and Leg; Left Hemianæsthesia; Left Hemianopsia: Mental Disturbances.—The patient was seen by me for the first time on April 3rd of this year, at the Convalescent Hospital at Cheadle. For the notes, I am indebted to Mr. Stanwell, resident clinical clerk at the Cheadle Hospital.

History.—A. H., aged 40, a joiner, married, with no history of syphilis, gout, rheumatism, or alcoholic excess, had been ill for two years, and unable to work during the last eighteen months, suffering from giddiness, headache, double vision, with numbness, weakness, and trembling of the left side. He had not suffered from vomiting; the bladder and rectum had not been affected. A week before admission, he had, one morning before rising, three fits, which, according to his wife's account, were of distinctly epileptic character; his memory had recently become impaired, and he suffered from occasional attacks of violent headache, associated with febrile symptoms.

State on Admission.—The patient was strongly built, sallow, fairly nourished; he had an anxious expression and a hesitating manner; the left side of the forehead was relatively smooth, whilst the right was habitually wrinkled; the left palpebral fissure was slightly the larger (he could, however, close the left eye). The left angle of the mouth was rather lower than the right; the movements of the muscles on the left side of the face were less extensive. The left upper limb was colder and paler, and the left forearm measured a quarter of an inch less in circumference, than the right. The grip of the left hand was weaker, and the whole limb was involuntarily and frequently jerked about. These spasmodic movements affected the forearm and arm, but not the hand or the fingers; they were increased by effort or attention, and especially when any movement was attempted by the right hand (as in writing), or by any reflex excitement of the right side (such as tickling the right foot). The movements ceased during sleep. The left leg was weaker than the right; it felt cooler, and measured somewhat less in circumference, than the right; it also was the seat of involuntary spasmodic movements, less in extent, but of the same character as in the left arm, and equally increased by exciting reflex contractions. The patient could walk, but dragged the left leg in walking. The tendon-reflex was considerably increased on the right side in both the upper and the lower extremity. The electric contractility was normal on both sides.

Sensation.—There was total left hemianæsthesia, exact in extent both before and behind; the sensibility to contact, to pain, and to temperature, was much diminished. The muscular sense was normal on the left side, and the patient distinguished well different weights on the supported left hand; he could stand and walk with closed eyes. The pin-prick on the left side bled the same as on the right. The pupils were equal and active. There was no nystagmus or ocular palsy, but there was exact and total left hemianopsia of each field of vision. The central vision was normal; the fundi were normal; the veins of the fundus were large, and in the left eye somewhat tortuous. Smell and taste were normal. The tick of a watch was heard only when the watch was in contact with either ear (the deafness was, however, of old date). His urine was normal.

Progress.—During the first week of his stay in the hospital, the condition of the patient remained the same; he had an attack of frontal headache, which was very violent, and accompanied by anorexia and a rise of temperature to 101°, lasting two days.

On April 24th, I tried the effects of the electro-magnet in the presence of Drs. Noble and Lindemann, who were good enough to see the patient with me. The magnet was applied to the left arm; on trying the sensibility about an hour after its application, it was found that sensibility had returned to the left side of the head and neck, but not to any other of the anæsthetic parts. The night after the application, the patient had again a violent attack of headache, with rise of temperature. The anæsthesia gradually returned to the left side of the head and neck, and for a time the repeated applications of the electro-magnet were not followed by any results, nor did the headache return. The mental condition of the patient gradually grew worse; he got up at night, and wandered about the wards, and he was, therefore, removed to the infirmary on May 26th. The electro-magnet was now daily applied for an hour; and, though the general condition grew gradually worse, the anæsthesia improved.

A few days ago (June 10th), Dr. Noble was kind enough to see the patient again with me; and, comparing his condition with that on April 24th, it was noted that the patient's mental condition had grown worse (he had immoderate fits of laughing, his memory was impaired, and he attempted to get up at night and wander about the wards); the hemianopsia was still the same, the loss of power on the left side had increased, while the spasmodic involuntary movements had diminished, and could not be so easily produced by reflex stimulation; his anæsthesia, however, had improved; he now felt the needle-pricks acutely on the left side, though not so acutely as on the right.

The symptoms in this case are so typical and well marked, that there can be hardly any doubt that we have to do here with an organic lesion (most likely tumour, with softening of the surrounding parts), implicating the thalamus, the posterior third of the internal capsule, and the optic tract on the right side of the brain. (Similar cases, with *post mortem* accounts, have been published by Gowers, Hughlings Jackson, Hirschberg, myself, and others.)

I have no desire to lengthen this communication by a detailed review of the cases given, or by theorising on the probable mode of action of the electro-magnet. I merely wish to corroborate the results already obtained by other observers. The immediate effect of the electro-magnet in all the three cases was very striking; and, while in the third case there can be no doubt of the presence of an organic lesion, and while the second case closely resembles cases of circumscribed meningeal syphilitic inflammation, the method of application in the first case was so conducted, that there could be no deception on the part of the patient. It is quite possible that, in the second case, the prolonged administration of the iodide of potassium would have cured the anæsthesia; and that, in the third case, the gradual diminution of the anæsthesia might have taken place, as it does sometimes in these cases, without the help of the electro-magnet; but, from a physiological point of view, the sudden effect produced by the magnet is certainly interesting.

I have tried the electro-magnet in two cases of progressive muscular atrophy accompanied by analgesia, without anæsthesia, one of which was very much improved by subcutaneous galvanisation, according to Dr. Morgan's method (*Lancet*, 1879), but in both, the magnet failed to give any results. Equally negative results were obtained in lesions of peripheral sensory nerves; and it seems, therefore, that the electro-magnet is only of use in cerebral cases, and it would thus be of diagnostic help in doubtful cases.

The effects of the magnet are, perhaps, best explained by assuming ready anastomoses between the several channels along which peripheral sensory impressions are conducted to the cerebral centres. For a further exposition of this view, I refer the reader to Debove's monograph. I merely wish to add that, after Vulpian's observations (*De l'Influence de la Faradisation Localisée*, etc), localised faradisation acts exactly like the electro-magnet.

ON MOVEMENT AS A THERAPEUTIC AGENT.

By JOHN K. SPENDER, M.D.Lond., Bath.

THE therapeutic doctrine of Rest has had so many prophets and bards, that it may seem daring to ask the question, whether it has not been pushed a little too far, or always used with discretion. The service done in this matter by the late Mr. Hilton cannot be overvalued, because, before 1861 (or thereabouts), there was no distinct appreciation of the physiological reasons of rest. It had been often applied without precision, and still more often in a halting and imperfect way. The enthusiasm which was the fruit of Mr. Hilton's teaching carried us almost out of the domain of pure unemotional science. The theory was not new, but it was put in the most attractive guise. Rest is first cousin to sleep; and if sleep can refresh and restore the healthy body, why may not rest undo some of the bad doings of disease? My present argument is not to disparage rest, but to plead for its more rational application. A remedy may be too benign, too quiet, almost too agreeable. It may be potent to subdue the slow workings of an insidious malady, but the healthy nutritional forces of the body require stir and exercise, anything but too much rest. Herein lies the danger—the real danger—that rest may not be left off at the proper time, and normal movement begun. I venture to ask, therefore, whether the therapeutic pendulum of rest has not swung rather too far.

It is indeed remarkable that there was no formulated doctrine of either rest or movement until within the last twenty years. As therapeutic agents, the words are not found in the index of Dr. J. Mason Good's *Study of Medicine* (1840); nor in that of Dr. Copland's *Dictionary of Practical Medicine* (1858); nor in that of Dr. J. Hughes Bennett's *Principles and Practice of Medicine* (1859). There is no index to South's *Translation of Chelius' Surgery* (1847), but I can find no allusion to the subject in this really grand work. It is admitted that, in an empirical sense, rest and movement have been employed since medicine became an art; but the scientific grounds for either the one or the other were not always clearly grasped or opportunely carried out. The boundaries between the conditions which demand such opposite lines of treatment are sometimes not easily traced. How are we always to know when local symptoms have become so quiescent, that it is safe to undo the fetters of immobility and restraint, and tell a lame man that he may try to walk, or let a crippled hand

begin to work? Pain is not an unerring guide. It is a fact in clinical medicine, that rheumatic neuralgia is sometimes worst when muscles are most rested; for a rheumatic person may awake after a night of good sleep with limbs stiff and painful, which symptoms distinctly pass away after moderate exercise and warm food. In like manner, surgical rest may continue too long.

Take the case of an acutely inflamed joint. Under the discipline of enforced rest, the synovial effusion becomes gradually absorbed; the classical signs of inflammation pass away; and when all danger of relapse has finally subsided, an organ of locomotion ought surely to be allowed gradually to return to its duty. But it is the fashion to confine an injured joint so long in wrappings and encasements of an immobile kind, that there is a risk of *quasi*-fibrous ankylosis, relaxation of ligaments, rigidity of tendons, and commencing atrophy of neighbouring muscles. Now, in order to prove that these are not imaginary evils, I will relate in the briefest manner three cases selected from several more of a similar kind.

(a) In March 1869, an elderly lady showed me her right knee, enveloped in splints and bandages. Towards the end of 1868, there had been an injury, the nature of which was obscure. She thought that she had struck or twisted the knee. There was little effusion into the joint, but the lower end of the vastus muscle seemed lifted from the femur as by a distended bursa. Hence this muscle acted at a disadvantage, and could not properly extend the leg. There was no sensation which could be called pain; but the stiffness and general uneasiness in the knee disabled her from walking, and *these symptoms supplied the reason why the joint had been kept so long at rest*. The leg was wasted, and there was a general weakness of the whole limb.

(b). In October 1877, a gentleman under thirty years of age consulted me, and gave the following history. In July 1876, while "walking almost at a run in the dark, he fell into an iron harrow, the two knees fitting into a square of the harrow, so that the iron missed the knee-joint and met the limbs on the muscle above and on the bone below". He was not conscious of any immediate symptoms, and walked about as usual; but in a few days there came on stiffness, and then pain, the latter being never of great severity. Local means gradually subdued local troubles; and then followed a long period of "irritability" (to use my patient's own word), for which the professional treatment was that the foot was for nine months supported in a sling, the other end of which went round the neck; and at night the knee-joint was packed in splints to prevent movement during sleep. For several months he carefully abstained from bending the leg upon the thigh, because he was emphatically told that continued rest was necessary. One result of this management was that, on the least strain or blow, the joint suffered from new attacks of "irritability" and pain.

(c). The wife of a tradesman fell down some steps at the Bristol Railway Station on July 25th, 1878, and fractured the radius of the right arm. The fracture was properly set, and the splints were removed at the end of August. A bandage was then applied for three weeks. On November 1st, a starched immobile apparatus was put on, and allowed to remain for four months. When this patient first came to me, at the end of last May, the hand was nearly useless, simply from atrophy of the muscles. The hand had been imprisoned too long, and no directions had been given to arouse functional activity after its liberation from imprisonment.

Now the memory of some of my readers may recall the practice of the late Mr. Hutton, and the lessons gathered from it by Dr. Wharton Hood. The various conditions of joints which came under Mr. Hutton's treatment were easily classified, and included a large number which were stiff and painful from injury, or had been kept at rest for the avoidance of pain either after some injury to themselves or to the soft parts around them. Summed up in a few words, Mr. Hutton's principle was the rupture of adhesions by manipulative force, guided by skilful leverage. We learned from him that the joints will bear much rougher usage than is sanctioned by professional tradition; but this is not the point now at issue. The sort of case which I have just illustrated stands apart from those which are treated with sudden and violent flexion and extension. In dealing with a joint which has not been materially damaged by inflammation, is not much enlarged, but is now weak mainly because the muscles are weak which ought to move it, a thorough and scientific shampooing (or *massage*) is our therapeutic watchword. The physiology of the joint has to be studied more than its anatomy. The joint is afraid of itself because it is not used; its volitional energies are "hidden under a bushel"; and the owner of it has, perhaps, been scared by the terror of what may happen if he presumed to walk even with the help of crutches. It is satisfactory to know that Dr. Sayre, who is the designer of such an ingenious plan for supporting and resting a diseased spine, distinctly says that, in the case

of ankylosed limbs, there is "a time for motion as well as a time for rest".*

First, then, we satisfy ourselves that the joint-ends of two bones are not mortared together, and do not require any forcible methods for their separation. A patient may be put partially under the influence of chloroform if necessary, and the capability of a joint to be bent or extended will then be fairly tested, and we shall discover what checks there are to healthy movement. The passive play of a joint tells us that its mechanism is sound; but the question is, What are its vital activities? What can the patient do with it, and how far can he use it? In the three cases which I have briefly delineated, I could see nothing to hinder the limbs from being actively employed. They needed to be brought out of the prison in which they had been immured by professional swathes and bands, and stirred into a more quickened life. They were suffering just as the whole body would suffer if, when clearly recovered from acute disease, it were still compulsorily confined to the bed or the bed-chamber.

The simple plan of treatment which I have for years adopted is as follows. Imagine the knee to be the affected joint, and the foot should rest on a stool or block of wood just within a large shallow open bath, so that the knee is over nearly the centre of the bath. A jug, holding about a pint of fluid, is filled with tepid water, and is turned upside down about three feet above the knee, so that the water falls with a splash on the joint; and this is repeated from six to twelve times. An attendant, sitting in front of the patient, then plants a hand on each side of the knee; and, with the thumbs meeting in front, the hands should be moved firmly up and down for eight or ten minutes. The pressure used should be equal and well sustained, not causing any uneasiness, not in the least rough, but such an union of firmness and gentleness as a practical manipulator will easily understand. The thumbs, while agents of moderate pressure themselves, may be made the fulcra for pressing and rubbing the back of the joint. At the end of the shampooing process, the whole joint ought to be dry and warm, and to be immediately wrapped in a covering of oiled-silk lined with wadding, which should be securely fastened and kept on for some hours.

By this easy plan, carried out regularly once or twice a day for several weeks, there is seldom any difficulty in restoring the torpid functions of non-ankylosed joints. Now and then it may be desirable to suspend the friction for two or three days, if the skin show signs of irritation; and in warm weather the impervious pad is scarcely necessary, and might cause an eruption of pustular acne. Medicated lotions or liniments are rarely prescribed; but now and then I introduce under the oiled skin wrap a piece of folded flannel soaked in a mixture of tincture of iodine (half an ounce), glycerine (half an ounce), and soft water (seven ounces). The early douchings are best done with tepid water; but this should be exchanged for cold water as soon as possible, on account of the greater glow and reaction which are afterwards obtained; and, during the summer months, cold water may be used from the first. In all cases, the local treatment should be supplemented by regular passive movements carefully and coaxingly executed, and never exciting pain and fatigue. Sometimes it is only timidity which hinders a patient from (say) pronating and supinating a hand, or flexing and extending an elbow; a group of muscles have to be taught anew. As the lower limbs bear the weight of the body, their voluntary exercise must be deferred until the patient regains confidence and acquires strength.

The next stage of treatment consists in the application of uniform and gentle support. A weak joint requires support when it no longer requires rest. This seems to be the key of the new and important devices of the American surgeons—*prolonged pressure without prolonged rest*.† The principle is not at all new. Fifty years ago, my father was curing chronic ulcers of the leg by means of firm equal pressure with a domette flannel bandage, telling his patients to walk about as usual. His practice was opposed to the almost universal surgical teaching of the day, reiterated since with with a loudness and constancy almost overpowering;‡ such surgeons as Dr. Underwood and Mr. Chapman being rare exceptions to the rule. And yet it ought to have been clear that to lay up a limb in idleness admits of the healing of an ulcer by a

* BRITISH MEDICAL JOURNAL, August 30th, 1879. While writing this paper, the 14th volume of *St. Bartholomew's Hospital Reports* came under my notice, and I have read with pleasure Mr. Willett's paper on Manipulation in Surgical Treatment. The cases which he relates are interesting; but they are examples of the utility of "forcible movement", and, therefore, belong to a different class from my own cases.

† As a remedy (or preventive) of acute inflammation, pressure has been enthusiastically discussed by Mr. Furneaux Jordan and Mr. Sampson Gamgee.

‡ Take at random such a sentence as the following: "Rest is Nature's own remedy, for the application of which she takes no denial; and the practitioner of the healing art takes his cue from this great teacher. If he have an ulcer on the leg to cure, he enjoins rest, and lays up the limb accordingly" (*Medical Times and Gazette*, October 19th, 1867).

degree of vital action, which is unable to maintain the permanence of that healing when the limb is restored to use. Similarly, when we have to treat a weak joint, the principle ought to flash upon us with unerring instinct; here is a case, we should say, for applying firm pressure and allowing moderate exercise. For the *ankle*, there is nothing better than an India-rubber bandage, put on from the base of the toes to the upper part of the leg. The bandage is far better than a so-called elastic anklet, because it supports all the muscles which move the ankle; it should make a gentle uniform pressure, without any sensation of squeezing, each fold slightly overlapping the previous one all the way up the limb. The *knee* should be enclosed during the daytime in an elastic support, *which should always be laced*, and which need not cost more than four or five shillings. The lacing allows the degree of support to be varied, according to the feelings of the patient and the amount of exercise he has to undergo. Equipped with this simple apparatus, the lower limb enjoys, as far as the upper part of the knee, a gentle and uniform pressure, which permits useful locomotion within restraining and salutary conditions.

The application of this principle to the *upper limb* is not difficult. A hand and wrist, when embraced by an elastic glove extending a little way up the arm, is competent to perform various feats of dexterous workmanship, which would otherwise soon cause aching and powerlessness. But what need is there for illustrating further such an obvious point of practice? If to be at work is the part which a healthy organ has to play, it is clear that too much rest cannot contribute to the perfection of that work, either in quantity or quality. That special condition which is called the "hysterical joint" is peculiarly amenable to the vigorous and helpful treatment of douching and pressure. For the douching, the use of the Bath waters is much to be commended, as the dynamic stimulus of their heat maintains an after-glow, which is a sign of more vital energy. And hysteria, if it mean anything, means a lack of this energy—a crippled volition, a sluggish blood-stream, and a general under-tone of life. The combination of firm pressure and moderate exercise fulfils, in this case, exactly what we ought to aim at: support to the mechanical apparatus of locomotion, and arousing and sustaining of vital function.

I heartily agree with what Mr. Roth has written about the importance of muscle-rubbing in infantile paralysis.* He insists that the superficial and deeper layers of muscles should be acted upon successively: firm circular friction is made on the same spot with the ball of the thumb, from left to right and from right to left, about ten times each way; pressure should be used at the same time with the thumb—the thumb being helped, if necessary, with the other hand. The fact is, however, that we ought to vary our manipulations according to the age and sensitiveness of the patient, and the duration of his malady. Thus, we use in one case stroking (*effleurage*), and in another kneading (*pétrissage*); sometimes percussion (*tapotement*) is most beneficial; and, now and then, it is best to trust to passive motion. The last three methods are particularly adapted to chronic inflammations. Hard kneadings crush and break up old hyperplastic tissue, and the detritus is passed into the lymph-stream; vascular congestions are emptied, and the vaso-motor nerves are mildly irritated. The friction of medicated substances may be an occasional aid, and among the best are mild iodine ointment and the liniment of iodide of potassium.

Rest and movement are, therefore, complementary to each other, both in physiology and in therapeutics. The analogy is as close as possible. Alternation of work and rest is the law of the human organism in health, and health could not be preserved without it. Disease may call for a prolongation of the element of rest; but it is a note of clinical insight to discover when the disease ends, or when sufficient health returns to justify the usual alternate rest and work. Continued work without rest could not be; rest continued too long is not only conceivable, but it is the object of this paper to illustrate it as one of the present dangers of therapeutic surgery.

THE TREATMENT OF GUINEA-WORM.

By FORBES DICK, M.D.,
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AT a time when the existence of filariæ in the blood and tissues is being laid before us as a possible cause of, or at least frequently associated with, elephantiasis, beriberi, and many tropical cachectic and local diseased conditions of the body, and when a discussion on the treatment of *filaria Medinensis* has taken place, it may not be inopportune to offer a short experience of the treatment necessary to the removal of this parasite. The general impression as to the entire available method

of surgical procedure for riddance of the worm would seem to be fairly summarised as regular winding and the application of antiseptic moisture. Before mentioning two other methods of extirpation, some impressions as to the behaviour of the worm, which may enable one the better to judge as to the most suitable method to adopt and mode to proceed, may be noted.

The worm is almost invariably found marching to the extremities, so that its anterior end is most distant from the heart. Should it be interfered with or naturally obstructed, as by the tissues surrounding joints, it may temporarily turn; but it prefers to double inwards to backwards. The worm is able to lay hold of the tissues with its anterior extremity, but not by its posterior. This can be easily seen if extraction on the double is for a moment delayed when all but completed, when the skin will show a puckering and drawing inwards opposite the channel through which the anterior extremity passes, which, on their catching hold, will rather break than yield; whereas this does not occur on withdrawal of the posterior extremity.

Preparatory to the formation of the vesicle, when the worm begins to pierce the true skin, in addition to local sensations, there is usually general cutaneous itching, and not unfrequently a roseolar rash.

The distensibility of the worm is considerable, and the process of winding is not necessarily the displacing of the entire worm, but only the coiling of so much of its extension as can be safely taken in before it gives way to the resistance offered by its vitality and the mechanical impediments of its length and the tissues surrounding it. It would seem as if an injured worm readily, if not immediately, exercises its powers of contractility to resist mechanical means of extraction; but a worm whose vitality is unimpaired may be entirely displaced before this force may be apparent, and before it can lay hold of the tissues with its mouth. The period after distension by winding necessary to a worm to accommodate itself would indicate the frequency with which the process might be repeated; and, as a matter of practice, it may be repeated every eight hours.

A dead guinea-worm may exist in the living tissues without producing any irritation. On one occasion, after removal of a guinea-worm from a Mahratta cart-driver, I was examining him with the view of ascertaining if others existed, when I came upon the characteristic whipcord running across the upper aspect of the left elbow. I pronounced it to be a guinea-worm, which he admitted, but stated that it had been there for two years, and was dead. An incision was made, and fifteen inches of a worm were withdrawn; it was firm and of a translucent appearance in greater part, but with milky opalescent spots at intervals.

Guinea-worm dies out in localities where tanks or ponds, equally used for drinking and washing, completely dry up during the year, and would seem to be endemic only where these do not do so. The way to stamp out the disease is obvious.

The Mahomedan *hakim* and Mahratta *dharavallah* seem to reason that treatment might be so applied as to stink the worm out, coax it out, pull it out, or suck it out. Upon the lines of these four ideas, I would refer to measures for its removal.

The mephitic theory, not being able to stand the test of physiological reasoning, has not been pursued in practice by me further than to test the value of the application of assafetida poultices as an incitement to the more rapid extrusion of the animal and an auxiliary to the winding process; but I am unable to endorse what has been urged by sufferers to me in their favour.

The coaxing-out theory would appear to be more reasonable. Observation of the natural behaviour of an uninterfered with mature worm, from the moment of extrusion to complete escape, during prolonged immersion in running water for instance, where it would be aided in its escape, and at the same time nourished and protected against the deleterious effects of exposure to the air, would doubtless prove that it is not so hard-and-fast a tenant as is supposed. The readiness with which an uninjured partially extruded worm will, in running water, come out six inches or more, and the fact that coils of the worm are frequently found on a poultice, are matters of frequent observation. In the application of poultices to aid winding and promote extrusion of the worm, that moisture should be thoroughly retained, so that there should be no drying up, is more important than the quality or kind of poultice. At the same time, I have to remark that brinjole poultices have been with me more fertile in showing coils of worm than linseed or other poultices. As a protection against the air, and to retain the consistence and vitality of the worm, glycerine and water painted on its extruded part seemed to be useful. A difficulty occurs in protecting the part from the accidents of rubbing, and especially during the sleep of the patient, when he is apt to displace the poultice and break the worm. But the winding process and all these aids to it are applicable only to the extruded worm. It is probable that in temperate countries, where the worm is unfrequent and not expected, this will be the most usual condition when

* BRITISH MEDICAL JOURNAL, June 14th, 1879.