Lard, ~~coated~~ lard, and numerous ointments with a paraffin basis have been used for this first purpose, and so also have carbolic and lead lotion, boracic and starch powder, and a host of other soothing applications. Each and all of them have met with a certain measure of success, but none of them appears to affect the course of the disease. It is well known that an attack of erysipelas usually runs a course of about six or seven days, though recrudescences and recurrences are common. There must be evidence that a local application, before it is accepted as being of any real value, has caused a rapid subsidence of the rash, and this will most often coincide with a fall of temperature. It is clinically impossible to recognize afebrile attacks of spreading erythema as being true erysipelas.

The applications of which I have had recent experience are a concentrated watery solution of magnesium sulphate, glycerin, glycerin and ichthylol, picric acid in methylated spirit, iodine in rectified spirit, and an aqueous solution of brilliant green. The first used to be a very fashionable remedy, but it gives little comfort to the patient, and I have never observed that it definitely influenced the progress of the disease. Glycerin itself, and a solution of ichthylol in glycerin, are perhaps more comforting, but I have no faith in their limiting power. Picric acid, iodine, and brilliant green I have tried in parallel cases of about the same degree of virulence, and my house-surgeons, as well as the nurses in charge of the cases, have all pronounced in favour of the last-named. The total number of cases is about 40, and we have not arrived at any conclusions as to the utility of any one remedy until at least 6 cases have been submitted to a trial of its powers. On several occasions, disappointed with the results of iodine or picric acid treatment, we have employed brilliant green with happier results, fully conscious that the time factor may have played an important part. Further, cases treated with brilliant green are the only ones where dramatic disappearance of both rash and fever as early as the second or third day of the disease has been observed.

These substances have been employed because they are well known as skin disinfectants, and they all possess undoubted power of penetration through healthy skin. How far they can penetrate skin which is in a state of inflammation is not known, but in the case of healthy skin Professor Dudgeon has kindly prepared sections from portions removed within two hours of the application of all these three substances, and has demonstrated to me the granules deposited among the deeper cells of the Malpighian layer. They appear to be more numerous in the case of brilliant green than with either picric acid or iodine, but, as the sections were unstained, it may be that these granules are more readily seen.

Tincture of iodine has been used in France for the treatment of erysipelas, and Basset and Lechelle² considered it superior to any other topical application. Their cases were only five in number and were all limb infections secondary to war wounds.

I do not know whether other surgeons have made use of brilliant green in this connexion, and I claim only to record a confirmed clinical impression as to its usefulness. To present scientific data is almost impossible since so much depends upon the stage of the infection when the patient first comes under treatment. Anything which is applied about the sixth or seventh day is likely to appear successful, for at this period the fever usually subsides and the rash ceases to spread or begins to fade. Nevertheless, since my observations have been fairly numerous and the cases have not been selected in any way, I have no hesitation in recommending this simple method of local treatment in erysipelas. I may add that in a dozen cases so treated the average time for subsidence of the attack was just over five days. There has been no mortality in the whole series, but I must admit that recrudescence occurred in two cases, once on the tenth and once on the twelfth day.

The obvious objection to the use of brilliant green is that it stains whatever it comes in contact with, whether it be the skin of the patient, the hands of the nurse, or the bedclothes. It may, then, be urged that this is treated by camouflage, and that we really substitute a green skin for a red one. The fact that the patients, both women and men, like it even when applied to the face, and that the nurses have quite withdrawn their original objections

to it, go far to answer these arguments, and, as far as I am aware, brilliant green possesses no toxic properties. Both iodine and picric acid are open to objection on this ground.

Our method has been to paint the affected area with a 5 per cent. aqueous solution once a day in mild cases and twice a day in severe ones. No dressing has been applied except a piece of lint on some parts of the body to prevent staining of the bedclothes. When the eruption has subsided the discoloration can be removed in three or four days by vigorous washing, preferably with ether soap. Possibly it would be wise to apply the solution over rather a wider area than that actually involved—for, say, an inch outside the advancing edge—but so far we have not done this.

I am indebted to the sister and nurses of our isolation wards, as well as to my recent house-surgeons, Messrs. Foss, Macdonald, Ryan, and Higgins, for their co-operation in testing the value of this treatment, and I may add that their opinion coincides entirely with mine.

REFERENCES.

¹ *Lancet*, October, 1909. ² *Bull. et Mém. Soc. de Chir. de Paris*, 1918, xliv, 1408.

ON INTRAVENOUS PROTEIN THERAPY IN EPILEPSY.

BY

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THE good results which have followed the injection of foreign proteins into the blood stream in haemophilia, purpura, paroxysmal haemoglobinuria, intestinal haemorrhages, streptococcal septicaemia, asthma, and multiple arthritis of various kinds—that is, in a number of diseases which have no common etiological or pathological factors—suggested that possibly it might be used with good effect in yet other diseases.

The following results have been obtained in a series of twenty-three cases of epilepsy. Ten of these were treated at the Bristol Royal Infirmary, and thirteen at the Stoke Park Colony for mental defectives, by the kind permission of Dr. McMath, the medical attendant.

A 5 per cent. solution of Armour's peptone ("powdered," formerly called No. 2) was used, made up according to the prescription of Auld.* It was injected into a vein at the elbow once a week. The initial dose was 5 m. In succeeding weeks 7 m, 10 m, 15 m, and 20 m were given, unless toxic symptoms occurred. No dose greater than 20 m was injected. If a fortnight went by without the occurrence of a fit, the dose was not further increased. If no results were obtained after three doses of 20 m the treatment was given up. In four cases toxic symptoms were observed—rigor, vomiting, temporary pyrexia—either as an isolated phenomenon, or in any combination. If this happened the next dose was lessened. In such cases it was found that the dose could be subsequently increased to the old figure or even beyond without the occurrence of any untoward symptoms.

In three cases of post-hemiplegic epilepsy no improvement occurred.

In eleven cases of epilepsy without signs of any gross cerebral lesion no permanent arrest was produced. In four of these the fits ceased but subsequently recurred, though in lessened severity, and in two cases the frequency was lessened. The average age of the patients was 18 years, the average duration of the disease ten years, and the average frequency of fits once a week.

In nine cases of epilepsy without physical signs of any gross cerebral lesion the fits ceased. This arrest has now lasted more than a month in all cases, and in some as long as three months. Five of the patients were mentally defective—in one of these no mental improvement occurred, in three some improvement, and in one considerable improvement. The average number of injections given was 5½. The average age of the nine patients was

* That is, dissolve the peptone in three-fourths of the required volume of normal saline solution, shaking and warming to 37° C. Add 1 c.cm. of a 2 per cent. solution of sodium carbonate for each 5 grains of peptone present. Make up volume by adding more normal saline. Add phenol, so that its percentage in the solution is 0.25.

18 years, the average duration of the disease was ten years, and the average frequency of the fits rather more than one a week.

As can be seen, no distinction could be drawn between those cases in which arrest of the fits occurred and those in which it did not, either in the age at which the fits began or in their frequency.

It appears, therefore, that of 20 cases of epilepsy, of *haut mal* type, the intravenous administration of a peptone solution caused arrest of the fits in 9 and diminution of their frequency in a further 6.

No certain deductions can be made from such small numbers, but the results are sufficiently good to lead to the suggestion that this treatment might be tried in other cases. Both the nature of epilepsy and the mode of action of a "peptone" solution are so obscure that it would not be profitable to discuss how this arrest of epileptic fits was brought about. But though epilepsy does not cause many deaths, it does cause so much disability that any new method of treatment which promises well deserves a further trial.

EIGHTY-EIGHTH ANNUAL MEETING

OF THE

British Medical Association.

Held at Cambridge, June 30th to July 2nd.

SECTION OF NEUROLOGY AND PSYCHIATRY.

DEMONSTRATIONS.

THE PATHOLOGY OF DEMENTIA PRAECOX.

BY

SIR FREDERICK MOTT, K.B.E., M.D., LL.D., F.R.S.

FOR some years past I have been interested in the pathology of dementia praecox. First I investigated the reproductive organs, and I have already published in recent numbers of the *BRITISH MEDICAL JOURNAL* a paper on the investigation of the testes in 100 cases of deaths in hospitals and asylums at all ages from birth to 80 years and over. In this paper I have shown that in a large proportion of the cases of dementia praecox there is a complete arrest of spermatogenesis, and in all cases a more or less regressive atrophy is shown, the degree of change as a general rule depending upon the age at which the mental symptoms first were manifested, and the time elapsing between the onset and death. In some cases in which the clinical history showed that mental symptoms had occurred in the prepuberal or puberal periods spermatogenesis may never have occurred. Now, in spermatogenesis we have a most active nuclear proliferation going on continually, and the histological evidence shows that the nucleic acid, which is the principal substance of the nuclear matter, is formed from a phosphorized lipid contained especially in the cells of Sertoli.

The head of the spermatozoon consists of a protamin nucleinate, and the tails, which are formed in these nurse cells of Sertoli, consist almost entirely of lecithin and cholesterol. I will not go into further details on this point, but I should like to point out that where active spermatogenesis is going on, there we find abundance of the lipid granules; the same regions which show the existence of these lipid granules also show the oxidase reaction. By this I mean that these granules play an important part in the chemical processes connected with the function of spermatogenesis. The oxygen on the surface of the lipid granules is molecular oxygen, but in order to become nascent (chemically active oxygen) the molecule of O_2 must be converted into atomic oxygen, and this is effected by the catalytic action of the iron contained in the nuclei of the spermatogenic cells. A continued process of decomposition and recombination, in which oxygen plays an important part in building up the fresh nuclear matter, takes place.

*Nucleic acid, which forms the main constituent of the heads of the spermatozoa (as was shown by Miescher and Kossel's experiments), contains a large amount of organic phosphorus, iron, and calcium. All nuclei contain these three important elements in addition to the elements of a protein. The arrest of spermatogenesis may, then, be due

to a failure of one or more of these elements in the circulating blood; or it may be due to an inherent biochemical lack of durability of the germ plasma.

The reason why I have given this short account of the failure of nuclear matter in the reproductive organs in dementia praecox—for it occurs in the ovaries as well as in the testes—is that the essential histological morbid change in the nervous elements of dementia praecox, as Nissl and Alzheimer pointed out long ago, is one of nuclear decay.

Nature is unmindful of the individual, mindful only of the species, for the body is only a vehicle for the germ plasma. During fetal life the hormone of the sex determinant cells is active in establishing sex characters; after birth till puberty all the productive vital energy is concentrated on the somatic cells to build up a body capable of fulfilling Nature's supreme biological end—reproduction. I showed that the interstitial cells forming a well-marked gland in the testes at birth in a few months shrink and become quiescent functionally; the spermatid tubules at three months have grown to twice the size of those at birth, and no further change of importance takes place till puberty, when the interstitial cells reappear and are filled with lipid substance, and active spermatogenesis begins. Simultaneously with this concentration of productive energy on reproduction, the sexual hormone passes into the blood and produces the secondary sexual characters; at the same time it effects a complete mental revolution. At first there is a vague, ill-defined longing, and this develops sooner or later into an all-prevailing desire, arousing new sentiments, passion, and behaviour, with many biological characteristics peculiar to each sex. The critical periods of life as regards mental disease are adolescence and the climacteric periods of life, when the sexual function matures and wanes. This affords *a priori* evidence of the important relation between the sexual functions and diseases of the mind. The question naturally arises, Is the regressive atrophy of the reproductive organs the cause of the mental changes: (a) by its disturbing influence on the whole endocrine system of glands; (b) by the suppression of the normal sexual impulse, the great source of psychic energy; or (c) does the regressive atrophy of the testes and the neuronic functional decay indicate a germinal lack of durability of the two most important structures of the body?

The changes in the nervous system are unlike those of organic dementia—for example, dementia paralytica; there is no naked-eye wasting; there are no evidences of chronic inflammatory changes; the fibre systems are but slightly wasted. The changes* in the neurones are of two kinds: (1) those indicative of suppression of function—namely, swelling of the nucleus and biochemical changes in it, vacuolation, disappearance of the Nissl granules, and even destruction of the cytoplasm and its dendritic processes, without destruction of the axon; (2) those indicating hypofunction—namely, accumulation of lipid granules in the cells of the cortex and basal ganglia and other structures of the central nervous system to an extent and degree exceeding by far physiological limits, for the same appearances may be found in old age, although the changes affect only scattered cells. The existence of these lipid granules can be easily demonstrated by staining with Sudan 3 or Nile blue. All neural processes, and therefore all psychic processes, are dependent upon physiological processes—namely, oxidation processes which take place at the synapse in the grey matter, and, as in the testes, upon oxidase granules. These granules are found upon all the dendrites and body of the cell, but not upon the axon. They are especially abundant in the layers of the plexiform cells (second type of Golgi) which form the synaptic junctions of the cells of the first type, where the molecular oxygen is converted into active nascent atomic oxygen by the catalytic action of the phosphorus and iron of the nucleus. A progressive failure of function of the nucleus to build up new nuclear matter is the essential morbid change in the testis; similarly a progressive failure in the formation of the nuclear substance in neuronic systems may be postulated as the cause of suspension or suppression of neural function by a consequent failure in the oxidation processes essential for neural activity.

Sir Frederick Mott gave a demonstration by means of the epidiascope and microscopes to illustrate the changes in the testis and the various structures of the nervous system—namely, various regions of the cortex, the basal ganglia, pons, medulla, and inferior cervical ganglion. A case of monorchidism in a patient suffering with dementia praecox, with marked diminution in size of the adrenal

* A full account, with coloured illustrations, appeared in the June number of the *Proceedings of the Royal Society of Medicine, Psychiatric Section*.