

molecule point to a molecular weight of about 13 million. Evidence has also been obtained that formation of some proteins is at least linked with the development of phage deoxyribonucleic acid, and by comparing the effects of chloramphenicol when added at different times after the infection of bacteria with the T2 phage evidence was also obtained suggesting a correlation of the evolution of the resistance to radiation with the synthesis of deoxyribonucleic acid. Other work in the Department suggests that even mild chemical agents of cellular origin have mutagenic activity. The enzyme deoxyribonuclease proved mutagenic to *Drosophila melanogaster* under laboratory conditions, treatment of larvæ and imagines with deoxyribonuclease producing both recessive and dominant lethal effects and chromosomal re-arrangement in the flies.

In the Department of Embryology, use of the techniques of rapid serial radiography and ciné-radiography provided direct evidence that arterial blood enters the maternal placenta from the endometrial arteries under a pressure sufficiently high to drive it through the intervillous space and towards the chorionic membrane of the fœtus. Injection of radiopaque dyes into the femoral arteries of anaesthetized pregnant rhesus monkeys and observation of the course of the dyes by rapid serial X-ray photographs or by ciné-radiography yielded films showing with great clarity the predicted characteristic spurts of blood as the dye enters the intervillous space. A major programme was completed in which chicken spleen was used to study the properties of immunologically competent tissues and the course of cells emanating from spleen grafts labelled with tritiated thymidine was traced within embryonic chick hosts. The cells of both donor and host appear to contribute to the spleen reaction, the host cells predominating numerically.

A new technique used during the year in the Department of Plant Biology facilitated the detection

of the several forms of chlorophyll, and experiments with the algal genus *Phormidium* showed that the pigment phycoerythrin increased efficiency of light absorbed by chlorophyll *a* 695 and other forms of chlorophyll *a*. It also appears that a maximum rate of *Chlorella* photosynthesis is reached only when the two photochemical reactions initiated by the two parts of interdependent pigments are proceeding in the correct ratio. Studies of the amino-acids isolated from cultures of *Chlorella pyrenoidosa* and examination of their carbon isotope composition indicated that some of the amino-acids, such as leucine and valine, contain markedly less carbon-13 than is present in the inorganic environment, and while others, like serine, had ratios much closer to the inorganic carbon dioxide used as input, the carboxyl carbons of all chains contained a higher proportion of carbon-13 than the remainder of the carbon chains of the amino-acid. If it can be assumed that the isotope abundance found in the lipids or in the non-carboxylic portion of aspartic or glutamic acids in *Chlorella* is characteristic of the fixation of carbon dioxide in carbohydrates, a considerable fraction of the carbon fixed in *Chlorella* must be incorporated by pathways other than those traditionally described for photosynthesis.

Further progress is reported in the development of image tubes for telescopes, and while further technical refinement is still required to remove imperfections, thirty-fold reductions in exposure time have been obtained as compared with direct photography. Dr. Haskins's review directs special attention to a report by Dr. F. Chayes, of the Geophysical Laboratory, "Correlation in Closed Tables", included in that Department's report, as an example of uncommitted research in the Institution. The research was stimulated by certain problems in petrography, but has novel and potentially useful conclusions applicable to the statistical analysis of data obtained in many branches of experimental science.

TECHNICIANS IN ENGINEERING AND CHEMICAL INDUSTRIES IN BRITAIN

THE results of a sample survey of the employment of technicians in the engineering and chemical industries, carried out in 1960 by the Ministry of Labour, are analysed in the *Ministry of Labour Gazette* of December.

Replies received from 309 of the 400 firms approached, of which three-quarters employed more than 1,000 workers and the remainder 100-999, indicated that in most groups the percentage of qualified scientists and engineers to the total number of employees is a little higher than the corresponding percentages obtained from the survey of scientific and engineering man-power made at the beginning of 1959. Technicians formed 8.7 per cent of all employees of the firms included in the survey, the figure varying from 11.6 per cent in the electrical engineering group to 4.1 in the 'other metal goods' group. Except in the chemical and allied industries, few women technicians were employed, the proportion for all groups being 4.6 per cent, and for the chemical and allied industries 10.4 per cent; in the latter group, 34 per cent of the women

were employed in research and development laboratories and 54 per cent on testing, inspection and analysis.

In the chemical and allied industries the proportion of technicians to qualified scientists or engineers was 1.6:1, compared with 4:1 in electrical engineering and electronics, and 7.6:1 in motor-vehicles and aircraft. The average ratio for all groups was 4.2:1, but the inquiry confirms that for engineering industries as a whole 5 or 6 technicians are required for each technologist. In all but the chemical group of industries the shortage of technicians in January 1960, measured by the percentage of vacancies that occurred at the time to the total number of technicians employed, was rather less serious than the shortage of qualified scientists and engineers a year earlier. The forecast demand for technicians in the two years following the survey was in most groups about twice the number of vacancies occurring. Over the whole field, the largest number (32.7 per cent) of technicians was employed in the design and drawing office, and 29.1 per cent of all technicians

were design assistants or draughtsmen, testing, inspection and analysis accounting for 14.4 per cent.

Design and drawing office work accounted for 40.7 per cent of all vacancies for technicians (67.5 per cent in shipbuilding and marine engineering firms), but in the chemical industry 44.6 per cent of vacancies were for laboratory technicians for research and development. An analysis of requirements for the next two years presented a similar picture. In the chemical group of industries 63 per cent of tech-

nicians had some qualification, and this group employed 43 per cent of all technicians with the General Certificate of Education at Advanced Level, while in the shipbuilding and marine engineering industry 58 per cent of technicians had a qualification. About 10 per cent of all the firms referred to apprenticeships, technician, student or drawing office combined with courses at technical colleges for which release on one day a week was granted, but nearly 70 per cent replied that no courses of instruction were provided.

HEALTH OF BRITISH SCHOOL CHILDREN

THE great majority of school children are not only robust and healthy, but are taller and heavier than their predecessors", states Sir John Charles, the chief medical officer of the Ministry of Education, in his report for 1958 and 1959*.

Sir John says under-nutrition has almost disappeared in Britain, and the differences between the heights and weights of children in good and poor districts are lessening. More fat than under-nourished children are being reported, but the number in each group is small.

Only about five per cent of school children contracted a notifiable infectious disease in the years under review. Tuberculosis continued to decline. Poliomyelitis reached its lowest level for thirteen years, and vaccination against it was undertaken vigorously everywhere. There were local outbreaks of diphtheria that involved 47 school children in 1958, of whom five died; seventy-seven were affected in 1959 with no deaths. Advocating the continued need for immunization the report directs attention to the fact that "as recently as twenty years ago 55,000 persons contracted diphtheria annually, of whom almost 3,000 died".

The main cause of death among children is through accident. More children aged 5-15 years die from accidents than from all congenital malformations and of circulatory, genito-urinary infections and respiratory diseases altogether. In 1958, 869 children of 5-15 years died from accidents, including 395 from accidents involving motor vehicles, 174 from drowning, and 58 from burns and scalds; 113 fatal accidents took place in the home.

The second chief cause of death of children of this age-group is cancer. There were 499 deaths in 1958, mainly from leukaemia. Other causes were respiratory diseases, 253; congenital malformations, 185; infectious diseases, 137; genito-urinary diseases, 76; and only 53 from diseases of the heart and blood vessels. More children died from appendicitis (44) than from rheumatic fever and rheumatic heart disease (30); these conditions were once widespread and deadly. The report stresses the need for unremitting research into the causes of the so-called congenital diseases and defects. "Medical research gives us reason to believe that some diseases that we consider hereditary or congenital in origin may well be found to be due to adverse influences in pregnancy or infancy." These diseases and defects cause the death each year of about 4,000 children under the age of fifteen

years and leave thousands disabled. To this must be added those who are mentally retarded or who are blind or deaf from birth or early infancy. Although most children are healthy and without blemish, there are tens of thousands who are disabled to a greater or lesser degree.

The report welcomes the increasing number of education authorities which are considering, or who have already started, a modification of the fifty-year old system of periodical medical examination. In these areas all children will be examined after first starting and before leaving school; but, instead of a periodical examination of intermediate age-groups, doctors will visit the schools more frequently and give more attention to the new children who appear to need it. The hope is expressed that school doctors will be able to give more time to the study of particular diseases and disabilities as they affect children at school. Illustrations given are respiratory diseases—as many as 100,000 boys and girls have asthma some time during their childhood—and the nature and effects of skin diseases, from which tens of thousands of children are still reported to be suffering.

In 1958 more than two million children were examined at periodical school medical examinations. More than 809,000 were examined in schools and clinics at the special request of the parents, doctors, nurses, teachers, or others, and nearly 1,044,000 were re-examined for defects found at a previous examination. The comparable figures for 1959 were 2,138,000; 704,000 and 1,041,000.

About 15 out of every 100 children who were examined after first starting school were found with some defects which required treatment; in some areas, from one in five to almost one in two of these were not receiving it. Often the parents did not know of the defect or did not appreciate its significance. Prevalence of defects found at periodical inspections shows that 175,000 are treated annually for skin diseases; 200,000 orthopaedic defects, mostly slight; 15,000 boys and girls are under treatment for epilepsy; 2,000 boys and girls of school age have diabetes. There are fewer children with heart disease. Of every thousand boys and girls examined, twelve had a heart defect in 1958 compared with eighteen in 1948. The recorded prevalence of lung disease in school children has become almost stationary since 1948. Of every thousand children examined 24 were found with lung disease in 1948 and 25 in 1958.

Although the number of verminous children is still "deplorably high"—219,000 in 1958 and 223,000 in 1959—it is less than half the figure of 464,000 in 1948.

* The Health of the School Child: Report of the Chief Medical Officer of the Ministry of Education for the years 1958 and 1959. Pp. iii+231+8 plates. (London: H.M. Stationery Office, 1960.) 10s. 6d. net.