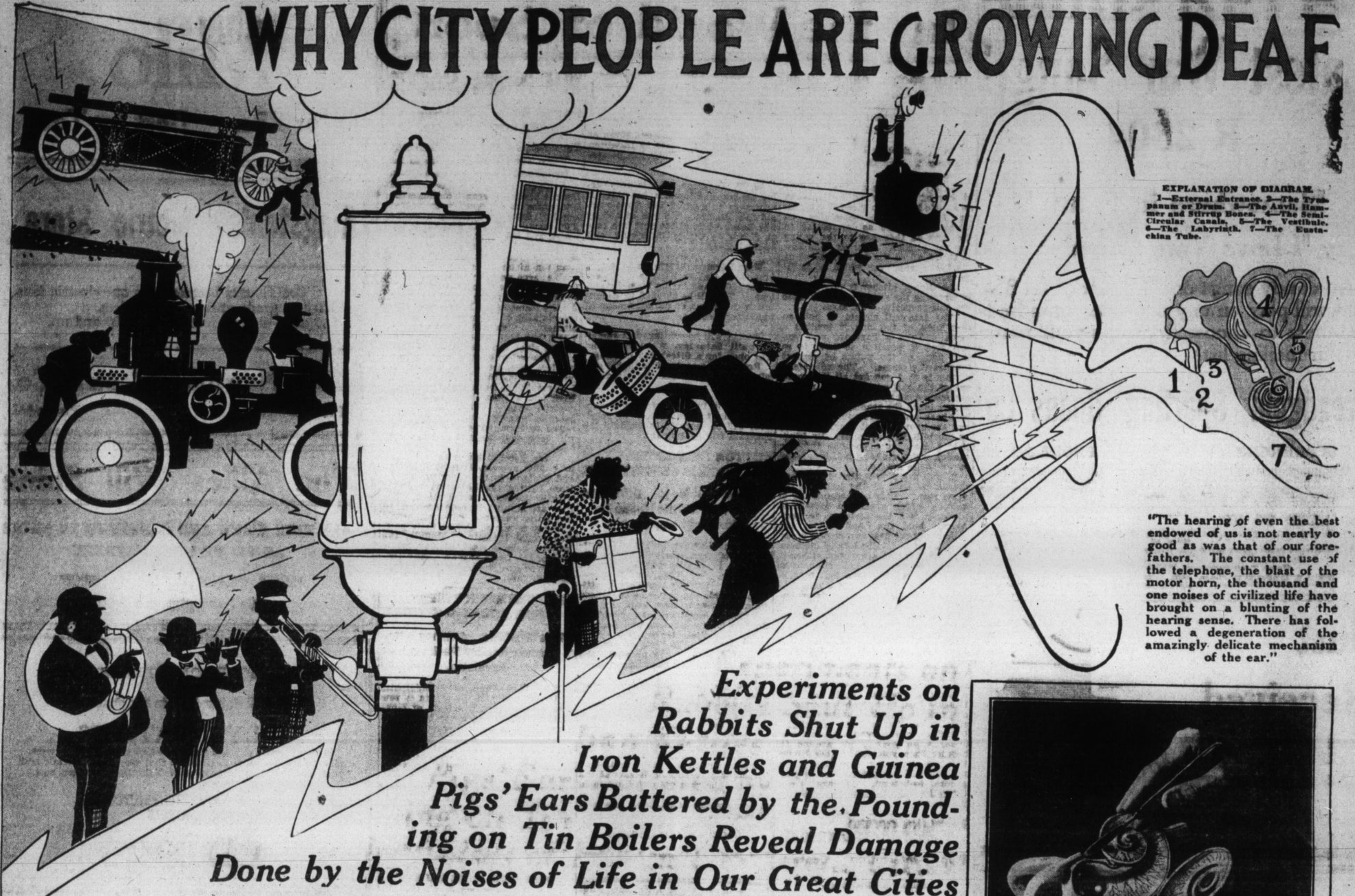


WHY CITY PEOPLE ARE GROWING DEAF



EXPLANATION OF DIAGRAM
 1—External Ear, 2—The Tympanum or Drum, 3—The Anvil, Hammer and Stirrup Bones, 4—The Semi-Circular Canals, 5—The Vestibule, 6—The Labyrinth, 7—The Eustachian Tube.

"The hearing of even the best endowed of us is not nearly so good as was that of our forefathers. The constant use of the telephone, the blast of the motor horn, the thousand and one noises of civilized life have brought on a blunting of the hearing sense. There has followed a degeneration of the amazingly delicate mechanism of the ear."

Experiments on Rabbits Shut Up in Iron Kettles and Guinea Pigs' Ears Battered by the Pounding on Tin Boilers Reveal Damage Done by the Noises of Life in Our Great Cities

RECENT scientific experiments have made certain the distressing fact that the men and women of the present day who live in the great modern cities are steadily losing their acuteness of hearing.

It cannot precisely be said that a man must hear to live. It is certainly true, however, that deafness is a dreadful handicap in the battle of life—hard enough as that battle is in general for those of us who have no physical or mental impairment.

We are all very sympathetic with the maimed, the halt and the blind; but we have comparatively little sympathy for the many thousands among us who are becoming deaf—and this so insidiously, so gradually, that the affliction is hardly realized until it has reached a stage where relief is possible, but full restoration of this precious sense absolutely impossible for those among us whose efficiency is lessened in proportion as their hearing loses its acuteness.

The most serious and pathetic cases of all are those whose mental activity becomes diminished by reason that they come to hear the voices of their fellows less and less until they cannot hear the comforting human voice at all. Hence the progressive inability of the deaf to engage in business, the trades and in human affairs generally, so that they become either wholly "undesirable" or have their earning capacity reduced, in proportion to the extent of their affliction.

To keep up in the twentieth century struggle for existence, one has to be active and in full possession of one's faculties. The strain on the nervous system is constant, especially on the organs of special sense, the eye and the ear. The overstrained eye gets attended to promptly enough; the proper glasses are usually the adequate remedy.

But for deafness once established there is alleviation of the affliction possible, but no such remedy as glasses afford the strained eyes. And yet most people pay no attention to their defective hearing until they find, usually by accident, that they cannot hear the tick of the watch, or of the family clock, or until there is a sensation of roaring in the ears; or until dizzy spells send them to the doctor for an examination, not for their hearing, but of their "constitution."

The hearing of even the best endowed of us is not nearly so good as was that of our forefathers, who needed this sense to be acute in or-

der to enable them to hunt, and to detect the prowling Indian. But to-day the constant use of the telephone bell, the strain of hearing so constantly that maddening "the line is busy" call; the demonic blast of the motor horn; the thousand and one horrendous noises of civilized life; have, by the nervous fatigue they induce, brought on a blunting of the hearing sense. There has followed a degeneration and a hardening (fibrosis) of the amazingly delicate mechanism in the middle and internal ear, on which acute hearing depends.

There is also thus caused an atrophy, a wasting away of the auditory nerve, the office of which is to transmit to the brain the impressions of the world outside us, which we get by our hearing sense. Once these delicate and labyrinthine tissues are destroyed, once their adjustment to one another is broken, the damage is beyond remedy; it is not possible, as in other machinery, to take out the broken down material and put in new works.

Such facts as these were actually demonstrated by Dr. Siebermann of Berlin, who gathered together a number of perfect ears of healthy rabbits, placed these ears in kettles and then subjected them to different noises, after which he found extensive destruction of the cells composing the tissues experimented on.

Dr. Siebermann found especially that the "Organ of Corti," and the terminal filaments of the auditory nerve in the labyrinth of the internal ear, suffered most in these experiments. Corti's organ is an extraordinarily delicate mechanism in which are some 3,000 pairs of microscopic pillars, the rods of Corti leaning as it were against these pillars are minute cells which end in hairlike processes. In close relation with these rods and cells and hairs are the filaments of the auditory nerve, to which the strands of a spider's web are about as the hawser of an ocean greyhound would compare with—well, with the strand of a spider's web. The organ of Corti shows a remarkable resemblance to the keyboard of a piano, and the observer finds himself likening the rods of Corti to the piano keys, and the filaments of the auditory nerve to the piano wires.

When we bear in mind that all hearing is by means of sound conduction and that the sense of sound is conveyed to the brain entirely by the auditory nerve, we can readily understand how injurious to the hearing faculty is the disruption of these most gossamer-like structures. Dr. Siebermann, in his experiments on guinea pigs, found the most serious destruction

to follow a single blank cartridge shot close to the ear. Corti's organ and the auditory nerve filaments were thus severely injured at one stroke. Conditions resembling those in boiler making were realized by automatic hammering on the outside of a big iron tube, with a guinea pig inside.

Siebermann found, and here is a very practical point, that in order to ward off harm from long-continued loud noises the air waves can be kept from striking upon the mechanism of the internal ear. The experimented animals whose ears were plugged with oil-soaked cotton or other free mass, did not suffer injury of the internal ear from long-continued exposure to recurring loud noises.

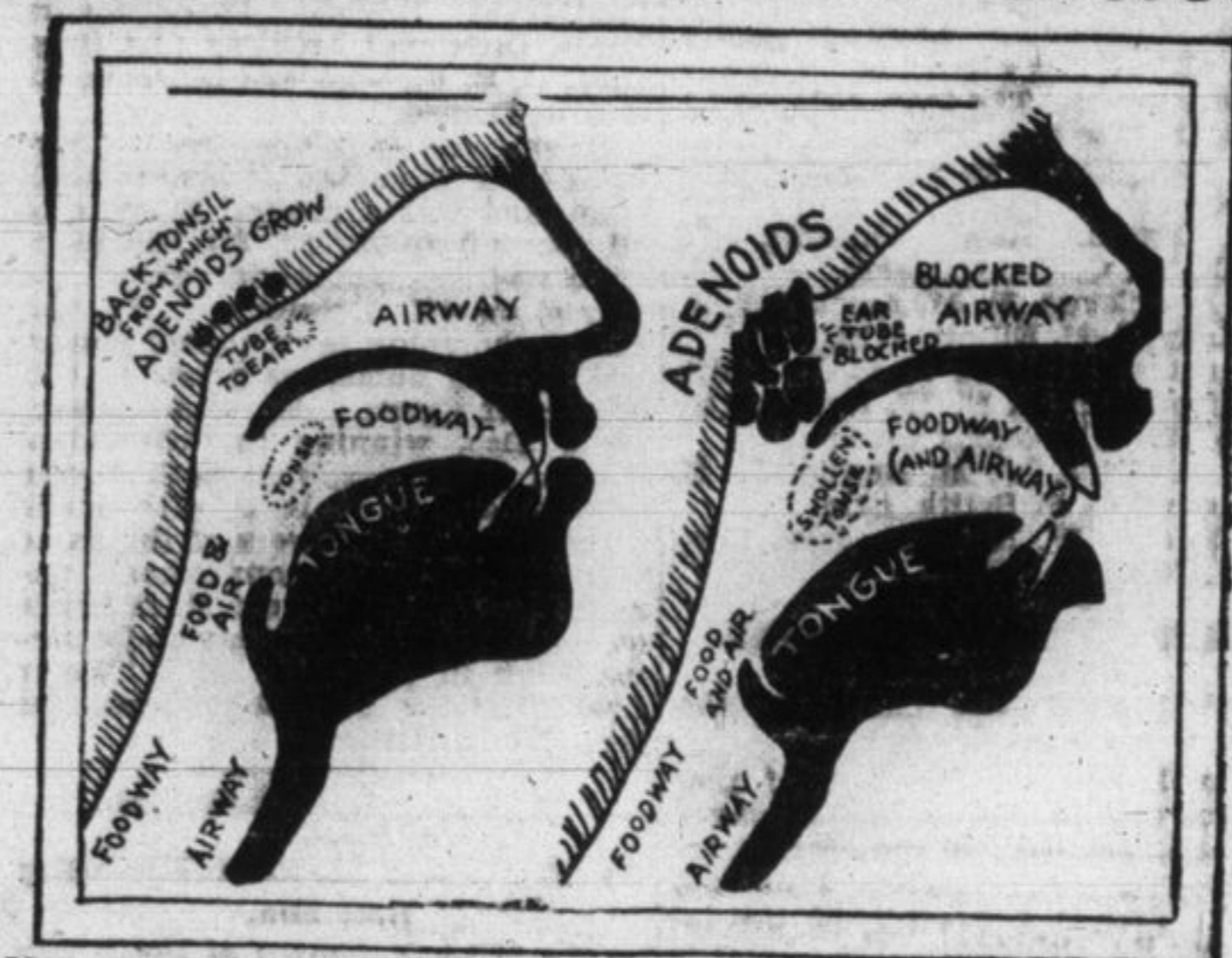
The transmission of sound by other routes than by the external and middle ear, has sight, if any, injurious action on the labyrinthine structures, and in human beings practically all harm can be averted by protecting the auditory mechanism against excessive sound waves, by an air-free, tight-fitting, isolating plug in the external ear. Such a plug must absolutely not be used, however, by sufferers from ear abscess or catarrh, because then the discharges resulting from the inflammation would be dangerously pent up. Such discharges, thus pent up, have been known to burrow their way even to the brain.

Such substances as thick felt have been used under foot by workmen to deaden sound. Dr. Siebermann could however find in his experiments no preventive or attenuating or beneficent influence in this procedure.

Dr. Siebermann intended to have presented his valuable researches on protection against injury of the hearing before the contemplated international congress for occupational affections. It is an odd comment on how widespread and world pervading is the baneful influence of the present European conflict, that his humane intention was by this fact frustrated. And the information here set forth is derived from his contribution to a Swiss journal.

Another very important cause of deafness, perhaps the most important of all, lies in inflammations, colds, catarrhs, not only of the ear, but also of the nose and throat. Any such trouble is bound to bring on swelling, congestion of the mucous membrane; and any such congestion in the course of time, and through constant neglect, results in a thickened mucous membrane. These incipient causes of deafness did not operate so strongly with our fathers and grandfathers.

Observe in the accompanying diagram how the Eustachian tube



How the Tonsils and Adenoid Growths Breed Germs Which Spread into the Tube That Extends into the Ear From the Back of the Nose.

passes from the throat to the middle ear. Catarrh in this tube, resulting from catching colds one after another many times, eventually thickens this tube so that it becomes closed up. The result is increased tension in the ear drum, often to the bursting point. For good hearing the Eustachian tube has to be open, in order that equilibrium may be maintained between the air within the ear drum and the air outside the drum. In the external ear. Besides, the open tube renders sounds clearer, just as those f-shaped openings in violins do. Adenoids and enlarged tonsils, obstructions in the nose and chronic catarrhs, have the effect gradually to clog up this Eustachian tube.

Worse still, the many germs that lodge in unhealthy throats—the germs of grippe, pneumonia, tuberculosis, quinsy, mumps, scarlet fever, meningitis and many another dreadful infection—are likely to travel along the Eustachian tube to the middle ear; all of which leads not only to deafness, but also to the development of such diseases in the body, possibly indeed to meningitis and brain abscess. The fact is, most cases of deafness are brought about by chronic catarrh, or habitual cold in the head or other irritation of the nose and throat; and the trouble all lies in that by the time people conclude to get these nose and throat troubles attended to, the ear condition has become so far advanced that no improvement in the hearing is possible. Practically, then, people with chronic deafness have got to be

content, as philosophically as they may, with the motto, that "what cannot be cured must be endured."

Dr. D. Harold Walker, of Boston, makes a very good point with regard to the rather fashionable and up-to-date belief that our children cannot live too much in the open air. This would be well enough if



The Delicate Mechanism of the Human Ear Exposed to View Under the Anatomist's Knife.

our human race, as it exists in civilization, had been accustomed, as the savage is, to living out-doors in all weathers; but in children sleeping exposed to the raw winds of winter, and then spending their waking hours in generally overheated rooms, favorable conditions develop for future ear troubles. Such children are like to suffer in time from obstructive adenoids and enlarged tonsils, which are bound in turn to affect the ear and the hearing.

As to chronic deafness in the adult, although something may be done in the way of relief, there is, as stated, little of cure to be hoped for. What must be done is to prevent comparative deafness from becoming absolute. And not only the ear, but the nose and throat also must be looked after, and the general constitution as well. Especially must constipation be avoided, as this tends to congest

tion; besides, the absorption of toxins from the intestinal tract is sure by transmission of these toxins in the blood and lymph channels, to affect grievously the ear mechanism and the auditory nerve.

Another cause of congestion leading to deafness is the inordinate use of tobacco—not only from the absorption of the tobacco toxins, but also by reason of the irritation the smoke occasions. Alcohol also should be "cut out." It is of course hard to persuade the average man to give up the habits of years; but to him, facts should be explained fully to him, and then the problem is up to him.

The deaf should be encouraged to go among their fellow men and to use their ears as well as they can. The tendency of these sufferers is to hibernate, to "go by themselves alone"; they get to imagine themselves a nuisance to their families and their friends.

The studies of Professor Metchnikoff on the whitening of the hair due to age throw light on the question, says a writer in the *Lancet*. According to him, when a hair begins to whiten there appear in it rounded or oval cells with prolongations which gradually come into relation with the cells containing the pigment granules and absorb them. These "pigmentophages," as he calls them, then descend toward the root of the hair to scatter in the skin, of which they are, according to him, the pigmentary cells.

The pigmentophages, which originate in the marrow of the hair, disappear completely when the hair finally loses its color. This theory explains the slow and progressive whitening of the hair in old age, and also applies to the rapid loss of color in cases like that of this French soldier.

The rapid mobilization of the cells in the marrow of the hair appears to be provoked by a nervous disturbance. The place of whitening seems to be determined by the points on the scalp which have been the seat of injury.

Just How Hair Turns White in a Night

THE sudden turning gray of hair under the influence of great emotion is a phenomenon so remarkable that it has always aroused curiosity. The well-known historical instance, such as the case of Marie Antoinette, who is said to have become gray in the night before her execution, are open to some doubt, but several well-authenticated cases have been noted by medical observers. At a recent meeting of a Parisian medical society doctor, Lebar reported the case of a soldier, aged twenty-three years, who was in a trench in Argonne which was blown up by a mine. He was projected into the air and fell, covered by a mass of earth, from which he had difficulty in extricating himself.

The detonation was such that he immediately became deaf. The flashing of the powder produced superficial burns of the face, and there were several bruises on the head, which were greatest on the left side.

He was taken to the English

Hospital at Afe-en-Barrois, where on the following day he noticed, to his surprise, tufts of white hair on the left side of the head. Those formed four "islets," separated from one another by normal hairs. The loss of color was complete from the roots to the ends of the hairs, and the longest hairs were just as white as the shortest. There was not a brown hair among them. The gray hairs were solidly implanted and could be pulled out only by strong force. The rest of the hair of the head was dark brown, and there was not a white hair in his beard or mustache. The patient was an intelligent man, and the truth of his story was confirmed by the fact that his hair was described in the description of him made when he enlisted as deep chestnut.

Just how the hair can lose its color so suddenly is not yet clear. It might be suggested that in this case it was due to bleaching by gases generated by the explosion, but this was negated by the fact that the parts of the hair underneath the skin turned gray like the rest.

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