



SATURDAY, SEPTEMBER 10, 1927.

CONTENTS.

	PAGE
Biology and the Race	353
Réaumur and his Work on Ants. By F. A. D.	356
Metalliferous Mining Methods	357
The Egyptian God of Medicine. By Prof. T. E. Peet	358
The Vegetation of the British Empire. By Dr. E. J. Salisbury	359
Our Bookshelf	360
Letters to the Editor :	
Structure in Surfaces of Liquids.—Prof. James W. McBain, F.R.S.	362
The Production of Sound by Heat.—Prof. Chas. T. Knipp	362
Frequency Demultiplication.—Dr. Balth. van der Pol and J. van der Mark	363
Movement in Fluid Dielectrics under Stress.—P. Dunsheath	364
Climatic Changes: Their Causes and Influences.—George M. Meyer; Prof. J. W. Gregory, F.R.S.	365
Fluctuations in Affective Reactions to the Odour of Caraway Oil.—Dr. J. H. Kenneth	366
Hot-wire Microphone and Audio-resonant Selection.—G. G. Blake	366
A Vibrating Soap Jelly.—Dr. E. H. Buchner	367
Electric Charges on Omnibuses.—L. Bellingham	367
Food-Value of Pasture Grass.—Prof. R. Newton	367
Corrosion of Copper Pipes.—A. F. Dufton and F. L. Brady	367
The Outstanding Problems of Relativity. By Prof. E. T. Whittaker, F.R.S.	368
Influence of Internal Secretions on Sex Characters	372
The British Association at Leeds	373
Obituary :	
Prof. H. R. Procter, F.R.S. By A. S.	376
Prof. E. B. Titchener	377
News and Views	378
Our Astronomical Column	381
Research Items	382
An International Congress of Soil Science. By Dr. B. A. Keen	385
A New Journal of Forestry	386
The Danish Lobster Fishery	387
University and Educational Intelligence	387
Calendar of Discovery and Invention	388
Societies and Academies	389
Official Publications Received	391
Diary of Societies and Congresses	392

Editorial and Publishing Offices :

MACMILLAN & CO., LTD.,

ST. MARTIN'S STREET, LONDON, W.C.2.

Editorial communications should be addressed to the Editor.

Advertisements and business letters to the Publishers.

Telephone Number: GERRARD 8830.

Telegraphic Address: PHUSIS, WESTRAND, LONDON.

No. 3019, VOL. 120]

Biology and the Race.

THE presidential address to the South African Association for the Advancement of Science, delivered by Prof. H. B. Fantham at Salisbury on June 29, deserves general by all interested in the broader problems of biology in its relation to national polity. There are probably few biologists who will regard as unjustified the note of pessimism which makes itself heard here and there in the address: there are equally few who will fail to recognise its common sense and constructive value, or to admit that much of what is addressed to South African listeners is well worthy of attention in Great Britain.

Dealing first with the immense spread of education in western Europe and America during the last six or seven decades, Prof. Fantham asks, Has it fulfilled its expectations? This question must be answered in the negative; not, however, that education is itself at fault, but rather that the swarming into the universities of all and sundry in search of a vocational training has brought with it the development of the examination system with its resultant overwhelming of the truly educative by the merely informative function. Initiative, instead of being developed, has been diminished or killed, and the universities, from being the homes of culture and the training-grounds of leadership, have tended to become mere training-colleges for the professions. The universities in turn react upon the schools owing to prospective teachers concentrating their attention upon such subjects as, at the moment, 'pay.' During training in the technique of teaching due attention is paid to drill in the 'principles' of education and psychology, but little to the fact that without solid biological foundations such principles are liable to be no more than the fleeting fads and hypotheses of the day. The teacher is told to 'follow the child': to make study interesting instead of to make the pupil interested in study. He is unimpressed by the important need to make the child fit into his biological environment by attention to the so-called small things of life—politeness, tidiness, consideration for others, the team spirit, the avoidance of sloppiness—mental, moral, or physical.

The instilment of biological principles into the school curriculum means the development of common sense, the appreciation of cause and effect, the development of personal effort, personal observation, personal thinking—all as different as possible from the familiar product of the present

day with its absorptiveness of what is served up to it, its responsiveness to popular catchwords and slogans, and its belief in conferences and committees.

No section of Prof. Fantham's address is more deserving of serious consideration than that in which he directs his attention to some of the sociological difficulties of the day. He points out the impossible handicap to which the white race is submitting itself by the ever-growing burden of social services with their crowds of officials. Amongst the most costly of these services is school education, but this burden is not incapable of being lightened. 'Frill subjects and snippets' should be eliminated or paid for by the parent. It is suggested that the education provided free by the State should be restricted to 'the three R's,' the study of the mother tongue—including grammar and composition, the general elements of observational and experimental science, with needlework and cookery for girls, together with a cultural subject, such as singing. Secondary education should not be free—it is a curious human weakness that what is not paid for is not appreciated—but generous help should be available in the way of scholarships to those who are mentally qualified to take full advantage of them.

It is perhaps prudent to hesitate before we dismiss all this as old-fashioned, and to ask ourselves seriously whether there is not contained in it a very large infusion of common sense.

Prof. Fantham, being a distinguished South African biologist, we naturally turn with special interest to what he has to say on the colour problem, for there are few problems in which attempts to reach a true solution have been more interfered with by the intrusion of sentiment uncontrolled by scientific knowledge. Here we have the opinion of a biologist who realises, as all biologists do, that the black skin of the negro is the outward expression of profound differences of a more obscure kind, which mark him off from the white race as distinctly as does his non-attainment of what we call civilisation, with its complex social organisation, its great cities, its high art, its written language, during all these untold centuries of his undisturbed sojourn in Africa.

Prof. Fantham has no doubt that the proper line of policy is that of social segregation of the two races. Racial admixture is disastrous in its results. "When once chromosomes of Bantu origin get mingled in white families they cannot be bred out, as is so often popularly supposed, but will exhibit themselves in unfortunate ways

and at unfortunate times throughout the ages." What we have to do is to make the black man a happier and better black man, not to attempt to make him an imitation white man. He is a country man. He should be settled in the country and trained in practical agriculture, in hygiene and sanitation. He should not be brought into towns and made to do all the manual labour of the whites—with the resultant encouragement of sloth and idleness amongst them.

It will be seen that Prof. Fantham's address deals with matters that have been much in the air at the moment. As the columns of NATURE have repeatedly testified during the last few months, the rôle of science in the school education of the citizen is attracting at the present time much attention and giving rise to much discussion. Not infrequently in the course of such discussion the main issue tends to be obscured through the persistent failure to keep distinct in the mind the two main functions of education—the first in importance, as it is in time, that of educating in the strict sense, of developing to the highest possible extent all these various capacities which combine to produce all-round ability, such as accuracy and rapidity in observation and the accumulation of experience, involving on one hand skill in actual observation, and on the other, skill in drawing rapidly and accurately sound conclusions therefrom; and the second, that of providing the mind with a store of knowledge and culture. Although the boundary between these two functions of education is naturally not a sharp one, it is imperative in order to secure clarity of discussion that its existence should not be ignored.

As a matter of fact the educational utility of the two main branches of science—physical on one hand and biological on the other—is related to these two main functions of education. As a discipline for the young child, to develop the powers of observation and of reasoning upon the basis of observation, it would appear unquestionable that it is the physical division of science that is the more useful. By it alone are provided those simple types of observation, capable of exact measurement and of repetition over and over again under approximately the same set of conditions, which are necessary for the best training in observational accuracy. Moreover, the mathematical methods employed in the treatment of its observations afford a quite unrivalled training in logical reasoning.

It is, on the other hand, in the later task of school education, that of turning out the well-informed citizen, that the claims of biology to

play an important part are quite irrefutable. In a complex modern State, with its citizens linked together into a biological whole of the greatest complexity, depending for its continued existence upon the applications of biology to food-supply, sanitation, medicine, surgery—its everyday discussions and conversations dealing with subjects like evolution, genetics, birth-control, heredity, public health, and so on—it is clearly absurd that the citizen should not be provided with the foundation of biology without which such discussion is apt to be not merely futile but actually harmful.

While probably all qualified by their own experience to form an opinion will be in agreement up to this point, there is unfortunately up to the present no agreed scheme of instruction in elementary biology for schools. The best of such courses as do exist in a few of the great public schools are commonly modelled upon what is required for the first M.B. examination. Even for its own special end—that of providing a sound foundation of scientific biology for the superstructure of the medical curriculum—this type of course is looked at askance by many competent judges, but quite certainly it is not what is required by our ordinary budding citizens. What is required for the education of the general citizen is not a mass of details regarding the ‘insides’ of men, or rabbits, or crayfish; it is not a collection of packets of ignorance or very incomplete knowledge done up in wrappings of polysyllabic words; it is rather a general knowledge of such of the main developments of biological science as are of importance, either practical or cultural, in the citizenship of the civilised State.

Each of the two main branches, then, of science—the physical and the biological—has its own rôle to play in elementary education, and it is of the greatest importance to realise this. It is of equal importance to realise what is wanted from each branch. In neither case is it masses of complicated detail. In the case of physical science, it is the careful repetition of observation and experiment in their simplest forms and the recording and treatment of the results arithmetically, the object being to train the young child in accuracy and rapidity of observation and reasoning. In the case of biological science, it is the acquirement of general knowledge regarding main results rather than training in the method of obtaining these results that is required by the citizen.

While the physicist may justly claim upon this showing that it is physical science that plays the more fundamental part in the educative process,

in actual practice the recognition of this claim has led to strange results, namely, on one hand the denial to biological science of any place in the school curriculum at all, and on the other, to that hypertrophy of the physical science portion of the curriculum which finds its expression in the schools undertaking courses in chemistry of a standard which is really that of the university. It is a common complaint, as already noticed in *NATURE*, that students of science and medicine in our universities have to waste an appreciable part of their time at the university in repeating what they have already done at school. The harm is much more than mere waste of time, for the quality of instruction in the average school laboratory is obviously not in a position to claim equality with that of a university department under the inspiring headship of a leader in his science.

When complaint is made of the large and even preponderating part played by science in certain modern developments of our educational system, it is well to bear in mind that ‘science’ in this connexion is apt to mean simply physics or chemistry. As stated in *NATURE* of Aug. 13, of the candidates from grant-aided secondary schools in England in the First School Examination in the year 1926, no less than 40·2 per cent. offered chemistry as a subject but only 2·5 per cent. offered general science. While overwhelming arguments can be adduced for science on the lines above indicated being given an important place in the school training of the average citizen, it is difficult to find any justification at all for bringing him up as a specialist in physics and chemistry completely unversed in science outside their limits.

Royal commissions are commonly regarded as the resort of harassed politicians when seeking a means of relieving some inconvenient form of public pressure. But occasionally they achieve great results, and the present would seem a really appropriate time for the appointment of a strong commission to deal with the general question of national education. When such a commission is appointed it is to be hoped that its personnel will consist not of academic specialists, but rather of persons who combine recognised intellectual prestige with understanding and breadth of vision, and that its terms of reference will be as wide as possible so as to include the whole range of education from the elementary school to the university. The selection of the personnel should provide a means of securing that its activities would be confined to big things and not wander away into the desert of detail.