

Richey (S. O.)

al

GENERAL ATROPHY

OF THE

CONDUCTING APPARATUS OF THE EAR

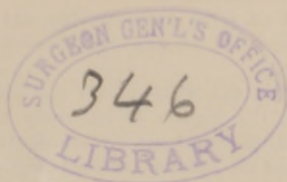
AS RELATED TO

PROGRESSIVE ARTHRITIS DEFORMANS.

✓
By S. O. RICHEY, M. D.,
OF WASHINGTON, D. C.



[Reprinted from the "Transactions of the Ninth International Medical Congress," Vol. III.]



IS GENERAL ATROPHY OF THE CONDUCTING APPARATUS OF
THE EAR IDENTICAL WITH PROGRESSIVE ARTHRITIS
DEFORMANS ?

L'ATROPHIE GÉNÉRALE DE L'APPAREIL CONDUCTEUR DE L'OREILLE EST-ELLE
IDENTIQUE AVEC L'ARTHRITE DIFFORMANTE PROGRESSIVE ?

IST ALLEGEMEINE ATROPHIE DES LEITENDEN APPARATES DES OHRES IDENTISCH MIT
FORTSCHREITENDER ARTHRITIS DEFORMANS ?

BY S. O. RICHEY, M.D.,
Of Washington, D. C.

The name general atrophy of the conducting apparatus may not be better than the numerous other names by which this affection is designated, but it has the merit of describing the result of the process as we see it, instead of indicating it by some particularity of its course. Some attempt will be made, herein, to show its probable neurotic origin in the spinal system, by its similarity to a more general affection which has been supposed to find its source there.

Atrophic degeneration of the conducting apparatus of the ear may not be, to any great extent, inflammatory in any part of its course, is *not* "preëminently local in its character," is influenced by constitutional dyscrasia, probably begins at the cervico-spinal nervous centres, and is propagated through the sympathetic nervous system or the sensory spinal nerves, interfering with local trophic action.

Many pathological changes have been observed in the cavity of the middle ear at

its examination after death, but we are not assured thereby that any given structural variation has been a result of this affection alone, as we are denied the opportunity of observing it during the progress of the disease. For many reasons, we must think it has a broader pathogenesis than that usually accredited to it, in the exposition of which one may be aided by the processes of analogy and induction.

Garrod says, of progressive arthritis deformans ("Reynolds System of Medicine," vol. I, page 555), "it is much easier to prove what rheumatoid arthritis is *not*, than to give the slightest clue to what it is . . . ; it appears to result from a peculiar form of malnutrition of the joint textures, an *inflammatory action with defective power* . . . ; it usually occurs in weakened subjects, and exposure to cold in many cases is the exciting cause of its development." Weber (*Journal of Mental and Nervous Diseases*, vol. VIII, 1883, page 630) considers it of neurotic origin. In its entire history, except in the functional peculiarities of the locality attacked, it is almost a complete analogue of atrophy of the middle ear, in causation, symptoms, progress, and therapeutics. It would be an advantage to study the process, as we cannot, in the ear.

Herewith is a parallel of the two affections—

Progressive Arthritis Deformans.

1. It is seldom fatal.
2. At an early stage, swelling and the appearances of ordinary inflammation are prominent.
3. When the effusion into the joint is absorbed, the capsule is commonly found thickened, the cartilages are sometimes absorbed, and the ligaments so much lengthened as to allow unusual mobility and dislocation.
4. At the commencement of the process, slow absorption of the cartilages takes place, often followed by fatty degeneration, and the formation of ligamentous bands.
5. Heredity does not seem to influence the affection, for one member of a family may be affected, and the rest be free.
6. Is frequent among women, and rare among men.
7. It occurs at any age, and individuals of weak frames whose extremities are cold are most liable to the disease.
8. Everything debilitating, as uterine hemorrhages, prolonged grief, persistent mental distress, loss of rest and dissipation, damp dwellings, poor food, and all rheumatic influences, are supposed active causes.
9. By test, no uric acid, or urate of soda, thus removing rheumatism and gout from consideration as causes: reduction of phosphoric acid in the urine.
10. The disease is slowly but steadily progressive. It may be stationary for a time, but exacerbations are sure to follow (Weber). There is slight remission, but no intermission, during the rest of the patient's life (Haygarth).

Atrophy of the Conducting Apparatus.

1. We do not know it ever to be fatal.
2. At an early stage this may be the cause of symptoms of inflammation.
3. When this happens it would be liable to cause tinnitus, or impaired hearing, or both: a flapping m. t., and disarticulation of the ossicula.
4. The result of this change has been seen in ankylosis of the ossicles, especially of the stapes; retraction of the m. t., and bands of adhesion in the cavity.
5. Complete correspondence.
6. Is more frequent among women than among men.
7. The symptoms are manifest at middle age, or just before, and at any later period. It may begin in the earache of children. Cold extremities are common.
8. Idem.
9. No tests, so far as I know.
10. There are long intermissions in progress, judged by the impairment of function.

Progressive Arthritis Deformans.

11. It usually begins as a subacute disease.
12. It is very intractable. When the disease is not advanced, *the affected joints few in number* and progress slow, the prospect is more hopeful, especially if there is no disease to keep up the impairment of the general health.

13. There is generally aching of the affected joints, prophetic of an increase of pressure in the atmosphere.

14. Frequent mental depression without a known sufficient cause.

15. It does not lead to suppuration, but to atrophy and more or less deformity.

16. The treatment must be sustaining. Local treatment by blisters, iodine paint, and croton oil in the beginning. Later use counter-irritation; later still, friction and slight motion. Living in a moderate winter climate, nutritious food, warm clothing, etc.

Atrophy of the Conducting Apparatus.

11. An open question.

12. Idem.

13. Any existing impairment of hearing, or tinnitus, is increased under the same circumstances.

14. Idem.

15. Idem.

16. This general line of treatment is the best with which we are acquainted.

Arthritis deformans begins in the smaller joints of the body, is symmetrical in appearance and progress, with lesions of the tissues surrounding the joints, atrophy of the muscular tissue, and, in old cases, a state of fatty and connective tissue degeneration (Weber). The Lilliputian joints of the ossicula auditus are peculiarly exposed to atmospheric changes by their location, and are in one of the extremities of the body, for which reasons they would seem to be more liable to an attack of this affection than even the joints of the hand or foot. Rheumatoid arthritis, beginning in the small joints of the extremities, advances to the larger joints of the body, in which fact we may find an explanation of the pressure and pain about the head, and the diminution of intellectual apprehension, so common in cases of profound deafness in advanced aural atrophy. It may furnish a better demonstration of the deafness of boiler makers, ship caulkers, and locomotive engineers. Taking its symmetrical onset and advance as a point in evidence of its neurotic origin, it may also explain the change in voice so commonly met with among the profoundly deaf, who have become so by slow and progressive stages, for the recurrent laryngeal nerve makes the connection between the cerebro-spinal nerve centres and the vocal cords very intimate. The recurrent laryngeal is supposed to get its motive power from the pneumogastric, and irritation of the pneumogastric in the upper part of the neck has been proven by experiment to cause heat and tingling of the ear. Jewell (*Journal of Mental and Nervous Diseases*, 1874, 426) "looks upon articular rheumatism, as well as certain painful affections of the joints simulating rheumatism, as produced . . . by disease of the nerve trunks or nerve centres, leading to decided local irritation at the peripheral termination of certain nerves," and Brown-Séguard has shown that nerve fibres going to the blood vessels of the various parts of the head come out chiefly from the spinal cord by the roots of the last cervical and first dorsal nerves. Leloir and Degerine* observe that, in a case of chronic rheumatism with considerable muscular atrophy and rapid eschars, they found the cutaneous nerves adjacent to the eschars affected with atrophic parenchymatous neuritis, which seemed to have existed previous to the eschars. Acute atrophy of the muscles has occurred without *lesion* of the cord. Those suffering with arthritis

* *Le Progres Médicale*, April 2d, 1881.

deformans appear to be emaciated and neurasthenic, as a rule, complaining of pains over a great part of the body, associated with periodical failure of control or power in the muscles or tendons. The pain in the joints, weakness in the muscles and tendons, and some emaciation often precede the manifest changes in the size and formation of the joints.

Women, according to Rosenthal, are more subject to prosopalgia in early life than men; neuralgia is most frequent between the thirtieth and fiftieth years of life; is sometimes accompanied by *inability to fix the mind on any subject or attend to business, and this effect is not due to pain*. Arthritis deformans is often introduced by hemicrania, and lean persons have a more decided predisposition than the stout, as in neuralgia of the trigeminus. The temporo-maxillary and the upper cervical vertebrae are joints particularly likely to be affected. No one questions the character of neuralgia, and arthritis appears to have a similar neuropathic origin and similar favoring causes.

Weber-Liel* has seen thirteen persons affected by progressive deafness presenting the symptom of spontaneous pain over the tracks of the cervical and brachial plexus, associated with pain in the ears and disagreeable tinnitus, varying from that habitual to the case. Otagia is often met with in the later stages of atrophy, generally uncomplicated with neuralgia elsewhere, but among individuals of the neurasthenic type.

Arthritis deformans, nervous exhaustion and aural atrophy (progressive deafness) very greatly resemble each other. Each follows causes exhaustive in character; does not terminate fatally; most of the symptoms are subjective and functional, and often unaccompanied with apparent structural variation. In each there is periodical hopelessness and discouragement. In nervous exhaustion and the ear affection there is diminished ability to fix thought on any subject (lack of mental control) and change in the voice; and Garrod claims that the irregular form of arthritis sometimes attacks the internal (middle?) ear and the larynx, and causes hoarseness and a peculiar dry cough.

Mr. R. W. Parker† reports a case of rheumatoid arthritis; the girl, aged fifteen years, whose father died of phthisis and whose mother died of chalky rheumatism, had, in six months, become almost quite deaf. She had double keratitis and enlarged joints. No examination of the physical condition of the ears appears to have been made, unfortunately; only the reference above given to the disturbed function. C. H. Burnett‡ mentions a woman, aged twenty-six years, well nourished, who, six years before, had an attack of probable rheumatic facial paralysis. Two or three years later she noticed ringing in her ears and impaired hearing. Lustre of the mtt. good; etc. pervious; when excited or fatigued there was a flush of the cheeks and neck and increased tinnitus.

In the deafness of boiler makers, undisturbed control of equilibrium and the absence of vertigo argue against a theory of labyrinthine trouble. Buck (*New York Medical Record*, July 5th, 1875) thinks the peculiarities of these cases due to rigidity of the ligament at the base of the stapes, or to some change in the membrana secondaria, which, to my mind, is the most natural explanation. The fact that individuals who have had acute or subacute catarrhal inflammation of the middle ear present the feature of hearing better in a din of some kind, does not invalidate Buck's theory, as, in even acute suppuration, the membrana secondaria may undergo changes calculated to produce this effect; persistent thickening, calcareous deposits, adhesive secretions, etc., for which reasons some of these cases can be comparatively promptly improved. "Pathological alterations take place in the stapedio-vestibular articulation in the

* *Monats. für Ohrenheilk.*, Aug., 1874.

† *Transactions International Congress*, 1881, Vol. I, p. 128.

‡ "A Treatise on the Ear." 1st Ed., p. 391.

course of chronic inflammation of the middle ear, *sometimes also with a perfectly normal state of the lining membrane.*"*

Among boiler makers the *continuous* action of the ossicula auditus renders them more liable to arthritis; and the exposure to draughts, lack of exercise of most of the other joints of the body, and irregularity in taking food, which is often less assimilable than it should be, furnish other sufficient factors in the causation of this affection. These same influences obtain among ship caulkers and locomotive engineers. That the disease may be manifest in no other joint is no sufficient reason against its attacking the ossicula when they are most used. It may extend to the sutures of the cranial bones and cause disturbance in their relation to each other, followed by a feeling of pressure or "weight on the head," or "as if there was an iron band around the head," or "as if there was an iron axle between the ears," resulting from even slight distortion. It may thus so derange the cranial contents as to interfere with normal mental alacrity and the memory, of which some people with "progressive deafness" are so acutely conscious in the later stages. It may alter the size and shape of the cranial foramina to such an extent as to cause pressure upon the nerve thus finding an exit, and result in neuralgia in the region supplied by the nerve; this being one of the ways in which persistent neuralgia is supposed to be produced.

Arthritis deformans may occur at almost any age; at first, in the most exercised small joints, and, if neglected, it will progressively attack every joint in the body. It would rarely be recognized in the ear before the age of thirty, when the true function of the ear begins to be impaired in the late stage of atrophy, though it might have existed from the age of four or five years, at which time it would have been in its inflammatory stage. This period of the affection would be marked by sudden onsets of pain of spasmodic or neuralgic character, causing at short intervals sharp, quick cries, followed by a period of ease and quiet. Though during the day there is entire comfort, the attacks are disposed to recur at night, the child sometimes waking from a sound sleep with a cry of distress, and falling to sleep again in a short time. These attacks of "earache" are supposed to be harmless because they do not result in suppuration, immediate deafness, or any other material change in function or structure, for they pass off after several hours of intermitting pain, leaving some tenderness to touch, to recur again the next night, to follow much the same course. The mt. may be hyperemic, but is not thickened; the et. is as patulous as usual, and there is no perceptible increase of secretion; it may recur every evening of several days with entire subsidence of pain for the greater part of the twenty-four hours.

These attacks differ in several particulars from the catarrhal affection resembling it, which causes almost continuous pain, thickening of the lining membrane, diminution or closure of the et., and increase of secretion with bulging of the mt. on this account. Sometimes suppuration occurs if the case is not promptly and properly handled; nearly always there is more or less impairment of hearing from congestive thickening of the tissues or the presence of fluid in the cavity. After one catarrhal attack there may never be another. The same cause seems immediately productive of each, because each is more liable to happen at the change of the seasons, the child being more exposed to the cold and the damp air at these times.

Thus, even in childhood a differential diagnosis might be made from the catarrhal affections, and we may reason that the disease at the foundation of the atrophic process may *begin at any age*, although the atrophy is a *malum senilis*.

Von Tröltsch thought the disease without catarrhal symptoms should be given a different classification, but it is yet generally classed as a catarrh by authorities, though Pomeroy ("Diseases of the Ear," page 148), in a cursory way, says, "I believe that the

* Politzer, "Diseases of the Ear." Am. Ed., p. 86.

rheumatic diathesis, in many instances, has much to do with the obstinate character of this affection; the rheumatic inflammation, according to its well-known predilection for fibrous tissues, finding a lodgment in the muco-periosteal lining of the drum."

Whether or not atrophy of the middle ear is of the same origin as arthritis deformans it has a more extensive pathology than that allowed to it.

TREATMENT.

Arthritis is introduced by a chill (Bruce), followed often by hemicrania, indicating depression of the nervous and circulatory systems. This action may be induced by cold, emotional disturbance, or physical shock: it concentrates at the cerebro-spinal nervous centres, and radiates therefrom, to express itself in the organ of least resistance in an individual, in the form of pain and trophic changes. The views of the writer in regard to local treatment in aural atrophy may be found in the *American Journal of Medical Sciences*, April, 1887, pp. 413-423. Iodine vapor is our sheet-anchor for topical application, but our efforts may be materially aided by constitutional and hygienic influences, under which head come climate, clothing, food, and other items of general treatment.

Climate should have special consideration in the choice of a winter residence. This should be moderate in temperature, and as dry as possible. The sudden changes of temperature in the higher latitudes are more deleterious, because they take place through a lower thermometric range, and passing from the inside to the outside of the house may produce violent circulatory disturbances during cold weather unless the cold is moderate. A climate distinguished by a decided difference in temperature between day and night is undesirable, unless this variation is guarded against by fire and clothing, which means thought and care on the part of the individual not likely to be taken.

Clothing is very important, as it should be of such character as to afford protection against the depression of climatic variation, that next the body needing most thought, though generally it has least.

Three areas of the body are especially sensitive to changes of temperature, and seem, to a great degree, to influence the comfort of the whole body. Such spaces are the *cervical region of the spine, the posterior aspect of the arm just above the elbow, and the nates.*

The ordinary dress of men protects them very well, and the buttocks are most exposed; from this region the body may be chilled or warmed. The exposure of this part of a chilled body to the grateful influence of radiated heat diffuses more general composure than warming the extremities, and every *man* will receive this suggestion feelingly. The effect is probably due to the superficial location here of the sciatic nerve, and to its short cutaneous branches.

Among women the cervical region of the spine and the arms are least covered, especially when in "evening dress." When entering a cold bath the body may be more quickly adjusted to the lower temperature by dipping the elbows and the nates, than by wetting the head and neck, according to the usual custom; and in this we may find some proof of the statement. Women, and especially neurasthenics, often complain at the menstrual period of cold on the posterior face of the arm just above the elbow. When one has his arms bared he may be seen to hold his elbows with his hands unconsciously, unless at work. This habit may be observed among workmen and washer-women, and sometimes among fashionable dames in bare arms. This part is supplied with cutaneous branches from the brachial plexus, and thus has more than local influence; to protect it from cold is instinctive. Women ordinarily have one thickness of dress upon the arm and neck; sometimes two on the arms; and, in the coldest season, often *none* on arms or neck. The dress may be worn high, and covered with wraps during

the warmest part of the twenty-four hours, to be exchanged frequently, for a décollete habit when the temperature is the lowest (slippers are not forgotten). May we not find in these facts some of the predisposing causes of the greater frequency of this aural affection among women? Fashion is without discretion, and is a Moloch to which health is unpitifully sacrificed (self-sacrifice). Intelligent advice may be given in regard to dress, but Fashion scorns it, and medication must be to little purpose without rational precautions on the part of the patient.

GENERAL MEDICATION.

Avoidance of shock, mental distress, damp cold, pregnancy, and whatever else tends greatly to disturb the balance of circulation, is to be advised. Nutritious food is to be taken regularly, and in such quantity as can be digested and assimilated. The moderate use of red wine is beneficial. Liq. potas. arsenit., in drop doses, taken for some months, promotes digestion and assimilation, in addition to its specific action upon the mucous membrane. In the same way it is probably useful in anæmia and certain forms of neuralgia. Syr. ferri iod. is serviceable in cases dependent upon impoverished blood, and may be associated with arsenic in the same prescription. Any gain from the administration of cod-liver oil has not been apparent to me. The salicylates have had manifest influence in some cases. Due attention should be given to the proper performance of its functions by every organ of the body, and particularly to the action of the bowels. A habit of constipation must be corrected, to aid nutrition.

The above outline, taken with the local manipulations heretofore described, are of more certain value in the treatment of aural atrophy than any other known to me. It is needless to say that a number of cases exist in which the structural injury is of such character and so established that nothing short of re-creation will restore to the organ the conditions necessary to its intended duties, as, for instance, osseous ankylosis or disarticulation of the ossicula.

DISCUSSION.

Dr. C. M. HOBBY, Iowa City, Iowa.—I can recall seven cases of arthritis deformans in persons related to each other not more remotely than second cousins, and occurring in the ramifications of a large family, and among more than thirty members of this family that I can now recall there has been but one case of deafness.

Dr. L. TURNBULL, Philadelphia, Pennsylvania, saw a case of this disease, arthritis deformans, on Canonicut Island this summer, every one of whose joints was immovable; he was like a chalk man. When I called to treat him for ulceration of the cornea his hearing was perfect. In another case that I saw every joint was out of its natural position; the hearing was perfect. (Inquiry being made whether these gentlemen had examined the ears, and if they found any structural change, they answered they *had not examined* the ears.)

Professor G. E. FROTHINGHAM, Ann Arbor, Michigan, said he had listened to Dr. Richey's paper with much interest, and all would admit that he had presented the theory with sufficient show of argument to challenge attention. While Professor Frothingham could not say that he is ready to accept the views presented, they are worthy of more careful consideration than could be given in an off-hand discussion of the subject, which, in the aspect in which Dr. Richey presented it, is new, at any rate to him. It is true, we have long acknowledged certain changes in the drum membrane and the articulation of the bones of the ear as due to a gouty or rheumatic condition, but the claims made in the paper he has not met with before. It is a subject upon which he must reserve his opinion until further consideration, as it

does not fully accord with his present views. He is all the more glad, on that account, to hear this view presented, as progress is best made by interchange of views, and stimulation to research grows out of opposing theories. He will repeat, "that man is a public benefactor who makes *two* blades of grass grow where one grew before." On the same principle, that man is a medical benefactor who gives us two ideas where we had but one before.

In obscure subjects, like the disease under consideration, we should take into respectful consideration any plausible theory, and, for one, he is willing to devote to it careful study.

Professor E. DE ROSSI, Rome Italy, inquired in what way Dr. Richey would distinguish between atrophy due to the cause suggested by his paper, and atrophy of the ear consecutive to hypertrophic processes.

Dr. RICHEY stated that in the published abstract of his paper he had stated that the question of atrophy of the ear consequent to hypertrophy would not be raised in the paper. In answer to Professor De Rossi, however, he said the *history* of the case would suggest an antecedent hypertrophic condition, by increased secretion and diminution of the upper air passages at some time; periods of greatly impaired function with relief, often without foreign agency; a subacute catarrhal condition, with thickening of the membrane involved, due to passive congestion, the impaired hearing being noticeable, especially during the exacerbations, and the absence of neuralgic pain. In atrophy following arthritis deformans, on the other hand, there is, if any, very slight thickening of tissue; no perceptible increase in secretion; very slow and progressive impairment of hearing, intractable in character; and neuralgic pain.

He did not anticipate immediate acceptance of the views offered. How can ankylosis, with prominence of the malleus and incus, be better explained? Is *dry* catarrh an inflammation? Mr. Henry Power, of London, England, in his remarks upon bacteria, in the Section on Ophthalmology, had intimated that the germs might, by migration, produce the joint affection, and Dr. Richey could not see that such a supposition would invalidate the theory of a neurosis, but, on the contrary, would do much to support it. He believes the bacterial theory, in explanation of this obscure affection, to be the *other* idea in Professor Frothingham's mind.

As arthritis deformans begins in the smallest and most used joints in the body, it might exist in the ossicula auditus, and be absent elsewhere. Drs. Turnbull and Hobby had not examined the structures of the ears in the subjects mentioned by them; they *did not notice impairment of hearing*. Their observations are therefore negative, for how often do we see distortion of the malleo-incudal articulation, without perceptible impairment of hearing?

