nus, tetanin, in the lifetime of the animal attacked, and that by the application of this fact it was not only possible to protect an animal against an inoculation of the tetanus bacilli, but also to *cure* it after this inoculation and the appearance of the symptoms of the disease.

The importance of such results, especially as they have been repeated and confirmed by independent observers, can hardly be overestimated. They mean an absolute revolution in our ideas, and a possibility of reaching the long-sought goal, — the successful treatment of diseases that have heretofore compelled the attendant to stand helpless before their progress.

Almost in the same week with the announcements of Behring and Kitasato with reference to tetanus, came those of Frenkel and Brieger upon diphtheria. Tizzoni and Cattari have completely confirmed the work upon tetanus; and, if later reports can be trusted, the method of cure has been successfully applied in man in six cases of tetanus (lock-jaw) that there is no reason to suppose would have terminated otherwise than fatally, as such cases almost invariably do.

Similar results have been obtained in animals in the case of some of the suppurative bacteria, — in anthrax, in swine-erysipelas; and the variety and extent to which experiment must go in the elucidation of the points brought up by these new facts is almost unlimited. At the same time, there is more reason than ever to feel that investigation is upon the right track, and that finally the promise that now looks so fair, will be fulfilled, and that there will be means secured at last for the successful combating of the effects of the most virulent of the diseases of modern times. For, as will be readily seen, we have at last caught sight of materials, effective for the destruction of the bacteria or their toxic products, that at the same time will leave the animal tissues unharmed after their application. Thus far, we have been able to employ for such a purpose, only materials that were in themselves destructive to the vital organism, and the remedy when effectively employed has been worse than the disease.

THE THIRD YEAR OF THE INFLUENZA EPIDEMIC.²

BY J. B. AYER, M.D.

I FEEL that no apology is needed for presenting the often-discussed subject of influenza believing that every contribution of facts *made at the time*, which a discussion brings out may be of value to us and to future students of the epidemic.

We are grateful to Dr. Rush for his description of the epidemic as he saw it in Philadelphia a century ago; and we regret that his contemporaries did not write out their experiences for our benefit.

Dr. Rush stated that epidemic influenza visited Philadelphia in the autumn of 1789 and lasted six weeks. It relapsed in April, 1790, but less severely, and remained till the early part of June. It finally disappeared the following winter in the form of a mild relapse.

Now, a century later, it had been predicted by the profession as well as the laity that a reappearance of epidemic influenza in this — the third year — would not be a serious matter. On the contrary, however,

its course has been severe, and it has proved disastrous in many of our homes.

Influenza, in this neighborhood, became epidemic about December 20, 1889, lasting more than seven weeks. It relapsed about January 1, 1891, and continued till the early part of June. The present relapse began early in December, 1891. Since the middle of February there have been very few new cases, but yet in March, there was still sufficient evidence of its presence in our midst.

The mortality statements of the city of Boston show that the first attack was most fatal between December 28, 1889, and January 18, 1890; the second attack was most dangerous to life in May, 1891; the third attack (the present relapse) showed the greatest number of deaths between December 6, 1891, and January 30, 1892.

The disease has not been entirely absent from our midst (in all probability), since December, 1889, although for successive months sporadic cases only have been present.

What have been the characteristics of the different attacks?

In past epidemics of influenza, the symptoms have been dissimilar. Dr. Rush, in his account, says: "It was remarkable that those who had the disease chiefly in the breast last year, complain now chiefly of their heads; while those whose heads were affected formerly, now complain of their breasts."

The epidemic, as we have seen it, has shown a diversity in the relative importance of the neuro-muscular, respiratory and gastric symptoms in the different attacks.

The first attack was pandemic and acute. The analysis made by Dr. Clouston showing that 97 per cent. suffered from neuro-muscular symptoms, 77 per cent. from respiratory symptoms, and 55 per cent. from alimentary symptoms was perhaps applicable to cases in this vicinity; the neuro-muscular symptoms being the most prominent and causing most suffering.

The second attack, which came in the form of a relapse a year ago, did not attack the whole community at once, but occupied more time in seeking out its victims. There was perhaps no alteration in the proportion of the three classes of symptoms, for the neuro-muscular type was still the prominent one, but its symptoms were less acute and more prolonged. The depression of the nervous system and the accompanying and subsequent exhaustion were the marked features at this time. Neurasthenia, with depression of spirits, apprehensiveness and mental instability stood out in such broad relief in cases noticed last spring that many German authors described influenza as a *Nervenkrankung*.

The present attack (second relapse), which started at the beginning of the third year, has been marked by increased importance of the respiratory symptoms. My notes of patients who have recently undergone a second or third attack show a decided change in type. It seems to me that the respiratory symptoms are now relatively more prominent than neuro-muscular symptoms have been in the past.

We will briefly consider the symptoms of the present attack:

(1) *Neuro-Muscular Symptoms*. — Very few patients have suffered from influenza this year without being conscious of muscular and neuralgic pain. Migraine, sciatica, lumbago, and pleurodynia have been com-

¹ Read before the Boston Society for Medical Observation, March 7, 1892.

mon; delirium, meningitis, and a tendency to the psychoses have not been entirely absent, but, on the whole, the nerve symptoms have not been sufficiently severe to impress the observer with the theory that influenza now is essentially a "nerve disease."

There has been less depression of spirits and less worry. The apprehensiveness I have seen this year has not been an unmixed evil, as it has caused patients to take proper care of themselves, and to follow implicitly the physician's advice regarding confinement to the house.

Irregularity of the heart's action of nervous origin has, perhaps, been more prominent this season, and also spasmodic cough, which will be mentioned later.

Again, this year, I have noticed a tendency to persistent localized pain from very slight accidents.

(2) *Respiratory Symptoms.* — We feel that catarrhal irritation of the upper air passages has been the most prevalent form, although from the middle of December to the end of January it seemed almost impossible among the elderly and debilitated to keep the catarrhal trouble from extending to the lungs, and there were at that time numerous cases of acute bronchitis and pneumonia, dangerous from the outset.

The symptoms in the majority of cases, however, has been those of laryngitis, tonsillitis and bronchial catarrh. I have seen less extension of catarrhal symptoms to the middle ear or to the nasal fossæ. Hoarseness of several days' duration, the feeling that there is a "lump in the throat" causing slight dyspnoea, and a harsh, hacking, spasmodic cough have been the causes of frequent complaint.

As with this cough one rarely finds important signs in the chest on physical examination, it is necessary to consider these symptoms as partly catarrhal and partly nervous in character. I saw a marked case of neuro-respiratory symptoms early in the present relapse, where there was "constriction of the chest" coming on suddenly, and often waking the patient out of a sound sleep with dyspnoea and spasmodic cough.

(3) *Alimentary Symptoms.* — In looking over my cases I have been surprised to find how little prominence has been shown by gastro-intestinal symptoms of late. In very few cases was vomiting present at the outset, and with only one patient was gastric irritability the most prominent symptom throughout the attack, and here I suspected the existence of organic disease of the stomach. In several cases, however, there was bilious vomiting during some portion of the attack.

Intestinal diarrhoea was noted in a few cases only, and in none was it an important symptom.

I feel that the relative importance of symptoms connected with the digestive canal has been much diminished of late.

Immunity. — There seems to be no rule as to the susceptibility to repeated attacks. The majority of the members of this community have not suffered from three distinct attacks of epidemic influenza, and a goodly number have never been affected.

Susceptibility of Age and Sex. — Elderly people, although they have suffered more severely from the effects of this year's epidemic, may not necessarily have been attacked in larger proportion than in preceding years. In a home for aged people in this city all the inmates, twenty-one in number, were attacked last spring, thirteen of them severely, but all but three escaped this year's attack.

Foreign writers have stated, that a larger proportion of children have suffered from influenza during the present season. It does not seem to me that this has been the case in this neighborhood, although sixteen deaths from influenza under the age of five years have been reported during the last three months in this city.

It has also been stated, that a much larger proportion of women has been attacked during the present relapse, and the mortality-rates of the city would seem to confirm this statement. I think I have seen a like number of cases in both sexes.

Ruhemann, in Berlin, makes the statement that those whose occupations obliged them to be in the open air — soldiers, letter-carriers, policemen, firemen and doctors — were more susceptible the first year; but that now a much larger proportion of those with indoor occupations (especially women), are affected.

Febrile Disturbances. — Probably few cases of late have been ushered in by a well-marked chill, but chilly sensations lasting several days have been frequently noted. High temperatures at the outset have not been common except with acute lung trouble. A temperature of 106.2° was noted in one case at the very outset, which proved fatal in thirteen hours, from pulmonary congestion. In most cases of late, the thermometer has been principally valuable in indicating the new phases in the progress of the case.

Suddenness. — Unlike the epidemic attack of two years ago it has been rare for severe symptoms to appear at the onset. We have seen very few patients suddenly *struck down* by the epidemic. Convulsions have been rare at the outset.

Eruptions. — Probably there has been less erythema, erysipelas, and herpes zoster than in previous attacks. Authors have referred to the puzzling difficulty in making an early diagnosis between some cases of influenza and scarlet fever. I saw recently a very irritable child suffering from influenza with severe throat symptoms, where there was at times a suspicious redness of the skin, which, however, was found to disappear when the child could be examined in sleep.

Chronic Cases of Influenzal Origin have not necessarily been unfavorably influenced by the recent relapse. — I can mention, in proof, a severe case of neurasthenia and sciatica, of over two years' standing, where the greatest gain has been made during the past season.

I see frequently a patient who has suffered severely with muscular and articular rheumatism since he was taken down with influenza December 25, 1889, but who has improved more rapidly during the past winter than in any time during the past two years.

A patient with albuminuria following painful influenza of the neuro-muscular type has been under my observation twenty-two months. His debility and prostration have left him, and he is able to work, as a jig-sawer, his full time daily; but the urine still contains a trace of albumin and a few casts and occasionally a decided trace of sugar. He has no symptoms of kidney disease, and during the past winter has been as well and as strong as ever.

These three patients were all of middle age and were not attacked by the recent relapse of influenza.

Recurrence and Persistence of Symptoms. — There has been a marked tendency to recurrence, and we have never felt certain that the disease has taken

its farewell of the patient. There has been so much exhaustion that progress, when uninterrupted, has been very slow — especially in elderly and feeble patients. Many patients have sent for their physician merely to ask, "Why don't I improve more rapidly?" but the delay in recovery does not seem to depress them so much it as did last year, and they are not unhappy, when they are told they must be content, with a slight gain from week to week.

Prognosis, like everything else connected with influenza, has been uncertain. Many of my cases have turned out unexpectedly well, the danger which seemed imminent from threatening cardiac failures and intense prostration having generally been overrated.

In Regard to Treatment, I wish to say but one word — in favor of oxygen in the acute pulmonary affections of the asthmatic type.

OPERATIVE TREATMENT FOR THE RELIEF OF CHRONIC SUPPURATIVE AFFECTIONS OF THE MIDDLE EAR: REPORT OF THREE CASES.¹

BY FREDERICK L. JACK, M.D.,
Assistant Aural Surgeon, Massachusetts Charitable Eye and Ear Infirmary.

CHRONIC suppurative inflammation of the attic of the tympanic cavity may justly be considered a serious trouble. Especially is this true if the disease begins during childhood and continues for a long period. In many instances caries of one or more of the ossicles, is present, with or without disease of the bony walls of the attic, and the small space in the cavity is crowded with granulation-tissue or polypoid growths, causing defective drainage and consequently retention of septic matter. Exacerbations are in many cases frequent, and at these times the possibility of extension of the middle ear inflammation to the meninges of the brain or mastoid antrum in a constant source of danger. In the majority of instances the hearing power is practically gone, but a point of far greater importance is the danger to life itself. Indeed, a fatal termination is to be expected in a considerable number of these cases. In the light of what has been demonstrated within a few years, and realizing the possible effect of neglecting or ineffectually treating such a trouble, does it not seem somewhat surprising that the disease is allowed to progress unchecked when surgical interference has proved very successful in the majority of instances? The result of the operation has been either rapid cure or at least such improvement as to make the disease amenable to after-treatment.

I desire, therefore, to call attention to what has been done in aural surgery towards the relief of this class of almost hopeless cases. I believe it to be of general interest, for the rule of procedure is the common-sense surgical one of removing diseased bone or whatever obstruction is found to free drainage.

As far back as 1877, Dr. Kessel, of Jena, published the report of a case in which he removed the drum membrane, malleus, incus and stapes.² He cited this case to show that the ossicles could be removed without danger. As to the pathology of the affection, Professor S. Moos, of Heidelberg, is of the opinion that the hammer is most frequently affected, and that often before caries can attack the anvil, it is exfoliated,

being loosely held in place by the adjoining ossicles and tissues. The stapes is most rarely affected. He further states that he has never observed or seen described a case of primary caries of these bones; that the mucous membrane must first be diseased before caries can attack the ossicles.³

On July 20, 1886, Dr. Samuel Sexton, of New York, in a paper read before the annual meeting of the American Otological Society, described "A New Operation for the Radical Cure of Chronic Purulent Inflammation of the Middle Ear Tract." Previous to that, a paper written by Dr. Schwartz, in 1885⁴ gives a *résumé* of the literature of operations on the transmitting mechanism of the ear. Since that time the application of this line of surgery has developed very rapidly.

I have endeavored to summarize the results in the few recorded cases since Schwartz's paper in 1885; and I add the report of three cases operated upon by myself for chronic suppuration of the middle ear.

In 1887 Dr. Sexton reported nineteen cases of this disease, with results as follows: In five cases a cure took place in less than one month; in two cases, in two months; in two cases, in three months; in one case, in six months. In five cases, still under observation, there was slight improvement; in three cases⁵ still under observation, there was no improvement; in one case the treatment was not continued. He does not mention in any case the duration of the otorrhœa, except in a general way, that it had long continued. The malleus alone was removed in six cases and the malleus and incus in ten. He estimated that the hearing power was increased from 75 to 100 per cent. in the cases cured.

Dr. Burnett, of Philadelphia, before the American Otological Society last July, reported a case of seven years' duration in which he excised the drum membrane and malleus. In thirteen days the discharge from the ear ceased. Three months from the time of the operation a cicatricial membrane was found over the promontory. No discharge. Hearing increased from nothing to whispered words at fifteen feet.

In my search for information as to the frequency of purulent inflammation of the superior portion of the tympanic cavity, I found, in a paper by Dr. Alexander Randall, of Philadelphia, "Notes on the Shrapnell Perforation,"⁶ a total of 120 cases among ten thousand patients — somewhat small number. If, however, to this number is added those cases with perforation of the drum membrane, my impression is that the number would be largely increased.

From 1885 to 1890 inclusive, there were treated at the Massachusetts Charitable Eye and Ear Infirmary for chronic purulent middle ear disease 3,795 cases out of 21,818 patients applying for treatment. Among 8,337 of all cases seen in the last two years, from 1889 to 1890 inclusive, there were noted 1,020 patients with chronic purulent trouble, and of these 94 cases of perforation of the flaccid membrane, — almost 10 in every 100 cases. This is practically the same ratio per thousand for all ear patients as that reported by Dr. Randall, and illustrates the relative frequency of this affection in suppurative middle ear disease.

Although without statistics to substantiate any fig-

³ Archives of Otol., March, 1885.

⁴ Deutsche Chirurgie, Stuttgart.

⁵ In two of these cases suppurative inflammation seemed to continue in one because of caries of the anvil, and in the other in consequence of the retention of the incus which could not be found.

⁶ American Otological Society, 1890.

¹ Read before the Boston Society of Medical Observation, March 7, 1892.

² Archiv. f. Ohrenheilk., vol. xlii.