trifle. Surely the sale of poisonous matches should be prohibited, especially when non-poisonous ones are so cheap.

PATHOLOGICAL REPORT BY DR. MIDDLEMASS.

The pathological appearances presented by the various organs in the above case, both to the naked eye and under the microscope, were very characteristic. Naturally, the morbid changes in the brain were those to which most attention was paid, seeing that the nervous symptoms were so prominent and interesting. The existence of previous mental disease, of course, makes it more difficult to decide what the exact changes produced by the poison were. Unfortunately, we are not yet in a position to say exactly what morbid appearances accompany every form of mental disease; and that from which the patient suffered (slight melancholia) is not one to which a distinct pathology can be attached. Nevertheless, it seems possible to differentiate the changes due to the phosphorus from those already existent, and causing the mental disease.

In addition to the brain, most of the important organs were made the subject of examination, and the results are given.

The skin and conjunctiva had a decidedly icteric tinge. In the various cavities of the abdomen, pleura, and pericardium there was a small quantity of slightly blood-stained fluid. In the cavities of the dura and arachnoid there was about $\frac{1}{2}$ ounce of clear fluid. On reflecting the dura mater there was discovered a recent hæmorrhage from one of the pial vessels on the left side. It was quite thin, forming a layer of less than an eighth of an inch in thickness, and quite recent, situated towards the vertex, and extending from the top of the fissure of Rolando backwards nearly to the parieto-occipital fissure, and downwards to about an inch above the fissure of Sylvius. It was slightly adherent to the dura, and the greater part was lifted off along with the latter when it was reflected. It did not pass down the falx at all. There was another similar, but much smaller, hæmorrhage about the size of a shilling over the middle of the occipital region. The sinuses of the dura mater contained large well formed *post-mortem* clots.

The encephalon weighed 53½ ounces, and the convolutions were numerous and well formed. The pial veins were very considerably engorged. The pia was not at all adherent to the cortex, and was separated from it by fluid to a noticeable extent only over the right superior parietal convolution, where there was some degree of local atrophy. There was no apparent atrophy of the convolutions at any other part. On section of the brain, the grey matter was seen to possess a distinct rose pink colour, and appeared very congested, many of the individual vessels being quite distinct to the naked eye. Its consistence was firm and it was not apparently atrophied. The white matter seemed fairly healthy, except that the puncta cruenta were more than usually prominent. The lateral ventricles were not dilated and the ependyma was healthy, there being an absence of thickening and of granulations. Like the grey matter of the cortex, the basal ganglia were of a rosy pink colour and congested appearance, the vessels being prominent. In the cerebellum, pons, and medulla there was a similar condition of things.

It was in the microscopic appearance of fresh sections of the cortex that the most interesting changes were seen. Those stained with osmic acid and picrocarmine showed very distinctly the presence of fatty particles in the walls of the larger capillaries. In only one or two instances was this change seen in the smallest capillary loops which pass to the individual nerve cells. In the larger nerve cells there could also be made out many darkly-stained fatty granules, and in some cases these were so numerous that the cell appeared like a black granular mass embedded in the neuroglia, without any definite structure. Where the fatty change had not been so pronounced the nucleus was well seen, and in nearly all of these several small, round, black points were visible, showing that the fatty change had taken place in the nucleus as well as the cell protoplasm. These appearances were corroborated in sections stained with aniline blue-black. In these the fatty particles in the nuclei appeared light, in contrast with the remaining darkly stained portions, and in the cell protoplasm the evidence of fatty degeneration could also be made out, though not so easily, as the fatty granules, slightly tinged by the osmic acid used in fixing the sections, presented an appearance not differing greatly from the par-

ticles of pigment in the cell. The changes in the nerve cells were most pronounced in those of the fourth layer.

This fatty change in the walls of the small vessels and in the nerve cells was almost certainly produced by the phosphorus which had been taken, as the extent to which it had occurred was quite exceptional, no other case that I have examined showing to the same marked degree. It is, moreover, quite in accordance with what one would expect, after examining the changes produced by it in the liver and other organs. The power of phosphorus to produce fatty degeneration in nerve-cells has lately been denied,¹ but this case seems conclusively to show that the nervous system does not escape the action which we know is capable of being produced by that poison in other organs. There were also evidences of slight pigmentary degeneration of the nerve cells, and deposit of pigment in the perivascular spaces, as well as slight increase in the nuclei of the neuroglia. From what we know, however, it is more than probable that these changes were present before the phosphorus was taken, and were the pathological correlatives of the mental disease from which the patient suffered.

The right lung showed numerous small subpleural petechial hæmorrhages between the middle and lower lobes, while on the left these were absent. The lung tissue was slightly congested and the bronchi inflamed, otherwise they appeared normal. On the heart there were a few subepicardial hæmorrhages at the apex of the left ventricle posteriorly, and also at the junction of the auricles and ventricles. There were well-formed large *post-mortem* clots in all the cavities. The aortic valve was slightly thickened and incompetent. The muscle was pale and soft, and had a greasy feeling. Under the microscope very well-marked fatty degeneration of the muscular fibres was seen to have occurred.

The liver weighed 52 ounces, and was of a very pale canary yellow colour, mottled with petechiæ on the surface. On section there were also numerous small hæmorrhages scattered all through the liver tissue. Under the microscope these hæmorrhages were found to be situated chiefly in the portal spaces and amongst the neighbouring liver cells. The liver cells were almost entirely replaced by fatty matter, and the nuclei could be made out only with difficulty, in many cells not at all. A section treated with ether showed very little of the cell protoplasm left. There was a considerable increase in the connective tissue corpuscles in the portal spaces, evidencing an inflammatory condition.

The kidneys were slightly enlarged, and appeared pale in colour. The vessels were somewhat congested, and the tubules evidently fatty. Under the microscope this was seen to be the case, all the cells containing small fatty granules.

The spleen weighed 3 ounces, and was softish, and of a uniformly dark colour on section. No definite changes beyond some congestion could be made out.

The stomach contained 16 ounces of dark brown fluid, which had no special odour. The mucous membrane was very pale, and at the cardiac end there were a few submucous hæmorrhages. The cells of the peptic glands were fatty, and there were evidences of an acute inflammatory process with rupture of some of the smaller blood vessels and escape of the corpuscles. There were numerous subperitoneal petechiæ scattered over the mesentery with fatty degeneration of the cells in the walls of the vessels.

The pathological interest of this case lies in the changes in the nerve cells of the cortex which have been described. The production of fatty degeneration in them shows that the tissues of the nervous system are not exempt from the powerful action in this direction which phosphorus possesses. The occurrence of the change in so many organs and tissues of the body would point to some fundamental alteration in the processes of metabolism which phosphorus has the power of bringing about. What this really consists in, however, we can as yet only conjecture.

REMARKS ON THE DIAGNOSIS AND TREATMENT OF THE INFECTIVE FORMS OF ECZEMA.²

By ALFRED EDDOWES, M.D. EDIN.,
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I ACCEPT almost without reservation the definition of eczema adopted by Dr. Unna, which is that "eczema is a chronic parasitic catarrh of the skin, with desquamation, itching, and a tendency to respond to irritation by exudation and well-marked inflammation." In the present state of our knowledge it is impossible to divide eczema into varieties with anything like scientific precision; but, thanks to Dr. Unna, we seem at last to have made a commencement in that direction.

Eczema Seborrhæicum.—Under this title a number of diseased conditions which were formerly variously named and

¹ Trzebinski: *Arch. f. path. Anat. u. Phys. u. f. klin. Med.*, Bd. cvii, H. 1.

² Read at a meeting of the Shropshire and Mid-Wales Branch.

looked upon as distinct diseases have been brought together, and shown to be due to one and the same cause. I will as shortly as possible detail the main characteristics of the affection.

It generally commences almost imperceptibly—as a scurfy condition (a seborrhoea) of the scalp. It may remain for an indefinite period in this condition, or it may assume a moist character, spreading to the ears, forehead, and cheeks. From these parts it may spread to the shoulders and arms, particularly their outer aspects, and to the backs of the hands; or it may affect the hands and face without having spread down the arms. The front of the chest and the back between the shoulder-blades form paths by which the eczema spreads to the waist, to extend sooner or later to the genitals and lower extremities. It may spread over the whole body, although it flourishes best, so to speak, over those parts most richly supplied with sebaceous glands. The secretion is more or less greasy. On the chest and back the eruption is most typical, and consists of patches which, if not congested, exhibit a yellowish tint, and are more or less distinctly bounded by a curved continuous margin, which is slightly raised, red, and covered by scales or crusts. If a portion of crust be removed from a well-marked case, it will be found to be thick, yellow, friable and greasy.

In any case of universal eczema it would be impossible to establish a definite diagnosis without a knowledge of the course which seborrhoeic eczema naturally takes, because the peculiar configuration of the patches or circles as well as the fatty crusts are then absent. On the scalp, active patches may at first sight be mistaken for ringworm, particularly while spreading from the margin of the scalp to the forehead. The absence of short stumps and crooked hairs, however, excludes ringworm.

The greatest difficulty arises from the occasional great similarity of seborrhoeic eczema to psoriasis. The points of difference are that the eczema extends from the head downwards, as already stated, while psoriasis spreads more rapidly, as a rule, to all parts of the body, showing itself specially on the elbows and knees. Itching is more marked in the eczema. If the dried exudation of the latter be removed, the skin underneath may exude, but it seldom bleeds.

It is a common practice to decide the question as to whether a given eruption be an eczema or psoriasis by examining the legs, and knees in particular. This is a mistake, because on the legs, from a variety of causes, eruptions lose their typical appearance. Efflorescences on the upper half of the body, especially on chest and back, are much more to be relied upon.

Eczema about the Mucous Orifices.—Under this heading may be included the tuberculous eczema of Unna, who has for many years taught that there is a true variety of eczema due to the presence of tubercle bacilli, an opinion strengthened by recent experience of the effects of injections of tuberculin. We are all aware how extremely common it is to find eczemas accompanying discharges from the various mucous orifices. If time had permitted I would gladly have treated this subject at length, especially as some interesting cases of infection of the skin arising from disease of the mucous membrane have recently attracted my attention.

Eczema from Scabies.—In rare instances it is not easy to establish the diagnosis of scabies. In all cases of difficulty special attention should be paid to the distribution of the rash. A good plan where the existence of a track is suspected is to place a little ink on the spot and then lightly wipe it off. In this way a track can frequently be very clearly made out.

Treatment of Eczema Seborrhoeicum.—Unna considers that sulphur and resorcin are specifics for this disease. They may be applied in various ways, separately or in combination, and in different strengths—gr. x to xxx or more to 3j—according to the position and inflammatory condition of the eruption. In bad cases affecting the scalp it is advisable to cut the hair short and thoroughly dress the head with ointments; the scalp should be freed occasionally from scales by washing with a solution of soft soap in spirit and water; and during the night at least an oilskin cap should be worn. It may be laid down as a general principle that it is useless to attempt to prevent returns of this disease on the body without curing the scalp, which is the usual starting point from which the

affection infects the rest of the body surface, being conveyed mainly by the agency of sweat. If the disease be slight on the scalp, some such lotion as the following will form a pleasant application and prove of great service: Resorcin, 30 to 60 grs.; glycerine, 10 to 20 minims; acet. cantharidis, 3iij; ol. amygdal., 3iv; eau de Cologne, 3j; sp. vin. rect. 3iij to v; aq., ad 3viij. Even when there is a slight itching and scarcely perceptible scaliness of the head the scalp should receive attention, especially as the insidious form of the disease, as a pityriasis, produces baldness. Warts are not uncommonly developed in connection with this eczema, and their treatment is essentially that of the eczema itself. After an apparent cure has been brought about, relapsing centres should be looked for and, if necessary, more energetically treated.

In bad cases of eczema of the eyelids ointment applied with the support of a bandage at night is specially to be recommended.

Ointments or other remedies can be applied to the ears and nostrils on lint or gauze wrapped round a short piece of rubber tubing or even a little roll of stiff paper, made to fit the orifices comfortably.

For eczema intertrigo powders are of great service and can be applied either rolled up in strips of gauze or in gauze bags and pads.

I have also seen powders give relief in pruritus ani when other favourite applications had failed.

In eczema affecting the legs the application of Unna's zinc gelatine with bandages is a method of treatment which deserves to be much more generally employed. It protects the skin from external irritation, and, being absorbent and capable of giving up moisture again quickly, is cool and comforting. It supports the veins and checks the spread of disease by infection along the surface. One immense advantage of this dressing is that it enables many patients to go on with their work who would otherwise be confined to their beds.

In eczema of the palms of the hands and soles of the feet it is sometimes necessary to remove much of the thick horny substance. In the chronic inflammatory conditions the usual method now employed is the application of Unna's salicylic acid plasters. In some of these cases I would recommend a trial of a bread poultice containing a few grains of acetate of lead or a small quantity of lead lotion.

In very acute cases, in which vesicles were present, I have made a practice of opening all prominent ones (after thoroughly disinfecting the surface of the skin) and after allowing the fluid to escape have as far as possible introduced lotions, pastes, or powders into the emptied cavities. So much relief has this method afforded the sufferers that they have requested me to continue the treatment and have assisted me in the search for fresh or previously overlooked vesicles. That this method of treatment should have occurred to me was only the natural result of the teachings of modern surgery and pathology.

When an eczema in children is widespread on the scalp or elsewhere and much inflamed, few dressings bring the surface of the skin sooner into a manageable condition and give greater relief than carron oil. This can be followed up by applications of zinc, bismuth, or mercury. To prevent scratching, Unna's zinc gelatine may be applied with bandages or the movements of the arms may be limited by the application of suitable splints. Of course attention should be paid to the condition of the gums, stomach, and bowels.

We may lay down certain principles applicable to the treatment of all forms of eczema. That all complications arising from internal sources of disturbance of the general health, such as gout, diabetes, syphilis, disorders of digestion, etc., as well as external complications, whether in the form of primary, secondary, or tertiary infections, such as impetigo, pustules, boils, ringworm, etc., should receive due attention. That a weeping surface should be dried. For the latter purpose a lead and spirit lotion, dabbed lightly upon the part, followed by dusting freely with a powder composed of oxide of zinc, starch, and a little boric acid may be used. The amount of spirits of wine in the lotion is regulated from time to time according to the sensitiveness of the skin. This application can be followed by pastes, and later by ointments. Pastes can be readily made by adding starch powder to

vaseline. A too dry and harsh condition of the skin requires grease; but few ointments keep well, and when rancid may aggravate an eczema greatly. An overstretched or infiltrated skin should be supported by careful bandaging, particularly on the legs. For this purpose I know of nothing more to be recommended than the gelatine dressing applied with gauze bandages.

Where large surfaces require the application of remedies, such remedies should be carefully selected and their effect watched on account of the danger which might arise from the absorption of poisonous drugs and from the idiosyncracies of certain skins.

UPON A NEW STYPTIC, AND UPON THE POSSIBILITY OF INCREASING THE COAGULABILITY OF THE BLOOD IN THE VESSELS IN CASES OF HÆMOPHILIA AND ANEURYSM AND INTERNAL HÆMORRHAGE.

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ONE of the most remarkable phenomena in the history of pathological and physiological science is the pause that frequently occurs between the discovery of a fact and its practical application. This divorce between knowledge and practice is in great part attributable to the fact that unfortunately physicians and surgeons are generally not practical physiologists, and still more unfortunately the physiologist is often not either a physician or a surgeon.

The history of the growth of the knowledge of the coagulation of the blood affords us with many instances of the truth of these remarks. If it had not been for such divorce between the knowledge of physiology and the knowledge of the requirements of practice, no doubt one of the first uses to which the discovery of fibrin ferment would have been put would have been its application as a styptic. I have, however, not come upon any evidence of its having been employed for such a purpose, and am therefore taking an opportunity here of suggesting such an application for it.

I have experimented somewhat extensively with a styptic of this nature and with a certain amount of success, but find that its coagulative properties can be greatly increased by availing ourselves of another fact in connection with the subject of coagulation, which has been for some considerable time in the possession of the physiologist. I refer to the influence which lime salts has been ascertained to exert upon the processes of coagulation (a fact the knowledge of which we owe among others to the researches of Hammarsten, Ringer, and Green) and also a fact to which particular attention has been recently directed by the brilliant discovery of Arthus and Pages, that the shed blood can be kept permanently liquid by converting the lime salts in the blood into insoluble exalates by the addition of small quantities of any of the soluble salts of oxalic acid. In connection with our present purpose we have, however, merely to note that the coagulation of the blood can be hastened by the addition of calcium salts.

It is a fibrin-ferment solution to which 1 per cent. of CaCl_2 has been added, which I would therefore suggest for employment as a styptic, and it is with such a styptic that I have conducted my experiments. It may, perhaps, here be remarked in passing that the action of a styptic of this nature differs quite essentially from the action of such styptics as tannic acid, alcohol, the salts of the heavy metals, or the actual cautery, inasmuch as all these hæmostatics exert their effect indiscriminately upon whatever tissues they are brought in contact with, and inasmuch as their action consists in a coagulating or disintegrating effect, which entails the formation of eschars or, at any rate, subsequent inflammation. Quite in contrast with the action of these is therefore the action of a physiological styptic like the one here proposed. Such a styptic exerts an elective influence on the blood and is perfectly inert when brought in contact

with other tissues, and is therefore perfectly painless in its action. Further, the coagulative influence which it exerts upon the blood probably takes place along the natural lines upon which normal blood coagulation occurs.

Experiments to determine the Efficacy of the Proposed Styptic.—With a styptic such as has been just described, I have, for instance, been able in the dog to cut across all the veins of the side of the head and neck with the exception of the common jugular, and to arrest the hæmorrhage by the application of the styptic without any ligatures. In a rabbit I found it possible to go even further. In an experiment directed to test the efficacy of the styptic I found it possible, by free application of the styptic, to cut across both common jugulars, both axillary veins, one lobe of the liver, and a number of mesenteric arteries without entailing the death of the animal from hæmorrhage. Further, in a large number of experiments in which I had occasion to cut across the central artery of the rabbit's ear in connection with a series of blood-corpuscle enumerations, I in every case succeeded in arresting the somewhat free hæmorrhage that occurs under such circumstances by the application of a drop or two of the above styptic on a piece of cotton-wool. Evidence of a more precise kind is, however, available, for it is evident that if we draw off a portion of blood from a vessel and divide it into two portions—one for a control and the other for an addition of styptic—we shall have an opportunity of obtaining quantitative expressions for the acceleration in coagulation thus produced. I will therefore here quote from my notebook a typical experiment in which the acceleration obtained by this means is clearly brought out.

Dog No. 1; October 12th, 1891. Chloroform and ether administered; 2.30 P.M. blood drawn off through a cannula in the carotid. Sample 1, drawn off 2.39 P.M., divided into two portions—*a* and *b*; *a*, Control, half solid at 2.43 P.M.; can invert tube 2.45 P.M.; time, six minutes. *b*, Three drops of styptic added to half a test-tube full of blood; can invert tube at 2.40 P.M.; time, one minute. Sample 2, drawn off 2.44 P.M.; *a*, Control; still liquid at 2.45 P.M.; coagulation begun at 2.46 P.M.; can invert tube at 2.48 P.M.; time, four minutes. *b*, Two drops of styptic added; half solid at 2.45 P.M.; can invert tube at 2.46 P.M.; time, two minutes. Sample 3, drawn off at 2.49 P.M.; *a*, Control still liquid at 2.50 P.M.; can invert tube at 2.52 P.M.; time, three minutes. *b*, A few drops of styptic added to half a test tube of blood; can slope tube at 2.50 P.M., can invert at 2.51½ P.M.; time, one minute and a half; trachea clamped at 2.52 P.M., and clamp retained on trachea till dyspnoic respiratory efforts begin, when tracheal clamp is released. Sample 4. Dark venous blood, drawn off at 2.54½ P.M.; *a*, Control, still liquid at 3 P.M.; coagulation begins at 3.2½ P.M.; can invert tube at 3.5 P.M.; time, ten minutes and a half. *b*, A few drops of styptic added; half solid at 2.56½ P.M.; can invert tube at 3 P.M.; time, ½ minutes.

It will be seen that there is a marked acceleration produced by the styptic, in the coagulation of both arterial and venous blood. We have now to pass on to the preparation of the styptic. The source to which we have to go for our fibrin ferment is of course the coagulated blood, preferably the blood of the herbivora, and we can evidently most conveniently obtain it from the blood of either cattle or sheep. Of the two the blood of the former is to be preferred, because of its greater yield of fibrin ferment.

The fibrin ferment can naturally be obtained from either of the two elements of the coagulated blood, the clot and the serum. In practice the clot, or more strictly speaking the fibrin, is the most readily available source of fibrin ferment. It is for our purposes best obtained in the following manner. The blood is received from the vessels into three times its volume of ordinary water. It is then set aside for a few minutes until it commences to gelatinise, when it is stirred in the ordinary manner with a bundle of sticks or of wires. The fibrin that is collected in this manner from the diluted blood is composed of very much finer threads than that prepared from the undiluted blood, and it also presents the advantage of enclosing much fewer blood corpuscles. The fibrin thus obtained is washed out under a tap, or better in several changes, of ordinary water until it is practically free from blood pigment. This process of washing can usually be efficiently completed in the course of some ten minutes, and since the fibrin ferment is soluble in water it is expedient not to overdo the washing. The fibrin is now ready for use and the fibrin ferment is to be obtained from it by extraction with a moderate quantity of water, approximately some five to ten volumes of water may be used to each portion of fibrin. The extraction is to be continued for some hours (I have usually extracted for twenty-four hours). The filtered extract constitutes our fibrin ferment solution. To this we add 1 per cent. of calcium chloride.

1 The efficacy of a fibrin ferment solution can be tested by means of a test plasma. The most readily available of these are the MgSO_4 plasma from the horse's blood, recommended by Schmidt, and the MgSO_4 plasma from the dog's blood, recommended by Wooldridge. These plasmas are obtained by receiving three volumes of blood into two volumes of a 20 per cent. MgSO_4 solution. The plasma is obtained either by filtration or by pipetting off the supernatant layers after the blood corpuscles have settled to the bottom. This plasma is diluted with eight to ten volumes of the fluid to be tested for fibrin ferment. The fluid to be tested must not contain calcium salts, as these alone will often inaugurate coagulation at any rate in Wooldridge's test plasma.