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SYMPOSIUM:

THE RECENT PROGRESS IN THE KNOWLEDGE AND TREAT- MENT OF DISEASES OF THE UPPER RESPIRATORY TRACT.

The Nose and Nasal Accessory Sinuses. By H. L. SWAIN, M. D.

The Pharynx. By WILLIAM K. SIMPSON, M. D.

Larynx, Trachea and Bronchi. By SIDNEY YANKAUER, M. D.

RECENT PROGRESS IN THE KNOWLEDGE AND TREATMENT OF DISEASES OF THE UPPER RESPIRATORY TRACT: THE NOSE AND ACCESSORY NASAL SINUSES.*

BY HENRY L. SWAIN, M. D., NEW HAVEN, CONN.

In keeping with the general title this paper will take up, under several captions, the subject-matter as applied to the nose and its tributary parts, stating only a very few of the changes wrought by recent work, and pausing here and there to point out some avenues but little traversed or scarcely entered, further pursuit of which would seem about to lead to knowledge of the utmost value. We shall speak of etiology and pathology, new methods of diagnosis, and treatment, surgical and non-surgical, under the latter head, including local and general anesthetics and serum, and other treatments general and local.

The perfectly enormous amount of literature on the subjects of infection and immunity, as impossible for one mind to grasp, as it

*Read before the New York Academy of Medicine, Section on Laryngology and Rhinology, April 7, 1910.

is for one paper to compass, has been tremendously fruitful in its suggestions to the general medical world, and we in rhinological work have profited greatly thereby. Much of this work has but rendered more impressive certain long-known basic facts and demonstrated the need of our giving them greater attention. Healthy membranes covered by healthy cells in a healthy, well-fed and well-kept body seldom fall a prey to infection. The reverse is often equally true. The equilibrium between health and disease is sometimes difficult to analyze, but, expressed in its simplest form, involves, in the case of the nose, first and foremost, the complete integrity of the outer layer of the mucous membrane. The whole protective mechanism in the nose is really one of construction and maintenance. If we erect a wooden building, we can do it along lines which make for tight joints and with no places for moisture to enter and there to be retained. Such construction would tend to conserve the integrity of the structure. The whole could then be covered by a coating impermeable to moisture. If rightly constructed and adequately protected by good paint it would stand a long time. Deprived of its protective covering, the wood rots, the structure leans, then totters, and finally falls. So with man's nose; if the ciliated epithelium is intact, germs and deleterious matter are wafted downwards and backwards into the throat and there disposed of. A free flow of bland serum oozes between the cells of the epithelium, and this bathes the surfaces, helping by mere mechanical action to keep the membrane clean. In years past it has been proved that this serum in its healthy state, while not antiseptic or deadly to germs, tends to inhibit germ growth. The presense of this fluid is also essential, and vitally essential to the health and activity of the surface cells and the mobility of the cilia of the epithelium. In its interior the normally constructed nose is so made that everything can be moved along and there are no retention spots. Normally there is not much real mucus present on the surface, and this is of the blandest and thinnest type. When the danger signals are set and when an invader is to be kept away or an irritant kept off from the membrane, then great activity of the mucous glands gives abundant mucus to act as a coating to protect the cells and to enmesh and thus render innocuous the invaders. Matter which enters the nose may be inert, as various kinds of dust. In these days, living in the cities as most of us do, our cells become accustomed to dirt. It calls forth no special reaction on the part of the cells, except that it must be removed. When in too great quantities for our very tolerant cells

to endure, it is often washed away by a call being sent in to the central nervous system to supply more serum or more mucus. This call may be local or general, and may come from the epithelial cells themselves, or, if they die early in the game, from the cells of the tissue beneath or of that surrounding the area which is out of commission.

Reduced then to its lowest terms, we are, as said before, all dependent upon the integrity and in a way upon the intelligence or alertness of the epithelial cells. This is particularly so in the tonsils or lymphoid areas, as has been so ably demonstrated and studied by our own Jonathan Wright. The question has been often asked by those who carry their investigations thus far, how can it be true that, as he has shown in the case of the tonsils, when the equilibrium is maintained, inert matter like cinnabar is allowed to pass freely into the tonsils in the current of inflow without let or hindrance. Leptothritic threads are allowed to lie upon or among the cells of the outer layer, but are not permitted to pass beyond, while the pathogenic germ is not only allowed to enter, but is actually kept off the membrane, repelled, never being found in the spaces between the epithelial cells, but outside in the crypt mingled with the leucocytes or lymphocytes which have emigrated or have been washed out by the outward flow of lymph. The epithelial cells themselves seem to have an absolute antagonism for these germs. Apparently only when the equilibrium is disturbed can the germs be found in the substance of the tonsil. This is quite as probably true of the active ciliated epithelium of the nose.

Now, such an action on the part of the cells seems to involve almost an intelligence, and seems almost beyond credence, and to explain it all sorts of theories have been abundantly discussed. Up to the present we have known in a general way that mono-cellular organisms actually did what we have insisted, the epithelial cell does more or less efficiently everywhere that such potentialities are shown, as evidenced in the tonsil and in the waving cilia of the epithelium of the nose, but the matter had never been consistently studied. There exists a mono-cellular organism to which the name *stentor caeruleus* has been given, and upon the surface of this mono-cellular organism there exist cilia similar to those which characterize the ciliated epithelium of our bodies. A. A. Schaeffer* has studied the habits of this cell under the microscope and has been able to discover substances that were pleasing or acceptable to

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it, and also those that were not. Apparently when so disposed the stentor is able to have its cilia waft toward its pouch substances which it likes or chooses, these being sometimes incorporated into the interior of the cell and later either modified, assimilated or thrown out again; but when anything comes along that the stentor does not choose to take in or does not like, then the cilia waft this material away from the cell body. Such things are rejected. He is able at least to distinguish three kinds of matter: inert matter, living matter and that kind of living matter which it prefers for food. When hungry he, like his multicellular neighbors of the genus homo-sapiens will eat anything which it is easy to get, but when sated or when the kind of food he likes is present, he always will select it and eschew the others. Thus we have the whole phenomenon of cell existence exemplified and the whole process of our protective organism typified. What this cell does each and all of our protective cells must and do accomplish for us, and upon these kind offices hangs our health, our very existence. Now, if we could understand just how the stentor does this, being as he is but a single cell, how he does this great work of selection and sends his cilia vibrating one way or the other, we would be in a much better position to understand and combat disease. Wright, who is simply indefatigable, has carried his studies and his hypotheses much further than most of us can follow him, and whether this power of the cell is an ultimate result of mere surface tension or the attraction or repulsion of electrically alike or different particles, or even a refined chemical or chemotactic process, we must not now stop to discuss. Certainly in the stentor it seems much more than a mere physical phenomenon. But it is a refreshing sign of the times that men do once in a while stop hacking and hewing at the inexpedient angles of the structure and consider the nature and the preservation of an intact covering to conserve the life of the component parts.

Just such studies as these, many of them most abstruse in their character, have yet enabled the laboratory men to evolve matter of the utmost import, not merely from the scientific standpoint, but have served as a basis for the most epoch-making discoveries that recent years have brought forth. We need mention only a few of them in passing to make it evident that the point is well taken. We refer to parthogenesis, to anaphylaxis, to antitoxins, to serum therapy, to autogenous and stock vaccines, to the complicated reactions bristling with such terms as amboceptor, antigen, complement. They make us understand hemolysis, give us insight into

the life-history of germs themselves, so that we inoculate one germ to kill another, and make possible such conceptions of the problems of hygiene and prophylaxis as were never dreamed of in days gone by.

These, I say, are most encouraging signs, and are in keeping with the progress along all lines which we have applied to our particular field, and it is interesting that while this contemplation which we have had together logically led us into one of those avenues referred to in the beginning of this article, it also leads us to deductions which are in the spirit of the age and the present time. We have grown to be a great nation, the greatest on earth. This was our destiny. We simply fulfilled it, as it were, sacrificing many times everything in the way, so that we might accomplish it. Our resources, our strength and often well nigh our integrity were lavishly expended to obtain the end. We were really jesuitical in that we thought that the end justified the means. For a long time a cry was made, faint and persistent, gradually becoming importunate, until finally to the logic of even this mercenary age came the call so strong, so insistent, that it must be heeded, and there arose that new kind of individual known as the conservatist and we now talk quite glibly of conserving our natural and national resources. So much to the fore is this subject that it is well-nigh disrupting the dominant political party. And is it not also the logic of what I have at some length and with some weariness to your souls presented to you, viz.: that if we only can conserve the integrity of the structures, can keep intact the epithelium, and will strive in our treatment of acute conditions to make use of all the knowledge we are daily gaining, shall we not contribute our mite to that grand millennium of therapy when it will be no longer necessary to view the gory fields of battle where septum and sinus vie with each other as they exhibit their ghastly scars and deformities, the result of the sad affray. The glories of the battle, the victories of the sword have ever been more widely heralded than those of peace, diplomacy and reconstruction, although these have made real whatever progress has come out of the opportunities the former have created. Both were perhaps necessary, but I leave it to you, if we only knew better how to take care of common colds and acute infections, as recently suggested by Kyle,* would we not find less opportunity for our surgery, and do you not feel that in the last few years on the whole we less often find it necessary to operate, and is not this an encouraging sign of the times worth chronicling?

*Ann. of Otol., Rhinol. and Laryngol., Sept., 1909.

In corresponding with your able and versatile chairman, he mentioned, among other matters which showed our progress in this field of work, this very question of the proper handling of acute infections of the nasal mucosa and that it was being more carefully considered and carried out, thereby preventing the more serious complications.

We as a profession are the most altruistic in the world. We constantly, never ceasingly try to teach people so that they can learn to care for themselves in such a way that if they only could and would make use of what we freely give them, they could soon get along with about half of us. And we "rhino-laryngologues" are not to be outdone by any of the other "logues." We have been struggling in the last few years to apply to our therapeutic armamentarium all the knowledge that we could make use of from the other departments of research, and we in our turn have modestly and unostentatiously tried to contribute from our own work that which would be helpful to our associates who care for other portions of the body.

A good deal has been written and still more said, to have the relationship of disease of the accessory sinuses to those of the eye and orbit and head properly understood. We have stood with the ear men to try and have the necessity of proper care of the nose and throat of first importance in warding off the tremendously serious complications of acute ear infections and to keep away those insidious chronic affairs which lead to deafness. We have often outlined how we think occasionally a grippe meningitis or a meningitis the result of grippe occurs through the medium of infection from the nasal surfaces. I have seen within a few weeks, a case of acute sphenoidal sinusitis where the symptoms of most intense general headache, somnolence, temperature of 104.2° , stiffness of the neck, and fairly well defined Kernig sign, made a picture of the utmost and increasing gravity for several days. We were about to use a lumbar puncture to assist in diagnosis, when the recognition of the involvement of the sphenoid and the proper treatment of it cleared the whole matter up. I have not the slightest doubt but that thereby the meningitis was actually prevented. Warnings of this character, we, as rhinologists, have been constantly sending out, and it may not be at all boastful on our part if we feel that we have assisted somewhat in the proper understanding of these affairs.

Apropos of the perennial question of ozena which often has for its very first pathologic change the loss of the ciliated epithe-

lism, considerable light has been given to the etiology by properly bringing forward the fact that many so-called ozenic cases are really nothing but obscure cases of sinus disease. And the older idea of the shape of the nasal chambers having something to do with the occurrence of this queer disease, has recently again been brought to the fore in new habiliments, the outcome of recent study.

Speaking about avenues of research, it has often seemed to me that the conception of the problem of hay-fever as it was brought forward to us by Dunbar, was one of the most remarkable and picturesque applications of laboratory research and study to the knowledge and treatment of disease. With you all I have to deplore the fact that it is not more fruitful in its results, but just as occurred with the Koch's tuberculin when originally exploited in its immature conception, that it did more harm than good, so I have the faith to believe that further study and research along similar lines to those of Dunbar, with the co-operation of all of us, will lead, as it has in the case of Koch's tuberculin, to a vastly different understanding of the situation and to therapeutic uses not now dreamed of. To this end such studies as those of Kyle which have in mind the chemistry of nasal secretions, must bring the greatest assistance.

Much progress has also been made by such researches as those of Loeb and Lincoln and Mosher in making us better understand the anatomy of the sinuses. We have been immensely helped out in our understanding of the relationship of one cavity to another by the splendid work of Coakley, Coffin, and so many others, who have given us the benefit of their knowledge gained by X-raying and getting radiographic pictures of the living subjects. We also now-a-days understand better what nasal polyps are. Our knowledge of the function of the nose and of the necessity of keeping a healthy mucous membrane makes us more careful of turbinate tissues, and as we shall venture once more to speak about when we refer to therapeutic advances surgical and non-surgical, the tendency to conservatism as the result of this information has been as refreshing as it is hopeful.

Regarding diagnosis we have not been slow to take up the help given us from other fields, and have assisted in developing some of them to greater perfection. Since the introduction of trans-illumination nothing has been more helpful than such work, to which I have already called your attention, as has been done in the way of exploiting X-ray diagnosis of sinus disease. We have not all of us

the apparatus, and we lack that broad experience which results in such good photos as Caldwell is able to make, but the impetus has been given, and we are all doing every year better work.

We have not been backward in our nasal work to take advantage of cutaneous and other reactions such as Wassermann's, the von Pirquet, and tuberculin, and we can be relied upon to show many a case where these reactions may show their power.

While not exactly appropriate to the subject of diagnosis, but more especially perhaps to the cause of prophylaxis, we have discovered (just as the general medical man has found that many a person is a typhoid distributor and becomes a common carrier of typhoid) that many a patient is for months at least, if not longer, a free distributor of diphtheria, and the study of the germs as they exist in the nose is prolific of results tending toward a better diagnosis, and very frequently to a better prognosis.

As we hurry, however, to the brilliant field of therapeutics we have there so many things to chronicle that I must be most brief in my reference to them. To hark back once more to the question of conservatism in the field of applied surgery, we have certainly demonstrated in practice what I have professed in theory. Your Chairman called my attention to the "practical discontinuance of the electro-cautery." Looking back, as some of us can, to twenty-five and thirty years ago, when our specialty was young and the galvano-cautery was the only means that we possessed of seriously combatting the changes which chronic inflammation made in the mucous membranes of the nose, so frequently was the cautery used, so freely was it applied, that we were often taunted with the fact that some of the active workers seemed to be foes to mucous membrane wherever found, and much harm was done. Cases of atrophic rhinitis were undoubtedly started by the excessive contractions brought about by scar tissue and the destruction of ciliated epithelium. Whether I should go as far as your Chairman in stating the practical discontinuance of this remedy, is a matter of discussion, but certain it is that we all of us are inclined to use it less often and less freely than of old. Whether this is because the nature of the disease-processes within the nose has markedly changed since the advent of la grippe and its having become endemic among us, it is not possible for me to say definitely, and yet I believe it. The enormous increase of sinus disease since the grippe has been with us may have possibly called our attention away from a very useful agent. It, however, seems to fit in very

well with the views that we have expressed concerning the conservation of tissue, and is in line with yeoman work as that of Yankauer, who endeavors, in doing turbinectomies and other operative procedures in the nose, to preserve as much as possible the normal mucous membrane, and if this reaction against the galvanocautery has back of it this sentiment, let us hope that it may be a permanent change in our work. If we all possessed the ingenuity of Dr. Yankauer, I believe it would be very much better for the noses of our clientele, but it certainly is a thought that we should not lose sight of that the erectile tissue and mucous membrane are things to keep if we possibly can. I am sure this has been still further borne out by the splendid work that has been done in perfecting the operation of submucous resection. Here a tiny slit is made, and from the space between the mucous membranes on each side of the septum the bone is removed, leaving intact the epithelial and other coverings, save for such traumatism as a difficult operation sometimes compels us to make. Here, again, we have refrained as much as possible from destroying mucous membrane. Whether the recent suggestion of making an incision on both sides of the septum by lessening the time of the operation and thus the traumatism, will produce better results, remains to be seen.

Once again, the conservatists are getting in good work. Notwithstanding all the brilliant efforts that have been made the world over (and there have been none better anywhere than by some of you men here in New York, who are within the sound of my voice) still, notwithstanding all this, I say, if one judges of work done by what the literature presents, we are certainly, in the last two years, hearing more about methods of opening the frontal and other sinuses, first thoroughly through the nose before resorting to the external operations which tend to greater or less disfigurement, and in that way, it seems to me, we also keep the nose in better shape to do the work for which it was originally intended. Very much has been done in the last two years to make, for instance, the antrum operation intra-nasally, and I believe it is better done in this way than it is by any of the external operations, where it is at all possible. In line with these statements comes the idea of using bismuth paste—a suggestion which we have adopted from the experience of the general surgeons—filling up the individual sinuses or the whole nasal cavity according to the exigencies of the occasion. As judged by reports from Beck of Chicago and others we are justified in expecting good results from its use. There will, how-

even, be every now and then occasions in the case of the frontal sinus at least, when intra-cranial complications present symptoms with which they can be no parleying. Here we must and will open externally in order that we may better see, drain and care for the collected pus in its dangerous proximity to or in its actual embodiment in the brain substance.

Our meningitis cases, whether they come from the nose or whether they come from the ear, will soon have the same chance, I am sure, if the time has not already arrived, as is now possible in cerebrospinal meningitis, thanks to the splendid work of Flexner and others. Enough investigation has been done in this line to give us a live hope for better things to come especially when we take into consideration the help which in desperate cases spinal puncture and ergot hypodermically injected have already given us.

Very recently knowledge has come to me as a new idea that a vaccine prepared from a hay-fever subject exactly as for a purulent rhinitis has been most useful in limiting the trouble. Also as a result of hemolytic work, rabbit's serum is being injected to increase the coagulability of the blood in violent bleeding from the nose.

In the case of discharge from the nasal sinuses, or where in the grave cases operative intervention has not succeeded in accomplishing all that it should, or where said intervention is refused or is inadvisable, we have attempted, as in the case of ear diseases, to use stock vaccines or vaccines produced by the cultivation of the germs within the patient, the so-called autogenous vaccines. This work, too, represents another of those avenues down which we have gone only a short distance, but enough has been done to give us the utmost hope that we may shorten the progress of the ordinary cases by the use of these materials, and perhaps save here and there the grave ones. In looking over the very considerable literature two points have seemed to be emphasized by experience, autogenous seem to be a bit more effective than stock vaccines and staphylococcus injections respond much more readily than the other varieties. To this I have to add a mite of individual experience, which is of negative value, that I have as yet to see any marked effect from these vaccines in serious pneumococcus or streptococcus infections, rather supporting the deductions from literature.

A very interesting case, has recently come to my knowledge where my associate, Dr. Sperry,* had used the substance, which

*Yale Med. Jour., February, 1910.

has come somewhat to the fore in recent years, called massolin. You are all familiar with it and its use in atrophic rhinitis, about which we will speak in a few moments. In the case I have in mind there had acutely resulted in a child of $7\frac{1}{2}$ years following suppuration of the cervical lymph nodes, not only a double purulent otitis media, with openings of both mastoids, but there had been a pansinusitis of both nasal cavities and both frontal sinuses had been opened, and as discharge came from both ethmoid regions these had been practically entirely curetted away. Here both stock and autogenous cultures of staphylococcus had been generously injected with no improvement; the various cavities discharged for a period extending from August to December last with apparently no let up. All surgical means possible had been adopted. The use of massolin dropped into the sinus cavities and into the ethmoid region with a simple dropper, as well as into the ear regions which had refused to heal, produced in two weeks a complete cessation of discharge and a practical healing of all these various discharging surfaces. Even though this is but a single instances, as a contribution to the helpfulness of massolin it is "worthy of your attention."

And now, just a word about massolin, about which you gentlemen in New York certainly know more than I. I have from my own experience simply to chronicle that there have been a number of obstinate cases of discharge and scab formation within the nose as well as some of genuine atrophic rhinitis, in which massolin has been of the utmost help, and whereas the work is new and we all have a right to speak of our experiences, enough has been done here in New York to make us believe that we have an agent of much power and effectiveness in dealing with genuine ozenas. In simple purulent discharge from the nasal accessory sinuses I have personally scored nothing but failure.

Mention should be made here that in the infrequent cases which we meet of tuberculosis of this region, not only are we justified in using tuberculin for diagnostic purposes, but as has been proved a number of times in my recent experience concerning tubercular laryngitis, I believe that rightfully used, in small enough doses, over a long enough period, tuberculin is an agent perfectly safe and of occasional utmost value.

We should not fail, in this connection, to also call attention to the work that has been done by the so-called Hiss lymph or serum, only recently spoken of, where the leucocytes derived from inflam-

matory exudates of the plural cavity, have been used to aid the leucocytes of the body in throwing off the infective process. Purely the result of scientific study as this sort of work is, we rejoice in the fact that there are men who are brilliant enough to put one and two together and thus apply them.

It may not be amiss to mention another fact; that as simple a substance as brewers' yeast, when given internally, has an undoubted effect upon a purulent process, and does seem to limit the duration of acute affections.

Concerning anesthetics general and local we are no longer as much hampered as we used to be by necessary adherence to one substance or method. Cocaine, which is still our main reliance, has had numerous rivals, and we now can use eucaine and alypin when we so desire. The latter has been proposed as an addition to sprays where, as in hay-fever we wish to somewhat benumb an extremely sensitive area. Combined with adrenalin in certain cases we can obtain apparently with perfect safety as regards habit formation of either the individual or of the tissues, practically the same effects as with cocaine. This is nearly, though not quite as true of its effects as local anesthetic for operative purposes.

For those of us who must often work upon the nose or face, or as far as that is concerned, anywhere upon the skull, it will be with a feeling of warm welcome that we learn that work enough has already been done on animals and a few humans to prove the perfect safety and effectiveness of rectal anesthesia. That is, general anesthesia will be begun and the patient thoroughly placed under the anesthetic in the usual way. Then the narcosis is continued by a new rectal apparatus, by which a measured dose can be administered as long as it is necessary. This will remove the anesthetist and the ether cone entirely from our field of work—"a consummation devoutly to be wished."

232 York Street.