prove the general health; but can this improved moral and hygienic discipline be shown and vouched for? In 1855 and 1856, the natural increase of the population was ascribed to the return of the army and navy from the seats of war; but this infusion of fresh life does not serve to account for the singular absence of fatal disease throughout the rest of the population. It is evident that the phenomenon remains to be explained upon principles of which we are not yet cognisant. During the past year, the number of persons who have died at a very advanced age is some proof, as far as it goes, of the old being able to survive the deleterious influences of a prevailing epidemic and a malarious atmosphere conjoined. Of more than 200 nonagenarians recorded in the *Registrar-General's Weekly Returns* for 1857, a large proportion is stated to have been living not only in unhealthy localities, but among the lower classes of society. Of 123 women, the greater number were widows. Thirty-five only were men, of whom a scanty few are designated as *gentlemen*. Seven had reached the verge of 100 and upwards. This return of extreme old age is only for one year, but it is sufficient to show that the old escape the pest as well as many of the young. How, then, shall we account for the extraordinary phenomenon of the increase of life, if not of longevity, after an outbreak of cholera? The answer to the question involves the consideration of a wide range of circumstances, pathological, social, and atmospheric; and the results of experience extended over a large portion of the globe, and continued uninterruptedly for a great length of time, are requisite for arriving at a definite conclusion.

ON DISEASES OF JOINTS.

By HOLMES COOTE, Esq., F.R.C.S., Assistant-Surgeon to St. Bartholomew's Hospital, and to the Royal Orthopædic Hospital, etc.

IV. LATERAL CURVATURE OF THE SPINE.

[Continued from page 115.]

THE body of a newly born infant was brought to me by Mr. Dunn for examination, as presenting a singular combination of abnormalities. There were noticed:—

1. Deficiency of the cranial bones posteriorly, and the presence of a large bag containing fluid communicating with the interior of the skull.
2. Hare-lip.
3. Fissured palate.
4. Congenital deficiency of the abdominal parietes, so that they burst during birth.
5. Talipes varus of both feet.
6. Double lateral curvature of the spine.

From numbers 1 to 4, we have illustrations of arrest of development. The fetal layers, which curve forward to complete the cavities of the body by uniting in the mesial line, had here performed their work ineffectually; development had been arrested while there were two separated halves of the body. Hence the open fontanelles; the hare-lip; the fissured palate; the thinned abdominal walls. We see the same in the fissured sternum; in epi- and hypo-spadias; and in the permanent and normal openings of the nares, mouth, vagina, urethra, or anus.

In 5 and 6, we have instances of intrauterine deformities, caused by long continued pressure of the uterine parietes upon the growing fœtus. The inward-turned feet cannot execute those movements, by which the first approach to the normal direction is attained. The muscles, ready formed to contract, are impeded; and the club-foot becomes permanent. The elongating spine has no space for its increasing growth. It becomes compressed, and curves laterally; *i.e.*, in that direction where it meets with least resistance. If the compression be slight, the curve is single, and extends in one sweep from the upper dorsal region to the pelvis. If it be severe, the curve is double, convex in one direction, and concave in another.

Do these deformities, depending upon compression, ensue from accidental deficiency of the liquor amnii, or from natural defect in the uterus, by which its power of expansion is limited? I should be inclined to doubt whether accident ever produced intrauterine errors. But yet others of great experience have stated that congenital deformities may occur in one child only in a family; the others being perfectly well formed. I confess that at present I have not data sufficient to answer the question.

In this communication, I wish to confine my remark to "lateral curvature". The fœtus was carefully dissected, in order that we might see why it was that the spine was twisted.

First, the vertebrae and the muscles, which acted upon them, presented no abnormality. The *erectores spinæ*, those assemblages of muscles which lie on each side of the spinous processes, were complete in every part, and equally developed, whether on the convexity or the concavity of the vertebral column. They were formed ready to execute their allotted function; but it was obvious that the deviations of the spine from the straight line had so displaced their insertions, as entirely to alter their sphere of action. The action of the sacro-lumbalis and the *longissimus dorsi* on the side of the concavity would have been, if any, to increase the curve. The same muscles spread over the convexity would twist or rotate some vertebrae, but in greater part would wither or become atrophied. I particularly desired to witness the effect upon the curve of the consecutive detachment of each muscular slip from its insertion, and accordingly cut through the tendons of both the principal muscles (namely, sacro-lumbalis and *longissimus dorsi*) first on the right and then on the left side, pressing and examining the curve at each instant, in order that I might detect the moment when resistance of any sort or kind was overcome. No effect ensued. The curve was as resistant as ever.

It may be as well to remark that owing to a stupid error, long since corrected by Professor Owen and others who have followed in the course of homological anatomy, but hitherto continued in the schools, the anatomy of the muscles of the back is inaccurate, and rendered so incomprehensible, that it is quite the fashion to profess ignorance of the subject. These muscles, however, are simple to a degree, and extend from homologous points of bone from the pelvis to the head. In the same manner as the *interspinales* reach from spine to spine, so do muscular and tendinous slips composing the *longissimus dorsi* pass from diapophysis to diapophysis (*i.e.*, the tubercle of the lumbar region; the transverse process of the dorsal; and a rough spot near the articulating surfaces in the cervical region) and those of the sacro-lumbalis from one rib to another.

We may conclude, therefore, that these muscles, the great extensors of the spine, have nothing to do with the production of lateral curvature; when the spine bends, they lose their proper relations, and cannot execute their functions. In old standing cases, which I have examined in the dissecting rooms, I have found the muscles on the convexity elongated, attenuated, and wasted; those on the concavity wasted also, but tense from secondary or *adaptive* contractions. But cut them through in every way, and the scoliosis, or lateral curvature, remains unaltered. No wonder that surgeons, who have been taught to believe in the "cure of a crooked back by the healthy exercise of its muscles," should be doomed to disappointment: that the practice of putting weights on the head of one, whose spine is already too weak to support the natural burden, should aggravate instead of alleviate the evil. "When I first became engaged," observed Sir Benjamin Brodie, in a lecture delivered at St. George's Hospital, 1846, "in a considerable private practice, and cases of curvature of the spine were presented to my observation, I was in doubt as to their nature and treatment; in this respect my education had been imperfect, and I had learnt nothing of them from my teachers."

What is it, then, which holds the spinal column thus curved, if the bones are primarily unaltered in shape, and the muscles are not concerned in the deformity? Unquestionably the spine yields to the superincumbent weight through weakness of the ligaments; these structures yield and contract, as we know ligamentous structures can contract, along the concavity. It is not one but every ligament which contributes to this end; those between the transverse processes; the fibrous capsules of the articulating processes; the corresponding part of the anterior and posterior common ligaments; moreover, there exists a general adaptation of surrounding parts. The yielding of these ligaments, easy and comparatively painless in a growing girl, is attended with extreme suffering in the adult, as was shown by the case of the late Gideon Mantell, the *post mortem* examination of whose body has been most accurately given in the thirty-seventh volume of the *Transactions* of the Royal Medical and Chirurgical Society, by my colleague, Mr. Adams.

To effect a cure, the spine must be slowly pressed into its proper shape, and there held by means of instruments until the same adaptive process of contraction, which ensued in the deformity, re-establishes the figure.

These remarks naturally point to some important conclusions in the matter of treatment.

First, any system based upon the development of muscular

agencies is fundamentally wrong. When the spine is straight, and not before, can good result from the action of the extensor muscles.

Secondly, although it be true that in some early cases the deformity is very greatly lessened by the patient assuming the recumbent posture, yet experience teaches us, that want of exercise is followed by loss of tone, and impairment of general health, under which circumstances the spine is little calculated to retain its normal form when the patient resumes the upright posture.

Thirdly, mechanical support must be constant and sufficiently firm to act upon the vertebral column; hence instruments must be strongly made. Mr. Tamplin has shown that those of slighter make *bend back on themselves*, instead of acting upon the curvature; they yield to the vertebral column instead of commanding it. The nature and peculiar construction of the instruments now in use can be best illustrated by particular cases.

[To be continued.]

Transactions of Branches.

ROCHESTER, MAIDSTONE, AND GRAVESEND DISTRICT MEETINGS, IN CONNECTION WITH THE SOUTH-EASTERN BRANCH.

AN ENUMERATION OF THE DIFFERENCES BETWEEN THE PERIODIC AND CERTAIN OF THE ERUPTIVE FEVERS: WITH REMARKS ON THEIR NATURE AND PREVENTION.

By FREDERICK JAMES BROWN, M.D., Chatham.

[Read February 12th, 1858.]

1. In the first part of this paper, I furnish a bare enumeration of the differences between the two divisions of fever, without entering into an examination of their distinguishing characteristics; for an inquiry into any one of these—such, for instance, as periodicity in the one compared with critical days in the other division—would itself occupy a paper.

The following is an enumeration of the distinguishing characteristics of periodic and of eruptive fevers:—

Periodic fevers.	Eruptive fevers.
1. Periodicity.	Critical days.
2. Enlargement of the spleen.	Lesion of an internal organ and cutaneous eruption.
3. Hyperinosis.	Hypinosis.
4. Leukemia.	Pyemia.
5. Indefinite duration.	Definite duration.
6. Subsidence on removal from the locality in which periodic fevers occur.	Continuance of eruptive fevers, notwithstanding removal.
7. Repetition of attacks.	Immunity as the rule.
8. Recurrence on exposure to cold and damp, after an interval of months, or even years, during a residence in non-malarious districts.	Relapses.
9. Absence of contagion in cold climates.	Contagion in many.
10. Permanently injurious effects on the general health and on the viscera.	Recovery of health, with sound viscera, as the rule.
11. Telluric causes.	Organic causes.
12. Acclimatisation.	Inoculation.
13. Immunity of the lower animals.	Febrile epizootics.
14. Prevention of periodic fevers by the peat in bog-lands.	Prevention of eruptive fevers by ventilation, by cleanliness, and by care respecting the ingesta.
15. Prevention by quinine and other nervine tonics.	The want of any trustworthy specific remedies that will guard against the bad consequences of the animal poisons causing the eruptive fevers.
16. The influence of a high wall or side of a street in protecting from periodic fevers.	The absence of any such protection in the case of eruptive fevers.
17. Antagonism, to a certain degree, of the two divisions of fever.	

It will be observed that whilst some of the characteristics may be compared, others contrast, the one with the other.

II. In the second part of this paper, I beg leave to lay before you some speculative considerations as to the nature of periodic fevers and of typhoid and typhus fevers.

I will first treat of periodic fevers, and will state the matter in the form of propositions.

First proposition. That enlargement of the spleen precedes or follows the first attack.

The researches of Surgeon Dempster and Major (now Colonel) Baker, in India, show conclusively that splenic enlargement is a direct effect of malarious influence. These researches establish the fact that a large percentage of the inhabitants of malarious districts present an anatomical element of disease; namely, enlargement of the spleen.

Second proposition. That no poisonous matter is introduced into the blood.

I find periodic fevers arising in damp situations where there is no decaying animal or vegetable matter, therefore I cannot but accept the conclusion that periodic fevers are produced by some other cause than gaseous emanations or poisonous matter in the fluid or solid form, from decaying organic matter. I fully admit that fœtid gases produce an injurious effect upon the human organism; but this question is distinct from the subject under consideration.

The sequence of occurrences in periodic fevers is utterly opposed to our ideas of disease produced by a blood-poison. Take those affections in which a virus is introduced into the blood, such as syphilis and hydrophobia, and compare them with ague. It is true that syphilis presents many remarkable progressions and retrogressions in its course; but the cutaneous eruption, the contagious nature of the disease, and its capability of being propagated by inoculation, and other circumstances, mark a wide separation between this disease, the effect of a blood-poison, and ague, a disease caused by diminished nerve-force. The phenomena witnessed in periodic fevers are wholly different from those seen in diseases that clearly arise from the introduction of animal poison into the blood. With respect to diseases produced by vegetable poisons, I am not aware of the existence of any such. We are acquainted with diseases caused by mineral poisons; but poisons from the vegetable kingdom kill rapidly without inducing a train of symptoms that endure beyond a few days. In other words, the vegetable poisons produce acute toxæmia, whilst the animal and mineral poisons give rise to acute, subacute, or chronic toxæmia.

Another argument in opposition to the idea that periodic fevers are due to blood-poisons, is as follows:—A man may contract ague in Essex, may go to Edinburgh (where there is no endemic malarious disease), may remain free from ague for a year or more, and be affected by the disease on the occurrence of a cold wet day in spring. This is a series of occurrences never observed in any disease that is proved to be due to virus.

Third proposition. That damp earth is necessary to the production of periodic fevers.

Damp must be in connection with soil for the production of these fevers. The damp decks of a ship will not originate this form of fever, although a recurrence of fever may take place from this cause. It may be objected to this proposition, that the bogs of Ireland have no influence in producing ague. It is true that the Irish bogs do constitute a remarkable exception. I put forth the hypothesis that the peat acts as a nerve tonic, and so enables the individuals residing on the damp land to bear the loss of an abnormal amount of electricity with impunity.

Fourth proposition. That periodic fevers are due to telluric causes; viz., the abstraction of positive electricity from the human body by induction, in abnormal quantity, through the agency of damp earth.

The fact is well ascertained that positive electricity is removed in abnormal quantity under the circumstances just enunciated. The order of sequences I give hypothetically. Abstraction of positive electricity in undue proportion; disordered function of the sympathetic nervous system; changes in the constitution of the blood, viz., first, hyperinosis; finally, leukæmia; changes in the condition of the spleen and liver.

It may be objected to this proposition, that the lower animals grazing on damp land should experience the same ill effects as man.

I attribute the immunity of the lower animals to the natural clothing of hair and wool that they possess, which preserves