Conclusions.

1. In the urine from patients suffering from measles, histidine is responsible for about 85 per cent. of the colour developed by the diazo-reagent.

2. In measles the output of histidine in the urine is increased.

The writer is indebted to Dr. Elliot, of Ruchill Hospital, Glasgow, for the material, and to Professor E. P. Cathcart for much help throughout the work.

REFERENCES.

[1] Von Noorden, *Metabolism and Practical Medicine*, vol. ii, p. 162. [2] Neubauer-Huppert, *Analyse des Harns*, p. 1303. [3] Weiss, *Biochem. Zeit.*, vol. cxii (1920), p. 61. [4] Engeland, *Zeit. für physiol. Chem.*, vol. lvii (1908), p. 49. [5] Hermanns and Sachs, Ibid., vol. cxiv (1921), pp. 79 and 88. [6] Koessler and Hanke, *Journ. Biol Chem.*, vol. xxxix (1919), p. 497. [7] Hunter, *Biochem. Journ.*, vol. xv (1921), p. 689.

SECTION OF DERMATOLOGY.

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DISCUSSION ON THE ETIOLOGY OF SEBORRHOEA AND SEBORRHOEIC DERMATITIS.

OPENING PAPERS.

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THE subject of seborrhoea was discussed in this Section of the British Medical Association in 1901 at Cheltenham, when Colcott Fox introduced the discussion and Sabouraud and others took part in it. For some years prior to that much had been published, especially on the bacteriological side of the question, notably by Unna and Sabouraud. Some of that work has been confirmed since, and is generally accepted now, but many of the points raised then are still undecided, and unfortunately the whole subject is still in rather a confused condition.

So many different conditions are included under the terms "seborrhoea" and "seborrhoeic dermatitis" that it is necessary, in discussing their etiology, to divide them up into their clinical varieties. They fall into two groups—namely, (1) the true oily seborrhoea, using the word in its true meaning, and (2) the so-called seborrhoea capitis and seborrhoea corporis or seborrhoeic dermatitis. Both these groups have certain things in common, and it is impossible in discussing etiology generally to keep each clinical variety separate. As to the clinical lesions, I think most of us will be in agreement, but it is quite another matter when it comes to their interpretation.

Strictly speaking the term "seborrhoea" should only be applied to the oily condition of the skin due to increased secretion of sebum. Seborrhagia, steatorrhoea, flux sebacea (Rayer), and seborrhoea oleosa (Hebra) are the older names for the condition. It affects chiefly the scalp, face, central area of the body, back and front, and the flexures, and is generally accepted now as due to increased secretion of the sebaceous glands. A close inspection of the skin will reveal the large and patulous orifices of the sebaceous glands and the oily condition of the skin and scalp hairs. But as it is often associated with increased sweating as well, it is difficult to dissociate the two conditions. Unna prefers the term "hyperidrosis oleosa," as he believes that the greater part of the oil is derived from the sweat glands. No great support has been given to this theory as it does not agree with the clinical facts. Probably there is right on both sides, the increased sebaceous gland activity being accompanied by some hyperidrosis.

This oily condition of the skin is the basic factor in all forms of seborrhoeic eruption. Is it an increase of a physiological process or is it due to an inflammatory infection of the oil-producing glands? The work of Sabouraud, Unna, and others has established the fact that a bacillus is always present in the sebaceous material in such cases, but, although Sabouraud claimed that the organism caused the condition, the tendency to-day seems to be to disagree with that view. All the evidence points to the condition being an amicrobic functional disturbance in the first instance. Before birth the sebaceous glands are very active, as is shown by the vernix caseosa, and at birth the infant frequently shows fatty plugs in the sebaceous gland orifices of the face, especially the nose. To this cause also the greasy adherent scales on the scalp of young infants—crusta lactea—are probably due. No one would suggest that these conditions at birth are of microbic origin. From birth on till puberty oily seborrhoea is not much in evidence, but with the development of the sexual glands the sebaceous glands become fully developed and the hair grows on the face, etc. It is difficult to estimate what is the normal oiliness of the skin, and there is no standard by which we can go. In some individuals the skin is probably naturally very much oilier than in others. It may be an hereditary characteristic. It is well known that the dark races have much oilier skins than the white. You may get ichthyotics with dry skin and deficient skin-gland secretions; why not other skins with increased glandular development? On the other hand, there may be other acquired factors which stimulate the skin glands.

Foods.—That diet is important no one will deny. Certain foods in excess, such as too much fat, starch, or sugar, have been blamed for making the skin oily. If a great deal of fat is deposited under the skin it is readily accessible to the skin glands. Montgomery states that all starches and sugars have, in process of digestion, to be turned into glucose, and if starch and sugar are taken in excess they are not all absorbed as glucose through the portal system and a great deal is thrown, through the lymphatic and thoracic ducts, into the circulation, without passing through the liver. This sugar, which is not so elaborately digested as that which passes through the liver, he considers, is irritating to the skin glands and causes their increased activity. He also states that many persons with seborrhoeic eczema have enlarged livers, probably from fatty infiltration or excess of stored glycogen. This might cause obstruction to the passage of glucose through the liver, and again the sugar is thrown direct into the circulation without going through the liver. Excess of sugar in the diet may also lead to increased fermentation in the bowel by its constipating effect, and the products of fermentation may lead to sebaceous gland irritation. Sterling pointed out that the milk fats, either as milk, cream, butter, or cheese, are more likely to lead to a deposit of fat in the skin than meat fats. The milk fats are oil emulsions, whereas in meat fats the fat cell has a membrane which has to be digested before the fat is absorbed, and therefore all milk fats are more quickly and easily absorbed than meat fats. Also the fatty secretion of the sebaceous glands in man and the higher animals consists almost entirely of cholesterol esters. These are very little liable to fermentation, and bacteria do not grow well in them. By taking a large quantity of milk fats the sebaceous gland secretes fats which are peculiarly liable to bacterial infection, hence excess of milk fats leads to infections of all kinds in the sebaceous glands. Alcohol, by dilating the skin vessels, may indirectly lead to stimulation of the sebaceous glands.

Apart from foods, there are some conditions which tend to increase the activity of the oil glands.

Heat.—Working in heated atmospheres and strenuous exercise increase the circulation in the skin, and in addition to causing sweating also increase the secretion of oil.

Clothing, etc.—The wearing of heavy clothing, especially flannel, is a well-known contributory cause of seborrhoeic eruptions. Want of cleanliness, irritation of dirt and dust, have also been blamed.

Anaemia.—It is well known that in anaemia the skin is often oily. The anaemia may lead to lowered oxidizing powers of the tissues due to want of sufficient oxygen and therefore to a tendency to the deposit of fat in the tissues.

Toxaemias.—The circulation of toxic substances in the skin may also excite the activity of the oil glands. This is especially the case in intestinal toxaemias and constipation. Acute infections such as the exanthemata and influenza are often followed by seborrhoeic eruptions, or existing lesions are aggravated.

Endocrine Glands.—The possibility of the endocrine glands having an influence on the skin oil secretion must not be lost sight of. Hyperthyroidism makes the skin softer and oilier than normal, but the excessive thyroid secretion may only be the result of some toxaemia which is really the primary cause of the condition.

Diathesis.—Lastly, it has been suggested that seborrhoeic conditions are due to an underlying disposition or diathesis of the patient. Darier describes the seborrhoeic diathesis as "la kérose." He considers it as an anomaly of the skin and not a disease in itself; not a trouble of nutrition of the skin, but a modification of the circulation of the glands and

the keratinization of the epidermis. He believes that individuals with this constitution have a hypertrophy of the sebaceous glands which lasts during their active sexual life. This condition makes their skin liable to the various infections known as seborrhoeids, and later ends with atrophic changes in the skin glands and hairs such as seborrhoeic alopecia.

Barber and Semon in 1918 again drew attention to this theory and support Darier's view that the tendency to seborrhoea occurs in a special type of individual, who is particularly liable to infections and inflammations of a seborrhoeic nature. They think that it may exist in infancy or may appear *de novo* in adults. They suggest that such individuals are suffering from a relative acidosis, and that, owing to insufficient intake of the mono- and di-sodium phosphates and carbonates in the diet, the normal alkaline acid equilibrium is upset. They point out the resemblance of this condition to what Czerny describes as the exudative diathesis in children, where their skins and mucous membranes are specially liable to bacterial infection, so that they suffer from adenoids, enlarged tonsils, glands, and skin infections. Barber and Semon suggest for this dyscrasia the term "status seborrhoeicus."

If this state is in some cases an acquired one due to faulty diet or digestion this theory is not so very far removed from the toxic and food theories. It has a great deal to recommend it, as it fits in with the clinical experience that all the conditions under discussion have something in common in the appearance of the skin and eruptions, and that appearance we are accustomed to describe as seborrhoeic.

Now that we have considered seborrhoeic conditions from the general standpoint, let us take each condition separately, and see wherein they differ in their special etiology.

The True Oily Seborrhoea.

This has already been considered, and the possibility of its being due either to an infection of the sebaceous gland with Sabouraud's bacillus, or to some general condition, either dietetic, toxic, or error of metabolism. But before leaving the subject mention must be made of associated conditions. The association of acne vulgaris with seborrhoea is well known, but as the cause of acne is hardly relevant to the subject under discussion I do not propose to deal with it further. The question as to whether oily seborrhoea leads to alopecia will be considered later under the next heading.

Seborrhoea Capitis.

Next let us consider seborrhoea capitis, and by that is meant the scaly condition of the scalp usually termed dandruff. Under this heading two conditions are usually included: (1) the dry scaly condition called by Sabouraud pityriasis simplex, and (2) the oily scaly condition which Sabouraud calls pityriasis steatodes. This latter condition may later become more inflamed, and lead to the so-called seborrhoeic eczema of the scalp. You are all acquainted with Sabouraud's views that pityriasis simplex is due to the spore of Malassez, and pityriasis steatodes to the spore of Malassez and the *Staphylococcus epidermidis albus*, and seborrhoeic dermatitis to these two organisms together with the seborrhoea bacillus; and with Unna's view that seborrhoeic dermatitis is due to the morococcus (*Staph. epidermidis albus*), so that it is not necessary to elaborate them further. I must say, however, that I have never been able to see any very clear line of distinction between the condition called seborrhoea sicca (pityriasis simplex of Sabouraud) and the more greasy form of the condition where the scales are oily and where there is occasional crust formation. It has always seemed to me that the one is probably only a further stage of the other. They have both this in common, that there is desquamation from the surface of the scalp, and the lesions are obviously inflammatory in nature, and all the evidence, both clinical and microscopic, points to an organismal infection of the skin and glands. Sabouraud ascribed pityriasis simplex to the spores of Malassez, and pityriasis steatodes to the spores and *Staph. albus*, but I do not see why one should go out of one's way to complicate matters when the same cause might operate in both cases. If one assumes that the infecting agent or agents in pityriasis simplex are simply growing in the superficial horny layers of the scalp it would lead to a branny desquamation such as one sees from the growth of the *Microsporon furfur* in pityriasis versicolor. If the condition goes deeper into the epithelium and pilo-sebaceous follicles of the scalp, then pityriasis steatodes would be produced; and if the infection goes deeper still in the epithelium and corium, then you get more marked inflammation with the production of seborrhoeic dermatitis. In favour of this view is the well-known fact that pityriasis simplex is usually very amenable to treatment, as one would expect in such a superficial infection, whereas the other conditions are much more resistant, probably because, being deeper, it is more difficult to get the therapeutic agent into contact with the infecting agent. The one form often leads on to the other, and usually in the same sequence—first the simple scaliness, then oily scaliness with or without crusting. As Sabouraud's bacillus, the spores of Malassez, and the *Staph. epidermidis albus* are present in all three conditions, and as these organisms have all been found on apparently healthy skin, I do not see that one is able, in the present state of our knowledge, to decide what part each plays in producing the infection.

Before leaving this subject mention must be made of a condition which is generally allowed to be the result of seborrhoea capitis—namely, seborrhoeic alopecia or the common form of baldness. Sabouraud ascribed this to the oily form of seborrhoea, and held that it was due to the prolonged action of the seborrhoea bacillus and its toxins on the hair papillae, but I think it is a general experience that alopecia more often follows the scaly form of seborrhoea capitis, and that, if the hair remains oily, it may turn grey early but usually does not tend to disappear. Darier would include it under his condition of kerosis, and puts it down to an atrophy through fatigue subsequent to the excessive stimulation of the hair and sebaceous glands in the earlier stages of the disease.

The wearing of hard hats, too much brain work, want of exercise, and various other conditions have been suggested as at least predisposing causes to the condition; but, so far as I can find out, no one has suggested what I think is the obvious predisposing cause—namely, wearing the hair short. Alopecia is rare in females and appallingly common in men. The only difference between the way in which men and women treat their hair is that the one wears it short and the other long. The hair was meant to be long, and I take it that the normal stimulus to the growth of the hair is the long hair hanging down the back and blowing in the wind. There is a gentle pull on the hair bulb by the weight of the hair which reflexly through the nervous system keeps the hair in tone and stimulates the circulation in the bulb. If one keeps the hair short, one removes the stimulus to the healthy growth of the hair, and the seborrhoea of the scalp attacks the hair bulb and soon destroys it. Women may have seborrhoea capitis for years, and it practically never leads to the degree of alopecia seen in men. It is a well-recognized fact that all organs which are not used as they were meant to be become weak and liable to the attack of infecting agents. Men also go much more frequently to the hairdresser than do women, and I think it is there that they are probably infected with seborrhoea. The revolving brushes which some hairdressers use are probably particularly to blame, as considerable force is applied and the organisms removed from a previous customer's scalp are vigorously rubbed into that of the next one. This repeated reinfection with a fresh virus from another individual would account for the recurrence of seborrhoea capitis in men in spite of treatment. Most men are probably infected in boyhood, and at first the inflammation of the scalp leads to hyperaemia and stimulation of the growth of the hair. This is the stage at which most youths are at 17 or 18 on leaving school, and the same youth at 24 years or so is beginning to get bald. The only men who have, as a rule, good heads of hair are some of the professional musicians, and that is not because they are musicians but because they wear their hair long.

Seborrhoea Corporis and Seborrhoeic Dermatitis.

This includes the lesions which start as papular, papulo-vesicular, and vesicular, and end as scaly and crusted areas of a yellowish-red colour, usually spreading peripherally, sometimes clearing up in the centre, and typically seen on the sternal and interscapular regions. There are also the similar inflamed lesions which may occur on the scalp and spread down behind the ears on to the neck, in the axilla, groins, etc. There is no difficulty in assuming the parasitic origin of the more superficial forms of seborrhoea corporis where there are circinate lesions spreading slowly outwards. Here again the same three organisms as occur in seborrhoea capitis may be found, and here again I do not see how one is to decide which organism or combination of organisms is the cause.

The ease with which these cases are cured by local applications, the slight degree of itching present, and the gradual slow spread without marked variation from day to day which one sees in other forms of dermatitis are all in favour of a simple infection. The older theories about flannel, sweating, etc., are probably correct, but these causes are only contributory or predisposing.

But when larger areas are affected, such as the whole scalp, behind ears, axillae, groins, and round the umbilicus, the condition does not look quite so like a parasitic one. In these cases the affected areas are often vesicular, moist and oozing, and crusted, but that is not necessarily against a parasitic cause, as one sees vesicular lesions which ooze in the eczematoid ringworm of the hands and feet, where the lesions are undoubtedly due to a fungus. On the other hand, in the light of recent discoveries in eczema one must take into consideration the possibility of these cases of seborrhoeic dermatitis being a sensitization phenomenon. This applies more particularly to the cases where the eruption, although starting on the typical seborrhoeic areas, spreads more or less acutely and becomes more or less generalized. The eruption flares up and dies down again repeatedly, and is often intensely itchy as in other forms of dermatitis. These cases are also not so amenable to local treatment as the simple circinate ones. Are they cases of sensitization to some protein by internal absorption on which the seborrhoeic virus is implanted on the top, or are they due to the cells of the skin or sebaceous glands becoming sensitized to the protein of the seborrhoeic virus from the outside? This question arises particularly in the infantile dermatitis. Some dermatologists consider these as falling under seborrhoeic dermatitis. The affection of the scalp and face, the spread down behind the ears, the implication of the flexures, and the colour of the eruption in many cases, strongly suggest a seborrhoeic element in them. You will admit that a good deal of evidence has been brought forward to show that such cases in infants are due to sensitization to food proteins. If that be so, then the probability is that the lesions are secondarily infected with the seborrhoeic virus. Then by scratching there is no reason why the child should not sensitize himself to the protein of the virus and so produce a double internal and external sensitization eruption. The same remarks apply equally well to extensive dermatitis in adults, especially in the cases affecting chiefly the flexures with either a scaly seborrhoea of the scalp or an acute dermatitis there. Many of these adult cases get well after some weeks when put to bed and treated with weak sulphur preparations locally and without any alteration in the diet. The local treatment would kill off the virus, and in three or four weeks the dermatitis gradually subsides and does not tend to recur for months or years. Whereas in the ordinary so-called eczemas due to internal sensitization from foods or bacteria the cases tend to relapse repeatedly and local treatment often has very little effect in preventing recurrences. The fact that these cases usually take several weeks or months to recover is in favour of some sensitization being present as against a simple infection. A simple infection would probably get right in two or three weeks. You all remember the stubborn cases of seborrhoeic dermatitis met with during the war. I refer especially to the cases where there was a moist dermatitis of the scalp, ears, eyebrows, and often the beard region, which resisted all local treatment and tended to relapse in spite of treatment. These cases looked like ordinary cases of seborrhoeic dermatitis. Were these cases sensitizations to the seborrhoeic virus or some other organism? Autogenous vaccines were sometimes helpful in these cases, and it is possible that in addition to the seborrhoeic infection these patients were sensitized to the staphylococcus or other organisms in the skin.

As having a bearing in this respect the work of Strickler, Kolmer, and Schamberg is noteworthy. These observers did complement fixation tests with the serums of patients suffering from acne vulgaris, rosacea, and seborrhoeic dermatitis, using the acne bacillus (Unna-Sabouraud type), *B. coli*, and staphylococcus. Of the ten cases of seborrhoeic dermatitis which were examined, 30 per cent. reacted positively with the antigen of *B. acne* and 25 per cent. with the staphylococcal antigen. With the antigen of *B. coli* from acne patients, fixation occurred in 40 per cent. of the serums and in 11 per cent. with the antigen of *B. coli* from normal persons. Several of the cases were mild types of the disease, and that might account for the negative reactions with acne bacillus antigen. These results are interesting from two points of view. First they show the presence of antibodies to skin organisms in the serums of patients with seborrhoeic dermatitis, and support the view that a sensitization to these bacteria has taken place; and secondly, the percentage of cases which gave a positive reaction to *B. coli*, pointing to the possibility of intestinal absorption playing a part in the sensitization of the patient.

The question of a local sensitization of the skin to the seborrhoeic infection is another possibility. It is well known that seborrhoeic eruptions repeatedly recur in the same areas of skin each time. It is possible that these areas of the skin have become sensitive to the seborrhoeic virus, and, therefore, the eruption always recurs in these places.

There is also the type of case of seborrhoeic dermatitis of the head and face in adults where, quite suddenly, for no apparent reason, the whole face becomes affected with an acute erythematous and oedematous dermatitis with swelling of the eyelids, so much so as to suggest erysipelas. Is that an acute streptococcal infection with an organism allied to the erysipelas streptococcus on the top of the ordinary seborrhoeic dermatitis, or is it a sensitization phenomenon? The suddenness with which it comes on and the general appearance of the face suggest a dermatitis venenata. It is possible that the patient is sensitized to the seborrhoeic virus, and by scratching the thin skin of the face rubs in the virus, living or dead, and so produces a local dermatitis venenata.

Pityriasis rubra seborrhoeica must also be mentioned. Are these cases of pityriasis rubra with the seborrhoeic virus implanted on the top of it, or are they general sensitizations to the seborrhoeic virus? The cases of general exfoliative dermatitis which occur from time to time during or soon after the administration of drugs like arsphenamin must be considered as due to sensitization of the skin to these drugs, and similarly cases of seborrhoeic dermatitis going on to pityriasis rubra seborrhoeica may be due to the patient becoming sensitized to the seborrhoeic virus. The eruption spreads much too quickly and too generally to be an extension of the seborrhoeic condition.

The whole question of sensitization is still rather obscure, and further light is required in regard to the subject before any definite statement can be made, but I am convinced that in some at least of the seborrhoeic eruptions sensitization will be found to play a part in their pathogenesis.

BIBLIOGRAPHY.

Audry: Séborrhée-Séborréides, *La Pratique Dermat.*, 1904, tome iv, p. 270.

Barber and Semon: The Etiology and Treatment of Seborrhoeic Eruptions, BRITISH MEDICAL JOURNAL, 1918, ii, p. 245.

Beattie, Wallace: Seborrhoea, *Brit. Journ. Derm.*, 1894, p. 161.

Brocq: Les Eczémas Séborrhéiques ou Séborrhéides, *La presse méd.*, 1897, p. 162.

Brooke, H. G.: The Clinical Relationship of Seborrhoea, *Brit. Journ. Derm.*, 1904, p. 205.

Cumston: Seborrhoea of the Scalp, *New York Med. Journ.*, 1921, p. 156.

Darier: La Kérose, *Ann. de Derm. et Syph.*, 1907, p. 3.

Fox, Colcott: Discussion on Seborrhcea, BRITISH MEDICAL JOURNAL, 1901, ii, p. 855.

Gardiner, F.: Eczema or Seborrhoeic Dermatitis in Children, *Practitioner*, 1920, p. 47.

Hallé and Civatte: The Bacteriology of the Sebaceous Glands, *Ann. de Derm. et Syph.*, 1907 p. 184.

Kuznitsky: Experimentelle und klinische Beiträge zur Frage der Hauttalgsekretion, *Arch. f. Derm. u. Syph.*, 1913, p. 691.

MacLeod: Seborrhoea and the Seborrhoeides, *Practitioner*, 1904, p. 755.

Montgomery: The Relation of Diets to Seborrhoea, *Journ. Cutan. Dis.*, 1916, p. 829.

Roberts, Leslie: Recent Researches on Seborrhoea and its Consequences, *Brit. Journ. Derm.*, 1897, p. 219.

Sabouraud: *Les Maladies Séborrhéiques*, Paris, 1902.

Southworth: The Predominance of Seborrhoeic Eczema in Early Life, *Arch. Pediat.*, 1920, p. 338.

Strickler, Kolmer, and Schamberg: Complement Fixation in Acne Vulgaris, *Journ. Cutan. Dis.*, 1916, vol. 34, p. 165.

Unna: Das Seborrhoische Ekzem, *Volkmann's Klin. Vorträge*, 1893, p. 669; and *Münch. med. Woch.*, 1921, p. 547.

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THE SEBORRHOEIC STATE.

[*Abstract.*]

IF by seborrhoea we merely mean an apparently excessive secretion of sebum it is extremely difficult, as Dr. Cranston Low has said, to determine the line between the normal and abnormal. The secretion is greater in the black races than in white, and on the whole among Europeans in people of the south than in those of the north. These differences probably partly depend on different climatic conditions, but there is no doubt that excessive greasiness, like excessive dryness, of the skin may be a familial and racial characteristic. One certainly meets with seborrhoeic families, and the Jews as a

race have oily skins; moreover, dark-complexioned persons as a rule have larger and more actively secreting sebaceous glands than blondes.

On the other hand, there is a pathological seborrhoea, and it is when this exists that the various types of eruption to which the epithet "seborrhoeic" is attached are apt to make their appearance. I am convinced that in this condition we are not merely dealing with increased secretion of sebum and sweat, but also with an alteration of their composition, and that it is this as yet not accurately determined change of composition, rather than the increase in the amount secreted, that renders the skin liable to active invasion with micro-organisms which the normal skin is able to resist. In favour of this view is the fact that, although in cases of seborrhoeic dermatitis there is usually obvious hypersecretion of the sebaceous glands, this is not always so. Indeed, one may meet with typical seborrhoeic dermatitis in ichthyotic persons.

There is, in fact, a seborrhoeic state, as Semon and myself insisted from our study of cases met with among the troops, and I may here say that, although further research carried out with Dr. Ryffel and others has caused me to modify my views somewhat, they remain substantially the same as when Semon and I published our paper five years ago. I can, perhaps, best give a vivid picture of this seborrhoeic state by describing the clinical appearances of an acute case; such cases, so common during the war, are still sometimes met with in civilian practice.

The face, scalp, ears, and neck are flushed, giving the patient a congested or plethoric appearance; the sebaceous glands are visibly hyperactive, as also are the sweat glands, so that even in cold weather droplets of sweat may be seen on the forehead, nose, and upper lip. If one tests one of these droplets with litmus paper it will usually be found to be strongly acid, much more so than the visible sweat obtained in normal people, and the high acidity cannot, I think, be due altogether to admixture with sebum. The vermilion borders of the lips are covered with a kind of yellowish scum, and examination of the nose, throat, and nasopharynx will show congestion of the mucous membrane, catarrh, and reddening and hypertrophy of the lymphoid follicles on the posterior pharyngeal wall. The urine is almost invariably highly acid, even if dilute, but occasionally the apparent anomaly occurs that is met with in some cases of diabetes—namely, that the urine may be only slightly acid, neutral, or even faintly alkaline when first examined, but on administering alkalis one finds that for a while it becomes more acid.

In this state the resistance of the skin and mucous membranes to bacterial invasion is diminished; in other words, there is apt to result what may be termed a catarrhal inflammation both of the skin and of the mucous membranes of the nose, nasopharynx, eyelids, conjunctiva, penis, and vulva. The micro-organisms concerned are chiefly the pyogenic cocci, particularly the *Staphylococcus albus* and *aureus;* of less importance are the acne bacillus and the so-called "bottle bacillus," which affect the skin alone. These various organisms produce eruptions whose clinical features differ according to the anatomical position in the skin of the inflammatory changes, the particular organism concerned, its virulence, the resistance of the patient, and the severity and duration of the predisposing seborrhoeic state.

The problem is a difficult one, but I think that, clinically at any rate, we must draw a distinction between seborrhoeic dermatitis, whether occurring in the follicular petaloid form (flannel rash) or as a scaly dermatitis (eczématide), and what I term true seborrhoeic eczema.

My view at present is that we must recognize three distinct conditions: (1) seborrhoeic dermatitis due to infection of the skin with a *Staphylococcus albus* or *aureus;* (2) primary acute seborrhoeic eczema due perhaps to irritation of the skin produced by some acid substance taken up by the epidermal cells; (3) infective eczematoid dermatitis due to sensitization of the skin to pyogenic organisms having occurred, and probably, not always although usually, associated with the seborrhoeic state. This may supervene in either 1 or 2.

The Urine in the Acute Seborrhoeic State.

It is in cases of the acute seborrhoeic state with acute or recurring attacks of seborrhoeic eczema or dermatitis that I have carried out most of my investigations with Drs. Ryffel, Joffe, Grace, and Payne. As I pointed out in the original paper written with Dr. Semon, these cases show increased alkaline tolerance often to an extraordinary degree—that is to say, large doses of alkali may have to be given before the urine becomes alkaline. This fact has been observed in a large number of cases met with since the war, not only among out-patients, in whom, of course, one cannot be absolutely certain that the dose of alkali prescribed has actually been taken, but also among patients in hospital in whom the amount taken is accurately known, and whose urine can be examined daily.

Dr. Ryffel has kindly investigated the urine of several of my cases with a view to determining the ammonia ratio and what may be termed the acid ratio. The former is, of course, the ratio of nitrogen excreted as ammonia to the total nitrogen, and is very high in diabetes; the latter is the acidity of the urine expressed in the same terms as the ammonia ratio. A survey of his figures shows that in these cases both the ammonia ratio and the acid ratio tend to be higher than normal, sometimes very markedly so, and the sum total of the two ratios is almost invariably high.

The question naturally arises whether the alkali in these cases is absorbed. In order to test this point Dr. Payne kindly investigated the faeces of one of my patients who was taking very large doses of alkali, and he found that their mineral content was not above normal figures, showing that absorption had taken place. We may therefore consider it established that in probably the majority of cases of the seborrhoeic state in its severe or acute form there is diminished alkali reserve, often to a very striking degree.

The Blood Sugar in the Seborrhoeic State.

Dr. W. H. Grace, working in my department at Guy's Hospital, carried out some investigations on the sugar content of the blood four or more hours after a meal in certain skin diseases, using the Folin-Wu method of determination, and comparing the results obtained with numerous controls. He found that in cases of acute seborrhoeic eczema or dermatitis, uncomplicated by septic infection in the form of boils, pustules, or abscesses, the sugar content of the blood was not as a rule much above normal, the average figure being 0.116 per cent. In chronic cases, however, in which secondary pyogenic infection had occurred the figure was much higher, averaging about 0.2 per cent., and in some cases reaching 0.28 per cent. It was found that the improvement in the condition of these patients proceeded *pari passu* with the fall in the blood-sugar content.

The Etiology of the Seborrhoeic State.

The chief underlying cause is, in my opinion, faulty digestion and metabolism of carbohydrate, and to a less extent, perhaps, of fat, whereby an excess of organic acid by-products is produced. These are apparently secreted through the sebaceous and sweat glands, causing not only excessive secretion, but also, of course, an alteration in the composition of the sebum and sweat. It is probable, too, that these acid products are taken up by the cells, not only of the glands, but also of the whole epidermis and mucous membranes, and are combined with or dissolved in the fatty substances in which these cells are so rich. At any rate, as Darier suggests in his description of "la kérose," there is presumably an alteration in the chemical composition of the epidermal cells which produces a modification of the process of keratinization, and diminishes their resistance to bacterial infection, probably by affording the bacteria a more suitable medium for active growth.

Once the bacteria—staphylococci and the acne bacillus—become established another factor comes into play—namely, bacterial sensitization or susceptibility, which is not confined merely to the skin, but affects the system as a whole.

The origin and nature of the acids responsible for the diminished alkali reserve and the high ammonia ratio in the seborrhoeic state probably result from the improper digestion and incomplete oxidation of carbohydrate and perhaps fat. The evil effect of an excess of sweets, cakes, pastries, etc., in patients with acne or seborrhoeic eczema and dermatitis is well known clinically, and in my opinion the chief factor in the production of the seborrhoeic state is the taking of an excess of soft carbohydrate foods and their imperfect digestion and oxidation. The diet of a large proportion of our population of both lower and upper classes is hopelessly unphysiological, especially in large towns. The tendency is to take an undue proportion of soft, concentrated carbohydrate food, which cannot be masticated and which is far in excess of the needs of a person living a sedentary life, very often in overheated, imperfectly oxygenated surroundings. On the other hand, fresh green vegetables and fruit, which supply a maximum of alkaline salts and a minimum of nutriment, are taken sparingly or not at all by many people. Some, too, not only take an excess of carbohydrate but devour large quantities of meat as well. I am in the habit now of asking

many of my patients to write down everything they eat during a period of three or four days, and their resulting diet sheets are often amazing.

Treatment.

I will conclude by considering the treatment of the seborrhoeic state, the principles of which are based on the etiological factors I have suggested. In its acute form, which may be associated with primary seborrhoeic eczema, the administration of large doses of alkali without any local treatment is specific. When sufficient alkali has been given the flushed appearance and the hypersecretion of the sebaceous and sweat glands disappear, and the eczema, if present, dries up. Moreover, the patients confess to a feeling of well-being, their appetite returns, and the sensation of heat and itching in the skin is lost. In the chronic form of the seborrhoeic state, in which bacterial infection has become established, producing clinical seborrhoeic dermatitis, acne, sycosis, etc., the problem is not so simple, for bacterial sensitivity has become a superadded factor, and is often the more important. Treatment then consists in regulating the diet as one would in a mild case of diabetes, in insisting on regular out-of-door exercise, in ensuring a sufficient intake of alkaline salts by giving plenty of fresh green vegetables and fruit, and, if necessary, by administering sodium bicarbonate before meals; in removing any septic condition of the mouth and throat, or a focus such as a chronically inflamed appendix; in prescribing full doses of hydrochloric acid after meals if there is hypochlorhydria or achlorhydria, as there is in most cases of rosacea, and in giving an autogenous vaccine prepared from the infecting organisms. Local treatment in these cases is, of course, of great importance, and its rationale is to render the skin dry by means of sulphur, salicylic acid, resorcin, the mercurials, and the *x* rays. But unless the diet, the digestion, and the mode of life of the patient are regulated, relapse is almost certain to occur when the local treatment is discontinued. With regard to vaccine treatment, I am aware that many observers of greater experience than my own are unconvinced of its value. It is probable that chemotherapy by preparations such as collosol manganese and stannoxyl may eventually take its place, but till then I shall remain one of its strongest advocates. It must, however, be controlled by serological tests, it must be given intelligently, and it must be combined with rational treatment of the underlying pathological state which has led to the lack of resistance to the infecting bacteria. I believe that the unfavourable opinion that has been formed by many dermatologists of the value of vaccine therapy in infective conditions of the skin is due partly to the use of stock vaccines, which I have now entirely abandoned; partly to the fact that the specificity of the organisms isolated is not determined by serological tests; that the dosage is injudiciously planned—for it is easy to make a condition worse with vaccines—and that the injections are not persevered with long enough; and partly that the underlying factors, which have lowered the patient's resistance to infection, are neglected. In some chronic cases of infective eczematoid dermatitis and of generalized seborrhoeic dermatitis, which are often accompanied by boils and hydradenitis, I have found all treatment unavailing until an autogenous staphylococcal vaccine was given, whereupon steady improvement began and continued until a cure was obtained. In some of these stock vaccine had been given without effect. In spite of all arguments to the contrary, my clinical experience has convinced me of the specificity of vaccine therapy, and, until we can find infallible methods of chemotherapy against the various types of infecting organisms, I believe that specific vaccination will continue to be the method of choice rather than non-specific protein therapy.

DISCUSSION.

Dr. R. W. MACKENNA (Liverpool) expressed the pleasure the Section had derived from listening to the two opening papers. He agreed with the remarks made by the President in introducing the discussion that the results of the frontal attack upon the question of seborrhoea and the seborrhoeides had been somewhat unproductive of definite results; but he believed that the flanking attack made by Dr. Barber and his colleagues on the question, along the lines of biochemistry, was likely to be much more fruitful. He paid a compliment to the work done by Dr. Barber during recent years—work which was likely to leave a permanent mark on dermatology. With regard to seborrhoea, he was of opinion that the hyperactivity of the sebaceous glands, which was a necessary antecedent to all the skin lesions classed as seborrhoeic dermatitis and the seborrhoeides, depended on some stimulation by the secretions of the endocrine glands. But the oversecretion alone was not everything. There was some other factor, and that factor was probably a micro-organism of some sort. When he read Dr. Barber's and Dr. Semon's original paper on the seborrhoeic state he was of opinion that they had made an illogical and unwarranted deduction from the facts before them; for it was unsound reasoning to conclude that over-elimination of acid in the urine told us anything about the alkali reserve in the body. Overacidity of the urine might mean simply overproduction of acid, and equally rapid elimination in order to keep the alkali reserve normal. Dr. Barber's paper that day, however, embodying the results of his later researches, proved that his (Dr. Barber's) original deduction was correct—namely, that in seborrhoeic conditions there was a definite lowering of the alkali reserve, and, coincidently, an increased alkali tolerance. He did not agree with Dr. Cranston Low's theory as to the retention of their hair by women. It depended, he believed, on endocrinous secretions. As Sabouraud long ago pointed out, eunuchs never go bald. With regard to protein sensitization in the skin he agreed with Drs. Low and Barber that the possibility of its place as a factor in the production of seborrhoeic dermatitis should not be forgotten; but he thought one should go warily in using protein sensitization as an explanation of all dermatological conditions of obscure cause.

Dr. KENNETH WILLS (Bristol) said that emphasis should be laid upon the infective nature of pityriasis capitis. He had found from clinical observation that eczema seborrhoicum ran in families, and that it was directly conveyed from parent or nurse to children. It was caught on the parts of the skin exposed, and might spread from those inoculation points. The primary lesion was a plugging of the follicles, followed by circumfollicular erythema with itching. Subsequently rubbing and scratching led to "eczematization." The same observations might be made in adults, where the cocci were conveyed from a scurfy scalp by scratching. Thus an insect bite or other simple itching lesion might become infected with eczema seborrhoicum.

Dr. DOUGLAS HEATH (Birmingham) said that he also had noted that large doses of alkalis improved acute seborrhoeic conditions, and he had also found that sulphur lotion was much improved by being made up in alkaline solution. Olive oil, although a popular remedy, he considered was very deleterious to seborrhoea. He had obtained good results in the treatment of acne from the use of a mixed vaccine.

Dr. A. M. H. GRAY (London) asked the meeting to define what was meant by seborrhoea, seborrhoeic dermatitis, and seborrhoeic eczema. He considered seborrhoea to be a mere excessive secretion of the sebaceous glands; he excluded from it conditions where there was any inflammation whatever. Seborrhoeic dermatitis he called those cases where there was some inflammation, the most typical of which were the cases of circinate and figurate dermatitis in the centre of the chest and back, also pityriasiform conditions of the scalp. In both of these bacteria, but of doubtful nature, were concerned. He refused to associate premature alopecia with the barber's shop and local infection; in the present state of our ignorance of the endocrine glands he preferred to stress the hereditary factor in these cases.

Dr. NORMAN WALKER (Edinburgh) believed, on the contrary, that the local cause was responsible for the loss of hair. He believed in frequent washing of the scalp as a preventive of baldness, and in the treatment of the scalp as the key of all the treatment of seborrhoeic conditions, and above all of rosacea. He also emphasized the importance of treating oily seborrhoea of the scalp when treating acne vulgaris. He referred to the importance of dermatoses, especially scabies, in war.

Dr. O'DONOVAN (London) referred to the frequency of hyperglycaemia in connexion with inveterate sycosis, but found that the exhibition of alkalis was of no therapeutic value. He had got the best results in bad sycosis from painting with the liquid acid mercury nitrate, which was painful but effective.

Dr. F. ANDERSON MURRAY (Glasgow) said that the question of treatment of seborrhoea and seborrhoeic dermatitis was especially interesting; he thought that insufficient attention

had been paid to the preventive treatment of seborrhoea. He thought that the scalp was frequently infected in childhood, and should be treated accordingly. Later in life the condition frequently was a question of occupation. Diet was also of considerable importance: patients prone to the condition should be sparing in the use of starch and sugar.

Dr. W. H. Brown (Glasgow) referred to two cases in which gastric analysis showed great hyperacidity. Dr. Lancashire (Manchester) also emphasized the importance of the preventive treatment against seborrhoea during childhood. He said that in local treatment he got the best results from sulphur in the form of ointments. He had been disappointed with colloidal sulphur.

Dr. J. Goodwin Tomkinson (Glasgow), in view of the conflicting theories as to the causation of seborrhoea, hesitated to dogmatize. He was, however, strongly inclined to accord a very important part to the microbacillus of Sabouraud. It was known that in some instances it might be present in the skin without causing any apparent modification in secretion, but its constant presence in teeming numbers in the cocoon was, to say the least, suggestive. This raised the question of contributing factors—factors which elicited or determined the pathogenic faculties of the microbacillus. On the one hand, these might be internal, on the other local, due possibly to the symbiosis of two or more members of the cutaneous flora. Among the internal causes one connected with the maximal manifestations of seborrhoea was puberty, which was associated with great glandular activity. Again, there were other adventitious internal conditions known to aggravate the eruption of seborrhoeides. It was well known that overwork sometimes determined an outbreak of seborrhoeic dermatitis. He had had a striking instance of this in his own practice about two years since. A medical student, long the subject of seborrhoeic dermatitis in the presternal region, had had the misfortune to fail in his final examination and had been unduly depressed thereby. He had also been unduly addicted to sweetmeats. When seen by the speaker he was confined to bed and feverish, and his skin was in a condition of generalized exfoliative dermatitis.

The President (Dr. Leslie Roberts, Liverpool) said that the conclusion arrived at as to the nature of seborrhoea depended on the point of view taken by the investigator. Clinical investigation carried them but a little way. There were two main lines of promising research: (1) that of the comparative microscopical anatomy of the vertebrata; (2) the biochemical method. The comparat ve anatomical method brought to light a remarkable correlation between the pilogenetic and sebaceous functions of the follicles. In the fulfilment of both these functions cells were cast off bodily. The follicle was, in fact, a primitive moulting organ, in the exercise of which function the clinical manifestations were strikingly different—namely, alopecia or baldness, or the arrested development of hair, as in the lanugo hairs, coupled with an increased output of fat-laden epithelial cells. Alopecia areata was the most complete example of the seborrhoeic or moulting process. In birds and reptiles in which the keratin-laden cells amounted to an exoskeleton, the sebaceous glands were either entirely absent or were gathered together into a single gland mass situated at the root of the tail of most birds, or were remarkable for the paucity of their numbers. The same correlation was observed in the human skin in the palms and soles, where some approach to a horny exoskeleton was found. If the true fat glands of the skin were looked upon as organs for the secretion of fatty acids, then the true fat glands of the mammalian skin were the sweat glands which found their highest development in the mammalian milk glands. The biochemical line of research would probably carry them farther into the heart of the subject than the anatomical. Dr. Barber and his collaborators had done useful work on those lines. They had ascertained experimentally certain facts which confirmed the opinion of Darier and others that the moulting process of keratin and fat cells was associated, and indeed was the outward manifestation of a chemical condition of the tissue fluids which seemed to consist, in part at least, in a lowering of the basal salts. Dr. Barber and Dr. Semon had demonstrated an increased alkaline tolerance in severe cases of seborrhoeic dermatitis. The interpretation of the biochemical data was, however, extremely difficult, and before this observation could be definitely established as a general truth it was necessary to ascertain whether lowering of tissue alkalinity and increased acidity of the urine was not a natural accompaniment of all cutaneous and visceral inflammations. It had been shown to accompany erysipelas and pneumonia, and the question arose as to whether the hypo-alkalinity of the tissue fluids was not due to the withdrawal of basic salts from the blood, and in reality had no connexion with the seborrhoeic process itself. This must be left for future investigation to decide.

The question of blood sugar was one of great practical importance in relation to inflammation of both the skin and the viscera. That its presence in the inflamed tissues was inimical to recovery was well established, but it was necessary to differentiate between the saccharides. Taking glucose as a typical monosaccharide, it had been shown by Folin and Berglund that the ingestion of 200 grams of pure glucose did not raise the level of the blood sugar above the renal threshold of glucose secretion. There was reason for believing, as Folin and Berglund had pointed out, that the absorption and excretion of foreign unsuitable carbohydrate material present in grain, vegetables, and fruit was of daily occurrence; and to this must be added the decomposition products due to cooking, canning, and baking of the food. There was, so far as we knew, no mechanism in the digestive tract for preventing the absorption of these soluble but incompletely digested carbohydrates. These authors further suggested that foreign carbohydrates played an important part in the etiology of many obscure skin and joint troubles. But we were going farther than the evidence warranted if we assumed that they were essentially connected with the seborrhoeic or moulting process. Turning to the clinical side of the seborrhoeic dermatoses, he was bound to admit that the group was vague and ill defined. All inflammatory reactions which were frankly connected with the moulting process could be rightly called seborrhoeic. These included the dry, discoid or circinate, infiltrated, hyperaemic patches met with on the front of the chest and on the back. The eczematization of the scalp coexisting with the loss of hair and increased output of sebaceous material must also be included in the group, and this form in many cases showed a tendency to spread downwards behind the ears, and to appear in the bends of the elbows and groins. In the war forms of severe "seborrhoeic dermatitis" described by Dr. Barber it was probable that an emotional factor played a considerable part in determining the form and distribution of the disease.

Dr. Cranston Low, in his reply, again emphasized the necessity for a revision of the nomenclature, and said that there would always be confusion until the term "seborrhoea" was only used in its true sense. He referred again to the cutting of the hair as the cause of common baldness. In races such as the Cingalese, where the men all wore their hair long, baldness was practically unknown. Dr. Low also sounded a note of warning with regard to the inferences to be drawn from the biochemical changes in the blood and urine in seborrhoeic conditions, and suggested that these changes might be the result and not the cause of the skin condition.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

MELANOTIC SARCOMA OF CHOROID AND OVARY.

Melanotic sarcoma appears to be accepted as the most virulent form of malignant tumour on account of the early date at which it forms secondary deposits in other parts of the body. For this reason, and because the literature on the subject is meagre in quantity and lacking in details, I venture to describe a case which shows some interesting features.

Mrs. M. is now 38 years of age and, with the exception of minor ailments incidental to an overstrung nervous temperament, and severe eclampsia previous to the birth of her second baby seven or eight years ago, has enjoyed fairly good health. She has worn an artificial right eye for many years, her explanation being that the sight failed in her right eye in August, 1906, and following a course of medical treatment (during which sixty bottles of medicine were consumed) the eye was removed on April 24th, 1907, for a "small tumour"—she being then 23 years of age.

In September, 1921, she consulted me about a small lump she had noticed under the skin of the right upper arm near the anterior border of the deltoid muscle. The skin being thin and fair the tumour showed almost black beneath. I excised a dead black lobulated growth the size of a horse bean. On microscopical