

### THE PAY AND SUPPLY OF TEACHERS.

THE striking facts and figures given in the presidential address recently delivered by Mr. T. H. J. Underdown to the National Union of Teachers, and published in NATURE of April 19, show that the whole fabric of our primary educational system is seriously threatened with disaster. Unhappily, the secondary and technical schools of the country are faced with the same danger from precisely the same causes. The systematic underpayment of the teachers and the resultant shortage of the supply must cause grave misgivings to all who have a real conception of the value of a good secondary education and its necessity, if success is to be achieved in the future in the various branches of commercial and scientific activity. Our national efficiency depends to a large degree upon the quality of our secondary education, and any such education worthy of the name will be impossible unless the present conditions of service obtaining in the teaching profession are radically and speedily altered.

It is characteristic of our national indifference towards education that, not merely the man in the street, but apparently also the leading members of scientific and commercial circles, have no knowledge of the utterly insufficient salaries paid to those upon whom the important duty of training the future generation falls; or, at best, if they have cognisance, they throw the responsibility upon the local county or borough authority, and wash their hands of the whole business. A sufficient proof of the inability of the local authorities to manage education under present conditions is evinced by the figures quoted by Mr. Underdown, and by the fact that the average salary paid to the assistant-masters in the aided and maintained secondary schools of the country, as shown by an inquiry made by the Incorporated Association of Assistant-masters just prior to the outbreak of war, is 175*l.* 10*s.* If the nation expects to continue to get highly trained, competent teachers, necessarily men of culture and education, who have laid out a large amount of ability and close study, to say nothing of money, for 3*l.* 7*s.* 6*d.* per week, the nation is making a huge blunder. Like any other business concern, it will get, in the long run, just what it pays for. Much has been written during the past year concerning the lack of science and scientific training in secondary schools in general, but is it to be expected that a really able and scientific expert will take up teaching with the above figures before him? The difficulty is accentuated by the ever-increasing demand for these experts from the various branches of manufacture and industry, and by the migration of teachers generally into more remunerative and less arduous spheres of work.

A large number of authorities and schools make no provision for systematic increase, while the following tables show the inadequacy of the scales that do exist:—

Maxima	England			Wales
	County Councils	County Boroughs	County "Published" Schools	
Above 250 <i>l.</i>	...	1	1	2
201 <i>l.</i> –250 <i>l.</i>	...	6	12	5
200 <i>l.</i>	...	7	12	11
Above 180 <i>l.</i> and below 200 <i>l.</i>	...	3	6	2
180 <i>l.</i> and below	...	—	14	26

Notes—(i) Figures for July, 1914.

(ii) Special cases excepted as being outside the range of the ordinary qualified assistant.

To quote a typical case, the maximum for honours graduates after sixteen years' service is 190*l.* Another

has 160*l.* as the ultimate reward for ten years' service. Other "scales" have Gilbertian maxima. Two are as low as 130*l.*, and five are below 150*l.*

The actual salaries received will show that our educational experts have been trying to run education upon the principles of lowest tender and cut prices. Some seven or eight university graduates receive less than 100*l.* a year. One Oxford M.A., after fifteen years' service, gets 120*l.* Only 18 per cent. of the masters receive more than 200*l.*

The grudging and meagre response to the demands of the teachers for a war allowance affords a glaring insight into educational administration and its reaction upon its employees. To quote, or, rather, misquote, from one of our most successful and popular teachers: "Those who polish the floors and those who survey the roads can be generously treated, but those who polish the brain are asked to wait for more opportune times, or are put off with a dole equal to an office boy's increment of wage—*forsooth*, because they are so many and the rates must be kept low!"

We note with pleasure and endorse thoroughly the recent statement of the President of the Board of Education that "the calling of secondary-school masters has yet to be made reasonably attractive to a really able man. . . . Somehow or other we must attract these men"—and may we add "keep them"? The proposed remedy—an additional grant of 433,900*l.*, of which a part is to be handed over to the authorities and schools, of which a part again is to be allocated to more or less spasmodic increments of salary—will cover only a portion of the recent increase in the cost of living. The sum is admittedly only a beginning, but the situation demands methodical measures even more urgently than it does money. Before it is too late, the country should insist upon the establishment of a regular and national system of payment, if the prospects and status of the profession are to be raised to such a level that it can fairly compete with the other professions for the best intellects from all classes and spheres of life.

Experience shows that the majority of the local authorities fail to realise the national unity of education. The average councillor thinks in terms of bricks and mortar, and so long as he regards education as one of the branches of architecture, so long will the real management remain in the hands of highly paid clerks and secretaries, who, however zealous they may be, work in watertight compartments, and have no interest in making education a national concern. Efficiency in education stands or falls with the man who actually teaches, and no amount of expensive inspectorial or administrative officialdom will compensate for the cheese-paring policy of underpaying the teachers.

Amongst the multiplicity of reforms rightly being advocated at present are included the extension of the school-life and the expansion of the facilities for secondary education. Official figures show that there are only 84,000 pupils between the ages of fourteen and eighteen in England attending grant-earning secondary schools, of which merely 21,000 remain at school to an age beyond sixteen years—an age of expanding receptive faculties, at which moral training is of inestimable benefit. It has been estimated that an army of 20,000 teachers of the secondary school type will be required, in addition to the 10,000 already available, to staff the secondary schools proper, the junior technical schools the day continuation schools, and the part-time trade schools of the near future. A great part of this number must have expert scientific knowledge combined with training. Under the existing conditions, the supply of teachers is quite



inadequate and is rapidly diminishing. The supply of teachers in grant-earning schools is at present largely derived from the pupils passing from the primary schools to the secondary schools, there to be maintained out of public funds almost entirely throughout their scholastic career. Education authorities, in their endeavours to obtain the necessary staffs, have adopted the doubtful policy of attracting pupils to the profession by the offer of educational facilities and increased maintenance allowances, in some cases despite the moderate standard of ability displayed.

However anxious the Government may be to embark on far-reaching schemes, it will fail unless the supply of the men who are to carry out those schemes is present; and the supply of men of the right type will not be forthcoming unless (1) a national minimum salary scale of really adequate terms is established for all teachers in secondary schools; (2) teachers are free to move from one area to another without loss of position, salary, and pension rights.

Such a system would do away, once for all, with the present enormous disparity in the salaries of different men with the same qualifications engaged in the same work and in similar areas.

The present time affords an excellent opportunity of introducing a system obviously necessary and long overdue. It is to be hoped that the Government will not adopt the futile policy of trying to patch up here and there, but will lay the foundation of a national structure in which every child shall enjoy, as a birth-right, the most suitable and valuable education compatible with its capability.

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#### SOIL AERATION IN AGRICULTURE.

SOME time ago (NATURE, February 24, 1916, vol. xcvi., p. 716) we directed attention to a paper by Mr. and Mrs. Howard, of the Agricultural Research Institute, Pusa, on the ventilation of Indian soils. "More air and less water" was then set before the native cultivator as the secret of successful crop production. With characteristic enthusiasm for his subject, Mr. Howard has since developed this idea in a lecture given during a meeting of the Board of Agriculture at Pusa, and now published as Bulletin No. 61 of the Agricultural Research Institute. Although discussed chiefly in relation to Indian conditions, and particularly the alluvial soils of the Indus and Ganges valleys, the subject in its broader aspect is of universal importance to agriculture. The heavy rains of the monsoon falling on these soils, which consist largely of small particles of fairly uniform size, cause the surface to run together and form a crust; the soil loses its porosity and aeration is impeded. The remedy advocated is the incorporation with the first foot of soil of *thikra* (tile fragments) at the rate of 50 tons per acre. Leguminous plants like gram respond at once to the improved aeration. Nothing is said as to the cost of this treatment, or if it can be applied commercially over considerable areas.

Java indigo is another leguminous plant of special interest, and about this Mr. Howard has a great deal to say in relation to soil aeration. He holds that the variable dyeing power which has greatly handicapped the natural indigo in competition with the synthetic product of the German factories is due to defective and irregular aeration. The indigo plantations of Bihar lie on the higher ground of an undulating country with rice in the valleys between. During the monsoon all the country becomes more or less water-logged except the crest of the ridges, and occasionally

some of these go under. The high-water mark is said to be rising at the rate of 3 in. a year, owing to increasing interference by embankments (canal, rail, and road) with the natural drainage of the country. Mr. Howard suggests that "when a railway has to run across a broad, shallow drainage line, it might pay to lay it flat and to let the water run over it. At most the interruption of traffic would not be a very long one." It would be interesting to hear what the permanent-way departments and traffic superintendents of the Indian railways think of this idea. Whatever the cure, it is evident that the activities of the civil engineer have been harmful to agriculture in some ways, and a good case is made out for a thorough study of the drainage systems of India from this point of view.

With regard to water supply, the author goes even further than in his previous paper, and suggests that some of the money now wasted on over-irrigation might more profitably be spent on aerating stations for the supply of oxygen to the insufficiently aerated water of the rice swamps. In this connection a sharp distinction is drawn between rice and other plants which is difficult to follow. It is said that while the former takes up its oxygen in the dissolved state from the swamp water, other plants, e.g. wheat, assimilate it as free oxygen. As the root-hairs of the wheat plant must be in contact with moisture if they are to function properly, it is probable that oxygen, like other plant foods, passes in solution through a film of water surrounding the roots. Wheat, barley, and peas all grow well in water culture so long as the nutrient solution is kept aerated. If the supply of dissolved oxygen falls off, the plant suffers at once, even if the upper roots have access to free oxygen. The distinction between swamp rice and wheat seems rather to be that the former requires much water and relatively little oxygen, while the latter needs a moderate amount of moisture and much oxygen. Under favourable conditions wheat obtains this by the rapid passage of the gas through the water films surrounding the roots and soil particles.

Turning homewards, the variation in the quality of malting barleys grown on different British soils is shown to be due to soil aeration. The best malt comes from the light land where natural aeration is good. One effect of the expensive organic manure used by market-gardeners and hop-growers is to increase the aeration of the soil and encourage root development. It is suggested that a permanent aerator like the Indian *thikra* might achieve the same result at a lessened annual charge for manure.

We have only touched on a few of the many interesting points raised in Mr. Howard's lecture, which deals with one of the most important factors in crop production. Although the necessity for soil aeration has been unconsciously recognised ever since man first drove a spade into the earth, because of its very obviousness agricultural science has scarcely given the subject the attention it deserves. E. H. R.

#### THE INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE.<sup>1</sup>

THE genetic relation between the serious pursuit of natural science and the profession of medicine is nowhere better illustrated than in British India, and in British India nowhere better than by the Asiatic Society of Bengal (the original "Asiatic Society"), and by its autochthonous congener, the Indian Association for the Cultivation of Science, founded in 1876

<sup>1</sup> Report of the Indian Association for the Cultivation of Science for the Year 1914. (Calcutta, 1916.)