REMARKS ON THE TENDENCY TOWARDS SYMMETRICAL COMPLETION IN HERPES ZOSTER, EXPLAINING THE GRAVITY OF THE NATURE OF THE COMPLETED LESION.

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On November 23rd, 1882, I was called to see Mr. F. D., suffering from the effects of chill. He had experienced what he described as a chilly rheumatic seizure, while crossing Hampstead Heath on the evening of Sunday, November 19th. On Monday, the 20th, he attended a concert at St. James's Hall. Coming out from the concert, he was detained in the passage by the crowd, and suffered acutely from an icy cold draught playing on the back of his head and neck. On my first visit, I looked upon the case as one of stiff-neck from chill. But on Saturday, November 25th, the seventh day after the first exposure to cold, I found the commencement of an abundant herpetic eruption over the right nape of the neck, shoulder, and upper arm, precisely the region supplied by the circumflex nerve, which comes off from the highest of the cords forming the brachial plexus, namely, from the fifth cervical, with possibly a few fibres from the sixth. The case ran a natural course, but was severe as regards pain, and the disability entailed on the patient in pursuing his work as an artist. When the pain was most trying, Mr. Prescott Hewett kindly saw the patient with me on Sunday, December 17th. On January 6th, 1883, I was able to cease attendance. Throughout that spring, however, the stinging after-pains and distress produced by use of the arm interfered with work. In the hot autumn of 1883, the pains almost disappeared, while Mr. D. was on a holiday in Yorkshire.

On December 28th, 1883, while I was visiting in the house for another purpose, Mr. D. took occasion to complain to me of an effect which appears worthy of record. He now stated that the pains (which during the previous winter and spring had been confined to points corresponding to the spots of the eruption on the right shoulder, neck, and arm) had transferred themselves in a more general rheumatoid form, giving pain on movement, symmetrically to the corresponding area of the left side. The pain was occasionally even more severe and disabling on the newly affected side. Sometimes it attacked in full force both synchronously; and sometimes the right, the original seat of pain, was still the worst.

This seems to argue conclusively that the effects of the chills caught on November 19th and 20th, 1882, caused irritation, probably inflammatory action, in the central spinal cells forming the origin of the circumflex nerve, first of the right side. This eventuated "in atrophy, or a tendency to it, in the posterior or sensory root of the painful nerve, or of the central grey matter with which it comes in closest connection." (See Anstie, in Reynolds's *System of Medicine*, vol. ii, p. 759.)

The importance of the case now turns upon the evidence that such a lesion may be progressive, and was progressive in this case. The process of invasion of the corresponding nerve-centre of the left side was gradual, and took about a year to manifest itself. It differed from the primary affection only in degree, but was so closely allied to it in effect, as sometimes to have given to the patient the feeling, "Can I again be about to have shingles on the other side?" When this process of extension had completed itself, the new symptoms about to be described show the origin of the belief in the gravity of a primarily symmetrical completion in the disease in the time of Pliny, when he wrote, "Zoster appellatur, et enecat si cinxerit." Observation does not bear out the fatal tendency of even this suddenly completed lesion, but the symptoms are significant. Thus, Mr. D. spent the autumn of 1884 in Norwich, and instead of comparative freedom from pain, as during the heat of the previous autumn, he had an illness which caused him considerable alarm, from its origin being clearly referred by him to the original seat of pain in the neck. He was suddenly seized with giddiness, and he could not walk. The sensations seemed to spring from the back of the neck, but proceeded to give a sense of weight in the eyebrows, and somewhat "the feeling of malaise caused by a sleepless night." He sent for local medical attendance, and was treated for biliousness, but the after-consequences of the conditions showed their meaning. He now began to suffer peculiarly on first getting into bed. If he lie down quickly, immediately after putting out the light, the hazy glimmer from the window facing him takes on a whirling appearance, revolving from right to left in a distressing manner. The force of this con-

dition is produced in direct ratio to the degree of incaution with which he lies down. This has caused him to get into the habit of resting his head upon his hand, and letting it down cautiously upon the pillow. The contact with the chill of the linen does not seem to be a factor in the producing cause. He further suffers from drumming in the ears. His own voice sometimes impresses itself upon him with a disagreeable ringing sound. Any shrill noise produces an unpleasant sensation to an exaggerated degree. Water from his bath, getting into his right ear, produces aggravated unpleasantness. There is often a persistent sound in the ears, as of the simmering of a kettle, which asserts itself above the roar of the streets in walking through them. Many of these are symptoms reminding one of a case of Menière's disease. Incidentally, these considerations provoke the question as to whether Menière's disease does not imply, when traced to its intimate source, the lesion of the nerve-centre controlling the labyrinth, whose disturbed condition is the peripheral symptom corresponding to the herpes in the case before us. The significance of the symptoms in that case is clearly due to the involvement of a complete entity, probably of grey matter, or a symmetrically entire group of nerve-cells, forming a centre for the nutrition and sensation requirements of the region indicated. The gravity of the general symptoms goes to prove that a morbid change cannot so completely itself without producing an effect upon the general health, which is not attained when only one-half of a nerve-centre is morbidly affected. There is probably a decussation of fibres in the nerve-centre, which at first retards the full force of the effect of the lesion while it is asymmetrical; but eventually these decussating fibres would form the lines of transmission of the morbid process, to the complete involvement of the whole centre. This complete involvement amounts to the loss of a definite entity, presumably of grey matter, however minute, in the nervous organisation, and the importance of the effect upon the general system is only attained when the loss is of a complete centre.

There is ground for belief that this expresses a natural law governing the action of the nervous system in disease. Thus, in closely observing a typical case of hemiparesis, such a case as begins with pain confined to one side, say over one eye, and gradually works round till the other orbital region is affected, it will be found that the severe depression of the whole system, culminating in nausea, or sometimes in actual sickness, is not physiologically attained till both sides have severally become involved in what may here be looked upon as the cycle of a nerve-storm. This forms the explanation of the relief thought to be afforded by the sickness. The true significance of the critical nausea is that it marks the termination of the storm, and is can be distinguished from the convulsive vomitings which sometimes occur during its progress, and which are not critical, because the storm has not worked out its cycle.¹

In considering this aspect of our case, an analogy for the whole morbid process is suggested by the views of Sir James Paget, in his address on Elementary Pathology, delivered at Cambridge in August 1880, and reported in full in the *BRITISH MEDICAL JOURNAL* of October 16th and 23rd of that year. Thus, when Paget says, p. 612, that "nearly 40 years ago, he ventured to suggest that symmetry in disease is determined by the disturbed condition of symmetrically distributed nerves, the disturbance issuing from a single nervous centre," he precisely summarises the description of the process of which this case is an illustration. It is a question as to whether the case does not afford an example of a suggestive similarity between plant and animal pathology. "The complication in considering animal pathology arises from the influence of a nervous system of a common nutritive fluid" (see Paget). Now, in the case under consideration, we have for the subject of disease a nerve-centre itself in a minutely defined entity, as shown by the precisely limited area of the distribution of its efferent nerves. The occupation of the patient may throw light on the reason for this spot being unable to resist the attack made upon it. He is a laborious and prolific artist, with his paint-brush constantly in his hand, and affording himself more frequently the opportunity of acquiring the artist's analogue to writer's cramp than strengthening his powers of constitution, already not too great. He is exposed, first, on one night, to an amount of chill which depresses his whole constitution, and, the next evening, to a direct effect of concentrated icy-cold air upon a weak part. The results follow as described. At the age of 60, although there is present no special gouty history, there may be degeneration of the vessels supplying this nerve-centre, but not more than in those supplying other centres unaffected. We may thus take it that the determination to this nerve-centre is due to its having been the subject of undue use, resulting in weakness rather than strength. The immediate cause is, unmistakably,

¹ For illustrative cases, see E. Liveing on *Megrim*, pp. 136-142.

cold. Here we come to the question whether there is not a relation between the effect of cold upon a spray of especially exposed leaves upon a plant, and this determinate lesion in animal structure.

The cause of an untimely withering of a definite area, such as a branch of a single plant, may be very similar to that which has occurred here. It is, perhaps, most frequently seen as the result of watering in the sunshine of frosty weather. The plant-circulation is stimulated for the moment, to be checked to destruction in the night. The area affected will coincide with the least vigorous section of the plant, or, in the case of numbers, with the least vigorous specimens, equally exposed to the adverse influence. In much the same way, it is in accordance with clinical observation, that the several tracts of grey matter, or definite brain-centres, may be unequally vigorous in a given individual. This may be due to hereditary conditions of configuration, or of intimate structure, as in cases of limited infantile paralysis involving speech-centres or motor-centres; sometimes to incidental causes of circulation, as in abnormal distribution or varicose conditions, or the irregularities produced by abnormal use, and in epileptiform conditions of unstable equilibrium; and sometimes to disease, as in the completed results of scarlet fever and of specific disease.

The lesson to be derived from the case now recorded is to sift to the bottom all obscure cases, involving disturbance of function. Upon such information alone can be founded rational views of treatment, or, what is more important in such nerve-cases, of management, which should always be mainly directed to the restoration and conservation of general health. These cases recover more or less completely, depending on vigour of constitution. The progress is slow, and the process not easy to understand. In some instances, particularly those of a gouty character, the lesion may be due to capillary embolism, the embolism being derived from gouty irritability of the lining membrane of the veins. In the case before us, it was more probably due to inflammatory action, eventually resulting in a dwindling or shrinkage of vessels. In that case, the circulation might in time become renewed, by anastomosis possibly, to the restoration of functional activity. Warm clothing, the heat of summer, the assimilation of good food, and even the act of partaking of easily digested food (probably by withdrawal of circulation from the nerve-centres to the requirements of the digestive function), have marked effect on persons suffering from such lesions.

Becoming more vigorous in health during this spring, F. D. gradually lost the distressing vertiginous symptoms he had endured since the autumn of 1884. Those experienced during the day were the first to go; and during this hot summer, they are all so far in abeyance. A recent rest and change in the country was of the greatest service to him. As is usual, certain of the precise painful spots where the herpetic eruption has destroyed tissue, remain persistently painful on being touched. There are times when the spots corresponding to nerve-terminations on the other side are painful. But, whatever be the process of recovery, substantial recovery has taken place in this case.

F. D. occasionally now has headache, which he can always refer to the left supratemporal region, as he places his hand to indicate the seat of headache. The original herpetic eruption was on the right shoulder.

The involvement of the function of the auditory nerve, as in the vertiginous symptoms described, and in the irritability caused by loud talking, noises in the street, and the sound of the bath-water in the ears, is difficult to account for in a lesion spending its force on a nerve-centre so distant as the origin of the circumflex nerve. It is interesting to note that, in the process of recovery, these auditory nerve-symptoms were the first to go. The description of them reminds one of the temporary irritability caused by nervous headache. This nervous headache is possibly the most attenuated example of the epileptiform tendency. If so, it is probably due to hyperæmia. The inflammatory lesion of nerve which produces herpes most probably leads to a temporarily persistent hyperæmia affecting an area of central nerve-tissue wider than that on which the inflammation expends the force which leads to organic change.

In view that the insertion of the remarks on elementary pathology may seem fanciful, I should like, in conclusion, once more to refer the reader to Sir James Paget's suggestive paper, particularly to that part of it dealing with the repair of injuries (pp. 613-4 *Op. cit.*)

LONGEVITY.—A local paper states that, in the village of Cranborne, near Salisbury, out of a population of 550, there are two persons aged 89 years, two aged 87, one 86, two 84, one 83, and two 80.

DR. C. LANGE, reader in Pathological Anatomy in the University of Copenhagen, has been promoted to the rank of Professor.

ON THE PERIODS OF ERUPTION OF THE PERMANENT TEETH AS A TEST OF AGE.

By JOHN LIVY, M.D., Bolton.

UNTIL the passing of the Factory and Workshops Act, 1878, the certifying surgeons had no other means of ascertaining the age than those furnished by the eruption or otherwise of the permanent teeth, and the general *physique* of those presenting themselves for examination. Since the Act enforces the production of a birth-certificate, evidence of age from other sources is unnecessary. The subject, however, remains of practical value, and retains its interest from a biological as well as a forensic point of view. The appearance, the number, the character, and disposition of the teeth form one of the most valuable and important guides in determining the classification of mammals. Their relations to the food and habits of the animal, and the facility with which they can be examined, as well as their durability, render them alike interesting and instructive to the naturalist.

The object of this paper, and the subjoined tables, have been simply to ascertain the periods of eruption of the permanent teeth. In order to obtain reliable evidence of age, every case was rejected where the birth-register could not be produced. Some authorities say that the first molars appear at the end of the fourth year, while others give it as late as the seventh year. In the case of children under ten years of age, who are not allowed to work in mills or workshops, advantage was taken of the Education Act, which requires the birth-register of every child on first going to school. For the purpose of this inquiry, about 4,000 children were examined, 2,000 over 10 years of age, seen at various mills and workshops in Bolton, and 2,000 under 10 years of age, attending various schools in the town. The class of children were those of the ordinary working population of Bolton, a town containing over 100,000 inhabitants, and comprised the children of mechanics, cotton-operatives, bleachers, small shopkeepers, labourers, etc. The annexed tables show a considerable range in the periods of eruption.

As a single exception at the same time invalidates, and to some extent supports, a general law, so, when the exceptions are numerous, as will be found to be the case here, a more or less high degree of probability is all that is attainable. There is no law in biology absolute. Nature is variable, and yet there is a certain uniformity. At the same time, it may be affirmed that the eruption of the permanent teeth is the best physiological proof of age that we possess.

The typical number of teeth among placental mammals is, according to Owen, 44, to others 40. Mammals only have a well marked division into four kinds; namely, incisors, canines, premolars, and molars. As is well known, the reduced human dental formula numbers 32.

The first and second premolars in man represent the third and fourth premolars in those animals having four premolars.

In the chimpanzee and the orangs, the second molar comes into position before the premolars. This, I have found, is a very frequent occurrence in the human subject, in both sexes, whilst the third or last molar is acquired before the canines.

When the typical number in diphyodont mammals is reduced, it is the first premolar that is absent, and the third or last molar. The first molar is, therefore, the first of its series, whilst the second premolar is the last of its series, and the fourth of the typical dentition.

The premolars in man have never more than two fangs, generally only one. The first and second molars have two fangs in the lower jaw, sometimes convergent, and occasionally divergent, placed anteriorly and posteriorly. In the upper jaw the molars diminish in size from before backwards. They have three fangs, and occasionally four, two external; the anterior is the longest. As a rule it will be found that the most vigorous and the most wisely fed children have the finest teeth. Indeed, it may be stated, almost axiomatically, the children of Irish parents have, as a rule, the best developed teeth.

In boys between 4 and 5 years of age, the lower first molars come first into place. In boys between 5 and 6 years of age, the first lower molars are acquired first, in the ratio of fourteen to one; at the same age the lower central incisors appear first, in the ratio of three to one. The lower lateral incisors also come first into position at this age. In boys between 6 and 7 years of age, the lower first molars are acquired before the upper first, in the ratio of three to one. The lower central incisors are the first to rise into position, in comparison with the upper central as seventeen to one, whilst the lower lateral incisors invariably first appear. In boys between 7 and 8 years of age, the first lower molars come first into place, in the ratio of five to one. The lower