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THE

SENSATION OF ITCHING

BY

EDWARD BENNET BRONSON, M.D.

PROFESSOR OF DERMATOLOGY IN THE NEW YORK POLYCLINIC

Reprinted from the MEDICAL RECORD, October 18, 1890



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THE SENSATION OF ITCHING.¹

IT is a somewhat remarkable fact that a manifestation of cutaneous irritability so common as itching, and one with which as a symptom we are so familiar, has been almost entirely neglected as an independent subject of study. Of other anomalies of sensation, such as hyperæsthesia, anæsthesia, and pain, we have tolerably clear and definite notions. But who has explained for us the cause and nature of pruritus? What is this disturbance of sensation? To say that it is a form of cutaneous irritation that produces an inclination to scratch (for such is the usual definition), is as much as to tell us that itching is the desire to scratch. We itch to scratch and scratch because we itch. It is clearly a nervous disturbance of some sort; but what produces it and why scratching relieves it are questions which, so far as I know, have never been satisfactorily answered.

Itching, or something closely akin to it, is in all probability common to most if not all animals, though most marked in those that are hairy or feathered. Though often provoked by irritants extraneous to the body, it also is very frequently spontaneous, occurring under apparently healthy conditions, as well as in disease. When in repose an animal will often by various actions or movements, that answer more or less to the act of scratching, betray the fact that it itches, even when the skin is neither

¹ Read before the American Dermatological Association, September 2, 1890.

diseased nor molested by insects. And in the human subject spontaneous itching is common enough, and it is often only the sense of propriety that represses the inclination to the desired gratification. The child stripped for bed and begging to have his back scratched is more in the state of nature. Let anyone sit quietly for a moment fixing attention upon the skin and the chances are that sooner or later he will become conscious of a slight intrusive irritation at some point, a prickling or picking sensation, and the longer it lasts the more it demands attention. You pass the finger or nail over the irritated point and it is gone. What was it? Was it pain? If all uneasiness is pain, yes. If desire is pain, yes. If the inclination to stretch the limbs, to wink the eyes, to eat is pain, so is this trifling disturbance of sensation, this desire to scratch.

In severe itching, and especially in disease, the feeling becomes more complex. This is evident from the multiplicity of expressions used to describe it—such as “tickling,” “prickling,” “picking,” “creeping,” “crawling.” But always there goes with it the impression of intrusive contact, together with the longing to scratch. Closely connected with it are other sensations that are secondary and probably entirely independent of the feeling of itching. Such are the smarting, burning, or stinging sensations which only accidentally are coincident with this feeling and are clearly painful sensations. They are not only independent of the pruritus but are distinctly antipathic to it. As soon as the scratching becomes violent enough to produce a painful sensation the itching is, temporarily at least, extinguished. Furthermore, any painful sensation of the skin would most likely be aggravated by scratching. Though pruritus has sometimes been described as a variety or phase of pain their characters are totally dissimilar. The feeling of pruritus always carries with it the suggestion of something extraneous to the body. There is in the sensation an element of objectivity, while in a painful sensation the feeling is purely subjec-

tive. In the one there is the consciousness, whether deceived or not, of something outside of self. In the other, one is only conscious of the suffering. One is resentment, with the instinct to repel an attack, an intrusion; the other is a suffering self-consciousness without cognizance of the producing agent. One is a longing desire to resist, the other the passive endurance of penalty.

Though a certain consciousness of the agent may accompany pain it is very different from that in pruritus. One resents a stinging blow, as the lash of a whip. The soldier struck by a spent ball curses the enemy. But there is no consciousness of the presence of a whip in the smarting flesh, nor of an enemy in the aching limb. Cause and effect may be a mile apart; it is only the effect that remains, and of that only is the subject directly conscious. At the first instant of injury the organ of touch is sufficiently involved to give intimation of the locality injured and perhaps something of the quality of the injurious agent, but the sensation of pain *per se* gives no such intimation. It is simply a passive condition. In pruritus, on the other hand, cause and effect are presented to consciousness as one. The consciousness of the object, the irritant, is not an instantaneous intimation, but, persists while the itching lasts.

But if pruritus is not pain in the ordinary acceptation of the word, is it any more nearly related to the special sense of touch? What are its relations to the so-called special senses on the one hand and to common sensation on the other?

The distinction recognized between common and special sensation is that while the former communicates only impressions of subjective states of the body, the latter imparts knowledge of external things. Through the former we are made aware only of somatic conditions, changes or phenomena that transpire in the *ego*; while through the latter we take cognizance of changes or phenomena in the outside world, the *non ego*. By means of the special

senses the presentations to consciousness are such that we are enabled to appreciate the qualities of external objects, and through a series of such presentations to know, to perceive, what the thing producing the sensations is. Such definite and competent sensations, perceptive sensations, exist only in connection with the senses of seeing, hearing, smelling, tasting, and touching. All other sensations, though widely diverse in character among themselves, are little more than varying phases of ease and discomfort, of well being and ill-being, of desire and gratification. Except through association of ideas, through imagination, they have no connection in consciousness with the outside world.

But notwithstanding the fact that the special senses in their present state are so far removed, in respect to the knowledge they yield to consciousness, from common sensation, there doubtless was a period when the distinction did not exist. Their differentiation has been the result of gradual and long-continued processes of evolution. There can be little question that the sensory organs to which the several senses owe their special attributes have all originally developed from simple nerve-endings that could give but the vaguest intimations of external objects. At the very beginning there was simply a common sensitive exterior that reacted to the various irritations it encountered in general, and more or less indefinite movements of the protoplasmic mass. Beginning with the protozoa, the protrusion of pseudopodia, as in the rhizopoda, was among the first simple attempts at adaptation. In further progress and by a similar process tentacles and sensitive hairs appeared. Nerve-terminals, at first homogeneous, gradually resolved themselves for division of labor into special organs. From the common sensitive exterior there were separated in the course of time the optic and auditory vesicles with nerve-filaments distributed over their interiors. Over little clefts or depressions in the integument other nerve-filaments became differentiated as the organs of smell and taste; while the common integument,

retaining its primitive common sensations, evolved a special sense of touch. The facts of evolution are exactly reflected in the parallel development of the embryo. Out of the ectoderm or outermost germ-layer the organs of special sense are gradually developed and traverse the same general phases of progress, as may be traced in the evolution of the higher creations of the animal kingdom. Both ontogenetically and phylogenetically the simple origin of the organs of sense appears too obvious for dispute. Diverse in their individual characters as well as in their divergent routes of descent, as these organs are, they all converge toward a common source in a general sensitive exterior composed of homogeneous nerves.

The earliest attempts at specialization in this common sensitive exterior could have effected little more than certain modifications of common sensation. To fix the exact period when these primitive modifications began to develop into the special senses, through which the animal is placed in intelligent communication with its environment, is needless, if it were possible. It must in general correspond to that period when the animal's movements first showed indications of purpose. When the amoeba comes in contact with a foreign substance the reflex movements that are excited are vague, haphazard, and apparently purposeless. According as the contact occurs, or as the object is presented to it, the animal shrinks away from it, or contracting about it envelops it in its interior, where, should the substance happen to be nutritious, it may be absorbed. The first beginnings of adaptation would naturally be associated with the simple consciousness of contact, a sort of primitive sense of touch. With the first intimation to the animal of a difference between one kind of contact and another we reach the threshold of an objective consciousness and the commencement of perceptive sensation. Partly empirically and partly through natural selection the differentiation of sensations gradually proceeds. The animal now directs its movements with intelligence and purpose. It acqui

the ability not only to feel but to perceive. It can select and seek its food, evade or attack its foes, and so gradually is equipped for the struggle for life. Thus as all the sensory organs can be traced to one elementary and homogeneous organ, so all sensations, whether common, special, or perceptive, may be traced to one undifferentiated and elementary sensation, which is common sensation.

In this evolution the impelling force, the directing impulse, has been derived from the two grand principles of life known as the instinct of self-preservation and the instinct of reproduction. To one or the other of these instincts every sensation that arises in the body must be directly or indirectly referred. All sensations, as we have seen, were originally tegumentary. To the common integument must be ascribed the source and potentiality of all sensations. As the result of specialization most of these sensations have been withdrawn from the exterior. What traces of the special senses thus abstracted still persist in the skin may be infinitesimal. That such traces do exist there can be little doubt. At least that the skin is sensible to waves of light has been demonstrated by curious experiments. There still remains to the skin and adjacent mucous orifices a variety of sensations, some of them undifferentiated from the elementary common sensation, others more specialized, including a special sense with perceptive faculties, and finally the most important representative of the reproductive instinct, the aphrodisiac sense.

The objective or perceptive sensations of the skin constitute what is known as the sense of touch or tactile sense. It is the sense by which we apprehend the form, size, location, temperature, and various other qualities of external objects, such as softness, hardness, smoothness, roughness and the like. Many of its attributes it owes to the so-called muscular sense, which in many tactile operations cannot be disassociated from the sense of touch. Moreover, the sense of temperature is really an indepen-

dent sense, depending actually upon nerve-terminations especially adapted to this purpose. This independence has long been recognized in certain pathological conditions, where one sense has been annulled irrespective of the other, while the recent experiments of Goldscheider have established the fact still more positively. Goldscheider, having first established experimentally that there were certain areas of the skin sensitive to touch and others to temperature, on exercising these areas found microscopically that the innervation was also distinct.

Of the existence of a specialized sense of touch there is no question, nor that it is limited to the skin and adjacent mucous orifices. It is not wholly expressed by pressure sense, for it is incomplete without the accessory muscular and temperature senses. Again, there is a sense of contact, the sense of being touched without perceptible pressure, which has come down from the earliest periods of animal development and which, originally at least, must have been unassociated with tactile sense as we now understand it. Before any consciousness of pressure exists, we are sensible of contact. But something more than this is necessary before there can be anything like sense of form or quality. It is this sense of contact, doubtless, that is the beginning—the threshold of pressure sense.

What is meant, then, by the phrase "sense of touch"? As we have seen, it has a composite character, but though made up of heterogeneous elements the perceptions that flow from it are as definite and as distinctly individualized as those afforded by its sister senses. Nevertheless the term is a vague one and inadequately expresses the sense implied. As we have seen, simply touching an object, simple contact, evokes a sensation or sensations that are only preliminary to the specialized sense. We become conscious of local contact before any quality of the object touched can be distinguished. It is only when the feeling of resistance begins and we are aware of pressure that there can be any appreciation of quality. It may be

said that such appreciation is purely an intellectual act ; but as the brain would be incapable of appreciating the different tones in sound except for the organ of Corti, or the different colors of the spectrum except for the intervention of the retina, so is it probable that the tactile perceptions would not exist but for the presence of special sense organs in the skin. Such organs have been aptly termed "organs of reinforcement."

The expression, therefore, for the special perceptive sense that belongs to the skin should imply more than mere touch. It is not simply sense of contact, it is not simply feeling, but it is contact plus something else ; it is feeling *of* the object as well as simple feeling it. The word palpation better expresses the act whereby the sense is evoked, but etymologically that term would be too restricted. Palpation (from *palpus*, the palm) relates more particularly to manipulation ; it is feeling with the hand only. A still better term would be *pselaphesia*. The Greek *ψηλάφησις* conveys the idea of feeling for or of a thing, or groping as a blind man or as one in the dark. The Latin *tactus* (from *tango*), on the other hand, signifies only the act of touching as expressed in the words tangent and contact. The only sense with which the skin is endowed that can properly be called perceptive, and that is worthy of comparison with seeing, hearing, smelling, and tasting, is the sense of *pselaphesia*. It includes the sense of contact, which, as we have seen, is its most primitive form ; its more important element is pressure sense, while the temperature and muscular senses are more or less essential auxiliaries. Common sensation is represented in the integument in its highest positive aspect by the voluptuous sensations, in its lowest negative aspect by pain.

From analogy with its sister senses, the sense of *pselaphesia* should depend upon a special arrangement and adaptation of the nerve-endings. There should be an organ or "organs of reinforcement." It is scarcely probable that in the skin there is any such highly specialized

arrangement as in the eye and ear, and yet we find nervous structures in the skin whose distribution and peculiar development mark them as organs of special importance to cutaneous sensation. What the exact functions of these different structures are is yet uncertain. It is little more than conjecture what special parts are played by the corpuscles of Meissner or those of Pacini, by the terminal bulbs of Krause, the nerve plexuses beneath the epidermis and about the hair-follicles, the tactile cells of Merkel, the free nerve-endings, and, finally, the nerve-distributions to the epidermis, including the remarkable intracellular nerves described by Pfitzner and Unna. Suffice it for the present to say, that from analogy we should expect the most highly developed of these to correspond to the most highly developed sense, to pselaphesia.

To turn from this long, though not purposeless digression, what relation to all these sensory organs of the skin and to their various sensations does the sensation of itching bear?

First of all, the sensations of pruritus must have to do with nerves that are very superficial. There is no reason to believe that of pressure-sense, properly so-called, there is the slightest intimation. If, with the end of my pencil I gently approach a sensitive surface, such, for example, as the cheek or one of the *ale nasi*, I become aware of a sense of contact the instant the surface is touched. A little pressure and I receive the impression of a smooth, rounded body, and a moment later a slight sensation of coolness. I have a perceptive sensation. If, instead of making any pressure, the pencil be retained just at the point of contact, presently a feeling of annoying irritation is excited. Still more marked is this irritation if, instead of using the pencil the part be lightly touched with a pointed wisp of soft paper or feather. There is elicited directly the sensation of a minute local shock, associated with an instinctive desire to escape from the irritating cause. If the same be repeated the excitement of the part becomes so great that the desire to rub or scratch it

becomes almost irresistible. This sensation is pruritus, and it is evidently a nervous disturbance provoked by touching the sensitive surface. What and where is this disturbance, and why should it be apparently so much greater than would be produced by a much more forcible contact?

First, how is it related to pselaphesia? The certain amount of pressure necessary to evoke this special sense implies that the organs on which it depends lie deep in the skin, and are doubtless those highly developed nerve-structures that are situated below the epidermis. It is evident that whatever connection the mere sense of contact may have with these organs it does not bring them actively into play. It is a well-known fact that in certain pathological states apselaphesia may coexist with hyper-æsthesia of the surface, *i.e.*, an exaggerated sensitiveness to impressions of contact. Moreover, those areas of the body most highly endowed with special tactile sense, with the sense of pselaphesia, are by no means necessarily the ones most sensitive to contact; nor are they to pruritus. While itching has no apparent connection with the sense of pselaphesia, it cannot be disassociated from the primary sense of touch, the sense of contact. Now, obviously, this sense of contact should pertain to those nerve-endings but slightly differentiated and those most superficial. Such nerves exist in abundance in the epidermis.

While I can present no absolute proof of the proposition, I believe there is sufficient evidence to locate the essential seat of pruritus in the epidermis. Itching is evoked by such irritants as act upon this tissue much more uniformly than by those that act on the derma. We have seen how it may be excited by external irritants that barely touch the surface without the least intimation of a pressure-sense. The itching that is commonly observed in connection with the healing of superficial wounds is not attributable to the granulating process. There is no itching in the granulations of an ulcer. It is

only when the part begins to heal and to "skin over" that the itching begins. It is a symptom of keratoplasia, not of dermatoplasia. In those cutaneous diseases also that more especially affect the derma, itching is present only exceptionally. In the erythematous, erysipelatous, and phlegmonous inflammations the sensations are of a smarting, burning, or aching character, *i.e.*, painful sensation, and if ever pruritus it is because of secondary implication of the epidermis. Likewise, of papular affections, as, for example, in syphilodermata, that are characterized by infiltrations confined to the corium or papillary body. If itching occur it is due to a similar and accidental implication. On the other hand, the essentially pruriginous affections, such as eczema, pemphigus, scabies, or lichen planus, are those invariably associated with decided trophic changes in the epidermis. In urticaria the implication of the epidermis is not so obvious, but as shown by Unna, urticaria is not primarily or essentially an inflammatory disease. It is often a neurosis and the itching is the primary factor, an irritation reflected to the terminal nerves from the nervous centres. The œdematous effusion that accompanies it, together with the local ischæmia, is doubtless the direct effect of muscular spasm.

However provoked, the sensation of itching is always associated with a presentiment to consciousness as though a foreign body were in contact with the surface. It is that sensation that experience through many stages of animal life has taught is often followed by a prick or a sting, and the inclination to escape the threatened hurt has grown into an animal instinct. The sense of contact at a minute portion of the sensitive surface is immediately interpreted to mean a miniature attack that must be repelled. If no attack has really been made, but only the threat, the intimation, then the excitement should disappear without returning the moment the cause producing the sense of contact is withdrawn. But it is the peculiarity of itching that it persists in spite of such with-

drawal, and is only relieved by the act of scratching. It seems as though the contact, or whatever the change may be that gives rise to the irritation, produces a molecular commotion in the nerves that goes on like the jangling of an electric bell, with a continuance of the sensation until such time as the surcharge of nervous energy is released. In pselaphesia the nerve-force, or the molecular vibrations excited by the impact, is directly transmuted into some intelligent form of activity and the accumulation of nerve excitation—the nervous engorgement—does not occur. The circuit is complete with no point of resistance intervening to create obstruction, and so commotion.

With regard to the sensations of pain, the view was maintained by Funke¹ that they passed into the gray tracts of the spinal cord, where their further progress was arrested; while tactile sensations (the sensations of pselaphesia) traverse the less resisting white tracts and thence passed directly to the brain. Whether this explanation would apply also to the sensation of itching, whether the obstruction that produces it is the same as for painful sensations, is a question that can neither be affirmed nor denied. It may be that the same process which produces what is called pain when proceeding from nerves deeply seated becomes itching if it starts from the nerves of the epidermis. Or, on the other hand, it might be alleged that the only difference lies in the amount or severity of the irritation, the nerves involved being the same. There are reasons, however, for believing that the epidermic nerves are not susceptible to pain. If with a knife we gradually pare away the epidermis, or if we thrust a fine needle through it, no pain is produced until it reaches the papillary body—until it “goes to the quick,” as the common phrase is. But it may be objected that neither does this cause itching. The explanation is easy: An essential condition

¹ See in Hermann's *Physiologie* (1879, iii., 2). *Physiologie der Hautempfindungen und der Gemeingefühle.*

to the production of pruritus is the uncertainty, the vague and indefinite character of the sensation. The impression that the knife or needle produces as it forces its way through or between the cells of the epidermis is one which offers a clear and interpretable presentment to the sensorium, the sensation undergoes immediate transmutation into other forms of nerve-activity, thus obviating the accumulation or stasis of nerve-force. It is a definite and perceptive sensation, which doubtless calls into play the special organs of pselaphesia that may serve to turn the course of the molecular vibrations into the direct channels of the spinal cord. *A priori* reasons for differentiating pain from pruritus have been given already. We have seen that they are not only inconsistent with, but antipathic to each other. The means to which the animal instinctively resorts for their relief are distinctly opposed to each other. While pain demands rest, pruritus incites to action. It is also probable that they engage distinct elements of the nervous system.

The reflex muscular movements excited by itching doubtless had for their object originally the expulsion of a foreign body, often an insect. Such movements are frequently spontaneous and more or less unconscious. Analogous responsive muscular movements are seen in sternutation and the act of coughing. The tickling sensations of the nasal or laryngeal mucous membranes which are their provocation correspond very closely to cutaneous itching. But the relief afforded by sneezing is not wholly explained by the expulsion of the irritating substance, but, partly, by the fact that the effort affords an avenue of escape for the retained nerve-force, a means for the transmutation of this force into muscular energy. In those animals in which the platysma myoides is more highly developed than in man, as in the horse and bovine genera, a certain relief may be afforded to pruritic sensation through its energetic contractions, which is not wholly due to expulsion of the insect or whatever else may have caused the sensation. The same tendency to dissipate pruritic

irritation through liberation of muscular force is evinced in the cutis anserina as well as in the hypertrophy of the arrectores pili muscles observed in many pruriginous diseases. May it not be that the changes in urticaria are the consequence of misdirected and ineffectual efforts of the cutaneous muscles to expel an irritant that produces on the sensorium the counterfeit presentment of some tangible body, as it were an offensive insect?

With regard to the effect of scratching in relieving itching, it is analogous to that produced by muscular exertion. Both cause a deflection of the pruritic irritation into other and freer channels. In the action of scratching there is substituted a decided and definite sensation for one that is simply vague and incomplete. It is the substitution of an effective energy for an ineffectual vexation.

Thus we arrive at something like a rational explanation of what itching is, why the sensation is attended with greater perturbation than are sensations produced by more tangible and appreciable contacts, and, finally, why it is relieved by scratching. Inasmuch as the presentations it yields to consciousness are vague and indefinite, it is closely related to common sensation, but inasmuch as it contains the glimmerings of an objective sense it is just one stage removed from it. It concerns those primitive nerves of contact out of which originally were developed the organs of special sense. It disturbs sensibility that was the precursor of, and doubtless is preliminary to, the sense of pselaphesia. Inasmuch as it concerns a sense of touch, it might be characterized as a paræsthesia of tactile sense; but regarding it more particularly as a disturbance due to interference with, to obstruction of, sensation, a condition in which there is vexation and annoyance of consciousness through the very indefiniteness and uncertainty of the sensations, the word paræsthesia does not express enough. Unfortunately, a term that most fitly expresses this condition has been already appropriated. Charcot has given the name

"dysæsthesia" to a form of hyperæsthesia or paræsthesia occurring in myelitis, in which slight irritations of the surface, such as pinching, or the application of cold, are directly followed by painful vibratory sensations coursing up and down the region irritated, and often appearing symmetrically on the other side of the body, and that continue for a considerable time after the irritant has been withdrawn. In some respects, the dysæsthesia of Charcot corresponds to the phenomena of itching. At all events, the term employed is, etymologically at least, as appropriate to pruritus as to the painful sensations just described.

To explain in detail, or even enumerate all the different phases of itching would be impossible. While some of them are associated with pathological changes in the epidermis incident to certain cutaneous inflammations, others have their source more deeply situated and are referable to the nerve-centres. To the latter belong the form of neurosis of which pruritus is at the same time the symptom and sole appellation. Still other sources are doubtless to be found associated with apparently normal physiological conditions. It would seem as if a certain amount of scratching were, under some circumstances, salutary and requisite for an animal's integument, and that the sensation of itching were the necessary incitement. It would facilitate the fall of deciduous hairs, it would promote the normal exfoliation of the cuticle, which, under certain conditions, may not separate rapidly enough to permit the upward growth and expansion of the prickle-cells of the rete. It would tend to dislodge accumulations in the crypts of the skin, the sweat, and sebaceous follicles. While these represent the most obvious sources of itching, or provocations for scratching, there is another factor of which hitherto but little account has been taken.

Both the English words itch and itching and the Latin prurio and pruritus, in their secondary significations convey the idea of a longing, teasing desire. It is apparent

in such expressions as, "the itch for gain," "the itch for praise," "the itch for scribbling;" while pruritus was commonly used by the Latins as a synonym for lasciviousness. There is an element of desire in the sensations of itching, and it is not improbable that the common, more or less definite recognition of this element is accountable for the derived or secondary meanings just alluded to. By desire in this connection something more is meant than merely the inclination to brush or scratch away a foreign body of which the sensation is apparently an intimation. It is, rather, a kind of desire closely akin to a lustful feeling, and one that sometimes makes scratching veritably a sensual indulgence. When pruritus reaches a certain degree of intensity, the subject is not content with that moderate amount of scratching that would ordinarily create a sufficient diversion to give relief, but there is a disposition to attack the itching surface with a vehemence that amounts to passion. Observe the motions of a dog when scratching. Sometimes its violent movements and muscular exertions betray an agitation that is not unlike the excitement of the sexual orgasm. The very act of scratching appears to evoke a condition of erethism and excitement that is far in excess of the mere pruritic irritation. And in the human subject voluptuous feelings are not infrequently accessories to the sensation of itching. The delight of having one's back scratched is doubtless chiefly due to a longing for a voluptuous gratification that would not exist but for the pruritic titillation. When the scabious Scotchman at "the scratching-post" fervently ejaculates his "God bless the Duke of Argyle!" it is not only the negative satisfaction of relief that he feels, nor that combined with clannish loyalty, but his sensations include an element of positive enjoyment, he is having the pleasures of a gratified sense.

Recognizing this peculiar element of desire in pruritus, the sexual excitement and depraving tendencies that are so commonly associated with pruritus genitalium are most easily explained. But it is not so surprising that voluptu-

ous sensations should attend itching here where they have their natural seat. Such sensations, however, are not confined to the genitals. They also affect the anus, where, more especially under certain conditions of moral perversion, as well as in association with pruritus ani, the erectile tissue in this situation may become the seat of erethism and in a measure there is excited an aphrodisiac sense. The female nipple also is susceptible of voluptuous sensations. These facts are well known, but the more general distribution of such sensations has received little consideration. They may be concomitants of itching in almost any situation. Persons subject to pruritus of the external auditory meatus are often in the habit of introducing the tip of the finger into the ear and making rapid vibratory movements that do not merely quell the itching but produce sensations that are distinctly voluptuous. The same is true, if in a less degree, of excessive rubbing or scratching of any surface that itches. There must be, however, the provocation of the pruritic irritation. By means of a violent excitation, superinduced by severe scratching, a liberation or discharge of nervous energy takes place accompanied by pleasurable sensations together with the relief of the pruritic irritation. A temporary inertia and rest follows and continues till a renewal of the pruritus provokes another resort to the same method of relief. How is this voluptuous feeling explained?

We have already seen that the only special senses that remained to the common integument after the differentiation of the special senses had taken place were the tactile senses, including the senses of contact, of pressure, and of temperature and the aphrodisiac sense. We saw also that the special sense of plesaphesia, while most highly developed in certain parts, existed to a greater or less degree over the whole surface. The same thing would seem to be true in a measure of aphrodisiac sense. Like the former, the latter is but a higher development of the primitive sense of contact. It has a special organ or instrument—the penis in the male, the clitoris in the female—

much as pselaphesia has as its especial organ or instrument the hand; moreover, like the latter sense, though perhaps in a less degree, it is distributed over the entire cutaneous surface. Now sexual excitement has for its incentive the desire to gratify a special appetite, the agent or vehicle of which exists in the cutaneous nerves of contact. A plethora of nervous irritation is generated in the communicating nerve-centres which can only be released by a violent general agitation, an explosion, as it were, of nerve force, which is followed by equilibrium or by a minus state of depression. This is the sexual orgasm. The whole process is in close analogy with what we observe in connection with the relief of the intenser forms of itching by violent scratching. In each case the stored up energy has to do with the nerves of contact or the centres with which they directly communicate. These are the non-conductors that accumulate and retain the charge; the motory apparatus furnishes the channels through which the charge is conducted away in muscular energy.

As to why this process is attended with pleasurable sensations it suffices to say it satisfies a law of being. Gratification of appetite is a condition of life, either of the preservation of life or of the reproduction of life. The sexual, the aphrodisiac appetite can only be secondary to the instinct and appetites of self-preservation. It is the outcome of superabundant vitality. With this surplusage there is engendered the instinct, the impulse to increase, to give life, to make more life. The acme of this impulse is passion. When the increments of vital energy reach high-water mark there is tumultuous overflow, as in the syphon of an invisible spring.

It is not only in the aphrodisiac sense that this impulse is displayed. It actuates many of the highest intellectual and emotional faculties of man. Through it the mind conceives and reproduces; the purest sentiments of love are its offspring. In the control of all the forces, both of the body and of the mind, the reproductive instinct shares

with the instinct of self-preservation, the one being the opposite and the complement of the other, as in the conduct of life the spirit of altruism is the opposite and complement of the spirit of egoism. The one prompts to give more than it gets; the other to get more than it gives. The one dissipates energy; the other conserves force. One or the other of these two great instincts provides the mainspring of every human action and is the source of every animal appetite. Their combined product is life. Aphrodisiac sense, the lustful sense of contact, is but a phase, a single factor in the great domain of the instinct of reproduction. The appetite it engenders, the lust of the flesh, at the same time the most ignoble and the most dominating appetite of exuberant animal life, is but a means to the grand end, and when prodigal nature established its chief seat and "sacred" organ, she neglected to withdraw from the outlying regions of the general surface those traces of a congenetic sense that remain in a more or less primitive form, but nevertheless engage corresponding elements of the nervous system.

From the foregoing considerations I believe we are warranted in drawing the following conclusions:

I. That there is a sense of contact independent of the sense of pselaphesia.

II. That this sense of contact is the sense disturbed in pruritus.

III. That it concerns primarily, simple cutaneous nerves or nerve-endings, situated superficially and probably in the epidermis.

IV. That the disturbance in pruritus is of the nature of a dysæsthesia due to accumulated or obstructed nerve excitation with imperfect conduction of the generated force into correlated forms of nervous energy.

V. That scratching relieves itching by directing the excitation into freer channels of sensation, sometimes, especially when severe, substituting for the pruritus either painful or voluptuous sensations.

VI. That the voluptuous sensations that may attend pruritus are a manifestation of a generalized aphrodisiac sense, representing a phase of common sensation that has its source in the sense of contact.

