

cian. When the patient owns a seagoing yacht, most difficulties vanish; and Sir H. Weber has suggested ships, specially built and equipped as ocean sanatoriums, to be sent on well-selected voyages according to season.

In the consideration of *seasickness*, the general precautions necessary to therapeutic voyages were considered. Here it may be emphasized in repetition that the pure air of the deck is preferable to the stuffy atmosphere of the cabins; that exercise is necessary; that exposure to the sun is usually beneficial; that the skin should be cared for by regular and systematic baths, frictions, etc. In addition to the care necessary in choosing vessel and cabin, the provision of congenial companionship and of sources of intellectual interest as the inclination to mental activity returns, demands attention.

**Indications.**—Short voyages of from five to twenty days are useful chiefly to give mental and physical rest and recreation, and to prevent relapse or other accident after convalescence from depressing affections, as influenza. Voyages of moderate length, twenty to sixty days, are sometimes followed by strikingly good results in cases needing more prolonged rest, as in breakdowns from overwork, irritable conditions of the nervous system, even actual neurasthenia when the patient has good resisting power. In certain cases of asthma, in the conditions termed "scrofulous," in chronic tendencies to "catching cold," in suspected or actual pulmonary tuberculosis, such voyages are often beneficial.

In chronic catarhal conditions of the upper air passages, in chronic rheumatic states, and sometimes in chronic rheumatoid arthritis, voyages to warm climates, as a winter trip to Mediterranean or Caribbean waters, may be advised. Hay fever has been reported to have been observed at sea, but the occurrence is so rare that its possibility may be disregarded and the general tonic effect of the ocean climate upon those susceptible to this affliction is highly desirable. Some chronic forms of diabetes mellitus in middle-aged or elderly patients are ameliorated by ocean trips, especially those to warm climates in the winter.

Prolonged voyages, three months or more, are to be advised only when the patient is known to be a good sailor, is not too severely ill or too weak to undergo some discomforts, and has a fair degree of resisting power, as well as good digestive and eliminative functions.

The special trips of three and four months to north European waters in the summer and to Mediterranean and Oriental waters in the winter, made by well-equipped vessels and including in their itinerary stops at various important ports are, however, to be classed therapeutically with voyages of moderate duration, and are especially to be commended to convalescents and those needing rest and recreation. Long voyages on the open sea, as to Australia, for example, are to be advised chiefly for those who enjoy the sea, for dipsomaniacs and drug slaves, and in cases of pulmonary tuberculosis. It is especially in suitable cases of pulmonary tuberculosis that well-chosen voyages are to be urged, sometimes as a means of recovery, sometimes as a means of palliation and of prolonging life. Some patients can "rough it" on sea and land with benefit; others must be carefully protected. The stage of disease, too, and the general characteristics of the patient make considerable difference. Hence general rules cannot be laid down. Certain main factors, however, may be presented. In febrile cases the temperature usually subsides after a few days upon the sea. In cases which show much general tendency to recovery, but in which limited areas of persistent activity remain, the local processes diminish and finally cease under the influence of the aseptic sea air and the general stimulation of nutritive processes. In cases of erethic temperament, unsuitable for mountain cures, especially those with a tendency to excessive cardiac action at altitudes, the sea exerts a beneficial sedative influence. No other measure is of equal value in early cases in robust males, especially in young men infected by chance, or when weakened by overwork, worry, or acute disease. In quiescent cases of a more advanced stage the

general health and hence the local conditions are usually much improved. In certain far advanced cases with extensive softening and persistent fever, a voyage in equable waters—say upon the Pacific, as from San Francisco to Japan and return by way of Hawaii—has been known to mitigate symptoms and to prolong life. Sometimes such patients can even benefit by excursions into cooler regions, as to Alaska, Iceland, or Spitzbergen. When patients are to be sent to a special land climate, as from Europe to Colorado, or from America to the Alps, or from either to Australia or South Africa, the sea trip may be made a special feature of the cure; and, similarly, sea trips may be directed to well-chosen objective points, invigorative or protective as may be, where the patients may remain for a time before coming home.

**Counterindications.**—Grave lesions of the heart and blood-vessels interdict any ocean trip; nor should a longer voyage than the week between Europe and America be permitted in the great majority of cases of far advanced tuberculosis, chronic gastro-intestinal disorders, cholelithiasis, or chronic diseases of the abdominal viscera. Gouty patients may suffer more severely at sea than on land; neuralgias are often aggravated; hemorrhoids may become troublesome. Among other conditions necessitating caution, or even the prohibition of a voyage, are a marked tendency to hæmoptysis, great general weakness, special liability to seasickness or loss of appetite, epilepsies, maniacal tendencies, periodic insanity, suicidal inclinations, marine photophobia, and marine insomnia.

Solomon Solis Cohen.

**SEBORRHŒA.**—**DEFINITION.**—For the purposes of this article seborrhœa may be defined as a functional disorder of the glands of the skin, characterized by the production of an excessive amount of fatty material, normal or abnormal in quality, which manifests itself upon the skin as an oily coating, scales, or crusts.

**HISTORY.**—The investigations of recent years have done much to determine the true limitations of this disease. Many points, however, remain unsettled, especially in the domain of etiology and pathology, and it is very probable that the future will render possible a definition of greater precision. The process of evolution of the present-day conception of seborrhœa is of interest, as showing the gradual differentiation of species from genus. The old Greek and Roman observers—Hippocrates, Galen, Celsus, Actuarius, and others—recognized the occurrence of falling of the hair; and by the Greeks the expression *πιτυρίασις*, *pitryiasis* (that which is winnowed, *i.e.*, husks, bran), was used to designate a condition of the skin and scalp characterized by the formation of scales. This was, in the light of our present knowledge, a very broad application of the term, and probably included, among other morbid states, that disease which we know to-day as *seborrhœa sicca*. The name *porrigo* was given by the Roman writers, notably Celsus, to pathological conditions of the skin attended by scale formation. It was not, however, until the latter part of the eighteenth century that any suggestion of a differentiation of the general class into specific types was made. Plenck, in 1783, described, quite concisely, a condition very similar to, if not identical with, our *seborrhœa sicca*, and stated that the flaky material was to be regarded as a product of the sebaceous glands of the scalp. His view was not generally accepted by his contemporaries; the term *pitryiasis* continued to be used in its comprehensive sense—including practically all squamous conditions—until well into the nineteenth century. A few investigators, however, seemed to have followed Plenck in the endeavor toward scientific differentiation. The terms *Teigne* (or *Tinea*) *amiantacée* and *T. furfuracée* were applied by Mahon to conditions apparently seborrhœic. Brett noted the occurrence of oily, scaling lesions upon parts of the body not covered with hair, and coined therefore the expression *acné sebacée*.

The terms *sécrétions morbides des follicules sebacées* and *flux sébacé* were used by Rayer in 1827, referring to morbid conditions of the sebaceous glands. In Hebra's time

and during the period immediately preceding him, dermatologists were still seeking a better separation of *seborrhœa* from the general class *pitryiasis*, with varying success. Fuchs, in 1840, it is said by Sabouraud, was the first to make use of the term *seborrhœa*.

In more recent years, largely as a result of the work of Unna, those cases formerly regarded as seborrhœa, in which an inflammatory process is present, have been set apart in a class by themselves, under the caption *eczema seborrhœicum* (which see). Unna himself would draw the line more closely, and would include in the class mentioned practically all types of *seborrhœa sicca*, since, he believes, inflammation is always present in these. His conception is not unanimously accepted in its entirety by dermatologists. The exclusion of the inflammatory process from seborrhœas, and their limitation strictly to functional disturbance, has greatly narrowed the field; it has imposed an added burden upon the diagnostician: that of determining where functional disorder ceases and organic change begins.

**SYMPTOMATOLOGY.**—The classification of seborrhœic conditions clinically is not a settled one, especially as regards minor distinctions. For practical purposes, however, two general types may be considered: *seborrhœa oleosa* and *seborrhœa sicca*. These have been variously designated by authors; the former has been called *stearrhœa*, *seatorrhœa*, *seborrhœgia*, *sebaceous flux*, *acné sebacée fluente*, *hyperidrosis oleosa* (Unna); the latter, *pitryiasis simplex*, *seborrhœa furfuracea seu psoriasisiformis*, *erythema capitis*, *acné sebacée sèche*, *eczema seborrhœicum squamosum* (Unna).

*Seborrhœa oleosa* may affect both the hairy and the non-hairy parts of the body. It most commonly appears upon the face and scalp, but it may occur on the chest, back, pubes, genitals, and in the axillæ. Obviously, in these latter regions it is seen much less frequently by the physician. When the scalp is involved the hairs are covered with an excess of oil; they are greasy to the touch; tend to mat together into bunches and strands, and in the uncleanly an offensive, rancid odor may be present. The scalp itself is generally pallid and cool, and is covered with an oily secretion; when the head is bald this gives the skin a shining, though sometimes muddy appearance. Itching is either absent or of a very mild grade; redness is not commonly present; when these are found to any pronounced degree, it is a fair presumption that some irritating factor has entered in to modify the classical type. Neglected cases of this type of seborrhœa affecting the scalp generally result in a severe alopecia.

Upon the face, the parts most involved are the nose (especially the alæ nasi), the adjacent parts of the cheeks, the chin, and the forehead. The unusual flux of fatty material gives the face a yellowish, oily appearance; in addition, a dirty, "smudgy" quality is imparted, owing to the ready adherence of dust and soot particles to the greasy surface. The orifices of the sebaceous glands are large, and are generally filled with a visible, yellowish-white plug. Upon pressure these are discharged upon the skin surface, and oily material exudes from the patulous ducts. Some redness may be present, more frequently about the alæ nasi, but usually the skin is cool and without inflammatory changes. Should these appear the condition can no longer be considered a simple seborrhœa.

The domain of *seborrhœa sicca* is disputed territory. Inasmuch as the questions concern largely the matter of classification, the writer will seek to give that symptomatology which has been accepted by the majority of dermatologists of the present time.

The most frequent type of *seborrhœa sicca* is seen upon the scalp in the condition commonly known as "dandruff." It is here characterized by the formation of fine, pulverant or flaky, and slightly oily scales, grayish- or yellowish-white in color, about and between the hairs. They may be scanty, requiring the use of the nail or a blunt toothpick to demonstrate their presence; or so abundant, especially upon the vertex and the regions im-

mediately anterior thereto, as constantly to shower the patient's shoulders with a flaky dust. Underneath the scales the scalp is pale, dry, and non-inflammatory. The hair appears to be deprived of its natural unguent, loses its lustre, becomes dry, thin, and atrophic, and eventually falls, the resulting alopecia being generally symmetrical and permanent. The subjective symptoms in mild cases are absent or very slight; if the scale formation is profuse there may be considerable itching and burning. This leads frequently to a modification of the clinical picture. The constant trauma from scratching in neurotic individuals who have neglected treatment soon induces a dermatitis, which, combined with already existing conditions, produces a type approaching *eczema seborrhœicum*. In these cases excoriated areas may be seen, usually small, upon which are formed yellowish, moist, friable crusts, distinctly greasy; beneath, a reddened, slightly exuding base may be found. The crusts, when removed, are quickly renewed; subjective itching and burning are quite pronounced.

Conditions similar to the characteristic *seborrhœa sicca* of the scalp are not uncommonly found in the eyebrows, eyelashes, mustache, and beard; it is more rarely seen in the pubic region. Upon non-hairy portions of the face, *e.g.*, the nose and adjacent parts of the cheeks, a continuous desquamation sometimes occurs; the scale is thin, grayish-white, and greasy; the skin is usually reddened and hyperemic. The relation of this condition to *rosacea* is very close. However, upon non-hairy portions of the body the crusting forms are more commonly seen. These are best exemplified along the edge of the scalp, about the ears, upon the nose and adjacent folds, between the shoulders, and in the sternal region. The secretion over the diseased areas forms crusts, which are yellowish, greasy, friable, and often rather bulky; the skin beneath is pale or, more often, reddened slightly. If a crust be removed with care, prolongations may be seen extending from the under surface into the gaping sebaceous openings. The crusting forms frequently exhibit a serpiginous border, slightly raised, and somewhat more reddened than the central portions. The periphery, too, bears a bulkier crust, while the centre is either clearing or entirely free from scales. This form is best seen upon the chest, the back, and along the frontal hair border. The terms "flower-leaf" and "petaloid" have been used to designate the type.

Seborrhœa may occur upon the genitalia. In the male it is manifested by the formation of quantities of white, cheese-like, glandular secretion, and epithelial débris about the posterior portion of the glans, the corona glandis, and the sulcus behind the latter. In the normal and cleanly individual functional hyperactivity of the glands of these parts is practically without symptoms; but in the filthy, from want of proper ablutions, and in the phimosed, from the anatomical conditions present, the retention of this secretion leads to various reflex nervous disturbances, and very frequently sets up a severe local inflammation. In the female, the secretion forms about the clitoris and the folds of the labia minora. If the individual be cleanly, there are no symptoms; in neglected young children and in the uncleanly, a vulvovaginitis may develop.

A form of crusting *seborrhœa sicca* occurring in infants is called *crusta lactea*, "milk crust." Imperfect removal of the vernix caseosa from the head is the probable cause, though it is stated that the condition may arise after perfect cleansing of the new-born child. The crusts may cover nearly all the scalp or be confined to a small area. As to physical character, they are variable: they may be bulky or thin, moist or dry, tough or friable, and present a color dependent upon the complexion and surroundings of the child. Generally they are greasy and rather adherent; the surface beneath is reddened and moist. It is probable that these cases should be regarded as instances of *eczema seborrhœicum*, since they present the picture of a dermatitis planted upon a seborrhœic base.

Kaposi, under the caption *ichthyosis sebacea*, has described a condition of the skin in infants which he re-

gards as a true seborrhœa, arising from the continued excessive production of the vernix caseosa. The skin is reddened, tense, and covered throughout with a greasy coating; it fissures readily, especially about the mouth, and subsequent inability to nurse leads to inanition and early death. That this is a seborrhœa is extremely doubtful. The same author has mentioned a seborrhœa occurring in the aged and marasmic, *pityriasis tabescentium*, characterized by scaling of the trunk and extensor surfaces of the limbs. The pathological position of this is also in doubt.

Neuman was the first to call attention to a peculiar seborrhœic condition found in the aged, which he designated as *verruca senilis*. Unna gives it the name of *verruca seborrhœica*. By the French it is known as *acné sébacée concrète*. The lesions are found upon the face, including all parts, the neck, the arms and hands, the trunk, and lower limbs. They vary in size and outline, may be single or grouped, are yellowish-brown or darker in color, sometimes nearly black. The skin between may be atrophic. Upon close inspection each lesion is seen to be raised, slightly verrucous, rough to the feel, and covered with a scale or crust, which is adherent and beneath which a reddened papillomatous surface is found. There may be slight itching. Hyde has called this a *pre-epitheliomatous seborrhœa*, an expression which is peculiarly apt, for if malignancy has not yet shown itself among the lesions it may be expected to appear in time; and the condition is almost invariably an accompaniment of cancer of the skin in those of advanced years.

**ETIOLOGY AND PATHOLOGY.**—*Seborrhœa oleosa* may occur at any age, but is most frequently seen in the second and third decades of life. The puberal epoch, so especially characterized by rapid growth of hair and hyperactivity of the sebaceous glands, often develops this form of seborrhœa. The disease occurs more commonly in women than in men, and brunettes are more susceptible than blondes. A tendency to oiliness of the skin is decidedly more marked in some races than in others; that shining, greasy condition of the negro's skin, which in him may be considered physiological, would be, in the white man, an evidence of abnormal glandular activity. Among certain classes of European immigrants to this country, *seborrhœa oleosa* is common. Various predisposing causes may be mentioned: disordered blood states, derangements of the digestive and assimilative functions, chronic constipation, convalescence from acute diseases, improper hygiene and habits of life, excesses in eating and in the use of alcohol; and, in women, menstrual disorders. Factors having a purely local action are sometimes efficient, as continuous exposure of a part to heat, local pressure tending to produce congestion, rosacea, etc. Elliott reports having observed its development on the site of a recently healed erysipelas.

Uncomplicated *seborrhœa oleosa* may be regarded as a functional disease, and pathological changes in the skin glands are not to be expected, though microscopic foci of inflammation are doubtless often present. It must not be forgotten, however, that the presence of an oily film upon the skin favors the entrapment of micro-organisms, and thereby predisposes to the implantation of an inflammatory process upon the pre-existing functional disturbance. Thus one may see a seborrhœa attended or followed by acne, folliculitis, furunculosis, sycosis, eczema, etc. Unna has ably championed the view that the coil glands participate in the formation of fatty secretion. He therefore proposes the term *hyperidrosis oleosa* as more accurately expressive of the true condition present when an excess of oil is poured out upon the skin.

*Seborrhœa sicca*, both the scaling and the crusting forms, may occur at any time of life. Blondes are more often attacked than brunettes; men exhibit the disease rather more frequently than women, the probable reason being that with the former the pilary growth upon the body is more pronounced, their daily toilet of the hair is less thorough, and their head-dress less hygienic. The same predisposing factors hold as for *seborrhœa oleosa*. Especially to be mentioned are convalescence from acute dis-

ease, syphilis, and the local influence of pressure and lack of ventilation about the head. A seborrhœic element is quite commonly found in the syphilides of the scalp and face, and one may see most typical forms of crusting *seborrhœa sicca* and *eczema seborrhœicum* beneath the stiff, unventilated head-dress of the nun.

The pathology of *seborrhœa sicca* is much in dispute. While there may be no clinical evidence of inflammatory action, the latter may be demonstrable microscopically. The view commonly held as to the origin of the scales is that they result from an imperfect metamorphosis of the epithelium lining the sebaceous glands into sebum, which abnormal product is extruded upon the skin, mixed with fat and horny epithelial débris. According to this conception, the essential process is found in a pathologic physiology of the glandular epithelium.

The most radical dissenters from this theory are Unna and Sabouraud, both of whom, for their originality of work, are entitled to great credit. The former's teachings may be summarized as follows:

All forms of *seborrhœa sicca* should be classed as *eczema seborrhœicum*; the coil glands are the source of fat in the scales (since seborrhœic catarrh with greasy scales may occur in the palm of the hand and sole of the foot), which fact he has repeatedly demonstrated by osmic-acid staining; the sebaceous glands and their secretion are normal, or the glands are filled with fatty cells and show no undegenerated epithelium; exit from the glands is blocked by an excess of horny cells in the follicles; the flow of fat from the coil glands is chemotactic; a definite tendency to acanthosis and parakeratosis is present within and without the hair follicle; the morococcus is practically always found, the bottle bacillus frequently; when the scalp is concerned, the openings of the hair follicles are choked and dilated with horny cells extending to the ducts of the sebaceous glands; there is a tendency, from pressure effect, to early separation of the papillary hairs, with failure of their new formation, hence the alopecia; after permanent fall of the hair, the sebaceous glands hypertrophy, and often form true sebaceous cysts.

Sabouraud's pathology, which is a still greater departure, is as follows:

There are two forms of seborrhœa: a moist type, *seborrhœa oleosa*, and a cystic type, *acne comedo*; of the first, the elementary lesion is a fatty sebaceous plug; this plug contains an enormous number of very small bacilli, which are constantly present in pure culture and are characteristic; the comedo is the cystic transformation of the sebaceous plug, the change occurring in relatively few of them; eventually the comedo becomes infected with ordinary cocci of the skin, among them the "gray-cultured" coccus, producing various types of acne; baldness is a microbacillar seborrhœa, each follicle from which the hair has fallen having been invaded by colonies of the bacilli; this bacillus grows on acid media, forming red colonies, and stains with Gram's method; the different forms of pityriasis are separated and distinct conditions from seborrhœa, but may be superimposed upon the latter; their lesion is the scale, an exfoliation of horny epidermis; this scale is produced by a special micro-organism, the bottle bacillus.

A description of the various organisms mentioned by these two observers would require greater space than the limits of this article will permit. It will suffice to state that dermatologists and pathologists are not at all agreed that these micro-organisms are specific for the conditions named, or even that they exist as distinct varieties.

**DIAGNOSIS.**—The recognition of *seborrhœa oleosa* presents no difficulties. *Seborrhœa sicca* must be differentiated from the following:

**Eczema.** In a pure eczema there is always evidence of inflammation, either in acute weeping or chronic infiltration; crusts are non-greasy, of coagulated serum; scales are dry, free from oil (unless treated with ointments), and rather adherent; burning and itching are always present. However, the dividing line between *seborrhœa sicca* and *eczema seborrhœicum* is often very difficult to draw, since the former frequently merges into the latter.

The feature of greatest importance in the differentiation is the absence in the one and the presence in the other of visible evidence of inflammation and of itching, though these may be present only in a slight degree.

**Psoriasis.** Psoriasis of the scalp is seldom seen unaccompanied by patches elsewhere. In mild cases affecting the scalp the lesions are generally small, more or less isolated, covered by an adherent, silvery, non-greasy scale, beneath which an easily bleeding surface is found; between the lesions the scalp is normal or a true seborrhœa may exist. If the psoriasis is severe, parts of the head may be covered with a thick, dry, non-oily crust, through which the hair is growing vigorously; other regions of the scalp are clear. Alopecia, as a rule, does not result in a pure psoriasis, even though the scalp be severely and chronically affected. Psoriasis is not commonly seen upon the face, and very rarely about the nose, a frequent site of seborrhœa. Upon the body it is easily distinguished if it be remembered that the outlines of the lesions are more distinct, the scales copious, lustrous, and non-greasy, and the surface beneath reddened and easily torn.

**Lupus Erythematosus.** The *seborrhœa congestiva* of Hebra was probably *lupus erythematosus*. The differentiation is made by considering that in this disease the site of lesion is generally the face; the outlines are distinct and elevated; the scale is very adherent, non-greasy; the skin beneath is reddened to a marked degree; scar tissue may be present in the vicinity; and close inspection of the lesion will reveal atrophic changes in progress, for in *lupus erythematosus* structural alterations occur which lead to cicatrices on healing.

**Ichthyosis.** This disease is generally present from birth. The scale is universal, dry, non-oily; the skin reddened, dry, and tends to fissure readily along the lines of flexure and cleavage. Frequently, but not always, malnutrition is present, sometimes to a marked degree, especially in the young.

**Syphilis.** Seborrhœa often complicates well-defined syphilis, but cases are not common in which an absolute exclusion of the latter disease must be made. When such is the case, recourse must be had to the past history of the individual as to exposure, initial lesion, adenopathy, exanthem, mucous patches, headaches, alopecia, etc., and to careful searching for the relics of an ancient syphilis upon the skin and mucous membranes. The crusting lesions of syphilis about the face and scalp are more defined in outline, and generally present the copper hue about their borders, which is so characteristic in specific disease. It must not be forgotten that any ulcerating lesions upon the scalp may produce enlargement of the nearest lymph nodes, a knowledge of which fact will help in the avoidance of mistakes in diagnosis.

**Tinea Tricophytina.** Here the decisive proof is the demonstration of the fungus. Upon the scalp the lesions present a dull gray, non-greasy, adherent crust, through which broken, fragile hairs project.

**TREATMENT.**—In the management of *seborrhœa* due regard must be had for the patient's general condition. Much can be accomplished by a careful regulation of the diet, attention to personal hygiene, and such general measures as shall restore and maintain a normal physiology of the various bodily functions. Especial attention should be directed to the digestive tract.

*Seborrhœa oleosa* may be treated locally with mildly stimulating applications, the object being to restore the normal function by purging the glands. Such applications, however, should not be continuously used. The medicaments of most value are sulphur, resorcin, tincture of benzoin, and white precipitate. The first three may be used in pomades or in weak alcoholic lotion; the last in an ointment only. To accomplish results the application should be strong enough to produce a reaction with scaling, after which a milder treatment should be followed. The use of astringents is of doubtful value; if resorted to it should be certain that the secretions from the glands are thinner than normal.

Since the x-ray has a selective action on the more

highly differentiated cells of the skin, causing atrophy, it has been suggested that conditions due to glandular hyperactivity were amenable, theoretically, to x-ray therapy. *Seborrhœa oleosa* would therefore be included in the category. The consideration is purely theoretical; the writer knows of no published reports of cases so treated.

*Seborrhœa* of the genitals disappears with cleanliness. In the scalp *seborrhœa sicca* requires rather elaborate and persistent treatment. In severe cases crusts and scales must first be removed by maceration with an oil, followed by a shampoo; in mild cases by the shampoo alone. The official *unctura saponis viridis* or Sarg's fluid soap will serve well as material for the shampoo. When the scalp is thoroughly cleansed a stimulating pomade should be applied. For this precipitated sulphur, resorcin, and the red sulphuret of mercury are most efficient, either singly or combined, the ointment base used being soft.

℞ Sulph. præcip. . . . . 1.00  
Hydrarg. sulph. rubr. . . . . .05  
Ung. petrol. alb. . . . . .30.00  
M. Sig.: Pomade for scalp.

In severe cases this should be rubbed into the scalp every day for a week or more; afterward less often. Patients generally object strongly to the greasy condition of the hair following the frequent use of an ointment. It is advantageous in such cases to prescribe a lotion, which may be applied six days in the week, the shampoo and pomade being used on the remaining day. Sulphur, being insoluble in water and alcohol, cannot be made an ingredient of the lotion; resorcin and bichloride, combined with other stimulants, as tincture of cantharides, are the most efficient compounds available.

℞ Hydrarg. bichlor. . . . . .10  
Tr. cantharid. . . . . .20.00  
Spts. vini. rect. . . . . .80.00  
Aq. rosarum. . . . . ad 200.00  
M. Sig.: Lotion for scalp.

To this, if indicated, a small proportion of oil may be added; the amount should rarely exceed 10 gm. in 200.

Resorcin is credited with producing a slight change in the color of blond hair. For such the bichloride lotion is preferable.

For the crusting forms of seborrhœa of the face and body, sulphur and resorcin are the remedies *par excellence*. Crusts should be removed by softening with oil and the careful use of water in which some borax has been dissolved. A pomade containing the above-mentioned drugs in suitable proportions may then be applied. Care must be taken in treating these cases that an acute dermatitis be not awakened. Should this happen, soothing measures must be used until the skin will permit further treatment of the original condition.

The *crusta lactea* in infants may be avoided in the vast majority of cases by a gentle but thorough cleansing of the child after birth. Should characteristic crusts develop later, a mild course of treatment following the lines mentioned above will bring about a cure.

The *verruca senilis*, or the pre-epitheliomatous seborrhœa of advancing years, requires careful watching for epitheliomatous developments. For the purpose of keeping the lesions soft, a mild pomade may be used. Cauterization is not advisable. If an extensive removal of the lesions be contemplated, resource must be had to x-ray therapy.

The two forms of Kaposi—*ichthyosis sebacea* and *pityriasis tabescentium*—require careful attention to the general nutrition of the patient, and the use of such ointments locally as will keep the skin soft and pliable.

**PROGNOSIS.**—The outlook for *seborrhœa oleosa* is dependent largely upon the strictness with which the patient carries out general instructions. *Seborrhœa sicca* of the scalp requires faithful treatment; if it is neglected, re-

currence is probable; alopecia is generally permanent. The seborrhœas of the body are more easily controlled. The same is true of *crusta lactea* in infants. *Pre-epitheliomatous seborrhœa* is not so unfavorable since the introduction of the x-ray as a therapeutic measure in skin diseases. In Kaposi's forms the prognosis is undoubtedly grave.

Stelwagon calls attention to the frequent presence of hypertrichosis in those suffering from seborrhœa of the face. It should be remembered that the prolonged use of greasy applications is certain to add to the hair growth already present.  
Ernest Lewis McEwen.

**SECRETIN.**—It has long been known that the introduction of acid into the intestine (duodenum) provokes a flow of pancreatic juice. Popielski and Wertheimer and Lepage demonstrated that this result may follow even after the exclusion of nervous impulses from without these organs. The secretion has therefore been attributed to the effects of a peripheral reflex brought about independently of central nervous influences. Since this flow of pancreatic juice will apparently follow even after inhibition of all nervous elements by atropine, it has been ascribed to a chemical stimulation of the pancreatic gland cells. The name *secretin* has been given by Bayliss and Starling to the chemical substance, as yet not isolated and identified, which is the direct stimulant to the gland. Wertheimer does not believe, however, that secretin acts independently of any nervous relations; and like Pflüger he points out the difficulty in obtaining complete isolation of an organ from nervous elements. The specific substance is obtained by extracting the mucous coat of the jejunum with 0.4 per cent. HCl. A very small portion of such an extract injected into the circulation suffices to call forth a copious flow of pancreatic juice. The active agent is not the HCl, since this alone does not provoke secretion when introduced directly into the blood current. Secretin is not present as such in the intestine, but is formed from a precursor, *prosecretin*, by the action of the acid. The transformation of prosecretin into secretin can also be accomplished by the action of boiling water or salt solution. The acid secretin solutions can be boiled and neutralized without undergoing a diminution in activity. The active substance thus does not behave like an enzyme. It is not precipitated by alcohol or ether; and presumably further investigation will demonstrate it to be a definite chemical individual of relatively low molecular weight. Camus has found that secretin may be formed in all animals examined by him, viz., the dog, cat, rabbit, guinea-pig, pig, pigeon, and frog.  
Lafayette B. Mendel

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**SECRETION, PHYSIOLOGY OF.**—By secretions we mean the products of the activity of gland cells. Usually these products are liquid or semi-liquid in character. In recent years a distinction has been made between internal and external secretions. By the latter term we designate a secretion that is discharged upon a free epithelial surface that communicates with the exterior. Such, for example, are the secretions of the glands of the skin or of the mucous membrane of the alimentary or respiratory tract. The name internal secretion is used to designate those secretions that are discharged into the blood or the lymph. The term is used especially in connection with the so-called ductless glands, such as the thyroids or the adrenal bodies, but it happens that in some cases a gland possessing a duct may form an

internal as well as an external secretion. A good example of this combination of functions is found in the case of the pancreas. The external secretion of the pancreas, the pancreatic juice, is emptied through its duct into the duodenum, while its internal secretion, of an unknown character chemically, is discharged into the blood. As will be described later, the two secretions in this case are formed in all probability by two different kinds of gland cells. It will be convenient to consider these two kinds of secretion separately.

EXTERNAL SECRETIONS.

The composition of the external secretions varies greatly, but in general we may say that they consist of water, inorganic salts, and certain organic constituents. The organic elements in the secretions have aroused the greatest interest since they may be characteristic of the secretion. They are found in some instances (for example, the urea of the urine) preformed in the blood, and the function of the gland cell is a selective one, picking out this particular constituent and discharging it into the lumen of the gland. In other cases the organic element is not present in the blood or lymph, and must therefore be formed within the substance of the gland cell. In both cases there is a general agreement, speaking broadly, that the gland cells take an active part in the secretion and that the production or elimination of the organic products involves the expenditure of energy on the part of these cells. We picture this energy as dependent upon the chemical changes, the metabolism within the gland protoplasm, and naturally the character of these changes may vary greatly. General theories of secretion have concerned themselves chiefly with the physiological mechanisms by which the secretion is excited, and the means by which the inorganic constituents of the secretion are produced, whether in response to purely physical forces such as filtration, osmosis, and diffusion, or by means of unknown activities of the living protoplasm. The general nature of the theories proposed and the modifications suggested for the different secretions can be given best by describing the physiology of the most important secretions.

**SECRETION OF THE SALIVARY GLANDS.**—Under the designation salivary glands we must include all the glands whose ducts open into the mouth cavity and whose secretions contribute to the formation of the saliva. Ordinarily, however, the term is applied to the three large pairs of glands, the parotid, the submaxillary, and the sublingual. The duct of the parotid, duct of Stenson, opens opposite the second molar tooth of the upper jaw; the duct of the submaxillary, duct of Wharton, opens at the side of the frænum of the tongue; the duct or rather ducts of the sublingual, open into the floor of the mouth and are usually known as the ducts of Rivinus; although in some animals, and sometimes it is said in man, one of these ducts, the duct of Bartholin, may be especially conspicuous and runs parallel with the duct of Wharton. The portion of this gland which empties into the mouth by the duct of Bartholin is designated by Ranvier by the separate name of the retro-lingual gland. Histologically these large glands show certain differences in structure. The secreting cells of the alveoli may belong either to the albuminous or to the mucous type. In the former the cells are relatively small and densely granular in appearance, so that in fresh sections of the living gland the outlines of the individual cells cannot be distinguished readily. In the mucous type the secreting cells are larger and much clearer. In the living condition they present a homogeneous ground-glass appearance, but on appropriate treatment display a few large granules much less opaque than those in the albuminous cells. These two types of cells may be found in the same gland or even in the same alveolus; but, speaking generally, the parotid in man contains chiefly albuminous cells, and the submaxillary and especially the sublingual, chiefly mucous cells. This difference in histological structure is associated with

a chemical difference in the secretion. The saliva from the submaxillary and the sublingual contains mucin and is thick and stringy, while the parotid saliva, although it contains some albumin, is free from mucin and is thin and limpid. Each of these glands receives a double nerve supply one set of fibres coming from the cervical,

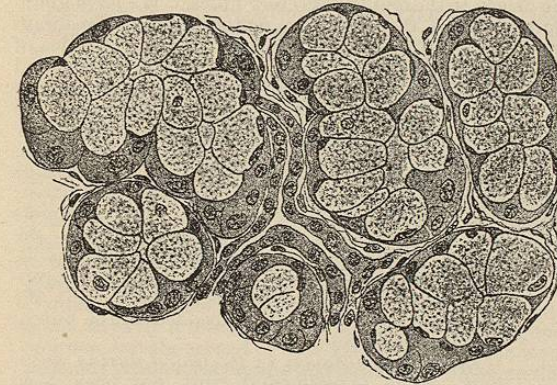


FIG. 4164.—A Section Through the Human Sublingual Gland. (Böhm-Davidoff.)

sympathetic and the other directly from the cranial nerves. The parotid receives its cranial nerve fibres by a very indirect path. In the dog in which their course has been worked out experimentally the fibres arise from the brain in the glossopharyngeal, pass into the tympanic branch of this nerve, also known as the nerve of Jacobson, and thence to the small superficial petrosal through which they reach the otic ganglion. In branches from this ganglion they pass to the auriculo-temporal branch of the inferior maxillary, and thence by several small branches to the gland. This path is supposed to involve two nerve units, the first which may be designated as the cranial or preganglionic neurone ending in the otic ganglion; the second, the sympathetic or post-ganglionic neurone, arising in the otic ganglion and ending in contact with the gland cells. The cranial fibres of the submaxillary and sublingual are found in the chorda tympani nerve. They arise with this nerve from the facial and pass with it to join the lingual branch of the inferior maxillary. After running in the lingual for a short distance the secretory (and vaso-dilator) fibres branch off in several small strands which pass toward the hilus of each gland following the course of the ducts. This path also involves two nerve units. The cranial or preganglionic neurone ends in nerve cells of the sympathetic type, which, in the case of the submaxillary, are found in its hilus or along the duct, while in the sublingual they form a collection, conspicuous enough to be seen with the eye, and located in the angle made by the strands of fibres as they leave the lingual nerve. This collection of nerve cells was formerly designated as the submaxillary ganglion, but since Langley has shown by the use of the nicotine method that they are intercalated in the course of the nerve path to the sublingual gland, it is more appropriately named the sublingual ganglion. These sympathetic cells constitute the second or post-ganglionic neurone which ends in the gland cells. The sympathetic nerve supply to the three glands is in general the same. The fibres emerge from the spinal cord in the upper thoracic nerves, pass over to the sympathetic chain in the corresponding rami communicantes, ascend in the neck in the cervical sympathetic, and terminate, so far as the first neurone is concerned, in the cells of the superior cervical ganglion. From this ganglion sympathetic neurones pass out in strands that form a plexus in the coats of the arteries supplying the glands. These fibres are usually stimulated while in the cervical sympathetic or by applying the electrodes to the superior cervical ganglion.

**Composition of the Saliva.**—The saliva of the mouth consists, or may consist, of the mixed secretions from the large salivary glands together with the secretions of the small unnamed glands of the buccal mucous membrane. In addition to accidental constituents, such as epithelial cells, it contains mucin, a small proportion of albumin, an amylolytic enzyme known as ptyalin, and inorganic salts. The saliva of each gland may be collected separately by inserting a cannula into its duct. By this means it can be shown that the secretion of each gland has its own characteristics, the parotid saliva, for instance, being free from mucin, while the sublingual and the submaxillary saliva have varying proportions of this substance, but contain little or none of the ptyalin. Experiments by Pawlow indicate that the secretion of each gland may be excited differently under normal conditions. He found that in dogs the submaxillary secretion is readily excited by sapid bodies in the mouth, or by the sight or smell of food, while the flow of parotid saliva is especially marked when dry substances are placed in the mouth.

**Secretory Nerves.**—The discovery that these glands are supplied by secretory nerve fibres, we owe to Ludwig. In 1851 he found that stimulation of the lingual nerve causes a flow of saliva from the submaxillary gland. Bernard showed that the fibres in question belong to the chorda tympani, and discovered in addition that during the stimulation of this nerve there is a greater flow of blood through the gland. We now know that the chorda tympani conveys both secretory and vaso-dilator fibres to the submaxillary and sublingual. The natural suggestion that the increased secretion on stimulation of this nerve is due to the greater blood flow has been disproved by a series of experiments. It has been found, for instance, that after administration of atropine stimulation of the nerve is followed by a vascular dilatation without any secretion, and, on the other hand, that injection of quinine may cause a dilatation of the vessels without a secretion, which, however, is readily obtained if the nerve is stimulated. Evidently the glands possess true secretory fibres capable of starting and maintaining a secretion from the gland cells. It was found, subsequently, that stimulation of the cervical sympathetic nerve gives a small flow of saliva which is characterized by its large amount of solids and by the fact that during the stimulation the blood flow through the gland is diminished in consequence of the simultaneous stimulation of vaso-constrictor fibres. Corresponding to these facts, Heidenhain found for the parotid gland that stimulation of the cranial nerve fibres in the nerve of Jacobson, gives an abundant secretion of thin saliva, while stimulation of the cervical sympathetic gives little, or, in the case of the dog, no secretion. In the latter case, however, it was discovered that stimulation of the sympathetic fibres has an effect on the gland, although no visible secretion is produced. Sections of the gland, for instance, after

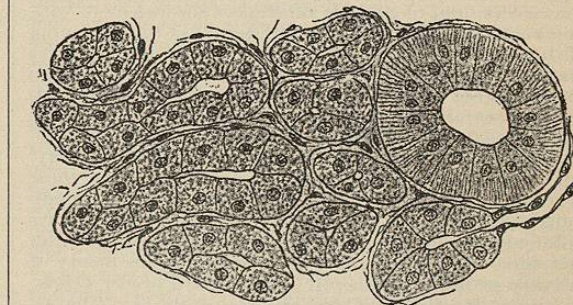


FIG. 4165.—A Section Through the Human Parotid Gland. (Böhm-Davidoff.)

such a stimulation show that the lumina of the alveoli and the ducts are distended with secretion, and if the cranial fibres are stimulated simultaneously with or subsequently to that of the sympathetic fibres, the secretion