

CHILD EMPLOYMENT AND EVENING CONTINUATION SCHOOLS.

ANOTHER appendix volume, No. 20, to the report of the Royal Commission on the Poor Laws and Relief of Distress has been published (Cl. 4632), and incidentally indicates the directions which educational effort should take in this country in order to ensure the provision in future years of better educated workmen in the various industries on which the success of this country depends.

The report is by Mr. Cyril Jackson, chairman of the Education Committee of the London County Council, who acted for the commission as a special investigator to inquire and report on the main occupations followed by boys on leaving public elementary schools in certain typical towns; the opportunities of promotion in such occupations or of training for other occupations; and the extent to which such boys subsequently obtain regular employment (skilled or unskilled) as adults. Mr. Jackson was given power to make any feasible suggestions of a remedial character indicated by the facts, and he limited his investigations to a consideration of the prospects of permanence and educative value for adult industry of the occupations entered upon by the boys with whom he was concerned.

As regards the methods of inquiry adopted, it may be said that Mr. Jackson was able, from the sources of statistical information he found available, to obtain an idea of the various occupations in which there was an apparent excess of boys who could not when adults be absorbed in the same branch of industry. He afterwards, by interviews and by the distribution among employers of special forms to be filled up, obtained some further information as to these occupations; but he met with many difficulties, and only a small proportion of the forms were returned to him. In addition, a form of industrial biography for young men was issued to obtain direct evidence of the length of time boys remain in particular occupations and the age at which they were displaced if they have been in boys' work which does not lead to permanent employment as adults; but a third only of the forms circulated were filled up and returned—"Lads are always suspicious of anything which they think is prying into their affairs, and they believe there must be 'something behind,'" says Mr. Jackson.

There has been a steady diminution in the number of boys employed under fifteen during the last quarter of a century. With the recent stimulus given to secondary education, and counting on the zeal of new education authorities, there is reason to believe the decrease may be even more marked in the next census return. There are, however, exceptions to this decrease. The census general report of 1901 states, "while owing to the restriction of child labour, the total number of boys under fifteen years, returned as employed, showed a decrease of 12.9 per cent. on the numbers enumerated in 1891, the number of messenger boys at the same ages declined by only 5.1 per cent." It is, however, satisfactory to note how few are the trades in which an actual or a proportional increase in the number of boys is shown. As Mr. Jackson says, messenger boys have a very short life as such, and this form of occupation ceases as soon as the boys begin to require higher wages. It is unfortunate, therefore, that it should be just in this class that the decrease in boy employment is least marked.

The problem presented by the results of Mr. Jackson's inquiry is very grave in character, and the various statements of it collected in the present volume may be commended to the careful consideration of those who administer our educational affairs. Similarly, the opinions here collated of schoolmasters, of men working in boys' clubs, &c., of trades unionists, of distress committees, and others, deserve earnest study.

The analysis of the numerous forms received by Mr. Jackson proved a long and difficult task, and he is to be congratulated upon the important facts he has been able to gather together. The information respecting the capacity of boys, the wages they are able to earn, and the precise conditions regulating boy labour in specially selected industries, will repay careful deliberation, and may

with advantage occupy the time and immediate attention of the members of education committees throughout the country.

Of especial interest are the conclusions arrived at and the suggestions which Mr. Jackson makes at the end of his report. The following excerpts will serve to show the vital importance of early legislation to ensure some efficient system of further education for all boys and girls during their adolescent years, whether they themselves desire it or not.

The evidence as to the difficulty boys find in getting into permanent work of a satisfactory kind seems overwhelming. Every inquirer gives the same impression.

The work of an errand boy or a telegraph messenger is bad for the boy, so is the work of a boy in a warehouse or factory who is employed to fasten labels to bottles, to fill packets of tea, or the like. It is not so much a question of a skilled trade not being taught as of work which is deteriorating, absorbing the years of the boy's life when he most needs educational expansion in the widest sense.

More skill of hand or eye is not everything. It is character and sense of responsibility which requires to be fostered, and "not only morals, but grit, stamina, mental energy, steadiness, toughness of fibre, endurance," must be trained and developed. Work which is monotonous kills development, and work which is intermittent destroys perseverance and power of concentration. The waste of boys' brains, character, and strength is ultimately not only destructive of the individual, but a serious economic loss to the community. It is probable that boy labour is not really cheap at all, owing to the undeveloped responsibility and carelessness of the young, but if the unskilled men who spring from them have been mentally and physically stunted, the loss to the employers is enormous, for they cannot earn a sufficient wage to live properly, and their output is below that required from an adult citizen.

In the large industries there should be a readjustment of conditions, but probably the initiative must come from an extension of State regulation of boy labour. This can be most easily effected by further raising the age of school attendance, or by a system of compulsory continuation schools. It must be recognised that much boys' work is wholly uneducative, and deteriorates instead of developing the man, and that this must be prevented. One of the largest industries—the textile—is still partly based on half-time child labour. It is probable that the operatives are really more to blame for this than the employers, many of whom are not very satisfied as to the advantages of child labour. The old contention that the manipulative skill required compelled the employment of children of twelve, because after that age their fingers lose suppleness, is not now heard so frequently.

One thing which appears likely to be of far-reaching benefit to the boy is increased education. Thus Mr. Kittermaster gives as his remedies:—

(1) Boys should be kept at school until the age of fifteen instead of fourteen.

(2) Exemption below this age should only be granted for boys leaving to learn a skilled trade.

(3) There should be school supervision until sixteen, and replacement in school if not properly employed.

Prof. Sadler and the Rev. Spencer Gibb suggest compulsory half-time schools, or, at any rate, some compulsory school until sixteen or seventeen. Mr. Gibb would like to see further amendments of the Shop Hours Acts so as to avoid the possibility of excessive hours of labour on certain days of the week. He points out, also, that the present Acts need to be more thoroughly enforced.

This inquiry seems to show that these reforms are necessary. The raising of the age of exemption would strengthen the boy, and he would be kept longer under discipline, and would become both steadier in character and more intelligent. It can hardly be seriously contended that the boy of the working man is really more fit for life than the public-school boy at the age of fourteen who is admittedly unready at that age.

It must not, however, be supposed that the present education given in the schools is all that can be desired.

There is a widespread feeling that it is too academic, and must be made more practical. In any case, it must aim at developing character and intelligence rather than merely imparting book knowledge.

If it is urged that further time for schooling is commercially impossible, it must be remembered that our great trade rivals, the Germans and the United States, have compulsory continuation schools or a higher exemption age. In Germany it is the custom for parents to put their boys to a skilled trade, and apprenticeship is as flourishing there as ever it was. "The Imperial Law on the 'Regulation of Industry' of 1891 decreed that the masters in any branch of industry were bound to allow their workers under the age of eighteen to attend an officially recognised continuation school . . . for the time fixed as necessary by the authorities." The local council might make such attendance obligatory for all male workers under the age of eighteen. Every raising of the school age or Factory Act limiting child labour has been in turn objected to as fatal to industry, but the community has very quickly adapted itself to the new conditions.

The removal of the supply of cheap boy labour under fifteen would probably lead to very useful readjustments of industry and to the substitution of mechanical labour for some of their work and for a greater employment of adult labour. It is, of course, true that to start boys at fifteen instead of thirteen or fourteen will not prevent a period of transition from boys' to men's jobs, but it will give a better chance of skill to the boy. A better and longer education should give the boys firmer and more disciplined characters and a greater power of adapting themselves to new work. Increase of efficiency, even in unskilled labour, means increased wage to the mutual benefit of employer and employed. It is the over-supply of unskilled labour which is not worth a good wage which is the real difficulty.

Again, in skilled trades proper there is little doubt that there is room for more boys, and they are not supplied now with the best material available. It is probable that labour exchanges for boys leaving school would be of very great value in securing that all the more intelligent and able boys had a chance of securing good openings. It is the ignorance of the boy which so often leads him into employment which is not suited to him.

Further, some better grading of wages is most desirable. At present, comparatively high initial wages are often paid to tempt boys into an unprogressive occupation. The value of the old apprenticeship scales lay in their attempt to make the wage increase with the capacity, but the low initial earnings have been the reason of the unpopularity of apprenticeship with the more needy and less far-sighted. It is quite possible that the boy leaving school at fifteen will still not earn more than he now does at fourteen. There is little doubt that in that case the employer would gain, because he would get a better article, but the boy would also gain, because he would be a better article and more fit to develop into a still higher efficiency, commanding better wages later. It is better that he should be paid less in his early years and be worth more as an adult. Under existing conditions he is bribed by large wages to spend his time on uneducative work which gives him no opportunity afterwards, and he is unfit to spend wisely the large wages which he receives. The present system demoralises the boy. The temptation to leave one job to get higher wages in another is almost irresistible, and the resulting instability is detrimental to himself and not economical to his employer, who is perpetually trying to train new boys.

#### EVOLUTION IN APPLIED CHEMISTRY.<sup>1</sup>

EVERY chemist, to be worthy of the name, should in his own work be a specialist; but there are few amongst us to whom it has been given to produce in their own particular line of research results of deep general interest. Our distinguished president, Sir William Ramsay, is one of the privileged few; I am one of the

<sup>1</sup> Address to the combined sections of the Seventh International Congress of Applied Chemistry on Monday, May 31, by Prof. Otto N. Witt, of Berlin.

many, whose scientific results are like the grains of sand, the importance of which lies in their aggregation.

But a chemist, to be worthy of the name, should also be able to step forth from his own small sphere of activity and to look upon his science and allied domains of human thought as a whole, to contemplate its history and its future, its aims and progress, and to glean a few useful truths from such considerations. This is what I shall try to do.

The simple daily wants of mankind in a primitive condition are all supplied by nature. It is the progress of civilisation which led to the necessity of transforming her gifts, and thus created a chemical industry. Human chemical work supplements the chemical work of nature, and is therefore subject to the same governing laws. It is strange that no attempt has yet been made to trace the many coordinated points which exist between biology, the science of life, and chemistry, the science of molecular changes, without which life is an impossibility.

The subject is extensive enough for a book. I cannot hope to do justice to it in a short lecture, but I shall try to point out some of the relations existing between the results of biology and applied chemistry.

Biology as a science is of very recent date. The manner in which our forefathers tried to gain an insight into the overwhelming variety of the vegetable and animal kingdoms was purely systematic. Linnaeus, de Candolle, Cuvier, and others, enabled us by their systems to classify nature, but they did not teach us to understand it. Hardly a century ago the dawn of a deeper insight began to rise on the horizon of science, and just fifty years have elapsed since that memorable meeting of the Linnean Society in which the flaming truth of evolution was given to humanity by one of the greatest minds that ever stood up amongst men. Botany and zoology, the pedantic histories of plants and animals, became suddenly united in biology, the great science of life, itself a living thing, capable of development and evolution.

Evolution is no longer a working hypothesis of natural science; it has become a new way of thinking, a method of harvesting everlasting truth from the fleeting changes of passing life. It is not applicable to living plants and animals only, but to everything that is capable of growth, alteration and improvement. Why should this method not be extended to the study of human achievements, of science as a whole? Why not to applied chemistry, which is so full of changes, and more vigorous in its growth and development than many another discipline?

It seems to me that England, the country which has given to all the other nations the invaluable gift of evolution, is the classical soil on which an attempt might be made to apply it in a new manner. It may help us to understand, and therefore to forgive, the struggle for existence, which in chemistry and its applications is as rife as amongst the organisms of the deep sea or the tropical forest. Looking at that struggle with the calm soul of the man of science, we shall easily recognise the underlying promise of the survival of the fittest and of certain progress in coming days.

As a rule, one takes it for granted that anything applied must have existed before its applications. It is not so with applied chemistry. Chemistry as a science is, as we all know, a comparatively new creation. Its applications, on the other hand, have existed since times immemorial, and may be traced back to the very beginnings of human civilisation. The men who in the past devoted their thought and energy to problems which we now call chemical had to reach their ends with the help of sound empiricism. Though their progress was slow it was sure, so that to this day we have sometimes occasion to marvel at their successes. More than that, we may safely say that some of our best industrial methods would never have been discovered if we had had chemical theory only to guide us. Science itself stands on an empirical basis—we cannot draw general conclusions unless we have well-established observations to start from.

It is perhaps not superfluous to remember these facts at the present time, when the brilliant success of theoretical chemistry is apt to make us forgetful of the services derived from purely empirical methods of research. Empiricism investigates without foregone conclusions,