(*d*) Ten illustrations of disease in the blood vessels—small and large—of the central and peripheral nervous system.

(*e*) A series of illustrations of diseased blood-vessels of the systemic circulation—other than the nervous system.

The illustrations were made from lantern slides which were shown, along with a cinematograph demonstration, at the Pathological section of the Brit. Med. Assoc. meeting in Manchester in 1902, and fully described in the *Journal of Pathology and Bacteriology*, 1902.

VII. Original Communications

1. MYCOSIS FUNGOIDES, AND ITS TREATMENT BY THE X-RAYS

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Ten years since I had the honour to read before this Society a paper on "Mycosis Fungoides," and as two examples of that comparatively rare disease have been recently under my care at the Royal Infirmary, I desire to bring these under its notice. One, because it exhibits an unusual phase; the other, as quite remarkable results have followed somewhat prolonged exposure to the X-rays. During these years, though many cases have been investigated and recorded, little, if any, further light has been thrown on its pathogeny. The more delicate methods of staining the tissues now in vogue have indeed enabled the various cell structures to be more accurately differentiated, but observers are not in agreement as to the source whence the more characteristic of these are derived, no causal microbe has been discovered, and its origin remains as obscure as it was in 1892.

A. J., 66, engineer, Carron. Admitted to Ward 37, 27th May 1901. Notes taken by Dr Grey Brown, Resident Physician. A strongly-built man who had had good health, though he admits having had a sore on penis more than forty-three years since, concerning which he can give little information, though he says he has had no trouble as to that since. There are, however, on the inner side of the knees several small scars, rather larger than a pea, white, with a ring of pigment round each, which resemble those left by a syphilitic ulcer.

He dates his present illness from three years ago, when after being over-heated some little "pimples" appeared on both wrists and later on legs, particularly on the shins. These again disappeared later. About a year ago the face became affected, the bridge of the nose being the starting point. The condition on the face was a dry, scaly, itchy one, spreading from the bridge of the nose up over the forehead and down the cheeks. Before the complaint began he had a good crop of hair, but this fell out over great part of the front of the right side of the scalp, and in a circular area on the crown. The affected parts gradually became red and weeping, as at present. On the right leg below the knee several raised areas showed themselves a year since, and also others nearer the patella, three months since. On the inner side of both thighs are reddened, crusted, ill-defined areas, much like crusted eczema, which showed themselves three months ago. All these itched to a considerable extent, but the pruritus is now replaced by a burning sensation if anything more than discomfort is complained of.

The greater portion of the face, extending well over the forehead, and including the ears, presents a yellowish-red, swollen, granular, œdematous, oozing surface. The skin feels thickened and velvety. Only those portions of the face and scalp which are hairless, either naturally or from denudation are affected. The bald portion on the crown is dry though the skin is thickened, but it has a curious pitted appearance, imparting a worm-eaten aspect to the surface. As a contrast to this there are scar-like areas in bands about an inch broad, sharply defined from the granular parts, on the left side of the forehead and left cheek. These are smooth, pale and hairless; he states that these were at one time moist and swollen like the other parts, but healed. On the nape of the neck are dry purplish-red, rough thickened patches. Under the knee on right side are several moist, red, granular, weeping patches, like those on face. On the inner side of both thighs is a wide, dry, crusted area, including scar-like parts, which he says were originally moist. The urine was examined shortly after admission. It was clear, straw-coloured, reaction acid, sp. gr. 1·020. No albumin, sugar, or phosphates. Dr Gulland examined the blood, which he found to contain a slight degree of increase of white corpuscles, and a very moderate degree of eosinophilia.

To cleanse the parts boric starch poultices were applied, and under them the œdema somewhat subsided, so that he could open his eyes more easily, but the discharge assumed a muco-purulent aspect, instead of a straw-like serous oozing, in places, too, tinged a little with blood. His appetite was good, his temperature and pulse normal till the morning of the 3rd June, when it rose to 98·8° and in the evening to 100·4°, and the pulse to 84. On the morning of the 4th, tem. 99·6°, pulse 82. Even., tem. 102°, pulse 108. On the 5th, tem. 100·2°, pulse 84. Various patients had a rise of temperature on these days, and in his case the bowels were confined, though a laxative and milk diet did not wholly reduce it. He was placed on the 4th on iodide of potassium thrice a day, ten grains, with carbonate of ammonia.

A section of the mucous-like growths on the leg, which had exactly the same structure as that on the scalp, was prepared by Dr Welsh, and stained with various reagents. The horny layer was defective, the keratohyalin had disappeared, and there were no perfectly cornified cells present; the epithelium was ragged and the cells defective. Among the surface cells were numerous leucocytes making their way outwards. The rete showed elongated interpapillary processes; the lengthy and œdematous papillæ contained dilated blood-vessels, well filled with blood. The cells of the prickle layer exhibited a well-marked fibrous structure, the uniting mesh-work between individual cells being fairly distinct. Below this there was a granulomatous condition, cells with a slightly granular protoplasm, containing large nuclei, which stained well, some round, some oval, embedded in a structureless stroma. The deeper part of the corium and subcutaneous tissue, so far as visible, was apparently normal.

June 25th.—Various dressings were tried, including ung. vaselini plumb., but all caused an increase in the purulent discharge and arrested cicatrisation; the poultices were therefore resumed, but charcoal and linseed were used in place of starch, as the odour was fœtid. These did well, and under them much fresh scar tissue formed, so that now there are only small areas still moist and raw. The iodide was discontinued on the 15th, and an acid mixture with quinine and strychnia substituted, and since then his appetite has somewhat improved. But the temperature rises every night, to fall from two to three

degrees each morning. On the 16th it read 104·2°, and last night it was 101°. He has wasted much too, and for the last two days there has been incontinence of urine, and he has rambled at times. An abscess formed at the back of the right thigh, discharges copiously, and shows no sign of closing. Dr Gulland again kindly examined the blood, and reports: "It shows a marked leucocytosis, over 90 per cent. of polymorphs. The eosinophiles have quite disappeared, and the blood now simply reflects some septic or inflammatory condition."

July 15th.—He has wasted very considerably, has a troublesome cough, with a good deal of muco-purulent expectoration. The abscess shows no sign of healing, and another brawny mass formed close to the anus, which on being opened by Mr Hodsdon disclosed rather a carbuncular condition than an abscess cavity. It too is sloughing. The face is now nearly all cicatrised, though as the surface is still tender pieces of salve muslin are applied here and there. The temperature at night reaches about 103°, but drops several degrees in the morning. The pulse is flabby, and somewhere about 80°. He eats fairly well but does not nourish, and he speaks feebly. There are no bedsores.

July 18th.—The temperature has been steadily falling, though not yet quite normal at night, and the carbuncular mass is cleaning, and Mr Hodsdon says doing well. But the cicatrix on the whole of the right side of the face has again broken down, so that the surface is granular, eroded, and excreting serum. In fact, it has returned to the state it was on admission. The left side is still cicatrised.

He remained in much the same state during the three months following, at times improving a little, the surfaces showing symptoms of cicatrisation, then rapidly and unaccountably breaking down. The abscesses never closed completely, while mentally he became more obtuse. On October 18th he was admitted into the Longmore Hospital, but three days later he had to be transferred to the lunatic asylum at Larbert, where he died very shortly after.

2. Mrs G., 54, was sent to me by Dr Simpson, of Golspie, Sutherlandshire, on the 24th June 1902. She seemed, apart from her cutaneous affection, in fairly good health. Her appetite was good, tongue clean, bowels regular and urine

normal. She has three children, 18, 14, and 10 years old, and in excellent health, as is her husband. There is no instance that she knows of of skin disease in the family or near relations, nor is she aware of anyone in her neighbourhood similarly affected as herself. She has, however, rather a tender skin.

Ten years since an irritable red spot the size of a shilling showed itself on her neck, below and behind the right ear. The opinion of a doctor from London, who happened to be in Golspie, was asked with regard to it, but no treatment was ordered. Zinc ointment, however, appears to have been applied, and for two or three years no others came, then a few manifested themselves. These were very itchy and always dry. On June 2nd, 1900, she consulted me with regard to them at the Royal Infirmary. There were then a series of red, dry, slightly-raised and scaly, itchy patches on the right side of the lower part of the neck and face, but no tumours; these first appeared in January 1901. Within the last two years she has twice had erysipelas of the face.

There are now ten tumours pretty closely set on the side of the right jaw, varying from a pea to a walnut in size. Some of these are smooth and hemispherical, others are ruptured and crateriform, with a greyish slough in their centre. Their colour lies between a dark and a pale pinkish-red respectively. The epidermis over them, where preserved, is thin and smooth, and their consistence is firm and flesh-like, not hard. The intervening skin is in places white, as if cicatricial, in places pinkish-red, but she maintains that the white areas do not necessarily represent previous tumours which have become absorbed, and it is certain that a few have done so and have left no trace. All the front of the neck below this is of a pinkish-red colour, tense, and somewhat thickened. On the sternum is a raw oozing patch, like leeting eczema, but not elevated, within a reddened area. There are in front of the chest a number of round or oval, red, well-defined patches, with slight thickening of the skin, and an isolated, flattish oval tumour, the shape and size of a mussel-shell. On the forehead, within the hair margin, is a faintish red macule, exhibiting the very earliest trace of the disease, and on the right breast are two rose-pink smooth macules, slightly later. There are some patches on the left side of the neck and below the left ear, also an ill-defined pinkish nodular patch on the tip of the right shoulder, and at

the margin of the same axilla an oval raised smooth patch, almost a tumour. Besides itchiness, the diseased parts, when exposed to the air, and particularly to air in motion, are acutely painful.

On the 26th July her blood was examined by Dr Lovell Gulland, who reported as follows: "I counted Mrs G.'s blood the other day. She has 6,250,000 red corpuscles with hæmoglobin to correspond, and 13,000 white corpuscles. The films show no abnormality except that the proportion of the polymorphonuclear leucocytes is rather increased—a slight leucocytosis. No eosinophilia. The high count of reds is probably due either to a general or local stasis of circulation. The blood was taken from the ear, and it is just possible that the condition of her neck may interfere slightly with venous return, or there may be a more general weakness of circulation."

Very soon after her arrival in Edinburgh she attended regularly as an out-patient, and treatment by the X-rays was commenced. The exposures lasted from three to five minutes to each part, a soft tube being employed at a distance of 4 inches, the interruptions being of medium rapidity. After each a little vaseline was smeared on. The itchiness and tenderness were considerably relieved by painting with calamine lotion made up with camphor water, which could be readily washed off before the exposure. The effect was a steady and continuous shrinkage in the tumours, but some fresh developments took place on parts not put under the influence of the rays. Thus in the beginning of September a new patch appeared within the hair margin on the left side over the temple, near where the earliest spot was visible on her admission. About the middle of the same month two other blotches came out, one on the corresponding portion of the right temple, the other at the back of the scalp. On the 16th September all these were raw, superficially oozing and crusted. Somewhat similar patches had also formed on the thorax, upper part of the abdomen, between and beneath the breasts, and on the nipples.

Up till the 18th October, when she left for home, where for domestic reasons she was obliged to go, she had had exposures on sixty different days. For long before she went every diseased area was exposed in turn, so that she had as much as an hour and a quarter in all on each occasion. No reaction such as necessitated interruption of the treatment ever

To Illustrate Dr Allan Jamieson's Article.

manifested itself. All the tumours had quite disappeared. On the right side of the face and neck the skin was now perfectly smooth, but there was some loss of substance, so that the region presented a somewhat puckered appearance. A faint redness remained, within which still persisted the white spots which were there in June. There was no infiltration. The rest of the neck was smooth and soft, with a little mottled pigmentation, some leucodermic spots and a rosy pink macule or two. Only one of the patches on the scalp had not yielded to treatment, a small one on the left side, 3 inches above the ear. The nipples were almost normal. There was a small nodule the size of a pea in the bend of the right elbow, and behind the left knee, and at the outer side of the right, three patches in all, averaging the size of a florin, and slightly moist. Everywhere else the patches or thickening had wholly become absorbed, or had left only faint brownish staining. Only at the site of the few still oozing areas mentioned was there a little very bearable itching, elsewhere that and the tenderness or pain had entirely vanished. She expressed herself as feeling very well, while the improvement in the state of her skin had a most beneficial effect on her spirits.

On 21st November she wrote to me as follows: "All the parts which have been treated with the rays are entirely cured. My head is almost bare now, but perfectly free of the trouble, and is very nice and clean. There are a few irritable spots on the lower part of my back."

With the consent of the patient, portions of an early patch on the shoulder and of one of the tumours on the face were removed for examination. Dr Shennan, the Pathologist to the Royal Infirmary, as also the Assistant Pathologists, Dr Macdonald and Dr Beattie, took a great interest in investigating the microscopic appearances, and Dr Shennan has kindly furnished me with the following report:—

"1. *Early Patch.*—The epithelium is thin, and the stratum corneum tending to separate. The nuclei stain well, and from the under surface columns of cells project downwards into the corium. The outline of these is not so defined as normal, and in them occasionally a small epidermic pearl is seen.

"In the papillæ of the corium, which, as a rule, are flattened there are collections of cells arranged round about the small blood-vessels. These vary greatly in size. Similar collections

are present deeper, round the vessels, but also in relation to the hair-follicles and sebaceous glands, and even in the sweat glands the cellular elements appear to be increased round the acini. The clusters increase in size in the deeper parts, but all have essentially the same structure.

"The vessels invariably have thickened walls. This appears in most cases due to proliferation of the endothelium, by which in some cases a layer of large oval cells, one or two deep, encircle a small lumen. The muscular coat is not easily distinguished, being represented at the most by a few cells. Inside the endothelium, in some vessels, the lumen is lined by a thin homogeneous layer, the nature of which is difficult to make out.

"Spaces, rounded or elongated, occur in the cellular mass containing similar large cells, probably lymphatic spaces.

"In addition to these cells, others, smaller and taking a deeper nuclear stain, are evident in the reticulum of the nodule. These are young connective tissue cells and lymphocytes. A few multinuclear leucocytes are occasionally seen in the nodule, in the vessel or in its wall. Mast-cells, presenting a dark brown granular staining, and plasma-cells, showing a small nucleus with clear space round it and beyond this protoplasm coloured blue, are encountered here and there. The endothelial cells are frequently degenerating, and contain small particles of granular dark pigment.

"2. *Tumour.*—Here the tissue is very cellular, but there are numerous blood-vessels, some with thin walls, embryonic; most corresponding to those described in the early condition. There are numerous endothelial cells, with large oval nuclei, connective tissue cells, and lymphocytes. Few leucocytes are met with. There are cells corresponding, after staining with polychrome methylene blue, to Unna's plasma-cells and a few mast-cells.

"There are areas of necrosis, in which small blocked vessels can be made out, this evidently determining the necrotic change. In the walls of some of the vessels and in the reticulum a hyaline transformation is seen."

Certain differences in the clinical aspect of these cases are observable. In the first the early symptoms were those of a dry and scaly, subsequently of a moist and crusted eczema, but the sequences were wholly at variance with what we are accustomed to see in eczema. The skin in various parts broke

down into ulcers, which never healed soundly, while in places deep abscesses arose. There were no tumours strictly speaking, yet the microscopical appearances and the mode in which it terminated fatally were quite compatible with the diagnosis of mycosis fungoides. The loss of hair in course of the advance of the disease has been encountered in other instances, and has led to a comparison with leprosy. There was no reason to believe that the syphilis from which he had suffered long before had any relation to his ailment, and treatment on that supposition was rather detrimental than otherwise. It resembled most closely that contributed to Galloway and MacLeod's[1] article by Stephen Mackenzie, where "the disease seemed to be restricted to the types showing erythrodermia, diffuse superficial infiltration, followed by extensive ulceration of the surface, without the tendency to the production of massive granulomatous infiltrations or tumours."

The second, however, exhibited features quite unmistakably those of classical mycosis fungoides. The prolonged prodromal period, with the dry, circumscribed, intensely pruriginous areas, and the eventual development of characteristic tumours, rendered identification unequivocal. Through sections from the thickened patches and from the tumours did not in every respect correspond to what has been described in some other cases, yet these showed a complete general resemblance to what has been found as a rule. Indeed, the variations in histological findings constitute the grounds on which divergent ideas have been based as to the nature of the disease, some classing it with sarcoma, others, especially French authors, with lymphadenoma, and a third maintaining that it should be included in the group of the infectious granulomata, which, on the whole, seems the most probable hypothesis.

The special interest which the case possesses relates to the results of treatment. Hitherto nothing has served to stay its deadly progress. One instance has been reported as having recovered after an attack of erysipelas, but in Mrs G.'s case, though the wave of erysipelas twice passed over her face after the establishment of the tumour stage, no amelioration, far less any temporary arrest, ensued. But the effect of repeated exposures to the X-rays was immediate and satisfactory. Not only did the tumours melt wholly away, but the thickened

[1] *Brit. Journ. of Derm.*, May 1900, p. 160.

patches likewise disappeared, and as they became effaced the itchiness ceased to assert itself, showing that the rays have a distinctly inhibitory power on the as yet unknown exciting cause. Still, though the rays could cure existing lesions, they could not entirely prevent new ones from cropping up, chiefly, however, on the scalp, where the hair masked the earliest traces. What has been accomplished in the way of cure of the fully-established disease warrants the hope that, attacked betimes, still better results will be obtained, and therefore in future no effort must be spared to discriminate the condition in its inception. While we were unprovided with a cure it did not, perhaps, matter so much whether the symptoms in an individual instance pointed rather to a possible mycosis fungoides than to an obstinate eczema, but now any circumscribed, very itchy and rebellious eczematoid eruption is to be regarded with suspicion, and ought to be subjected, if at all possible, to the rays. I cannot close this record without expressing my thanks to Dr Norman Walker and to Dr Frederick Gardiner, my House Physician, for the care and trouble they took to carry out the treatment during my absence from town.

2. A CONTRIBUTION TO THE STUDY OF THE LOCAL DISTRIBUTION OF CANCER IN SCOTLAND

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(Plates I. and II.)

Doubtless it may be thought that I have presumed rather far in attempting to give an account of the geographical distribution of cancer in Scotland. I have, however, guarded myself against any such rashness by entitling this communication, "A Contribution to the Study of the Local Distribution of Cancer in Scotland." I cannot find that such an inquiry has attracted the attention of any one in Scotland, and it seemed to me only right that some one should break the ground for others to work in. To investigate this question thoroughly would be a problem which might well defy the powers of any one man. I have been bold enough to attempt a beginning, and more with the object of bringing this question to the front, in the hope that it may stir up a greater interest