of the two former cases. He is now, five months* since beginning of treatment, practically quite well. The right cord is free from growth and is mobile, with no turgescence of the ventricular band.

IV.

A. D. The patient is a marine consulting engineer, aged 64 years. He is a smoker but is temperate in his habits. This case is interesting, and worth including with the above, as it also was a direct sequel to influenza, and had been regarded for some weeks as a simple adenitis.

The case is therefore a very recent one, and has only had a few irradiations. Up to five months ago—that is, the beginning of January last—he was quite well, and in his usual good health when he contracted influenza. From this he recovered, but in a fortnight had a relapse after undue exposure. Immediately following, and practically coterminous with it, he had some enlargement of the anterior cervical glands of the left side of the neck, which has continued to the present time. There is a little discomfort in swallowing, and the voice is a little changed in character, but neither of these symptoms amounted to very much. His physical condition on March 17th was as follows:—On the left side of the larynx, springing from the aryteno-epiglottic fold, and including the arytenoid cartilage, was a medium-sized, mulberry-like growth. This occupied the whole side of the larynx between the arytenoid and epiglottis. There was no fetor of breath, hæmorrhage, or discharge. The left vocal cord could not be seen. The expectoration was examined for tubercle bacilli, with negative results. The glands were tender and rather hard, but not at all stony.

Precisely the same treatment was adopted as in the former cases, but so far he has only had a few irradiations, with the following results:

Condition of Larynx.—The mulberry-like growth has entirely disappeared, bringing into view the cord on the left side. There is, however, some infiltration, extending from the arytenoid cartilage, along the aryteno-epiglottic fold, for three parts of its way upwards, assuming the appearance of an oval swelling. There is some pain in swallowing for the first time, and previous to the irradiation pain was experienced, radiating from the region of the epiglottis to the mastoid, in the course of the great occipital nerve. The patient expressed a sense of general well-being, and to all appearance was soon much improved. Three weeks ago there was no pain in swallowing; a small ulcer was seen behind the right arytenoid eminence, slight secretion and no fetor, with signs of retrogression of the lesion.

Apropos of the above method, the following abstract from the *Epitome of Current Medical Literature in the BRITISH MEDICAL JOURNAL*, February 16th, 1907, paragraph 89, is interesting:

The x-ray Treatment of Syphilitic Adenitis.—M. Nencioni and A. Paoli (*Lo Sperimentale*, 1906, lx, 882) have treated 37 cases of glandular enlargement due to Hunterian chancre with the x rays. The subacute cases (14) recovered a little faster, and had less pain than similar cases not treated by the x rays. The chronic cases (16) obtained great benefit from the treatment; they were relieved of all pain, the glands diminished rapidly in size, and the glands which had been opened by the surgeon healed up with great speed. The acute cases (7) also benefited considerably by the x-ray treatment. The authors conclude that the treatment is of considerable value, and in particular accelerates the healing of indolent wounds and ulcers.

Drs. Lawrence and Crane of the United States have recently published independent articles on x-ray irradiations controlled by opsonic estimations which lend support to my views on this subject.

In the *BRITISH MEDICAL JOURNAL* of July 20th, 1907, a suggestive article is to be found, entitled "A Case that seems to Suggest a Clue to the Possible Solution of the Cancer Problem." In this, as well as in several cases recorded in England, in Europe, and in America of spontaneous recoveries from cancer in man, one conspicuous feature that seems not to have been sufficiently appreciated has been the invariable extensive lymphatic glandular involvement—a fact, indeed, which has led to the decision that the cases were inoperable. Such was the condition in the case I have just referred to, and although at this stage x-ray treatment seems to have been ultimately employed, the irradiations were seemingly directed to the lesion in the breast, and not to the glands in the axilla or those in the pulmonary region. After her return home in a moribund condition she had an attack of pleurisy with extensive effusion, following upon which there was a period of enforced starvation. Consequently a resolution of the neoplastic encapsulating tissues enveloping the glands took place. It is well known that during hibernation in animals and in starvation those tissues which are of rudimentary

* The period of freedom from recurrence is now, one year in the first case, ten months in the third, and nine months in the second and fourth cases.

organization are first drawn upon for the needs of the organism.

Fasting for from two to three weeks is commonly enforced by the Arabian Hakims, who practise the old Greek or Yunani system of medicine at the present day, and, like venesection of old, it doubtless has its advantages when judiciously applied.

We know that the iodides produce a resolution of such tissues and the therapeutic action of the x rays is very similar, but with this difference, that in the case of the former, months of medication are necessary, and in the latter it is a matter of hours, judiciously extended over a few weeks.

Trypsin, amylase, and papain are proteolytic enzymes and act similarly as solvents. The antigens elaborated within the deep lymphatic and lymphoid structures, being of a colloid nature, cannot be diffused, until the impervious encapsulating tissues are opportunely resolved.

In the light of recent clinical knowledge it seems to me that the time has now come when, in the diseases which involve the production of an immunizing agent, we may safely adopt as a working hypothesis that of the implication in these tissues of a microbic causation.

It is highly probable that in the great majority of such diseases the lymphatic involvement is, in its early stages, physiological and not pathological, therefore not manifested to our senses either subjectively or objectively. A microbic attack necessarily involves the initiation of the formative process of an immunizing agent, this process being completely carried out in those cases in which a certain adequate dose of the infection is successfully repelled.

Hitherto, lymphatic glandular involvement in the infectious processes in the animal body has been looked upon most unfavourably both by the physician and the surgeon, as "a spreading of the disease into the most vulnerable parts of the system," and not as an *extended response of the body in the mechanism of bodily defence*.

These glands which are usually conspicuous in the neck and armpits are therefore cut out as completely as possible; it is said, "to prevent further spread," or "recurrence" of the malady. It should, however, be noted that there is this serious inconsistency in what has been called the "radical operation" in cancer, that these glands are usually left undisturbed, when they are not easily accessible to the fingers, as in operations for cancer in the abdominal organs. The fact that these glands have been estimated to number from 800 to 900 in the human subject, and that they exist for the purposes of a most important function, seems to have been entirely overlooked.

Professor Goldmann, in a paper read before the Royal Society of Medicine in November last, stated that the results obtained by the German surgeons who now operated in cancer without extirpating the involved lymphatic glands were no worse than those obtained by other German surgeons who insisted on their complete removal; . . . and thereby hangs a tale.

THE FUTURE OF THE AILING POOR-LAW CHILD.

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DURING the past decade real progress has been made in the treatment of two classes of Poor-law children—first, the normal and healthy children; and, secondly, the children who are acutely ill. But there is a third class which, on account of various administrative difficulties, has not obtained the treatment which is urgently needed for it. This class is made up of children who are weak and ailing, who are neither in a fit state of health to be classed for treatment with the normal child, nor ill enough to require the constant medical attention needed for the acutely ill.

The advance which has been made in dealing with the healthy child is one of the brightest features in the progress of Poor-law administration. The number of such children remaining in the unsuitable environment of the workhouse is gradually decreasing, the horrible barrack-

school system is passing into the oblivion which it deserves; and the village communities, with their unfair taint of pauperism, are being replaced by scattered homes, where the children live in small "families" under the care of a foster-mother, attend the public elementary schools, and mingle with the outside world, free even from the handicap of a uniform dress which would brand them as paupers. Moreover, an increasing proportion of these healthy children is being boarded out or emigrated to Canada, and the children are thus given a better chance of becoming self-supporting, self-respecting adults. This is real progress, for the true aim in the rearing of the Poor-law child is to make of him or her a useful member of the community.

There has been real progress also in the treatment of the second class of children, the acutely ill. The efficiency of the workhouse infirmaries has increased very much during the past twenty years, and these institutions are being managed in a manner more consistent with the present standard of medical and surgical science.

But the third class of Poor-law children—the "in-betweens," as they may be called—what of them? They are merely weak and ailing, their condition of health is not so bad that they need be kept in an infirmary ward, but they are not strong enough to be sent to the scattered homes or emigrated to Canada. And under the present system they are allowed to grow up in the surroundings of the workhouse infirmary.

True, attempts are made to brighten the lives of these children, and due measure of praise should be given to the average workhouse infirmary nurse, who by her patience and kindly interest fosters the affection and love which await the awakening no less in these than in other and non-pauper children. But the effect of this environment on the mental, moral, and physical progress of the child is necessarily evil. The monotony of life in the ward, the lack of freedom and fresh air, and the unnatural seclusion from the life of the world beyond the grey surrounding walls would hinder the development of any child, and the effect is even more serious in the case of the child who is weak and ailing. And the disadvantageous circumstances of their upbringing can have but one result. The majority of these children grow up in the workhouse environment into weakly adults with a store of health insufficient to enable them to earn their own living; they therefore remain on the rates during the rest of their lives, and the cost to the State is not negligible.

A change in the method of dealing with them is imperative on two bases, the economic and the humanitarian. To refer again to the principle which should govern the treatment of all Poor-law children, it will be admitted that the object is to rear the rate-supported child in such a way that he or she will become a self-supporting adult who, instead of costing the State money for maintenance, will be a useful wage-earning member of the community; so that on the economic basis, the rearing of these little ailing "in-betweens" should be on such lines as will produce among them the greatest proportion of self-supporting adults.

In considering the question from the therapeutic standpoint, it will be clear that this end is more likely to be attained by giving these children a free open-air life in the country. Fresh air, good food, and a natural life in the country will be infinitely more likely to result in this end than the present system of upbringing in a dull infirmary ward, and the possible administration of many medicinal tonics. Even if these wards were efficiently ventilated, the atmosphere is certainly not a suitable one for the rearing of a weakly child; and in most of them there is still a regrettable condition of overcrowding. Moreover, in many of these wards which are not administered on the "open air" system, there are always some cases of tuberculous lesions, and however low be the infectivity of joint tuberculosis, the existence of discharging tuberculous sinuses in a non-open ward will render it unfit for the continued habitation of other ailing children.

In considering any such scheme, two questions will inevitably present themselves for answer; first, Is it worth while? Secondly, can it be carried out without great expense? The consideration of the first question, "Is it worth while doing?" necessitates a reference to the biological faith of a section of the community who, in answer

to such a proposal, would advance the doctrine of the "survival of the fittest." They would say, "these children are weaklings, in the struggle for existence they will fail, therefore let us not waste our resources in attempting to help them." But in our present day civilization, the principle of the "survival of the fittest" has but a limited influence on race progress. It might be right, though not righteous, to allow this principle to operate fully for the benefit of the race if these children died off in the keen struggle for existence. But they do not die off. They live on to become adults who are unable to support themselves, they remain a burden on the State. So that the principle of the "survival of the fittest" offers no negative answer to the question, "Is it worth while?"

Truly, the application of this principle to modern sociological problems is being abused by a section of the public whose knowledge of evolutionary theories is too limited to allow of a proper perspective in their views. For instance, the fact that the conditions of life and rearing in our large towns result in the death of 130 out of every 1,000 infants in the first year of life is to this section of the public no reason for the amelioration of those conditions. To them it is merely the operation of the principle of the survival of the fittest. They fail to realize that the conditions which kill off the 130 infants will damage and handicap many if not most of the 870 who survive the first year of life.

To return to the question with which we are dealing, we may make the following hypotheses: That under the present system a very large proportion of the weak and ailing Poor-law children grow up into adults who are unable to support themselves, and who remain during their lives a burden to the State. Secondly, that in order to reduce considerably this proportion, it is worth while changing the present system and rearing the children on lines which will give them the best chance of becoming self-supporting, non-pauper adults.

The other question, that of the cost of this open-air treatment in the country, must be dealt with in two phases—first, the initial expense of the change, and secondly, the cost of administration when the system has been established. The first phase is the more serious, but I believe that the Poor-law authorities have only to become opportunists to make the initial expense moderate. One of the most pressing problems with which Poor-law authorities have to deal to-day is what to do with the consumptives who make an appreciable proportion of the pauper total. Until recent years these patients were treated in general wards with other non-consumptive patients, and there is no doubt that the disease was spread to some extent in this way; and, indeed, in very many workhouse infirmaries this system still obtains. But with the onward march of medical science attempts are being made to isolate all such patients, and with this object in view many unions are establishing sanatoriums in the country. Here, then, is the opportunity of providing for the little "in-betweens" an open-air life in the country, for on the same plot, but isolated from the sanatorium, an open-air home could be built for them.

Before leaving the workhouse attention would be given to bad teeth, enlarged tonsils, and adenoids, if such conditions existed, and the children would then go to live in the open-air home, reared in the country on good wholesome food.

Such a place could be used also as a convalescent home for the second class of Poor-law children—the acutely ill, many of whom, under existing conditions, win through the acute illness only to drift into a condition of indifferent health, which brings them into the ranks of the "in-betweens"—the weak and ailing.

The question of the expense of administering such a home in each union is not serious. The maintenance of the children in the country would cost no more, and in many cases less than in the expensive and heavily-rated town workhouses, and the present number of the actual nursing staff would need but the addition of a kindly, experienced nurse, who would act as superintendent and foster-mother of the home.

In this paper the future of the ailing Poor-law child has been discussed from the economic standpoint. To the local Poor-law authority the proposed scheme would mean a reduction in the number of weakly adults to be supported during a lifetime; to the State it would mean that

many of these ailing children would be reclaimed from the slough of ill-health; many of them would become self-supporting adults, of value to the State. Therefore economy indicates that the scheme is expedient. There comes also the voice of Humanity appealing to us to lighten the burden of the little children who have done nothing to deserve its continuance, whose heritage too often is sorrow, and whose path through life is the weary path of ill-health.

ON THE ADMINISTRATION AND DOSE OF STAPHYLOCOCCUS VACCINE.

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HAVING for some time past been in the habit of employing bacterial vaccines, I venture to record the notes of one case which has in particular convinced me that the doses of staphylococcus vaccine commonly employed, namely, 100 to 500 millions staphylococci, are often too large, and therefore harmful. The case I refer to is one of chronic fronto-ethmoidal suppuration of many years' duration, which has been under treatment with a vaccine for eighteen months. There was in addition antral suppuration, on which Dr. Watson Williams of Clifton operated with entirely satisfactory result eighteen months ago. This operation was followed by a very acute exacerbation of the frontal sinusitis, which was treated by daily irrigation of the sinus for a month. Much improvement resulted, but a large amount of purulent discharge continued.

Staphylococcus in pure culture was found by Dr. Munro of Bath in pus drawn from the frontal sinus and a vaccine made by him.

The first hypodermic injection of vaccine was given on April 7th, 1907, and between this date and October 21st, 1907, the patient had sixteen injections varying in dosage between 500 and 100 millions staphylococci. Many of these injections were controlled by opsonic index determinations made both before and after injection. It was always found that the opsonic index corresponded closely with the clinical signs, enabling one after a time to dispense with the determination altogether. Frontal sinusitis, in most patients at all events, is a condition in which index determinations may be safely dispensed with. In this case a low index means frontal headache and increase in the amount of discharge, and vice versa. After each of the above injections there was a negative phase marked by pain, increase in the amount of purulent discharge, feeling of illness, and sometimes enlarged cervical glands, lasting four or five days when the larger doses, for example, 500 millions of cocci, and two or three days when smaller amounts, for example, 100 millions, had been given.

At the end of October, 1907, the patient was much better, both locally and generally, than she had been for more than a year, and there was great improvement in the general septic condition in which the patient had been some months previously. The discharge was much less, and pain, except during the negative phase produced by the menstrual periods, quite infrequent. The patient remained well till February, 1908; during that time no further injections were given. Then the sinusitis again became active and remained so, with periods of less activity, till April, when, as there were no signs of improvement, vaccine treatment was resumed. The dose of vaccine was much reduced, so as to abolish the troublesome negative phase, and was given about once a week. Further, following Dr. Latham,¹ I commenced to give the vaccine by the mouth, on an empty stomach, in normal saline solution. The same clinical effects were produced as when the hypodermic method was employed—for example, 60 million staphylococci by the mouth gave my patient slight frontal headache for about a day and a half with increase of discharge lasting a day or two longer; while, if this amount is given hypodermically, the negative phase lasts decidedly longer. Doubtless, the positive phase lasts longer after hypodermic injection than after oral administration. The doses were further reduced to 20 million, and sometimes 10 million staphylococci by the mouth, and these smaller doses were found to cause no subsequent headache, though there is always slightly

more discharge for one day—the second or third after the administration of the 20 million cocci doses of the vaccine. Since April this patient has been steadily treated with the vaccine in doses of 10 to 20 millions; sometimes a dose has followed on the last with an interval of a week, and sometimes only four days. During this period she has been in better health in every way than she has been for several years past. She has rarely had any frontal pain, except during a menstrual period, and at times days have elapsed without any purulent discharge.

It is difficult to resist the conclusion that the improvement is due to the vaccine, and, further, that small doses, that is, of 10 or 20 millions of cocci, have answered best, and, moreover, that oral has been as efficient as hypodermic administration, and entails less time and trouble.

While a cure in such a case seems to be too much to hope for, any method of treatment which might obviate the necessity for a radical operation is worth attempting. Further, though the improvement has been slow, it has been marked, and still continues, accompanied by a continuous levelling-up of the patient's general health and lessening of the general septic condition which existed before treatment by vaccine was commenced.

REFERENCE.

¹ *Proc. Roy. Soc. Med.*

"FLIES" AS CARRIERS OF THE BACILLUS TYPHOSUS.

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ON September 4th I received from Dr. Heywood Wilshaw a box containing a large number of flies. Twelve of these (living) were minced in a sterile dish with $\frac{1}{2}$ c.c.m. of sterile salt solution. The whole of the resulting turbid fluid was used for cultures: (1) To demonstrate the presence of *B. coli communis*; (2) to search for the presence of microbes belonging to the typhoid group. Phenol broth, litmus lactose bile salt peptone water, and two large plates containing Drigalski-Conradi medium were used for the purpose.

In all of these cultures copious *B. coli communis* was easily identified. In the Drigalski plates, besides numerous colonies of *B. coli communis*—red colonies with red halo—there were present also a number of blue colonies, but only two or three of these blue colonies in each plate presented the appearances which might indicate the *B. typhosus*—namely, blue colonies with slightly irregular filmy margin, thicker raised centre, finely granular, and, under the microscope, composed of cylindrical mobile bacilli. An emulsion of a particle of such a

Characters and Cultures.	Laboratory Stock of <i>B. typhosus</i> .	Microbes Isolated from the Flies.
Morphological	Cylindrical, very mobile	Cylindrical, very mobile.
Gelatine streak	Translucent band after 48 hours	Translucent band after 48 hours
Glucose gelatine shake	Good growth, no gas	Good growth, no gas.
Neutral red broth	No change in colour	No change in colour.
Litmus milk	Slow acid formation, remains fluid	Slow acid formation, remains fluid.
Litmus, lactose, bile salt, peptone water	Bleached, no gas	Bleached, no gas.
Litmus, glucose, bile salt, peptone water	Acid formed, no gas	Acid formed, no gas at first, very slight gas after 3 days.
Phenol broth	Cloudy growth, no pellicle	Cloudy growth, no pellicle.
Indol formed in broth after six days	Negative	Negative.
Drigalski-Conradi medium	Blue finely granular colonies with raised conical centre, irregular filmy margin	Blue finely granular colonies with raised conical centre, irregular filmy margin
Agglutination of broth culture 24 hours old with typhoid serum, dilution 1 in 50	Distinct within 10 minutes	Distinct within 10 minutes.