lymphangitis and possible suppuration in the glands of the elbow and axilla.

All of these panaritium cases demand radical antiseptic treatment: early deep incision down to the seat of the suppuration, curetting, antiseptic washing, in many cases packing with gauze wrung out of a 1:2,000 bichloride solution, and the application of an antiseptic poultice till the infection is gone. Prompt treatment of this character will save many fingers and hands that are of the utmost value to those most generally afflicted—the working classes. Carbolic solutions have a tendency to produce gangrene in the extremities and should be avoided in these cases. Bichloride solutions should be employed according to the dermal irritability of the individual. If too strong they may produce an irritation of the skin, and even poisoning. *Charles Lester Leonard.*

ABSINTHISM.—A term applied to the train of morbid symptoms following the abuse of the liquor called absinthe.

In its general features absinthism is almost identical with the alcoholism brought on by the immoderate use of any other alcoholic beverage (see article *Alcoholism*, under the heading *Insanity*); and some observers have even doubted whether any special and peculiar symptoms could be attributed to any of the non-alcoholic ingredients contained in the liquor. Nevertheless, according to most authorities, not only the evil effects of intemperance appear earlier in those addicted to the habitual and excessive use of absinthe than they do in the case of abusers of other alcoholic drinks, but these effects are in themselves of a severer nature, and there is, besides, a more marked disturbance of the nervous system in its various parts. Vertigo, severe headaches, a condition of stupor and of apathetic listlessness, terrifying hallucinations, and epileptiform convulsions are particularly noticeable among the symptoms belonging to the absinthe tippler, and this liquor is especially prone to bring on an early condition of mental decay, and seems to be *facile princeps* in its power to enslave its victim. That the active principles of absinthe (Artemisia absinthium and its congeners) are the agents in causing the special toxic effects of the liquor, has been pretty well established by Marcé in his experiments on dogs and rabbits.

Huntington Richards.

ABSORPTION.—Gould, in his "Medical Dictionary," defines absorption as: the permeation or imbibition of one body by another; the process whereby nourishments, medicines, morbid products of tissue metamorphosis, etc., are taken up by the lymphatic and venous systems. Foster defines it as "the inbibition of nutrition or other materials by a living organism; the process of taking waste or effete material into the general circulation." In the limited sense of this article, and as usually accepted in physiology, absorption is merely the process by means of which nutritive material is taken from the digestive tract into the circulation.

Certain fluids when brought into contact with one another will mix until the liquids present a uniform composition, and the passage of the molecules of the one liquid into the intermolecular spaces of the other has been named "diffusion." When the same or similar two liquids are separated by a membrane, this diffusion takes place through the membrane and is then called "osmosis."

For a long time osmosis was supposed to be sufficient to account for all the phenomena of absorption, the process seemed so delightfully simple; but careful studies revealed the fact that while dead membranes, fluids, and gases under certain definite conditions obey equally definite laws, osmosis fails to explain the actions of living organs. Theories of electrical action and of differential filtration demonstrate only more clearly the complexity of the function of living absorbing surfaces. Living cells obey their own laws, and they are laws of life, not of mechanics. As the unicellular animal ingests, digests, absorbs, and excretes, and knows what it wants and what it has to do, so in the complex higher animal each cell retains all these functions, while the differentiation of the organs has imposed upon each the additional labor of doing something for the general well-being of the whole organism. The work assigned to the cells of the different parts of the digestive tract concerned in absorption is first to keep themselves in good condition; secondly, to pick out from the contents of the tract such substances as the body wants, and pass them into the circulation. It is safe to assert that normal absorption is a living, not a mechanical act, and that osmosis, as a factor in these phenomena, must not be taken into account. In pathological conditions, however, in conditions in which the separating membrane has been injured or its vitality lowered, osmosis may well come in as a strong factor in swellings, effusions, lymph accumulations, and all the phenomena usually designated as poor absorption; here we shall have to imagine a fight between the osmotic and the vital processes, the latter constantly tending to check the action of the former, until recovery takes place and osmotic action has ceased.

In a healthy body the skin can be excluded as an organ of absorption; in spite of the many careful experiments made pro and con, the weight of authority to-day rests with the assertion that under normal conditions the skin is passive so far as absorption is concerned. The same must be said about the mucous membrane of the mouth and œsophagus, for although we know that violent poisons can be and are taken up by the mucous membrane of the mouth, under ordinary conditions food does not stay there long enough to allow of any absorption to take place. That limits the absorbing surfaces of the human body to the mucous membranes and allied structures of the stomach, and the small and large intestines.

While the food eaten determines the length of the digestive tract, the absorbing surfaces bear a definite relation to the bulk of the body and explain why the body stops growing after a certain size has been attained. During a given limit of time the absorbing surfaces increase as their square while the body increases in bulk as its cube. In other words, if we assume that the absorbing surface equals 2, and the body bulk equals 2, then by the time the former has grown to equal 4 the latter equals 8; and when the former has increased again to 16, the latter's bulk is 512. It is easy to see how the growth of bulk is checked by the limitations of the absorbing surfaces.

The substances to be absorbed are peptones, glucose, and emulsified fat, the products of digestion, besides water and different salts which have remained unchanged.

The stomach has no specialized organs of absorption, but its whole mucous membrane absorbs materials digested in its cavity, peptones and glucose. The older view which made the stomach practically the only organ worth mentioning of the digestive tract, and took it for granted that its function in the absorption of peptones, glucose, salts, and water was of proportionate importance, has been slowly changed by the results of modern experiments. Without going to the other extreme view which makes the stomach merely the temporary receptacle for food, these experiments prove that absorption of the above-named substances does take place, but only to a limited extent. Of the carbohydrates, dextrose, lactose, maltose, and saccharose, even dextrin, is absorbed by the mucous membrane of the stomach, and the more concentrated the solutions, the more marked is the absorption. Peptones are absorbed slowly and apparently with difficulty, while condiments and alcohol increase distinctly the absorbing power of the stomach.

Perhaps the most interesting and least noticed fact brought out by these experiments is, that practically *no* water is absorbed by the stomach, but that all passes into the intestines; on the other hand, alcoholic solutions are readily taken up. This fact may ultimately help to explain why water is the beverage most desired when men are thirsty, and why something mixed with the water seems necessary when people, not thirsty, gather and drink for social enjoyment.

Peptones, glucose, and emulsified fats are absorbed

mostly in the small, and to a limited extent in the large intestines. Throughout the large and small intestines we find organs specialized for absorption, viz., the villi and the solitary glands. The former are most numerous in the duodenum and jejunum, the latter in the ileum. Throughout the large intestines we find solitary glands, but no villi, irregularly scattered, the largest numbers in the cæcum and appendix vermiformis; and their limited number, together with the well-known high absorbing power of the large intestines, leads us to think that its mucous membrane is, like that of the stomach, an important factor in absorption.

The villi, little cone-shaped protuberances in the mucous membrane, have a dense network of blood capillaries just underneath their epithelial covering, while a lacteal duct occupies the centre of the cone. The solitary glands have a dense lacteal plexus beneath the membrane and a limited supply of blood capillaries. All the blood capillaries of the intestinal tract are radicles of the portal vein, while the lacteal ducts and capillaries are radicles of the abdominal lymphatics. The villi, however, are the principal organs and carry the bulk of the peptones and sugars into the circulation directly, while the emulsified fats absorbed are poured by the way of the lacteals and abdominal lymphatics into the receptaculum chyli, and from there through the thoracic duct into the left subclavian vein.

How much the peptones absorbed are changed in their passage through the epithelial cells of the villi, and how much additional modification takes place in the capillaries and veins before the absorbed material enters the liver, is as yet a matter of conjecture. The knowledge that everything ingested, with the exception of fat, and water enough to emulsify the fat, has to pass through the liver before the body can make use of it, will probably increase our respect for that long-neglected and much-abused organ.

The emulsified fats are taken up by the epithelial cells and passed into the stroma of the villus; but whether directly into the delicate lymph channels which traverse it and finally unite to form the lacteal, or whether the leucocytes, so abundantly found in the stroma, carry the small fat globules from the epithelial cells directly into the lacteal, is yet an unsettled question. Under ordinary conditions only fat enters the lacteals, while peptones and sugar find their way into the blood capillaries; but that does not preclude the possibility that after an excessively fat meal, a trace of fat can find its way into the blood capillaries, as well as that, in cases in which an excess of meat and carbohydrates has been eaten, a trace of either can be found in the lacteals.

The bulk of the fats ingested is absorbed in the form of an emulsion; the small amount which is broken up into fatty acid and glycerin is probably absorbed with the peptones and glucose.

The absorbing power of the small intestines is about equal to the task of taking up the quantity of fluid formed by the action of the digestive ferments plus the quantity of fluids secreted by the pancreas, liver, and intestinal glands, and thus, as these quantities combined do not represent the total amount of fluid present, the contents of the small intestines remain fluid throughout their entire length. In the large intestines the conditions change, the absorbing power is high, secretion and digestion are limited, and, as a consequence, the contents become more and more pasty as they near the rectum, until finally the fæces contain that portion of the food ingested which has escaped digestion and absorption. The absorbing power of the large intestines is not limited to substances prepared by the action of the digestive fluids, but it can absorb undigested food, such as white of egg; and nutrient enemata, based upon this knowledge, have saved the lives of many patients.

The final test of the activity of absorption as well as of digestion will be a chemical and physical examination of the fæces, a proceeding perhaps not quite as agreeable to the physician as an analysis of the contents of the patient's stomach after a test meal, but an innovation which will be accepted with heartfelt gratitude by all whose digestive tract needs the services of the physician.

Julius Pohlman.

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ACANTHACEÆ (Acanthus family).—A large family, related to the Mints and Vervains, but unimportant except for its very rich ornamental properties. Many species have been utilized in the materia medica of British India, and the properties of Adhatoda (see *Vasicine*) are very peculiar. The principles are mostly resinous and amaroidal, with a few alkaloids, and all the recorded actions and uses, except those of *Adhatoda*, are rather indifferent. *H. H. R.*

ACANTHOSIS NIGRICANS.—(Synonym: Dystrophie papillaire et pigmentaire [Darier]). A disease of the skin and mucous membranes characterized by hyperpigmentation and papillary hypertrophy, developing in the course of an abdominal cancer.

The first recorded case of this disease occurred in a patient in Dr. Unna's Clinique for Skin Diseases in Hamburg, and was described by the present writer in the "International Atlas for Rare Skin Diseases," No. 4, Plate X., in 1889. Since then cases have been observed in France, Austria, England, and Russia. Couillaud,* in a monograph published in 1896, was able to record thirteen cases. At the Twelfth International Medical Congress, Moscow, two additional cases were described.

The disease usually begins with a slaty or brownish discoloration of the skin of the neck, about the genital organs, and the umbilicus. In other cases the first symptom to attract the patient's attention is the papillary or condylomatoid proliferation affecting the mucous membranes of the mouth. Other regions that may be affected are the flexor surfaces of the extremities, the axillæ, and the inframammillary region, the anal region, and in women the vulval and vaginal mucosæ. A striking feature of the distribution of the disease is its almost perfect symmetry. The pigmentation varies from a light gray to a bluish-black in color. It occurs over large areas and fades at their borders into the normal color of the skin. It is generally coextensive with the papillary hypertrophy, but sometimes appears as a precursor of this condition. It has never been noticed on the mucous membranes.

The papillary hypertrophy varies in degree from a slight prominence of the normal areas of the cuticle to warty excrescences that may attain an elevation of a centimetre. It occurs in extensive patches in the regions noted and its borders merge insensibly into the normal skin. The patches are always dry, there is no exudation even from pronounced filiform excrescences, and they impart a harsh grating sensation on palpation. On pinching up the skin the epidermis is seen to have lost its elasticity, but the affected regions are freely movable over the subcutis. There is no appreciable desquamation from the affected areas. On the mucous membranes the papillary elevations may be discrete or they may occur in patches. The excrescences sometimes attain a very considerable size, and in appearance and consistency are strikingly like venereal warts, but, unlike them, do not bleed readily on palpation.

In some cases of long duration, changes in the appendages of the skin have been noted. The nails of the fingers and toes become dry, cracked, and misshapen. The hairs on the head and over the entire body become dry and fragile and may fall out spontaneously, producing a total alopecia.

Anatomy and Pathology.—Under the microscope changes corresponding to the clinical picture are found. The horny layer appears somewhat thickened; the granular layer shows several rows of keratohyaline cells; the rete Malpighii is the seat of a hypertrophy which in

* Dystrophie pap. et pig. ou acanthosis nigricans, Paris, 1896.

some sections attains the enormous dimensions seen ordinarily in common warts, and its lowest layer contains great quantities of pigment. The papillæ are elongated, sometimes attaining a length of 6 or 8 mm., and often ramify, following the digitations of the epithelium above them. They show no evidence of increase in width. The subpapillary layer and the cutis itself show but very slight changes—a moderate increase in the number of emigrated cells, of mast and pigment cells.

In most of the cases there has been more or less positive evidence of cancer affecting the abdominal organs. In the two cases in which an autopsy was obtainable there was an extensive carcinosis of the abdomen, which, while it spared the adrenal bodies, was especially noted as involving the lymph glands in close proximity to the large sympathetic ganglia. There is no doubt that the disease is directly dependent on the existence of abdominal cancer, but whether it be a cutaneous manifestation of a peculiar cancer intoxication or whether it be due to changes induced in the great sympathetic ganglia through the pressure of the tumors on them, or to the combined action of both these causes, is a matter that future investigation must determine.

Diagnosis.—Ichthyosis, pityriasis rubra pilaris, and keratosis follicularum (Darier's disease) are the only diseases which may bear even a remote resemblance to acanthosis nigricans. Ichthyosis is a mild congenital disease, persists throughout life without producing any general disturbances, is located chiefly on the extensor surfaces, never affects the mucous membranes, and is characterized by constant desquamation in more or less extensive scales. Pityriasis rubra pilaris, sometimes occurring in extensive sheets about the great flexures and presenting the peculiar discoloration common to many hyperkeratoses, may suggest acanthosis nigricans, but in all other respects there are more points of difference than of resemblance between the diseases. Darier's disease is differentiated by the limitation of the affection to the follicles, the non-involvement of the mucosa, the peculiar greasy character of the affected surfaces, and the occasional occurrence of large nodular masses from which a foul secretion is discharged. The differentiation from the various pigmentary affections of the skin need not be entered into.

The *prognosis* of the disease is, of course, that of the underlying cause—the abdominal cancer; that is, it is hopeless. In some of the cases the cutaneous manifestations have undergone a varied course, probably depending upon changes in the location or size of the tumors in the abdomen. In my own case there was an almost complete disappearance of the affection of the skin and mucous membranes shortly before the patient died.

Sigmund Pollitzer.

ACARDIUS. See *Teratology.*

ACARI. See *Arachnida.*

ACAROIDES GUM. See *Zanthorrhœa Resin.*

ACCLIMATIZATION.—When any animal, brute or human, is removed from the environment to which he and his ancestors have long been accustomed, a considerable disturbance of the whole economy is liable to ensue. The process of evolution has developed certain organs and certain functions in accordance with the requirements of those circumstances under which his race has found itself, and when he is suddenly transplanted into new conditions some of his faculties become without occupation, while others hitherto uncalled upon, and therefore undeveloped, are suddenly subjected to a demand to which they are quite unable to respond. The process of accommodation of the individual to new conditions of climate is known as acclimatization or acclimation. These conditions include temperature, moisture, morbific germs, elevation, sunshine, food, and other less tangible factors. Such elements as are connected with the social rather than the natural environment, as, for instance, education, the standard of public morality, and the avocation or means of livelihood, while in any radical change that they may undergo profoundly affecting the individual, are yet to be held distinct from the conditions to which acclimatization properly refers.

No other animal is so facile in his accommodation to changes of climate as man. The lower animals and plants often do not recover for several generations from the effects of transplantation. The Société d'Acclimatisation of Paris has for years been carrying on, in its gardens, an extensive zoölogical experiment on the domestication of foreign animals and plants which it is believed can be made useful to European countries. The record of its failures and successes is embodied in the numerous volumes of its reports. Man's comparative immunity from the disastrous effects of changing climate is due in part to his ability, by an intelligent prevision of the dangers which are to beset him, of guarding against them. The records of arctic explorers present abundant eivdence of the ability of the denizens of temperate climes to endure winters in which the thermometer averages from 40° to 50° F. below zero. On the other hand, Europeans have lived in health and cheerfulness on the banks of the Senegal when the thermometer in their tents stood at from 120° to 130° F. Men endure extremes of barometric pressure ranging from that of several atmospheres, as found in caissons, to the tenuity of the air experienced at great elevations. In the Himalayas men have lived at the height of 15,000 feet, and Humboldt even went to the elevation of 19,286 feet, where he remained for a time without ill effects; but where no animal but a dog would follow him, and this creature quite lost the power of barking.

The differences in the facility of acclimatization at various points in the same latitude are shown by an article reprinted in the *Popular Science Monthly* for July, 1884. Between 30° and 35° N. latitude, Europeans acclimate much less readily than in the same latitudes south. Algiers, for instance, is vastly more difficult for the European to live in than Cape Colony, yet both places are about latitude 35°. The Argentine Confederation and New South Wales are more healthy than the East and West Indies, which are of the same latitude. The mortality of the French and English troops has been found to be about eleven times as great at foreign stations in the northern as at those in the southern hemisphere. The chief cause of the difference is in the prevalence of miasmatic fevers so deadly to Europeans. Those fevers in the northern hemisphere occur even in high latitudes, while south of the equator they do not extend beyond the tropic. The island of Tahiti, for instance, about latitude 18° S., is quite exempt from these fevers. The records of the French and English soldiers on foreign service show, in South America, a sickness from malarial fevers of 1.6 in 1,000 men per annum; while in a similar latitude in the northern hemisphere, the number of such cases annually is 224 per 1,000.

To persons removing from one point to another within the temperate zone, one principal obstacle to acclimatization is change (especially diminution) in barometric pressure. Many persons on going to an elevation of not more than 6,000 feet experience a sense of constriction in the chest as well as across the liver and stomach. The pulse is quickened, as is also the respiration. The individual sometimes feels that he cannot take a long breath, and is often testing himself to see if he can do so, but the act does not relieve the air-hunger. Slight exertion causes fatigue and sleep is disturbed and fitful. If there was any pre-existing heart trouble, the condition may soon become perilous. Anything like a congestion of the internal organs adds to the danger of ascending to high altitudes. If the unpleasant symptoms continue after a day or two of perfect rest, it is advisable to make no further attempt to secure acclimatization.

The practical questions of greatest importance connected with acclimatization are those relating to the colonization of Anglo-Saxon peoples in tropical countries, which, while they have long concerned our English

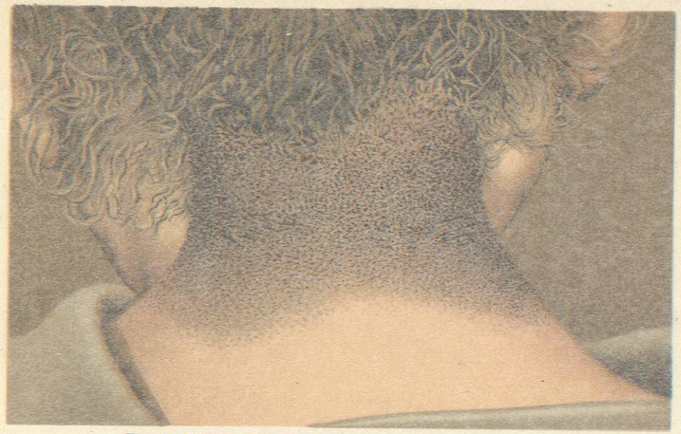

Fig. 1. Shows the roughened and discolored condition of the neck.

Fig. 2. Shows the discoloration about the lips and chin, and the condylomatoid proliferation at the angles of the mouth.

Fig. 3. Microscopic section through one of the condylomatoid masses at the mouth.

Acanthosis Nigricans. (Case of Dr. S. Pollitzer; from the International Atlas of