and no pain, but he had palpitation occasionally. At times there were slight choreic movements of the facial muscles, and also of the left arm and leg. There was considerable obstruction in the nasal passages owing to hypertrophy of the lower turbinate bodies.

He was placed on a course of general treatment similar to that mentioned above. The mucous membrane of the lower turbinate bodies was cauterized in several stages. After a few weeks he was able to breathe entirely through the nose, and ceased oral respiration. He made good progress, his palpitation ceased, and he was able to take walking exercise with ease and without discomfort. In addition to the balneological treatment I am convinced that the removal of the nasal obstruction had a marked effect in relieving the heart from obstruction in the pulmonary circulation.

A few days ago his medical attendant reported that he had no trouble with the heart and looked very well. The murmur was still present, but the pulse was regular, the rate being 68. He had increased in weight and had no dyspnoea.

One object of the treatment is to train the patient as to the amount and nature of the exercise he may take with benefit, and this forms a valuable guide to him when he returns to his ordinary life.

In conclusion, I should note that the mineral water, besides barium chloride, contains a considerable amount of calcium chloride, which recent observations have shown to have a somewhat similar action—that is, in slowing the pulse and increasing the force of the systole.

CASE OF GENERAL PARALYSIS OF THE INSANE WITH EXTRAORDINARY LYMPHOCYTOSIS IN THE CEREBRO-SPINAL FLUID.

By WILLIAM BOYD, M.B., CH.B.,

HOUSE-PHYSICIAN, EDINBURGH ROYAL INFIRMARY.

It is now generally recognized that in tabes and general paralysis of the insane the cerebro-spinal fluid usually—perhaps always—contains an excess of lymphocytes, and that this lymphocytosis may be of considerable value in

exact number could not be estimated. In the non-centrifuged cerebro-spinal fluid the number of leucocytes (almost all lymphocytes) was no less than 285 per c.mm.

I am indebted to Dr. Bramwell for permission to publish the notes of this case.

G. W., aged 30, single, a wine merchant's traveller, was admitted to the Edinburgh Royal Infirmary, under the care of Dr. Byrom Bramwell, on March 5th, 1909, complaining of nervousness and difficulty in speaking.

History.

The history furnished by an intelligent sister was that in July, 1907, it was noticed that he was beginning to speak indistinctly, slurring his words now and then. About six months later occasional twitchings of the lips and unsteadiness of the tongue were noticed. In the summer of 1908 he had a great deal of worry connected with money matters; shortly afterwards the articulation and the movements of the lips seemed to get worse. He was able to work up to June, 1908, but then found he was unable to get on with his employers; he had lived at home since.

His sister had noticed very little change in his general behaviour. There had been no grandiose ideas; his power of concentration was, she said, unaffected.

In 1898 the patient contracted syphilis, developed a rash and sore throat, and took pills for over six months. He had had no other illnesses of note.

Family History.

Nothing bearing on the case.

Social Conditions.

The nature of the patient's employment afforded numerous opportunities of taking wine and spirits, of which he seems to have availed himself freely; he states that at times he drank to considerable excess.

Present Condition.

The patient is a very strong, heavily-built man, with a somewhat hang-dog expression. His weight is 13 st. 5 lb.; two years ago he weighed over 15 st. There are no signs of syphilitic disease on the surface of the body.

Nervous System.

Although his mental symptoms are not well marked yet there is something strange in his manner. While speaking to

Fig. 1.—Photomicrograph of a lumbar puncture film in the case of general paralysis described in the text, magnified 60 diameters. The film was made after centrifuging 5 c.cm. of the fluid for ten minutes. The photograph was taken from a thin portion of the film.

Fig. 2.—Photomicrograph of a lumbar puncture film in the case of general paralysis described in the text, magnified 450 diameters. The film was made after centrifuging 5 c.cm. of the fluid for one minute. The photograph was taken from a thin portion of the film.

the diagnosis of the parasymphilitic diseases of the nervous system.

Under normal circumstances the number of lymphocytes in a field of 450 diameters, in a film made after centrifuging 5 c.cm. of the cerebro-spinal fluid for a period of ten minutes, is usually two or three. In tabes and general paralysis of the insane the number is greatly increased. In several of Dr. Bramwell's cases which I have examined during the past six months the number has been from 200 to 250. Dr. Purves Stuart states that he has observed 450 in a field. In the following case the enormous number of 3,450 was counted in a single field of 450 diameters; in places where the film was thick this number was greatly exceeded, but, owing to the thickness of the clumps, the

him you get the impression that you are dealing with a person of rather childish intellect. Sometimes he is timid, at other times suspicious and morose.

There are no abnormal sensations (paraesthesiae) and no objective disturbances of sensation, except that the patient is rather less sensitive to pain than the average man.

The gait is normal; there is no Rombergism and no paralysis. In the muscles of the legs, and to a lesser extent in those of the arms and trunk, there is a curious fibrillary tremor. When the patient holds out the hand there is a slight tremor. There is marked tremor of the lips, tongue, facial muscles, and eyelids.

The tremor of the eyelids is very marked when the eyes are tightly shut. There is no ocular paralysis and no definite nystagmus, though the eyes are jerky when the patient tries to fix a near object. The pupils are equal, each measuring 4 mm. in diameter; the left pupil is very slightly irregular in out-

line; both pupils contract to light and on convergence. The optic discs are normal.

The articulation is much affected, slurring and indistinct, and is accompanied by inco-ordinate movements and tremors of the lips and tongue. "Hippopotamus" and other test sentences are pronounced in the characteristic G.P.I. fashion.

All the deep reflexes are distinctly exaggerated. The plantar reflex shows active flexion; the abdominal and cremasteric reflexes are present. The organic reflexes (bladder and rectum) are normal. There are no signs of disease in the other systems or organs.

Lumbar Puncture.

An examination of the cerebro-spinal fluid revealed some very interesting facts. The fluid came out under distinct pressure; it was very slightly turbid; this turbidity was not due to the admixture of blood; it was alkaline in reaction, and had a specific gravity of 1001.

After centrifuging 5 c.cm. of the fluid for ten minutes, decanting and examining the deposit, it was found that the film presented an extraordinary appearance. Here and there the leucocytes were collected in great masses several layers thick; between these masses they were more sparsely distributed (Fig. 1). In places where the distribution was fairly uniform there were, under a magnification of 450 diameters, about 3,400 leucocytes to the field (Fig. 2).

In a fresh specimen of the fluid which had not been centrifuged, there were on an average 285 leucocytes per c.mm.

In the dense parts of the film all the leucocytes appeared to be lymphocytes, but in the thinner parts it was found that polymorphs were present in the proportion of 1 to 5. The lymphocytes varied considerably in size, the great majority being small.

Chemical examination showed that the fluid contained a large amount of albumen.

A lumbar puncture was made on several different occasions and the results verified by Dr. Edwin Bramwell, Dr. Ford Robertson, and Dr. W. T. Ritchie. Dr. Ford Robertson and Dr. Ritchie made bacteriological examinations of the fluid, with negative results.

ANAESTHETICS IN GENERAL PRACTICE.

By H. BELLAMY GARDNER, M.R.C.S., L.R.C.P.LOND.,
FORMERLY INSTRUCTOR IN ANAESTHETICS AT CHARING CROSS
HOSPITAL, ETC.

It is my intention in this paper to recount some of the details which procure success in the administration of anaesthetics in general practice. It would not be wise to refrain from the preliminary remark that safe anaesthesia cannot be conducted without actual personal practice on the part of the administrator, for the larger his experience of its difficulties the greater becomes his facility in preventing their onset, and in correcting untoward symptoms when they have arisen.

There are two main principles by which the administrator must be guided in his care of an unconscious patient: (1) To retain a weakly active corneal reflex, and (2) to keep the airways clear.

1. The Corneal Reflex.

The most sensitive spot on the eye is the centre of the cornea opposite the pupil. This is protected from injury in daily life by the smart closure of the upper eyelid on contact with a foreign body. When a patient is unconscious the muscular reflexes are gradually lost in a definite order as narcosis deepens, but the sensitiveness of the centre of the cornea does not disappear until last of all, and this happens *before* the respiratory and cardiac centres are themselves invaded.

I cannot lay it down too emphatically as an invariable law that it is impossible under any known conditions for the respiratory centre or the cardiac centre to be poisoned by chloroform or ether whilst the upper eyelid still closes when the centre of the cornea is touched by the finger.

This sign, therefore, furnishes an absolute guide to safety, in that, if by careful frequent testing of both corneae a condition of weakly active reflex closure of the upper eyelid is always retained, any complications which occur cannot be due to central poisoning of the respiratory or cardiac nervous mechanisms. An extraordinary fact connected with this simple procedure is that so very few know how to do it. The administrator stands behind the patient, and uses only one finger with which to raise the upper eyelid and touch the cornea. That is, he should insert the pulp of his middle finger between the palpebral edges, drawing the upper eyelid upwards and at the same time brushing that finger pulp lightly against the centre of the cornea. When he has arrived at the upper limit of

the pupil he should let go altogether, noting both by the senses of touch and sight the degree of briskness with which that upper eyelid closes.

The frequent mistake which is made verges on the ludicrous, for the eyelid is held open with one finger so that it cannot move at all, and then the cornea is rubbed with another finger whilst the observer gazes doubtfully at the inert ocular globe.

An improperly-elicited corneal reflex is not only useless but dangerously misleading. The sclerotic portion of the eyeball is weak in tactile sensibility, and is useless as a guide in surgical anaesthesia. The lower eyelid in man does not and is not intended by Nature to cover the cornea, and corneal contact has practically no effect upon it in the unconscious state. There is only one proviso with regard to this sign, which is that when a definite difference exists in the activity of the two upper eyelids, we must be guided by the more active. Working on this principle, on account of the fact that a large pupil is found both in the second and fourth stages of anaesthesia, which can only be differentiated by reference to the activity of the corneal reflex, pupillary signs may be neglected altogether. A progressive dose of chloroform or ether having been given until the upper eyelid is weakly active in response to corneal contact, this condition can be exactly retained throughout by stopping the anaesthetic for a few breaths to quicken its activity, or giving more anaesthetic to weaken it as required.

Put in another way, the addition of more anaesthetic by the administrator should always be a guarantee to the surgeon and onlookers that the patient has at that moment a demonstrable corneal reflex.

2. To Keep the Airways Clear.

It is necessary to know by the sound of the breathing when they are clear. There is, of course, a distinct difference between the sounds of inspiration and expiration; but this is only known instinctively after careful practice. The rule in anaesthesia is that every expiration must be either heard or felt by the administrator in order to make sure that efficient breathing is going on. It is of no use to see the abdominal and thoracic movements, for they may proceed for a considerable time after obstruction to air entry has taken place. Fifteen years' experience has taught me that unrecognized obstruction to air entry is the main factor of danger and death in anaesthesia, that dosage regulated by the corneal reflex is rapidly learnt and easily adjusted; but that elimination of asphyxial factors in all cases is the avocation of an artist and the study of a lifetime. The successful elimination of the numerous possible asphyxial factors as they arise depends upon their immediate detection, causal differentiation and application of the proper remedial measure without hesitation. So subtle in their action are some of these factors that the clinical effect first noticed is often only a secondary syncopal result upon the heart and circulation, when the general condition is graver than it ought to have been allowed to become.

Dusky lips and ears is a sign that air is not entering the lungs in adequate amount, and is due to this absence of air-intake, not to ether or chloroform *per se*. Here we have a definite physical sign, and the man who guides himself by the sound of breathing, putting in a small mouth prop, raising the jaw or drawing the tongue forward directly the sound of breathing through clear airways is replaced by that of partially obstructed respiration, prevents the onset of dusky lips and its consequent additional dangers.

I venture to assume that the operations for which anaesthesia is most frequently required in general practice, with the exception of dental extractions, are those undertaken by general practitioners themselves, and do not include those for which a surgeon has been engaged.

Dental Extractions.

In the employment of nitrous oxide gas for dental extractions, practice is especially required, not because of danger of giving an overdose, but on account of the extremely short anaesthesia which results from its administration.

Attention to a number of small details which greatly assist the dentist in his work is the only means of ensuring a painless operation under its influence. We