

while the clinical symptoms were very similar and typical histories were obtained of several other members of the family having been insane and having chorea, yet the pathological pictures macroscopically were very different. The brain of the woman was small and firm, there was no thickening of the pia-arachnoid, the ventricles were only slightly dilated, the cerebro-spinal fluid was only slightly in excess, and there was apparently no wasting of the grey matter or basal ganglia; the brain of the man was large and very soft throughout; there was marked thickening of the pia-arachnoid, which was also adherent; the ventricles were very greatly dilated and the subarachnoid and ventricular fluid in great excess; there was marked frosting of the ependyma of the lateral and fourth ventricles. The grey matter and the corpus striatum were brown, very soft, and considerably atrophied, especially the caudate nucleus. In the brain of the woman the cerebral arteries were in good condition; in the brain of the man they showed numerous rings of sclerosis. Other details are as follows:

Case 1.—A woman, aged 41 on admission on June 22nd, 1921; no occupation. Several members of her family had been insane and had chorea, including her father and two uncles. She was imbecile and had previously been in mental hospitals for five years. She had delusions of persecution; the chorea was then only slight, but gradually became more severe, rendering her unable to do anything for herself and making her speech unintelligible. She died five years after admission.

Case 2.—A labourer, aged 52 on admission on November 25th, 1925. One brother and one sister had chorea and died insane. One brother had chorea and committed suicide; one brother is living but has chorea; one brother and one sister are living and healthy. The father had chorea and committed suicide. Two paternal uncles and a paternal grandmother had chorea and were insane. The patient had suffered from chorea for many years; he was imbecile and had latterly become irresponsible, mischievous, violent, and obscene; on admission he could give no account of himself, and the choreiform movements affected the whole body, including the face, and made the speech an unintelligible jargon. He died five months after admission.

In each case the terminal cause of death was a rapidly spreading inflammation, starting, in the case of the female, in an ischio-rectal abscess, and in the male in a boil of the gluteal region. As to the rarity of the disease during the last twenty years, I have been able to find mention of only two other cases at this hospital.

I am indebted to Dr. W. Vincent, medical superintendent, for permission to publish these cases.

FREDERICK BACK,
Assistant Medical Officer and Pathologist,
South Yorkshire Mental Hospital.

Sheffield.

POISONING BY TOBACCO APPLIED TO THE SKIN.

THE case of tobacco poisoning following inunction, reported in the *JOURNAL* of April 24th (p. 739) by Drs. Jones and Morris, calls to mind a case that I saw in Italy in 1918.

Whilst "resting" in a small village behind the line I was asked one evening to see an Italian soldier lying sick in a farmhouse in which some of our men were billeted. I gathered that the man was home on short leave, and would have returned to his unit that day had he not been taken suddenly ill.

I found a young man lying in bed obviously ill, drowsy, flushed, and irritable. He complained of sore throat, headache, and diarrhoea. His temperature was 104° and the pulse over 100. The fauces, soft palate, and pharynx were all very red, but free from membrane. There was a generalized erythema on the trunk and limbs. No paresis was noted.

He was handed over at once to the nearest Italian military authorities, who, in reply to my request for a diagnosis, informed me that the case was one of tobacco poisoning, the method of administration being that usually adopted in this particular form of malingering.

The method was as follows: two *toscani* (cheap Italian cheroots of great potency, usually cut in half and smoked by the poorer classes), having stood some hours in a glass of water, were placed at bedtime one in each axilla and held in position by a puttee or bandage. In some cases, in order to make more certain of the effects, the man drank the water in which they had stood. The following morning he generally went sick, and so escaped duty.

Unlike the case reported by Drs. Jones and Morris, the nicotine had not been removed from the tobacco by combustion, and consequently it was the probable cause of the vasomotor upset.

London. S.W.

J. NISSEN DEACON.

THE BLOOD VESSELS OF THE HUMAN SKIN.

AN ABSTRACT OF THE CROONIAN LECTURES, DELIVERED BEFORE THE ROYAL COLLEGE OF PHYSICIANS OF LONDON,

BY

SIR THOMAS LEWIS, C.B.E., M.D., F.R.S.,
PHYSICIAN TO UNIVERSITY COLLEGE HOSPITAL, LONDON.

THE Croonian course delivered before the Royal College of Physicians of London by Sir Thomas Lewis consisted of four lectures given on June 8th, 10th, 15th, and 17th. It dealt with work done in collaboration with Drs. Grant, Love, and Zotterman, and was intended to stimulate interest in the study of human physiology as opposed to animal physiology; the results considered refer to man only.

The description given by Spalteholz of the arrangement of the vessels in the skin was adopted as the anatomical basis for the observations.

The colour of the skin is mainly due to the blood contained in the superficial venous plexuses. The capillaries may contribute in small part to this colour, particularly in such regions as the palms of the hands and soles of the feet, as they are more numerous in these sites than in others. The contention of Spalteholz that all the blood to the skin passes through the capillaries in the papillae is in accordance with one of their functions—namely, the dissipation of heat.

The chief methods available for the study of these vessels are:

(1) Direct observation through the microscope as employed by Lombard. The skin at the base of the nail is very suitable for such observation. The capillaries here lie horizontally; the arterial loop is seen to be finer than the venous and the subpapillary venous plexus can be made out dimly; the blood flow and the red and white corpuscles can be distinguished. The capillary loops vary in size and in conformation in one field of vision and become larger as age advances. It is important to remember that the vessels visible in this way form only a limited proportion of the total and that they are all endothelial structures. The horny layer of the skin is an obstruction to the view, and after its removal by blistering the picture becomes much clearer; arteries can be seen to come up and divide and the capillaries to join the subpapillary venous plexus. Blistering, however, is not justified for physiological observations, since it alters the normal state; physiological observations are therefore confined chiefly to the tips of the capillary loops.

(2) Estimation of skin temperature by means of a specially constructed thermo-electric couple; alteration of the skin temperature indicates a corresponding alteration in the blood flow.

(3) Observations of skin colour, from which an estimate of the relative rates of blood flow can be made.

The reactions of the skin vessels to injury are of great importance and interest. Light and heavy stroking of the skin with a blunt instrument results in the appearance of the well known white and red lines respectively. The white line is due to the active contraction of the minute skin vessels—capillaries and venules—while the red line is but an element of a much more complex reaction. The development of the red line is accompanied by the appearance of a surrounding and brightly coloured irregular flush and is followed, if the injury has been sufficiently severe, or in a susceptible subject (urticaria factitia), by the formation of a wheal along the line of stroke. The red line itself is due to the active dilatation of the capillaries and venules, and also possibly of the terminal arterioles, and is independent of the nervous system. The surrounding flush is due to an independent and widespread dilatation of the arterioles brought about by a local axon reflex. The wheal is due to an outpouring of fluid from the vessels as a result of a local change in the permeability of the vessel walls, an increase of permeability which is independent of the dilatation and is uncontrolled by the nervous system.

The mechanism of this triple reaction to mechanical injury has been elucidated by studying the effect of the introduction of histamine into the skin. The physiological

properties of this substance have been worked out by Dale; it is found to be produced at the bowel, the lungs, and the liver, and is coming to be regarded as a normal metabolite. In the minute concentration of 1 in 30,000 histamine pricked into the skin produces the same triple reaction as mechanical injury. This evidence suggests that there is a fundamental and common cause at work, and it can be shown that this common factor is the presence of a diffusible substance in skin—histamine introduced on the one hand, and on the other a diffusible substance released in the skin by the mechanical injury and having a histamine-like action on the vessels and nerves. The evidence for this release of a diffusible substance by mechanical injury depends on showing that certain phenomena of the histamine reaction, which can only be interpreted as due to the presence of histamine in the skin, are exactly reproduced in the stroke reaction. Thus, for example, if the skin is stroked with the circulation arrested, the red line remains so long as the circulation is arrested and the local reaction is all the time increasing in breadth. If the circulation is not arrested then the red line fades slowly. Histamine produces identical phenomena, and in this case their meaning is clear—the histamine is diffusing out from the site of puncture. The clear correspondence of the course of events in the two cases is evidence that when the skin is stroked some diffusible substance is released. In similar manner it can be shown that the surrounding flush and formation of oedema in the stroke reaction also depend on this release of a diffusible substance in the skin.

This triple reaction, however, can be produced, not only by stroking and by the introduction of histamine, but also in a variety of other ways. It is produced by cold or freezing, by burning heat, the galvanic current, by ultra-violet light, by the application of such chemicals as hydrochloric acid, sodium hydrate, morphine, atropine, mustard oil, cantharidin, and many others. It is also produced by peptone and by antigen in those patients with hyper-susceptibility to the protein concerned. Again, it is held that a common factor is at work; one property is common to all these stimuli—they produce tissue damage and by their action release a substance, identical in all cases, which sets in motion the mechanism of the triple reaction. At the moment it is not justifiable to say that this substance is histamine, but it is histamine-like.

These observations warrant the formulation of a more general law that every form of injury to the skin reaching a certain grade of severity calls forth a series of nervous and vascular reactions dependent on the same fundamental and natural chemical stimulus; in other words, there exists in the skin a single mechanism of defence against injuries of all kinds. Further, histamine pricked into the skin produces this triple reaction; introduced in greater quantity into the circulation it results in histamine shock. Slight injuries of all kinds produce this triple reaction; more severe injuries result in conditions closely akin to histamine shock—for example, wound shock and burn shock. There is a whole series of gradual transitions from the small daily injuries which pass almost unnoticed to the state of severe shock. The differences are quantitative, not qualitative; the defence mechanism, if excessive, is deleterious. It is another aspect of the conflict between the cell as an individual and the well-being of the body as a whole.

In the investigation of the action of heat and cold on the vessels of the skin numerous other points of interest arise, and special apparatus has been devised for applying these physical agents to the skin, and for registering the temperatures attained at the skin surface and subcutaneously. It is found, for example, that though the real freezing point of skin is probably very nearly that of normal saline ($-0.6^{\circ}\text{C}.$) yet the highest temperature at which the skin has been frozen is $-2.2^{\circ}\text{C}.$ and at this temperature it is not easily done; it is difficult enough at $-10^{\circ}\text{C}.$ or $-15^{\circ}\text{C}.$ At $-20^{\circ}\text{C}.$ on some occasions freezing has not occurred—this is presumably the phenomenon of supercooling well known to physicists. Certain factors predispose to supercooling, chiefly the relative moistness of the skin and its content of grease. It is a factor of importance in considering why Arctic explorers may frequently be exposed to winds of $-20^{\circ}\text{C}.$ or $-30^{\circ}\text{C}.$

without invariably suffering frost-bite—the skin is naturally protected by supercooling, a protection enhanced by the grease which remains on the skin from lack of facilities for washing.

Finally, it has been shown that histamine punctured into the skin causes the production of a wheal, but if the circulation be arrested before the introduction of histamine and the arrest be maintained for fifteen minutes there is no whealing or only very slight whealing after the release of the circulation. If the circulation is released after only five minutes' occlusion whealing is full: the period of occlusion required for the prevention of whealing is shortened if the skin is warmed and prolonged if the skin is cooled. The failure to wheal is due to the loss of the increased permeability of the vessels first developed; it is not the result of the absence of histamine, as fresh histamine may be put into the spot which has failed to wheal after fifteen minutes' occlusion and still no wheal appears. To this phenomenon the term "refractoriness" has been applied. Refractoriness may be demonstrated, not only after the introduction of histamine, but in several other ways—for example, in those subjects who wheal readily on stroking the skin. By similarly maintaining circulatory arrest the development of a wheal over the line of stroke may be prevented, though the red line develops, and, moreover, histamine punctured into this red line fails to produce a wheal. Again, if a wheal is produced by freezing or by ultra-violet light and allowed to subside, the damaged area is found to be refractory to stimulation in this sense. Recovery from refractoriness in these last cases is gradual, extending over days. The refractoriness refers to the phenomenon of permeability alone, but, in addition, the vessels in a refractory area have lost their power to contract, for example, to adrenaline and pituitrin; there is no evidence, however, that refractoriness and the unresponsiveness to adrenaline and pituitrin are the same phenomenon.

Refractoriness and unresponsiveness of the skin vessels to pituitrin and adrenaline are both found in a variety of clinical conditions. Thus, if the skin of the red reticulum seen in erythema *ab igne* be tested, the vessels fail entirely, or almost entirely, to react to histamine, and with adrenaline there is no blanching, or very little. The same phenomena are displayed by the vessels of the telangiectasis resulting from exposure to x rays, etc., of the port-wine stain, and of the skin of the faces of those who have long been exposed to the weather. As to the cause of refractoriness, no complete explanation is yet possible.

Reports of Societies.

HEALTH OF THE PROFESSIONAL WOMAN.

At a meeting of the London Association of the Medical Women's Federation, held on June 8th at the House of the British Medical Association, with Dr. CHRISTINE MURRELL, President, in the chair, Dr. LETITIA FAIRFIELD gave an address on the health of the professional woman.

Dr. Fairfield said that excessive sickness among women compared with men was a recognized feature of all statistical tables; especially between the ages of 45 and 65 the female morbidity rate was much higher than the male rate, though the female death rate was lower. This excess of sickness gave some grounds for differences in pay where work was equal, and it was therefore important to analyse its causes. The health of professional women was less easy to investigate than that of the working classes, but in the speaker's work for the London County Council she had been able to survey a wide range of cases and to make some interesting comparisons between men and women of the teaching profession. The rules of the L.C.C. were that every teacher away for more than three days had to have a certificate from her own doctor. If the absence lasted more than a month the case was referred to a Council medical officer, and the teacher was asked to see the medical officer with reference to sick leave. In cases of absence due to debility, headache, or neurosis action was taken after more than three days' absence. Dr. Fairfield's