

enjoyed by some patients, and they are efficacious. Starch poultices with boracic acid added to them, a heaping teaspoonful of boracic acid to a small bowl of starch paste, are an excellent means of loosening up epithelial masses.

**PROGNOSIS.**—Ichthyosis as a deformity is not dangerous to life. As, however, it represents an extensive developmental fault in an important organ, it indicates a corresponding lack of resistance. As a matter of fact people so afflicted are frequently puny and illy developed in many directions. Usually they have not the normal quantity of subcutaneous fat. They easily become chilled and catch cold, and many of them end with tuberclosis (Lewin).  
*Douglass W. Montgomery.*

**ICHTHYOSIS FETALIS.**—**DEFINITION.**—Ichthyosis foetalis is an independent anomaly of development of the skin in the foetus, accompanied by consecutive malformation of certain parts of the face. Ichthyosis foetalis must not be confounded with ichthyosis vulgaris, with which it has nothing whatever to do. It is for this reason that the word ichthyosis in the name of this disease is unfortunate and leads to confusion. Very probably a better name would be hyperkeratosis foetalis.

The disease is very rare, and even of those children who are born with it, but few come under the observation of men interested in skin diseases, as they usually die shortly after birth, and are therefore seen only by the accoucheur. Only a few of these cases have been reported, and of those few, it has several times occurred that one mother has had more than one child afflicted with this malady, so that ichthyosis foetalis, like ichthyosis vulgaris, is a family disease. Excepting this fact of its being in many instances a family disease, very little is known of its etiology. Bowen thinks the disease may be due to the persistence of the epitracial layer of epithelial cells. The epitracial layer of epithelial cells occurs in some animals, and Bowen's hypothesis is that it is present at one stage of human foetal development, but is, under normal conditions, shed. He supposes that in ichthyosis foetalis it is for some reason not shed, but grows and forms the hard resistant coating seen in these cases.

**SYMPTOMS.**—The epidermis has a dirty yellow, leathery appearance, and is thickened, and the skin looks too small to contain the infant. In fact it looks as if the infant as a foetus had been covered by a much thickened and inelastic epidermis, and that in growing it had burst this inelastic coating, forming cracks in it running into one another at all angles. These fissures or cracks are more or less red, and about a centimetre wide, and they may or may not be covered by a thin epidermic layer; when not so covered the raw surface lies exposed, and it soon suppurates abundantly.

In addition to the deformity of the skin there are other deformities present, such as congenital ectropion in which the lids look like red projections hiding the globes of the eyes completely. There are neither eyelashes nor eyebrows, and in fact the whole pilary system is very badly developed. The hair, however, though thin, grows very quickly, as do the nails (Thibierge). The nose is flat to the face, and is represented by two rounded holes, and the cartilaginous septum is entirely lacking. The lips are thickened and are cut by radiating fissures, or they are entirely absent and the skin of the face may run over directly to the gums. The ear shell is represented by a flattened plateau with a central rounded hole, the external auditory meatus. There are no nipples on the breast, the anus may be imperforate, and the external genital organs are imperfectly developed. The fingers and toes are often bent and clawed, and give the impression of being hidebound. The fingers and toes may be more or less soldered to one another, or they may be entirely absent, the extremities terminating in rounded masses.

The reasons for thinking that the foetus at one stage of its existence is completely covered with this inextensible horny envelope, which afterward is burst open, are that the direction of the fissures is in all cases about the same,

and is such as would be occasioned by the growth of the enclosed foetus; that the furrows at birth are partially or entirely covered with a thin epidermal layer, which represents the healing process after the bursting has taken place; that the hair follicles are entirely absent from the centre of the furrows, while on the sides the hair follicles are directed outward as would result from tearing the plastic foetal skin asunder (Peukert); and that the deformities at the orifices of the body, the absence of the eyelids and of the lips, the flattening of the nose and of the ears, as well as the deformities of the hands and feet are such as would be occasioned by the foetus being hidebound.

Infants with such severe lesions die inevitably, and usually in two or three days after birth. They may not be able to take food at all, because of the malformation of the lips, or they may die from the suppuration in the cracks of the skin, or from bronchitis or pneumonia. Attenuated forms of the disease have been reported, however, in which the patients have lived for years. The mouth seems to be the chief factor in determining the prognosis, as those having a badly formed mouth die of inanition.

**DIAGNOSIS.**—Ichthyosis foetalis differs from ichthyosis vulgaris in the time of its appearance, ichthyosis foetalis being apparent in the foetus and in the new-born babe, while ichthyosis vulgaris is rarely evident before the second or third year of life. Ichthyosis foetalis is almost always associated with malformation of the ears, eyes, and lips, and frequently with other malformations. It is rare for ichthyosis vulgaris to be associated with any other malformation whatever. Ichthyosis vulgaris has its regions of greatest development, and it rarely affects the folds of the articulations, but if it does affect them the disease in such situations is very mild. In ichthyosis foetalis, on the contrary, the disease is as severe in the articular folds as anywhere else. Furthermore, in ichthyosis foetalis the epidermis is not alone thickened, but it is also abnormally resistant and inextensible. In ichthyosis vulgaris the absence of sweat is a marked characteristic, while in ichthyosis foetalis the secretion of sweat takes place (Thibierge). The diagnosis between hereditary syphilis and ichthyosis foetalis has only to be remembered to be made. Ichthyosis sebacea is simply a temporary exaggeration of the normal physiological desquamation of the new-born, and has nothing whatever to do with ichthyosis foetalis.

**TREATMENT.**—In a case observed by Sherwell, in which the infant lived an unusually long time, it was kept soaked in olive oil.  
*Douglass W. Montgomery.*

**ICTERUS.** See *Jaundice.*

**IDAHO HOT SPRINGS.**—Clear Creek County, Colorado.

**POST-OFFICE.**—Idaho Hot Springs. Hotel.

**ACCESS.**—Via Colorado Division of the Union Pacific Railroad, the route lying through the famous Clear Creek Canyon. These springs are situated in the Rocky Mountains at an elevation of 7,500 feet above the sea level. The location is exceedingly picturesque, and the climate of a wholesome and salubrious character. Invigorating mountain breezes prevail throughout the summer. The facilities for bathing form a special attraction at these springs. Three immense swimming pools have been constructed, besides numerous private baths, the water ranging in temperature from 85° to 115° F. A natural tunnel furnishes excellent conveniences for a ready-made vapor bath, and is largely resorted to. The following analysis of the Idaho Hot Springs water has been made by J. G. Pohle, analytical chemist:

ONE UNITED STATES GALLON CONTAINS:

Solids.	Grains.
Sodium carbonate.....	30.80
Calcium carbonate.....	9.52
Magnesium carbonate.....	2.88
Iron carbonate.....	4.12
Sodium sulphate.....	29.36

Solids.	Grains.
Calcium sulphate.....	3.44
Sodium chloride.....	4.16
Calcium and magnesium chlorides.....	Trace.
Sodium silicate.....	4.00
Magnesium sulphate.....	18.72
Total solids.....	107.00

Within five minutes' walk of the Hot Springs there is a cold spring of sparkling, effervescent water, excellent for drinking purposes. A good carriage road leads to the summit of Bellevue Mountain, less than three miles distant, which it is said to afford the most majestic mountain view in Colorado.  
*James K. Crook.*

**IDAN-HA SPRING.**—Bannock County, Idaho.

**POST-OFFICE.**—Soda Springs.

**Hotels:** Idan-ha, Carriboo, Stock Exchange, and Williams.

The Idan-ha Spring is located two miles from Soda Springs, from whence it is reached by a good roadway. The situation of the spring is 5,886 feet above the sea, and the surrounding mountain scenery is of a grand and impressive character. The climate is very salubrious, the weather being, as a rule, clear and bright. The town of Soda Springs has long been known as a health resort. Within the town limits are the following named springs: the "Horseshoe," "Octagon," "Williams," "Soda," "Mount" and "Blanche" springs. In the outlying districts are the "Mammoth," "Steamboat," "Hooper," "Jews-harp," and "Fresh-Water" springs. The latter supplies the town with water by a pipe line. Close to the Idan-ha (which is known as the "90-per-cent.") are the "100-per-cent.," the "80-per-cent.," and the "Cham-pagne" springs. An extensive bottling establishment has been built in connection with the Idan-ha Spring, and the waters are shipped and sold in all parts of the country. It is charged with carbonic-acid gas from the Mammoth Spring, two and one-half miles east of Idan-ha, which supplies an immense amount of this substance. The following analysis was made by Prof. Charles F. Chandler:

ONE UNITED STATES GALLON CONTAINS:

Solids.	Grains.
Sodium chloride.....	13.19
Sodium bromide.....	Trace.
Lithium bicarbonate.....	1.27
Sodium bicarbonate.....	7.34
Magnesium bicarbonate.....	62.40
Calcium bicarbonate.....	57.96
Strontium bicarbonate.....	Trace.
Barium bicarbonate.....	.08
Manganese bicarbonate.....	1.73
Iron bicarbonate.....	.12
Potassium sulphate.....	1.72
Sodium sulphate.....	1.96
Sodium phosphate.....	.88
Sodium borate.....	Trace.
Alumina.....	.05
Silica.....	3.56
Organic matter.....	Trace.
Total solids.....	152.06

This water also contains an excess of free carbonic acid gas. The analysis shows an excellent alkaline-saline water, with ferruginous properties. It should possess valuable properties as a diuretic, mild aperient, and tonic. It is very pleasing to the taste, and possesses the desirable quality of blending with wines and liquors, without giving discoloration or precipitation.  
*James K. Crook.*

**IDIOCY AND IMBECILITY.** See *Insanity: Idiocy and Imbecility.*

**IDIOSYNCRASY.**—This term (from *ιδιος, σύν, κρᾶσις*, literally, a personal or individual commingling) is applied medically to those mental or constitutional peculiarities of an individual which separate him from the majority of men. To those peculiarities which are shared by classes of individuals, on the other hand, the term temperament is given.

One should not include under the term idiosyncrasy

qualities due to pathological conditions, as, for instance, the absence of reflexes in tabetic subjects or sensory aberrations like color-blindness, lack of smell or taste perception. But while idiosyncrasies are usually congenital, they may be, as we shall see later in the case of drug and poison addiction, acquired.

The most important idiosyncrasies which fall under the attention of the physician are included under (a) sensations, (b) reflexes, (c) infections, (d) foods, (e) drugs and poisons.

(a) **Sensations.**—One of the most marked idiosyncrasies has to do with response of a given individual to pain. This is shown, for a common illustration, in the matter of vaccination. The actual insult to terminal sensory nerves in a series of patients submitting to this little operation is about the same; but while some of them will notice no hurt whatever, others will shrink and cry out in evident acute pain. Some few will faint. This varying personal factor of pain susceptibility must receive due consideration by the physician in interpreting the symptoms which a patient describes. Other minor discomforts, which yet from a nosological standpoint may be important, receive very varying attention from different people. For example, the writer has observed a large scrotal tumor in an elderly bookworm who said, on his attention being called to it, that he had never noticed its presence at all. Or, again, a woman is found with a completely proident uterus to which she had never given any thought; whereas most women with a far less pronounced degree of prolapsus would have early sought medical advice.

Auditory sensations have a peculiarly unwelcome effect on certain people. The squeak of a file, of a saw, or of a slate pencil are familiar examples. Shylock emphasizes these sensory idiosyncrasies when he says:

"As there is no firm reason to be rendered  
Why he cannot abide a gaping pig,  
Why he, a harmless, necessary cat,  
Why he, a swollen bag-pipe  
So can I give no reason, nor I will not  
More than a lodged hate and a certain loathing."

(b) **Reflexes.**—These are perhaps more important medically than the class just considered.

Sea-sickness deserves first mention here, from its wide prevalence. In fact it is perhaps the absence of this reflex susceptibility that constitutes the idiosyncrasy. Certainly there is no way of foretelling which individuals will prove able to resist it. Freedom from it is to some extent cultivable, though it is well known that some sea captains and naval officers even lose what they have gained in that direction after a short residence ashore.

Hay fever doubtless belongs in this category, for while a pathological lesion exists in a certain proportion of cases, a reflex idiosyncrasy to certain irritants is also a factor. Whatever this irritant may be, it is doubtless similar in its action to ipecac upon another sort of idiosyncrasy. The writer knows a druggist who is so susceptible to the reflex irritation of this drug that he not only cannot dispense it himself, but is obliged to leave his store when any of his assistants is doing so.

Asthma probably owes a part at least of its etiology to a similar reflex idiosyncrasy. For while we have a determining cause in some pathologic state of the respiratory tract, and an exciting cause in an acute inflammation of the bronchi, or elsewhere, we must assume in asthmatics a predisposing cause in a peculiar reflex irritability; for not all persons possessing the first two conditions have asthma.

Another reflex idiosyncrasy is that which enables the rigger and the steepie-climber to ascend to high places without giddiness or fear of falling.

It is a failure of natural reflex response to cold baths and cold affusions which explains the idiosyncrasy noted in some people at water-cure establishments. On the other hand, those untoward results of batlis which include skin eruptions, eczema, furunculosis, etc., are, in so far as they are not due to uncleanly methods, to be classed in the following section among therapeutic idiosyncrasies.



(c) *Infections*.—The present article does not touch upon the subject of *Immunity* (which see). But there is in some persons a lack of susceptibility to various diseases which can be ascribed only to idiosyncrasy. This is well illustrated by vaccinia, there being a very few persons upon whom vaccination cannot be made to "take" no matter how often repeated. Some families of children escape in epidemics of the exanthemata, while others have these diseases several times, seeming to be unable to acquire the usual immunity from one attack. The universal exposure to the bacillus tuberculosis would indicate that the varying resistance of different individuals was largely a matter of idiosyncrasy.

(d) *Foods*.—There are many instances of idiosyncrasy as regards special articles of diet. One person, for instance, not only cannot eat cheese without violent gastro-intestinal irritation but cannot eat comfortably at a table where it is served. A special form in which these food idiosyncrasies assert themselves is in the production of urticaria from the use of them. Familiar examples are fish and shell-fish, especially lobsters; also strawberries and peaches. The latter fruit with some patients will cause an intense coryza apparently like a rose-cold. Herpes and angioneurotic oedema are similarly produced. Milk is an article of diet which many persons, generally mistakenly, think they cannot take. But there are really some who undoubtedly do have an idiosyncrasy against it. Regarding this as every other article of diet, a person should, often with medical supervision to guard against error, establish the fact of his own idiosyncrasy, and having once established it should thereafter respect it.

(e) *Drugs and Poisons*.—In this field idiosyncrasy may show itself either by an unusual susceptibility to a small dose, or, on the other hand, by a lack of susceptibility to the average physiological or even toxic dose. The former of these conditions is usually congenital; the latter may be either congenital or acquired. To it is given the technical name of "tolerance."

A high degree of tolerance is usually an acquired condition. It is well known that in both man and the lower animals, increasing doses of a toxin can be given till doses are tolerated far in excess of what would be fatal without such a progressive increase in dosage. The use of the toxin of diphtheria in the preparation of antitoxin is a familiar example of this. The same tolerance is established in the case of non-bacterial poisons, as, for example, tobacco, alcohol, and arsenic. But while such tolerance may appear to be present in certain organs or systems of the body, it may be absent in others. For example, the nervous system may appear to be resisting tobacco or alcohol, while the cardiac or digestive may be in reality succumbing to its use, or vice versa.

Such an acquired tolerance, whether in the case of toxins or of drugs, ceases soon after the regular administration of the poison has been stopped. The term Mithridatism was applied to a supposed immunity against poison gained by King Mithridates through the systematic use of poisons employed for that end.

The Styrian peasants have long been noted for their acquired tolerance for arsenic. One sceptical traveller is recorded to have administered seven grains of arsenious acid to an apparently healthy Styrian without ill effect. The enormous doses of morphine taken by morphinomaniacs of course suggest themselves in this connection.

A tolerance for one drug sometimes develops a tolerance for others of similar nature. To this may perhaps be ascribed the large amount of ether required to anesthetize a habitual alcoholic. The writer once saw a morphine habitué who after taking nearly a drachm of morphine with suicidal purpose added to the dose over one hundred grains of chloral, to which he was not specially addicted, but the conjoined dose had no serious effect. Insensibility to large doses of sedatives, as ether, chloroform, opium, hashish, and bromides, is found in some persons not habitués of any of these drugs. Such persons are apt to be of a hysterical or emotional character. A lack of response to large doses of cathartics may be dependent on the cathartic habit or may be met with in-

dependently of it. People of warm climates are said to require exceptionally large cathartic doses.

Many persons are aware of their own drug idiosyncrasies, and may properly acquaint a strange physician with them. It is unwise to disregard such information if given by a person of intelligence. In doing so one is liable to repeat the disastrous experience of a previous attendant, and even if the experiment has no other ill-effect than the temporary discomfort of the patient, the latter is likely to feel provoked that his warning was not regarded. But of course the patient may have drug idiosyncrasies which are unknown to him. It is therefore unwise for a physician in case of untoward symptoms arising, to say off-hand that they could not possibly be due to the use of a given drug, even though in his experience such a result had never occurred.

It may be said in passing that sometimes a pathological condition of some organ, involving too slow or too rapid absorption or impaired elimination, is at the bottom of what is regarded as a congenital drug idiosyncrasy. Thus renal inadequacy has been found in some persons who could not take iodine.

Childhood appears to present some special features with regard to drug susceptibility. Especially opium should be used very cautiously at this period. There is a common belief, on the other hand, that arsenic and belladonna are especially well borne by children. I think it very doubtful if this be true of the latter. Jacobi thinks children tolerate relatively large doses of quinine, digitalis, potassium iodide, and mercury.

It remains to mention a few specific drugs and poisons in regard to which marked individual idiosyncrasy is most often met.

*Icy Poison*. Here all degrees of susceptibility are met, from perfect immunity to the most intense dermatitis following the slightest contact.

*Alcohol*. Here we find not only quantitative but qualitative idiosyncrasies. One man can drink down all his fellows, while the others with an equal quantity of liquor may show either amativeness, quarrelsomeness, hilarity, or gloom.

*Quinine* is a drug which occasionally produces ill effects in a dose much smaller than ordinarily given. Such effects are tinnitus, deafness, blindness, and erythema. The writer has seen an intense universal dermatitis follow its use, and has known a clergyman in whom a dose of two grains invariably produced a marked erythema of the scrotum. Fever and abortion have both been reported to follow the use of quinine.

*Salicylic acid* will cause at times an intense delirium. I have seen it simulate an acute mania and last nearly a fortnight.

*Belladonna* also, as is well known, causes delirium in certain patients. *Opium* has caused vomiting, wakefulness, convulsions, and delirium. Doubtless there are some persons who should never take the drug. In the first use of the hypodermic syringe upon strangers a considerable conservatism is wise.

*Potassium Iodide*. Perhaps no drug reveals more of personal idiosyncrasy than this. Two to five grains often cause coryza. Four ten-grain doses have produced an oedema of the glottis severe enough to require tracheotomy. Fifteen grains a day will often cause a good deal of acne. But, curiously, patients who cannot take the small doses often can take the large one, and the massive doses of four to six drachms three times a day are generally well borne. One cannot insist too firmly that the tolerance for this drug is not a diagnostic criterion of syphilis.

Charles F. Withington.

**IGAZOL** is said to be a mixture of formaldehyde, paraformaldehyde, and an iodine compound of unstated nature. It is in the form of a powder and was introduced by Cervello as a remedy for tuberculosis. Norway used it by vaporizing over a lamp for two hours three times a day. He reports good results in asthma, laryngeal spasm, and phthisis. It has no specific action.

W. A. Bastedo.

**IGNATIA**.—**SAINT IGNATIUS' BEAN**. The seed of *Strychnos Ignatii* Berg. (fam. *Loganiaceae*). This is a large, half-climbing shrub, with very long, slender branches, and rather large, oval, pointed, three-nerved leaves. The flowers resemble those of *S. Nux vomica*, and the fruit is a very large (10 to 20 cm.), solid, many-seeded, hard berry. The plant grows in the Philippine Islands, and has been introduced into Cochinchina. The fruit appears to be not uncommon in some Asiatic markets. The seed has been known to Europeans since 1699 (Flückiger).

Saint Ignatius' Beans are hard, oblong, but irregularly faceted seeds, 2 or 3 cm. in length, of a dull yellowish-gray or blackish color, and corneous texture; they are normally covered with short, coarse, appressed, glistening hairs, but these are usually rubbed off before they reach this country, probably by the friction of the long voyage or carriage. The seed consists mostly of perisperm, but contains an oblong embryo, 6 or 8 mm. in length, in a cavity near the centre. The seeds have but little odor, and a very bitter taste.

**COMPOSITION**.—*Strychnine*, to the extent of from one to one and a half per cent.; *brucine* from one-half to three-fourths per cent.; considerable albuminoid matters; no starch. These seeds, from chemical, structural, and physiological points of view, are qualitatively so exactly duplicates of *nux vomica* that the reader is referred to that article for further information. Because it was supposed to be more uniform in its alkaloidal percentage, and in the relative percentages of strychnine and brucine, this drug was made official in 1880, but it was found impossible to induce physicians to substitute it for the familiar *nux vomica*, and it was dropped at the 1890 revision. An abstract, of fifty-per-cent. strength, dose 0.06 to 0.3 gm. (gr. i.-v.), and a tincture of the same strength and dose as that of *nux vomica*, were supplied.

W. P. Bolles.

**IMMUNITY**.—The past few years have added a great deal to our knowledge concerning the nature of immunity, but there is still much to be learned. Care must therefore be taken, while discussing the many plausible theories advanced, to remember always that they are but theories and may be, however interesting, still untrue.

Experience and observation have taught us that various races of animals and men, and various individuals among these, differ in their susceptibility to certain diseases; and, further, that the same individual is at one time more resistant to such diseases than at another. This inborn or spontaneous refractory condition is termed natural immunity, in contradistinction to that acquired during an attack of disease.

As in bacteria we distinguish between the ability to produce poison and the power to multiply, so in animals and man we may distinguish between immunity to poison and immunity to the invasion of bacteria.

With regard to variations in susceptibility, certain facts have been ascertained. Thus, cold-blooded animals are generally insusceptible to infection from those bacteria which produce disease in warm-blooded animals, and vice versa. This is explained in a measure by the inability of the bacteria which grow at the temperature of warm-blooded animals to thrive at the temperature existing in cold-blooded animals. But differences are observed not only between warm-blooded and cold-blooded animals, but also between the several races of warm-blooded animals. The anthrax bacillus is very infectious for the mouse and guinea-pig, while the rat is not susceptible to it unless its body resistance is reduced by disease and the amount of infection is great. The inability of a micro-organism to grow in the body of an animal does not necessarily indicate, however, an insusceptibility to its poison; thus, for instance, rabbits are said to be less susceptible than dogs to the effects of the poison elaborated by pneumococci, but these bacteria develop much better in the former than in the latter. Differences in susceptibility are sometimes very marked among different varieties of the same race of animals, as,

for instance, between different kinds of rats and pigeons to anthrax. In animals, as a whole, experiments have shown that the young of all species are on the average less resistant to infection than the older and larger ones.

The difficulty experienced by many micro-organisms in developing in the tissues of the healthy body can be to a great extent removed by any cause which lowers the general or local vitality of the tissues. Among the causes which bring about such lessened resistance of the body are hunger and starvation, bad hygienic surroundings, exhaustion from overexertion, exposure to cold, the deleterious effects of poisons, bacterial or other, acute and chronic diseases, vicious habits, drunkenness, etc. Purely local injuries, such as wounds, contusions, etc., give a point of entrance for infection, and also through tissue injury one of less resistance, where the bacteria may develop and produce local inflammation. Local disease processes, such as endocarditis, may also afford a weak spot for the bacteria to seize upon. The presence of foreign bodies in the tissues in like manner predisposes them to bacterial invasion. Interference with free circulation of blood and retention in the body of substances which should be eliminated also tend to lessen the vitality. In these and other similar ways animals which are otherwise refractory may acquire a susceptibility to bacterial invasion.

Just as all conditions which are deleterious to the body lessen its power of resistance to bacterial invasion, so all conditions which are favorable to it increase its resistance, and thus aid in preventing and overcoming infection. The internal use of antiseptics against bacteria has not proved successful, for the reason that of all known non-specific bactericidal substances an amount sufficient to inhibit bacterial growth is found to be poisonous to the tissue cells. The efficacy of quinine in malaria and of mercury in syphilis is, possibly, an exception to the rule, but in both cases we are dealing probably with animal parasites, not bacteria. Such substances as nuclein and others contained in blood serum, when introduced into the body in considerable quantity, aid somewhat in inhibiting the growth of many bacteria. Even bouillon, salt solution, and small amounts of urine have a slight inhibitory action. The hastening of elimination of the bacterial poisons by free intestinal evacuation and encouragement of the functions of the skin and kidneys are also of some avail. The enzymes formed by certain bacteria have been found to exert a slight bactericidal action, not only on the germs which have directly or indirectly produced them in the body, but also on other varieties. None of these enzymes is sufficiently protective, however, to be of practical value nor equal in power to the protective substances formed in the body after infection with many micro-organisms.

The tissues of the animal body under the normal conditions of life are unsuitable for the growth of the great majority of bacteria, and are only fairly favorable to the development of the few remaining. Indeed, only a very small number of varieties of bacteria find the conditions really satisfactory, and even these must gain a point of entrance.

In seeking for a reason for the difficulty experienced by the bacteria in growing in the tissues, we cannot expect to find it in either the lack of or concentration of the nutritive substances, in the temperature, or in the reaction; for although these conditions may be unsuitable for some bacteria they are suitable for many, and thus cannot constitute the fundamental explanation of immunity. A possible reason for the inability of the bacteria to invade living tissues may be in the fact that the nutritious material in the living cells is in a form which the bacteria cannot readily assimilate; but if this be true it does not adequately explain why the bacteria do not develop in the nutritious fluids so abundant about and in the body tissues. We are thus driven to the conclusion that the body fluids themselves contain substances which are directly deleterious to the bacteria. As to the origin of these substances, it is conceivable that they may be either regularly produced in the cells or that they may be pro-