a water-bath to a small volume. On standing, hard white crystals separated out and were found to melt at 98° C.

Inactive arabinose is made up of equal parts of the dextro-rotatory and laevo-rotatory varieties, and although the difference in its optical activity and the rotatory powers, melting points, and solubilities of its derivatives are sufficient to distinguish it from these two sugars, the actual separation of its constituents furnishes the most conclusive proof of its composition. We therefore attempted to effect this, and were successful in isolating the laevo-rotatory sugar from one specimen and the dextro-rotatory sugar from another. The recovery of both from one sample was impossible owing to the small amount of material available.

Separation of Laevo-rotatory and Dextro-rotatory Sugar.

In order to obtain the laevo-rotatory sugar 1 gram of the α -arabonolactone, prepared as described above, was dissolved in water and mixed with a saturated solution of brucine, cooled, and the brucine salt filtered off. This was suspended in water, shaken with barium hydrate, filtered, and the filtrate extracted five times with ether to remove the excess of brucine. The watery solution was then decomposed with carbon dioxide and the resulting barium carbonate filtered off. The solution, which was now found to be dextro-rotatory, was evaporated on a water-bath, and the lactone which separated out was recrystallized from alcohol. It was found to have a melting point of 95° C. On being dissolved in water and treated with sodium amalgam the lactone gave a sugar which yielded a phenylosazone with a melting point of 160° C., and 0.2 gram dissolved in pyridine-alcohol showed a specific rotation of $+1.10^\circ$, proving that the sugar was l-arabinose.

The dextro-rotatory moiety of the sugar was separated from another sample as follows: One gram of the purified sugar, prepared as before, was mixed with 1 gram of sodium acetate and 1 gram of l-methyl-hydrazine and heated in a water-bath for two hours. On cooling, the product which separated out was recrystallized from alcohol, and found to have a melting point of 131° C., corresponding to d-arabinose-l-methylhydrazone. From this the free sugar was separated by the action of formaldehyde. On preparing the phenylosazone it was found to have a melting point of 160° C., and 0.2 gram dissolved in pyridine-alcohol had a specific rotation of -1.1° , corresponding to d-arabinose.

The source of origin of the inactive arabinose found in the urine in essential pentosuria has been the subject of much debate and many experiments. That it is not derived from the carbohydrates of the food is shown by the fact that their complete withdrawal has no influence on the excretion of the sugar in the urine. There is some evidence that it may be related to the proteins in the diet, however, for Klercher² found that the output varied considerably during the day and that there was a certain parallelism between the amount excreted and the total nitrogen content of the urine. Klercher and Janeway³ also observed a diminished excretion on a purin-free and milk diet. Neuberg⁴ has advanced the hypothesis that the parent substance may be galactose, and in support of this are the observations of Tintemann⁵ and Klercher that a slight increase in the amount of pentose in the urine followed the administration of galactose or lactose, especially in the first few hours after the sugar was taken. Bial and Blumenthal, on the other hand, failed to find any such increase. We had the opportunity of carrying out a number of experiments bearing on this question on one of our patients who went into a nursing home for observation. In this case the administration of lactose on two occasions, once alone and later along with oatmeal porridge, milk, bread, and coffee, had no effect on the amount of arabinose appearing in the urine, even in the hours immediately succeeding the meal. When all carbohydrate food was withdrawn the excretion of the pentose was practically unchanged, but as the protein was diminished the output of pentose fell from 3.2 grams to 0.5 gram daily, and then gradually rose again to its former level as the protein intake was increased.

It is noteworthy that the urine of all our cases of pentosuria contained an excess of urobilin and showed a high excretion of amino-acid nitrogen, a combination which we have come to regard as indicative of defective functioning of the liver; moreover, in the case where continuous observation was possible, we found that the output of arabinose varied with the amount of urobilin and the quantity of amino-acid nitrogen excreted. We have also noticed that alimentary pentosuria has been associated with an excess of urobilin and a high amino-acid nitrogen in the urine. We are therefore inclined to conclude that pentosuria is dependent upon defects in the functional

activity of the liver. In some cases it is probably due to a congenital, or possibly an acquired, abnormality, which results in the imperfect metabolism of a pentose of protein origin, thus giving rise to essential pentosuria, while in others it is merely an inability to destroy the pentose derived from foods containing it, with the result that alimentary pentosuria follows their use.

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A NOTE ON THE TREATMENT OF CUTANEOUS ERYSIPELAS WITH BRILLIANT GREEN.

BY

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ERYSIPELAS is a disease to which little attention is paid in these days, though formerly it used to be regarded with respect and even dread. Probably there are few diseases which have been treated in so many different ways or with so many different topical applications. During the war, when streptococcal infections of wounds were prevalent, it was not a very infrequent complication, but the prognosis rarely gave rise to anxiety, and isolation of erysipelas cases is not now regarded as essential for the well-being of other patients in the wards. The reason is not far to seek. To be logical all streptococcal infections should be segregated, and the fact that the infection has reached the superficial layers of the skin, and is therefore more apparent to the eye, is not a sufficient argument in favour of isolation. Furthermore, it is well known that, except at the extreme age periods of life, erysipelas is not a dangerous disease, and in previously healthy patients the mortality is very low. These patients may be very ill for a time, and the rash may spread almost all over the body, but with intelligent treatment and good nursing the outlook is almost always favourable, even when the lesion originates in connexion with a serious wound. With the abolition of sepsis in clean surgical wounds erysipelas has retired to a place of little importance. Cases, however, are still admitted to hospital in fair numbers, and at St. Thomas's they are taken into the isolation block reserved for obviously septic cases. During the last eighteen months I have been in charge of these beds in the hospital, and therefore I have had the opportunity of observing many examples of this disease and of comparing the relative merits of a large number of topical applications. It has enabled me to come to conclusions as to whether topical applications are of real value, and also which of the many in use may be relied upon to limit the disease and to ease the patient's distress.

In 1909 I published, in conjunction with Dr. P. N. Panton, some observations on erysipelas and allied infections,¹ in which we emphasized the facts that erysipelas is usually a streptococcal inflammation of the epidermis, but that the streptococci are of many different strains. From this, and by subsequent clinical observations, it is realized why the treatment of this condition by stock serums and vaccines is not conspicuously successful. Otherwise it would appear that such treatment ought to be efficacious. I have since been keenly on the look-out for any evidence that topical applications really influence the disease. It was at one time held that the extension of the rash in the skin could be limited by incisions outside the affected zone, by scarification, or painting a ring of silver nitrate around it, but these methods have all been abandoned owing to their lack of success. In some cases, at any rate, there is a coincident streptococcal lymphangitis, and this may account for failure. Perhaps such examples should be termed phlegmonous, or cellulocutaneous erysipelas, but anyhow these cases are difficult to separate from the purely cutaneous ones.

A whole legion of topical applications has been employed in the treatment of this disease; they have been used for two purposes—namely, to give comfort to the patient, and to limit the spread of the infection. The first is undoubtedly of importance since in some cases there is intolerable itching which disturbs the patient's rest, but the second is the supreme test of all local treatment.

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.

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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.c. 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.