nor so slow as in Porter's description; unless, indeed, we are to institute a comparison between the formation of an abscess and the course of acute laryngitis. In the American case, laryngotomy appears to have been rendered necessary very shortly after the onset of the laryngeal symptoms. In my own case, the patient died suffocated within forty-eight hours from the accession of the disease. The difficulty in demonstrating laryngeal abscess is in exact proportion to the irritability and congestion of the surrounding parts, and more especially of the fauces. In my case, two laryngoscopic examinations only were possible, and neither of those showed the swelling on the left side of the larynx, which was afterwards demonstrated at the necropsy. Remedial measures are, however, since the introduction of the laryngoscope, less difficult than heretofore. Provided a satisfactory exploration of the larynx can be made and the swelling detected, the contents of the abscess may be evacuated with comparative ease with Mackenzie's laryngeal lancet. The only other alternatives, if the dyspnoea be urgent, are laryngotomy, or the method suggested by Porter—viz., to cut gradually down to the cartilage from without, and give exit to the pus externally. With regard to this last operation, Porter observes that, "although it has happened that I have not cut upon the matter in the first instance, yet it always made its appearance on the following day, the abscess never failing to burst into the wound. The result of the incision in the neighbourhood of an abscess seems to depend on the disposition of purulent matter to make its way to the surface by that route which offers least resistance; and the principle may be turned to advantage in every case where matter exists in a hazardous situation, and it is desirable that it should be discharged externally." This latter operation might, however, have been resorted to in days before the laryngoscope came into use; it is far less simple than the intralaryngeal method, and, in all probability, no less dangerous. In the case here related, it would have been difficult to give exit to the pus by such a proceeding, seeing that the abscess lay entirely under cover of the ala of the thyroid cartilage. Moreover, in the presence of urgent dyspnoea, there would scarcely be time for the amount of careful dissection which operations in this neighbourhood render necessary. In the treatment of laryngeal abscess, then, where the dyspnoea demands immediate relief, the only means that appear to afford any prospect of successful termination are direct incision into the abscess with the laryngeal lancet, or, failing this, laryngotomy.

ON A NEW FORM OF ARTIFICIAL MEMBRANA TYMPANI.

By GEORGE FIELD, Esq.,
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IN treating cases of perforation of the membrana tympani, it has always appeared remarkable that some patients should derive benefit from Yearsley's pellet of moistened cotton-wool, while others gain greater advantage from Toynbee's artificial membrane. It has, therefore, occurred to me that the instrument I am about to describe might prove advantageous; and such I have found to be the case. It is simply a combination of Toynbee's artificial membrane, viz., a thin disc of India-rubber mounted on a fine silver-wire stem, and Yearsley's cotton-wool. In my instrument, the wire is carried beyond the India-rubber for about a quarter of an inch, and terminates in a second disc, made of flannel. The space between the two is filled up with a small portion of Dr. von Bruns's wound-dressing cotton-wool, which is absorbent, and so takes up and communicates to the flannel disc any medicated solution which it may be desirable to apply. To prevent overcharging the cotton-wool, a pipette should be used, as one or two drops are sufficient to moisten every fibre of the wool and flannel.*

Its advantages are the following.

1. It does not irritate the membrane, and being very soft, is not likely to injure it.
2. It is made of cotton-wool, which is absorbent; lotions can by this means be constantly applied with much advantage.
3. By thus keeping the part clean, the membrane gets into a healthy state, and the perforation heals.
4. The hearing distance is improved.
5. It is not liable to leave the India-rubber disc in the meatus.
6. It is easily used; and does not require the forceps, as is the case with Yearsley's cotton-wool.

The following cases are interesting.

E. F., aged 26, a clerk, came to consult me at St. Mary's Hospital, having suffered from deafness for twenty years. Both membranes were

perforated. On the right side, there was a large perforation; he could not hear my watch on contact. On the left side, there was a smaller perforation; he heard the watch at the distance of an inch. On the right side, Toynbee's membrane increased his hearing about seven inches; cotton-wool had no effect. In the left ear, Yearsley's mode of applying cotton-wool answered best; the India-rubber disc having very little effect on this side. With my instrument, he can hear nearly eighteen inches on both sides. His hearing is thus greatly improved. The membranes are gradually getting into a healthy state. He says "he can now hear sermons", a benefit he was never able previously to enjoy.

H. J., aged 19, came to consult me at St. Mary's Hospital. She had been deaf for two years in both ears. The deafness came on after measles. She had a large perforation of the membrana tympani on the right side, with constant offensive discharge. She could not hear a watch on contact. After the new artificial membrana tympani was used, her hearing improved one foot, and by using (by this means) various lotions applied directly to the perforation, the discharge has gradually ceased, and her hearing distance when wearing the instrument is now one yard, and about four inches without it. The membrane now looks healthy, and the perforation is decidedly smaller.

W. D., had perforation of the left membrana tympani. He could not hear a watch on contact. He had been deaf eight months; the deafness came on after "brain-fever." This boy's hearing improved four inches, and the discharge, which had previously been very great, has ceased altogether.

H. L., aged 17, had had deafness for five years in both ears after scarlet fever. There were large perforations in both membranes. With Toynbee's artificial membrane, her hearing is greatly improved, four to five inches. The application of the cotton-wool also affords benefit; but, with the combination of the two, a much better result is obtained; for, when she wears them in her ears, she can hear ordinary conversation perfectly well, and the hearing distances were twelve and fifteen inches. The lotion she has lately used (which has quite stopped the discharge) consists of two grains of the nitrate of silver to the ounce of water; she says, also, that when wearing them, the sound seems much clearer than with the others.

S. M., aged 26, had perforation of both membranes, much the same as the last case. It came on from scarlet fever. Her hearing is improved to a very great extent on both sides. She says that my instrument is much more comfortable than the other, and does not move about like the India-rubber one; she also hears double the distance with it. The discharge has stopped.

I have several other cases of the same kind, both in hospital and private practice, in all of which the benefit has been the same.

My predecessor at St. Mary's, Dr. Peter Allen, was of opinion that in Yearsley's contrivance (when the natural membrane is perforated or lost) the benefit is derived from support given to the ossicula, by which they are enabled to exercise that due pressure at the fenestra ovalis, which keeps the membrane of the fenestra rotunda in a condition susceptible of vibration, and capable of transmitting them to the nerve-expansion of the labyrinth. And Yearsley himself says his object is to support the remaining portion of the membrana tympani or the ossicula, and that care must be taken that the entire opening be not covered, otherwise the experiment will not succeed; it is also indispensable to success, that the moisture of the wool should be preserved.

Toynbee, on the other hand, says, "It seems to me no doubt but that one of the functions of the membrana tympani is to confine the sonorous undulations to the tympanic cavity, in order that they may be concentrated on the membrana fenestrae rotundæ. Indeed, it is probable, that the vibrations only partially pass through the chain of bones to the vestibule, and that the air in the tympanic cavity is one great medium of communication with the labyrinth. If the means of communication with the labyrinth be the air in the tympanic cavity, it is palpable that any aperture in the membrana tympani is likely to diminish the power of hearing, by permitting the vibrations to escape from that cavity into the meatus, and so prevent their concentration upon the membrana fenestrae rotundæ."

But, in the supplement of his book, Hinton says, "Mr. Toynbee, also, modified the view he at first entertained (by page 452). This he was partly led to do by intercourse with Dr. Julius Erhard who, without any perforation, found his hearing much improved by the use of cotton-wool, and published his experience in a paper entitled, *Deafness Curable by Pressure*."

Roosa says, "That the artificial membrane is only of service in cases of partial or complete loss of the drumhead." (Page 380.)

Von Troeltsch is of opinion, that the action upon which the benefit mainly depends is the pressure on the remaining portion of the membrana tympani and the chain of ossicula; whether it be that, by this

* It is made by Messrs. Krohne and Sesemann of Duke Street.

mechanical influence a morbid relaxation in the connection of the ossicula is removed, or the fluid in the labyrinth is put under increased pressure. Such an India-rubber disc will act as a vibrating plate, and can transmit a considerable number of vibrations to one of the ossicula. (Politzer.)

This appears to me to be the best explanation. I use the cotton-wool for the necessary pressure on the remaining portion of the membrana tympani, and, at the same time, the India-rubber disc as a vibrating plate.

The improvement I suggest I have found of great service in nearly all cases of perforation. The instrument should not be worn at first for more than an hour at a time, the cotton-wool should be often changed, and the lotions altered occasionally; and, lastly, it is very essential that only a very small quantity of fluid should be applied to the cotton-wool.

ANALYSIS AND PATHOLOGICAL PHYSIOLOGY OF THE TROUBLES OF SPEECH IN THE GENERAL PARALYSIS OF THE INSANE.

By AUGUSTE VOISIN, M.D., Médecin de la Salpêtrière à Paris.

THE troubles of language which are observed in general paralysis are of various orders, and bear different denominations. They are termed stuttering (*ânonnement*); drawing; hesitation; jabbering; stammering; and quavering.

These denominations are too often confounded in the observations of general paralysis, and indifferently employed. The intimate cause of these symptoms does not seem to me to be sufficiently known. I will here speak of the analysis and pathological physiology of the modifications of language. The faculty of language infers soundness (1) of the cortical substance of the anterior lobes of the brain, the seat of the intellect; (2) of the nervous fibres which pass from the cortical substance to the bulb, and which serve as conductors of the will; (3) of the bulb and the intrabulbous nucleus of nerves animating the muscles which are called into play during speech; (4) of the nerves animating these muscles; (5) of the muscles themselves. The participation of these various organs is indispensable to the regular exercise of speech. It is not enough, indeed, for the movements of these muscles of tongue, pharynx, glottis, and face, to be rightly co-ordinated; it is necessary to have a sound intellect, a knowledge and memory of words; and the voluntary excitement must be easily transmitted to the nerves proceeding from the medulla oblongata. Every restraint on the action of the organs presiding over these functions will disturb speech.

1. Stuttering (*ânonnement*) is the embarrassment of speech produced by a slowness in the presentation and emission of letters, syllables, and words: this delay being occasioned by a disturbance of memory. It is most frequently accompanied with another symptom, the intimate cause of which is the same, and which consists of the omission of words in writing, and of the misplaced insertion of unintelligible signs and hieroglyphs, and indistinct and irrelevant words in the middle of a sentence. In nearly all cases, the patient has very little or no consciousness of the symptoms; this is readily understood, as the lesions by which they are occasioned occupy the part of the brain which is the seat of intellect. The alterations inducing this disturbance of speech are hyperæmia, infiltration with blastema, with exudation, and recent embryoplastic productions, and softening, of the cortical layer of the anterior lobes of the brain. If the stuttering do not exist in the earlier stages in certain cases of paralysis of the insane, it is always to be observed at a later stage, until the patient presents that other sign of the deep alteration of the cortical layer, viz., impossibility of conversing, of expressing thoughts, of pronouncing comprehensible words; finally, muteness. At that moment, the embryoplastic deposits have begun to be transformed into fibrillary tissue, the atrophic consequences of which are known. The circonvolution of the island of Reil, and the three frontal superior convolutions, are the parts the lesions of which, as they are observed in general paralysis, may induce stuttering. As well as the frontal convolutions, the island of Reil is softened on its surface, its substance is infiltrated with a somewhat serous liquid; and microscopical examinations, made when it is recent, show that embryoplastic deposits are blended with the nervous elements, and that endarteritis and embryoplastic bodies exist in the perivascular spaces. I have made a number of fine sections on specimens of the island of Reil, hardened by chromic acid, and my researches have led to the following results.

The vessels presented in their walls, and in the spaces by which they are surrounded, an abundance of embryoplastic nuclei in very close rows. I found vessels that were almost crammed with them, and in

some preparations no vessel was free from them. The nervous substance itself contained a numberless quantity of these nuclei. I found lesions of this kind in various stages. In one case, remarkable from the extent of the alterations, the patient offered several characters similar to those observed in cases of aphasia. When questioned, he almost invariably answered, *ça va mieux; ça fait mal* (I am better; it gives me pain).

Stuttering, drawing, and incomprehensibility of speech, may also be consequent upon lesions situated on the course of the nervous fibres, which pass from the cortical substance of the anterior circonvolutions to the medulla oblongata, through the white cerebral substance, the corpora striata, and the pons Varolii. In the course of these fibres, and in their interior, you meet with an enormous quantity of embryoplastic nuclei, which are especially abundant in the vascular sheaths, in the perivascular spaces, and which thence certainly have invaded the nervous substance; and you meet, also, with masses of hæmatosine, of hæmatine in yellow or colourless crystals, or effusion of blood-corpuscles more or less old. I have found even foci of softening between the anterior ascending fibres of the pons Varolii. You understand, in seeing these preparations, how the cerebral functions, and especially the will, must be disturbed by the presence of these enormous quantities of recent productions among the nervous fibres which act as conductors.

2. Stammering, jabbering, and quavering of speech do not result from any troubles of intelligence and will, but are consequent upon an absence of harmony in the co-ordinate acts performed by the muscles animated by the nerves proceeding from the medulla oblongata; I mean the hypoglossal, facial, spinal, and glossopharyngeal nerves. I will now explain these alterations, which have not as yet been described, within my knowledge at least.

The medulla oblongata, in cases of general paralysis, presents in most parts, not uniformly, but more on one side than on the other, an immense quantity of embryoplastic nuclei, of fusiform bodies, interposed among the nervous fibres, among the nerve-cells of the nuclei of origin of the nerves, among the fibres of these nerves, and among the nerve-cells of the olivary bodies. As in the brain, the multiplication of these new productions is especially abundant in the walls of the vessels, in the perivascular spaces, even along the most delicate vessels. The walls of the vessels are often doubled in thickness, with very firm fibrillary tissue. Vessels altered in this manner are found even among the fibres of the roots of the hypoglossal and facial nerves. The cells of the nuclei of origin of the nerves in the medulla oblongata may themselves be altered and transformed into fat in various stages, and suffer a necrotic change. The proportion of cells thus altered to sound ones may be as one to five. I have met more frequently with lesions in the cells of the nucleus of the facial than in those of the hypoglossal nerve; and when they were to be seen in both, the alteration was more advanced and more extensive in the nucleus of the facial.

Schröder van der Kolk, and other authors who have reproduced his opinions, represent the olivary bodies as playing so important a part in the mechanism of speech, that I expected to find considerable lesions in their cells; but there was nothing of the kind; I never found any alterations in the proper tissue of these bodies. With these alterations of the medulla, I have not yet found lesions of the commissural fibres or of the fibres of the nerves arising from the medulla.

The morbid state which I have just explained exists from the first periods of illness. I met with it in a woman who died between the twenty-fifth and thirtieth days of general paralysis. In that case, the number of nuclei was much less considerable, and they existed only in the vascular walls or in the perivascular spaces. In that case, also, the number of diseased cells in the nucleus of origin of the facial nerve, was at most two or three; whilst, in advanced stages, the number may be eight or ten. The nature and form of these alterations appeared to me to explain sufficiently the disturbance of the part of speech which requires the intervention of the medulla oblongata. In that organ, indeed, take place the numerous acts of automatic and involuntary co-ordination which are performed during the articulation of words, the rapidity and good execution of which are dependent on the education and exercise of the organ. Now, if you observe under the microscope the countless number of foreign bodies which are interposed in the fine and compact meshes of the constituent fibres of the medulla, and amidst the cells of the olivary bodies, you will understand the disturbance which this state must produce in the functions of the medulla and in the automatic co-ordination of the nerves proceeding therefrom, and of the muscles supplied by them. These troubles of speech, always accompanied with ataxy of the tongue and lips, demonstrate the important part which is played by the facial nerves in these phenomena. To prove it, comes also pathological anatomy. Alterations in the cells of the nuclei of the facial are indeed more frequent and more advanced than those in the nuclei of the hypoglossal, as has been said; and while, at the outset of the disease, the nuclei of the