEMPLIFIED BY RHODE ISLAND.¹

Year.	No. of Marriages.	No. of Divorces.	No. of Marriages to One Divorce.
1890	3195	294	13.1:1
1891	3320	275	12.1:1
1892	3502	296	11.8:1

1. "The Increasing Sterility of American Women." THE JOURNAL A. M. A. xxxvii, p. 891.

* Special Report of the Commissioner of Labor in the United States. 1889, revised 1891, p. 147.