of ophthalmology would be the granting of a diploma, as is done now in the universities of Oxford and Liverpool, and for that purpose the work of the eye department would be linked up with that of the physical, physiological, pathological, and probably also the psychological laboratories. Such a qualification would encourage the taking of a complete post-graduate course in the subject, and would thus necessarily give a great impetus to advanced study, and create an atmosphere in which the young ophthalmic specialist could train and develop.

DISCUSSION.

Mr. MALCOLM L. HEPBURN (London) said that the teaching of ophthalmology to medical students must of necessity fall under two headings. (1) The teaching of students who intended to become general practitioners, and (2) the teaching of those who proposed to practise ophthalmic medicine and surgery. In regard to the first, since the time at the disposal of the students in question was unavoidably short, it should be expended in accumulating knowledge of those parts of ophthalmology which were most likely to concern the general practitioner; consequently the teaching should be centred round methods of diagnosis, special attention being paid to external diseases and external manifestations of intraocular disease, with a minimum amount of ophthalmoscopic work, operative surgery, and book reading. Ophthalmoscopic work should be limited to a knowledge of the appearance of the disc and the diagnosis of opacities in the media. The teaching should be mainly clinical and practical; refraction work should be taught and learnt as accurately as possible in the time, not with a view to the prescribing of glasses, but chiefly for diagnostic purposes, owing to the importance of being able to exclude refractive error in any given case. The course should be taken near the end of the medical curriculum, and the board of examiners should always include an ophthalmic surgeon, who should examine candidates on the lines indicated. As for the education of future ophthalmic surgeons—including those who wished to do ophthalmic work under school boards, county councils, etc.—let the teaching be of the highest order in all branches of ophthalmology; let it include a thorough grounding in the preliminary subjects of optics and physiology conducted by special teachers, and let the students be required to hold a degree (by examination) in ophthalmology. The difficulty of carrying out ophthalmological teaching on a large scale lay partly in the fact that so many different branches of a subject had not so far been conducted in one central institution, and students were therefore forced to spend a good deal of time, trouble, and money in going from one place to another. At present post-graduate centres had attempted to cope with this difficulty by establishing special lectures, papers, and clinical evenings, etc., but the really practical and clinical side must in any case be neglected, owing to the absence of sufficient clinical material, the inconvenience of collecting cases belonging to different hospitals, and to the fact that disproportion between the number of students and patients often interfered with satisfactory individual examination. In addition to the subjects already mentioned, there should be facilities for the study of both medical and surgical ophthalmology, operative surgery, pathology, bacteriology, clinical work, and neurology; but the difficulty of carrying on instruction in ophthalmology on these lines was obvious. At Moorfields they endeavoured to approach this ideal by distributing the teaching amongst the thirteen members of the staff, but medical ophthalmology must necessarily be neglected at such a hospital. Cases of this order were, and should be, transferred to some general hospital, or remained under the care of the physician. Three times a year they had scheduled lectures, which lasted two months, and dealt with the examination of the eye, refraction, ophthalmoscope, motor anomalies, surgical anatomy, operative surgery, pathology, bacteriology, and medical ophthalmology, while clinical demonstration went on daily all the year round. The advantages of a surgical hospital such as Moorfields were very great, owing to the large amount of clinical material and the variety of methods employed by different members of the staff, whose results could be carefully watched and compared; but it did not represent all that was desired, and the preliminary subjects—medical ophthalmology and

neurology—received only a very small place in the teaching. From the students' point of view, plenty of clinical material was essential, and some of the large general hospitals, with a correspondingly large ophthalmic department, suggested themselves as possible centres to combine all the teaching required; but there were few such hospitals, even in London, and many of the ophthalmic departments were inadequate even for the proper teaching of ophthalmology for the general practitioner. The teachers should be men engaged in ophthalmic practice, not those who had gained their experience solely in hospital work.

Dr. A. F. MACCALLAN (Cairo) said that the importance of the teaching of ophthalmology was recognized in Egypt. The students had to acquit themselves sufficiently well in a special paper in ophthalmology in the final examination for the diploma in medicine and surgery at the Government medical school. Those post-graduates who desired to take up the speciality of ophthalmic surgery were drafted to the ophthalmic hospitals, which were now sixteen in number. Here there was unlimited practical work to be done, while once a year a course of six weeks of clinical and pathological teaching was given, which included laboratory work.

Dr. MACGILLIVRAY (Dundee) detailed the method adopted in the teaching of ophthalmology in the University of St. Andrews, and in examining candidates in their final examinations. He advocated the importance of every student knowing how to correct refractive errors, showing that it was easier to teach a student how to prescribe spectacles than to prescribe rationally for dyspepsia. If adopted generally, it would stop the wholesale spectacle mending at present in vogue.

Dr. R. A. REEVE, Dr. CASEY A. WOOD, Mr. T. H. BICKERTON, and Dr. A. HILL GRIFFITH, having described the methods of teaching adopted in the universities and colleges with which they were respectively connected, Dr. RAMSAY, in reply, said he thought that during the limited time at the disposal of the medical student, he should be taught the most important subjects, and it was impossible to turn them out skilled refractionists. The aim should be to improve the general teaching as much as possible rather than to devote much time to special subjects.

A CASE OF DISSEMINATED SCLEROSIS TREATED BY INOCULATION.

BY

H. LYON SMITH, M.D., DURH.

With Clinical Report

By T. GRAINGER STEWART, M.D., F.R.C.P.,

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THE reason for reporting this case of disseminated sclerosis at such an early date is that it presents some features of unusual interest, and that the line of treatment has apparently been sufficiently successful to justify others, who may have to deal with similar cases at their onset, in testing its value. It is in the initial stages of an infection that one can expect to intervene most effectively.

A girl, aged 19, a probationer in a sanatorium for tuberculous children, was in good health until the beginning of March, 1914, when she was invalided home with obscure symptoms of muscular weakness, and came under the care of Dr. Robert Grant of Cromer. Involvement of motor areas progressed very rapidly. Disseminated sclerosis was diagnosed; a Norwich specialist was called in consultation, and a very grave prognosis was given. On May 24th Dr. Grant sent her up to London in an ambulance for bacteriological investigation, with a view to experimental treatment if any clues were forthcoming. On admission to the Duchess Nursing Home the patient was unable to stand, to feed herself, or even to move her arms and legs without involuntary jerks. Dr. Grainger Stewart pronounced her condition to be typical of disseminated sclerosis.

Clinical Report by T. GRAINGER STEWART, M.D.

The patient, a young unmarried woman aged 19, came of a healthy stock and had always enjoyed the best of health except that between the ages of 5 and 9 she had suffered from "glands" in the neck. These quite disappeared and she has never had any sign of them since. Before Christmas, 1913, she cut the middle finger of her right hand, and the wound suppurated and did not heal up for about three weeks.

Present Illness.

Early in March, 1914, she had a slight bilious attack which lasted for two days. It was not accompanied by any febrile disturbance, and she apparently recovered completely and was quite well for a week.

About the middle of March, 1914, she suddenly lost the use of her legs, the right leg became almost powerless and the left was weak and shaky and at the same time she lost control over her water. The onset was sudden, without any noticeable febrile disturbance, and she suffered no pain and did not lose the feeling in the legs (tested with pin and cotton-wool). She was confined to bed and three days later the right hand and arm became "numb," weak, and very shaky so that she could not feed herself well or write or use the right hand at all. At the same time she saw double and a "squint" was noticed. She had no pain, headache or vomiting, and felt quite well in herself. During the next three weeks she slowly improved, the diplopia became less and the legs stronger, but the right leg was very unsteady and shaky and she was still unable to stand or walk even with help, and could not use her right hand. She then had another sudden attack in which her left hand became numb and shaky, and the right leg again became weak. Since then she has slowly improved and has not had any further relapse. At no time did she suffer from any headache, pain, or loss of vision apart from that due to the diplopia.

State on Examination, May 25th, 1914.

The patient was bright and cheerful, and her memory and attention were good. Her complexion was rather muddy, and the skin over the lower extremities dry and scaly; the skin on the soles of her feet was peeling. Her general health was good, and there was no evidence of any organic disease of the heart, lungs, or abdominal viscera. There was no glandular enlargement. The urine was normal. There was no history of any previous trouble in the nose, ears, or throat, and the mouth was healthy except for a slight degree of gingivitis. Her periods were regular.

Cranial Nerves.—Smell, taste, hearing normal. Vision good; no impairment of visual fields. Optic discs normal. 346. Pupils equal; reacted normally to light and on convergence. Ocular movements: no obvious paralysis, but the patient complained of slight diplopia on looking down and to the right. Coarse nystagmus was present on conjugate lateral movement of the eyes to the right and to a less degree to the left. Slight nystagmical jerks were present on looking upwards and downwards.

Motor System.—General musculature good.

Upper Extremities.—Muscles well developed; no wasting. There was slight spasticity in the right arm; none in the left. Power was diminished in both arms, especially in the right. On getting the patient to hold out her hands or to touch the point of her nose there was a well marked coarse tremor, more on the right than on the left. At rest no tremor was visible. The patient was unable to write or to hold a cup of tea in either hand without spilling it.

Head, Neck, and Trunk.—She could not raise herself in bed without using her arms. When sitting up there was a distinct unsteadiness noticed, the movement being in the antero-posterior axis.

Lower Extremities.—The right leg was slightly spastic and very weak in all movements. The patient could move it in bed, but was unable to raise the extended leg from the bed; all movements were accompanied by intention tremor. The left leg was not spastic, but was slightly weak and ataxic.

Gait.—She could not stand alone, and was unable to walk even with support.

Sensory System.—There was a feeling of numbness in both hands, but there was no pain or tenderness. On examination there was definite loss of sense of position in the thumb and fingers of the right hand and in the two ulnar fingers of the left.

Reflexes.

	Right.	Left.
DEEP.		
Arm—		
Biceps	++	+
Triceps	++	+
Supinator	++	+
Leg—		
Knee	++	+
Ankle	++	+
	Clonus	Slight clonus.
SUPERFICIAL.		
Epigastric	Absent	Absent.
Abdominal	Absent	Absent.
Plantar	Extensor	Extensor.
SPHINCTERS.		
No loss of rectal control.	—	—
Some loss of control over bladder. No distension.	—	—

There was no loss of discrimination of two points, of vibratory sense, or of tactile, painful or thermal sensibility. Elsewhere, sensation was normal. The patient was unable to distinguish differences in the weight of coins placed on the fingers, but there was no asteriognosis.

Further Progress.

May 30th, 1914.—No diplopia, no nystagmus. Intention tremor less in arms; still loss of sense of position in hands and fingers. Right leg stronger and less shaky, but the patient cannot stand alone or walk without support. Abdominal and epigastric reflexes absent. Plantars extensor. Micturition normal. Complexion clear, and the patient looks more healthy.

June 3rd.—No diplopia, no nystagmus. Upper extremities: Power good, intention tremor only present in slight degree in right hand. Can write slowly and unsteadily with right hand; can feed herself quite well. Legs: Power of right much improved; can stand alone and walk with help. Plantars: Right, extensor; left, flexor.

June 9th.—No diplopia, no nystagmus. No loss of sense of position in the hands or fingers; can write, sew, and crochet. Can stand alone on both legs and on the left foot, and can walk without support, though still unsteady. Plantars: Right, indefinite flexor; left, flexor. Abdominal and epigastric reflexes present on both sides.

July 1st, 1914.—Cranial nerves: Normal, no nystagmus. Motor system: Arms normal, no tremor, no weakness. Head, neck, and trunk: Normal, no tremor. Lower extremities: Slight weakness of right leg and slight ataxia, but the patient can walk alone quite well; can walk along a straight line, and can stand alone on either leg. Sensory system: No defect can be detected. Sense of position perfect in all fingers. Reflexes: Deep, are all brisk, and there is now only a tendency to clonus at the right ankle. The epigastric and abdominal reflexes are normal, and both plantars are flexor, though the right is more difficult to obtain than the left. Sphincters normal.

Treatment.

In addition to the vaccine therapy, the patient was put upon Frankel's exercises for the hands and legs, and was practised in sitting up, later in standing, and finally in walking with foot step exercises.

Remarks by Dr. GRAINGER STEWART.

The symptoms and physical signs present in this case conclusively prove it to be organic, and the history and the mode of onset and nature of the symptoms are characteristic of disseminated sclerosis. The absence of any noticeable febrile disturbance, pain, or severe sensory loss contraindicate a diagnosis of disseminated myelitis, and the absence of any evidence of specific infection negatives a diagnosis of cerebro-spinal syphilis.

It is unfortunate that the Wassermann reaction was not tested in this case, although there was not the slightest indication of any specific disease, and also that a further examination of the cerebro-spinal fluid was not possible.

The improvement which has taken place both as regards its extent and rapidity is also characteristic of the clinical course of the early stages of disseminated sclerosis, and this, taken into consideration with the fact that it had already started before the commencement of the vaccine treatment, must make any one who is acquainted with the disease very cautious before attributing the subsequent recovery to the vaccine treatment employed.

The onset of disseminated sclerosis is usually sudden and the initial symptoms may be severe or relatively slight, but in many cases complete recovery takes place, and the patient may remain apparently healthy for months or even years before the onset of the second attack. The occurrence of such remissions has led on many occasions to a mistaken diagnosis of hysteria. On the other hand, the popular conception of disseminated sclerosis as being an absolutely hopeless and incurable condition is too extreme, for although the great majority of cases eventually become chronic, yet the remissions and degree of recovery in the earlier stages should caution one against giving too gloomy a prognosis.

This tendency towards remission and recovery in the early stages makes it well-nigh impossible to attribute temporary recovery or improvement to any special form of treatment, although some apparently have a beneficial effect.

In the present case a certain degree of recovery would, I think, have been expected apart from any treatment, as it was the initial attack. As some improvement had already taken place before vaccine treatment was adopted, it might be urged that the ultimate recovery which took place was merely coincident with the treatment and not due to it; at the same time it was remarkable to note the extreme rapidity with which the symptoms and physical signs disappeared after the commencement of the vaccine treatment.

There appeared to be two possible portals of entry of infection. At the end of December, 1913, she had cut the tip of the middle finger of her right hand with broken glass, and the wound took a month to heal. It seemed possible that some pathogenic microbe might have found its way along a nerve trunk. The second possibility was infection from her gums, which were distinctly septic.

There was marginal gingivitis, and at several points the spongy gums bled at the slightest touch.

On May 25th 10 c.cm. of blood were withdrawn from a vein, and proved to be sterile. On the same day Dr. Grainger Stewart made a lumbar puncture and 25 c.cm. of cerebro-spinal fluid were withdrawn. Through the cannula 6 c.cm. of normal saline fluid, prepared with triply-sterilized distilled water, were injected with the double purpose of replacing some of the cerebro-spinal fluid and of stimulating lymph lavage. 1 c.cm. of the cerebro-spinal fluid was injected hypodermically immediately after its withdrawal, on the assumption that it might contain specific toxin in solution, or even the living virus, if such was present. The latter proved to be the case, as an examination of the fluid almost immediately after its withdrawal showed the presence of about 50 small lymphocytes in 1 c.mm. and a number of living cocci, which were roughly estimated at 2 million in 1 c.cm. The Wassermann reaction of the fluid was not tested.

Tubes of serum agar, blood broth, and ordinary agar were inoculated with the cerebro-spinal fluid, and a growth of *Staphylococcus aureus pallidus* developed quickly. A vaccine was prepared from this, and was used on May 27th. Doses of 50 million, 100 million, and 200 million were given on three successive days; 300 million were given at intervals of forty-eight hours for three doses, and then 400 million every third day. For a few hours after the lumbar puncture, the patient suffered from severe headache and vomiting. The injection of the cerebro-spinal fluid caused little local pain or discomfort, and no swelling or tenderness could be discovered over the area when examined next day.

The patient was obviously improved thirty-six hours after the first inoculation, and on June 3rd, when she had received four doses of the sterile vaccine, the general improvement was manifest. Her movements were less jerky, she was able to stand alone for a few seconds, and even to write a little. Her colour had improved, and the gums were in a much healthier state. At the end of a fortnight she was able to feed herself, to stand and walk with a fair amount of confidence, could write quite well, and each day seemed to mark some recovery of strength.

On June 21st, as the temperature still showed an afternoon rise of 1° F., daily injections of 400 million of her vaccine were given in the hope of inducing a normal temperature. She was unwilling to submit to another lumbar puncture unless further symptoms developed, therefore we were unable to complete our investigations by a Wassermann reaction or a repetition of bacteriological tests. The chart showed an improvement at the end of the week, and it was decided to reduce the inoculations to one in seven days, until absence of the slightest febrile symptoms indicated that the infection was quite dormant. On July 4th she returned to Cromer to spend a couple of months quietly convalescing, all traces of the paralysis having entirely disappeared.

Some points of interest in this case are: (1) Infection of the cerebro-spinal area, whilst blood cultures showed no indication of infection in the general systemic circulation. (2) Workers in the field of general paralysis and locomotor ataxy tell us that there is no exchange between the cerebro-spinal system and the general circulation—by which they explain the failure of salvarsan injections—but it would appear from this case that antibodies developed in the blood can reach the tissues of the cerebro-spinal system. (3) The first inoculation contained some 2 million of living cocci. Eighteen months ago Besredka urged me to use living sensitized bacteria for immunizing purposes, but this is the first time I have ventured, in spite of the brilliant results obtained by Broughton-Alcock, some of which he was good enough to show me when I was in Paris. To what extent the cocci were sensitized in the present case is an unknown quantity, but some may be inferred from the fact that there was no perceptible reaction at the site of the inoculation. (4) It is difficult to judge whether the marked constitutional disturbance which immediately followed was due to (a) the lumbar puncture, (b) the withdrawal of too much cerebro-spinal fluid (25 c.cm.), (c) its partial replacement by normal saline, or (d) systemic reaction to the living vaccine.

Reviews.

ISOLATION HOSPITALS.

In public health literature it is remarkable that so few books have been written referring exclusively to hospitals for infectious diseases. This may possibly be due to the fact that as long ago as 1882 Sir (then Dr.) Richard Thorne Thorne presented to the Local Government Board a most exhaustive report on the whole subject. This was so elaborate and authoritative that for many years there seemed little need for anything more to be said on the question. It is a tribute to Sir Richard Thorne's prescience that this report was reissued in 1901. At that date and for some time before and afterwards Dr. H. FRANKLIN PARSONS, First Assistant Medical Officer of the Local Government Board, was concerned very intimately with all the hospital schemes which came before the Board, and it was therefore quite appropriate that in 1912 he should have made a further report on the question. The document which he produced, though not so elaborate as that of 1882, has already, like its predecessor, become a classic. Upon his retirement from the Board Dr. Parsons set himself the task of producing a work in which, though basing himself upon his official report, he was able to write with greater freedom than when trammelled with official responsibilities. This work, entitled *Isolation Hospitals*,¹ was completed shortly before his death and has been included in the Cambridge Public Health Series, edited by Dr. G. S. GRAHAM-SMITH and Mr. J. E. PURVIS. It will now become a standard work of reference for all those who have to concern themselves with these institutions. He expresses the opinion that the uses of a hospital for infectious diseases are the cure or relief of persons suffering from such diseases; the separation of such persons from the rest of the community with a view to prevent the spread of disease, and to obviate the disabilities, inconveniences, and pecuniary losses which the presence of infectious sickness might entail. The very definite statement is made that scarlet fever, contrary to former belief, is infectious from the very commencement of the symptoms, and this is given as one reason for the non-success of hospital isolation of scarlet fever cases, another being that the patient may apparently in some cases continue capable of conveying infections even when no pathological condition can be discovered, for it is now believed that the contagion that was formerly, and is still popularly, supposed to have its seat in the desquamation from the skin resides in secretions from the mucous membranes of the nose, throat, and ears, and possibly also in the urine. On a review of the whole question of the advisability of the hospital treatment of scarlet fever, it is pointed out that there are instances in which the patient has not the proper lodging and accommodation required for his own well-being, nor for the prevention of grave risk of spread to other persons in the same building, such as in a common lodging-house or in the crowded houses of people of the poorer class. Then there are severe or complicated cases in which the patient requires treatment and nursing which he can obtain much better in a hospital than in his own home. Cases also occur in circumstances where non-removal might involve serious pecuniary loss, as at a hotel or a boarding-house. On the other hand, the author considers that it is doubtful whether the removal to hospital as a routine practice of every case of scarlet fever is advisable on grounds of health, or is worth the expenditure which it involves.

Referring to the isolation of cases of tubercle, it is asserted that the objects which may be had in view in the reception of phthisical patients into hospitals are the cure or arrest of the disease and restoration of the patient to health, or at least the amelioration for the time being of his condition; the isolation of the patient with the view to prevent his infecting other persons; the educative treatment of the patient with the view to teaching him good habits—as of living in fresh air and the proper disposal of sputum, which may conduce to his own benefit and to the safety of other people after he has left the hospital; and the keeping of the patient under observation for a short

¹ *Isolation Hospitals*. By H. Franklin Parsons, M.D.Lond., D.P.H. Camb. Cambridge Public Health Series, under the Editorship of G. S. Graham-Smith, M.D., and J. E. Purvis, M.A. Cambridge: The University Press. 1914. (Demy 8vo, pp. 289; 55 figures. 12s. 6d. net.)