stopper at the top of the encasing tube was expanded into a glass saucer, closed by a thin and slack rubber diaphragm from toy balloons. The wet-bulb thermometer was suspended from this diaphragm with appropriate stops to limit its range of up and down movements. Normally it remained with its bulb immersed in the mercuric chloride solution. When the air-pump was started the small pressure built up in the encasing tube caused the diaphragm to distend; this lifted the thermometer with its dripping wet wick into the turbulent air-flow and held it steady in position ready for reading after two minutes had elapsed. The wicks used will hold the depression constant for some five minutes or more, according to conditions, before they show signs of drying up. The evaporation from the solution is negligible except while the air-stream is flowing, and it is then of the order of three milligrams of water per test, so that the solution has eventually to be topped up with distilled water; actually about once a week when in continuous daily use. The relative humidity of the outgoing air is perceptibly increased by this added water, which is immaterial unless re-circulation is employed, when small corrections become necessary, dependent on the volume of air in the system.

The stability of the system over long periods of time, and its low standard error, are its outstanding advantages. Its accuracy would seem to be of the same order as that of the more difficult dew-point determinations. Additionally, it is often very convenient to be able to place the intake in some particular locality, with a long rubber tube to the apparatus, and examine the humidity in different parts of a room, or underground in the soil, and so forth.

ROYAL PHOTOGRAPHIC SOCIETY'S ANNUAL EXHIBITION

THE eighty-eighth Annual Exhibition of the Royal Photographic Society of Great Britain was opened on September 3 by H.R.H. King Peter of Yugoslavia. The Exhibition is being held at the Society's premises at 16 Princes Gate, London, S.W.7, and will be open to the public between 10 a.m. and 5 p.m. until October 23 inclusive. A new experiment being tried this year is Sunday opening. The Exhibition is being opened on alternate Sundays, September 12 and 26 and October 10 from 2 p.m. until 5 p.m. This is to enable members and others who, on account of their war work or other causes, are unable to travel or find time to see the Exhibition on weekdays.

The Exhibition, as is usual, covers all branches of photography from the purely pictorial to the use of photosensitive material in research. While one cannot but admire some of the pictorial work and note that both the quantity and quality of previous years seem well maintained, one can regret that the same cannot be said of the 'scientific' exhibits. The best represented section is probably "Natural History", in which are shown many fine examples of wild life (both plant and animal) in their natural habitats. The War has evidently had little effect on the patience of the photographer of Nature.

Colour photography also seems to have suffered little, being represented by a number of prints on paper some of which are of excellent quality. Many transparencies are shown, including one case of "Scientific Colour Transparencies" which are mainly of biological subjects, or photomicrographs by polarized light.

Of special interest this year are two exhibits in the Trade Section. One is on mass miniature radiography by Ilford Limited and the other on the 'Kodak' transfer sensitizing process. The attack on tuberculosis depends for its success on early diagnosis, so that the possibility of mass miniature radiography should be a milestone on the road to the control of the disease. In the absence of means of refracting or specularly reflecting X-rays it has been generally necessary to obtain full-size pictures of the subject. Quite apart from the cost of such large photographs as are necessary when dealing with the human chest, the handling of large numbers of 15 in. × 12 in. films becomes a serious matter. The possibility of photographing, with an ordinary camera and film sensitive to light, the fluorescent image produced by X-rays falling on a fluorescent screen was shown many years ago, but it has only relatively recently been possible to reduce this process to one of routine requiring only a short exposure of the patient to X-rays. This development has been due largely to the increase in aperture of lenses and the increase in speed of photographic film. The image of the chest is contained in an area of film only one inch square, so that a large number can be accommodated on 35 mm. cine-film which can be easily handled in any length.

Mass miniature radiography units have been developed and have been adopted by the Ministry of Health for national service purposes. The equipment and method of working is illustrated in detail by pictures and models. It must be emphasized that the method is not intended as one for diagnosis but to enable a large number of presumably normal individuals to be examined to detect unsuspected abnormalities which can, where necessary, be the subject of full-scale radiological and clinical examination.

The exhibit by Kodak Limited is of the 'Kodak' transfer sensitizing process by means of which any flat sheet material can be sensitized. The chief application is in the marking of templates. The conventional method consists in hand-scribing the design from a scale drawing, which requires a skilled and experienced operator. By the method illustrated the material on which the template is to be marked is first lacquered and the sensitizing paper is then squeegeed to it by means of a roller squeegee. The temporary paper support is stripped off when the sensitive surface is required for use. The required design may be drawn on translucent paper, or should the original drawing be on an opaque support an intermediate negative is necessary or the 'reflex transfer' process may be used. The exposed layer is then developed on the metal or other support to yield an image of the required design.

The process is illustrated by a series of specimens contributed by Handley Page, Ltd., including an 8 ft. × 4 ft. metal section bearing designs reproduced by this process.

The process also lends itself to the production of such things as name-plates, instrument dials, etc. Direct use may be made of the photographic image, but more robust forms may be made by converting the image into a gelatin stencil which allows the undercoat lacquer to be dissolved away, leaving the design in lacquer, or the bared metal may be plated or etched and filled. Typical examples of this applica-

tion are shown by Marconi Instruments, Ltd., and The Accurate Recording Instruments Co.

Having dwelt at some length on only two of the exhibits may give the impression that there is little else to be seen. This is not so. The pictorial prints, lantern slides and stereoscopic transparencies are themselves worth a visit and can be relied upon to provide agreeable relaxation.

A SURVEY OF CANADIAN SCHOOLCHILDREN

THE statistical results of a survey of children in the elementary schools of the city of Toronto, taken in November 1939, have recently been published*. It is a team work in which the Hospital for Sick Children in Toronto, the Department of Pensions and National Health, Ottawa, the Education Statistics Branch of the Dominion Bureau of Statistics, and the Toronto Board of Education participated. The whole report is the work of Mr. N. Keyfitz and his assistants of the Social Analysis Branch of the Dominion Bureau of Statistics.

In 1923 the Department of Public Health in Toronto made a survey of 59,000 elementary pupils, from which a table of average heights and weights by age was calculated and which became the standard for Canadian school-children. During the intervening sixteen years it was found that, as a result of the policy of social improvement based on the previous findings, pupils in the various age-groups were outgrowing their categories, and it was decided to institute a new survey in which medical investigation would be as thorough as possible and the correction of physical defects would be a major aim.

In the present study of 78,000 children, equally divided on the basis of sex, emphasis is laid on the influence of such factors as economic status, birthplace of parents and the range within which nutrition affects the build of children. An effort is made throughout to determine the relative importance of the following points: (1) Does the economic status of the family influence the prevalence of disease and defect? (2) Does it retard the child in his academic standing as indicated by his school grade? (3) Do certain combinations of defects or diseases have more effect on the height and weight than the same defects and diseases unassociated? (4) How does heredity as shown by parental birth-place affect build?

The pupils of 1939 are found to be taller for their age than similar groups of 1923, except the six-year-olds. This may be explained by the fact that it is now customary to enter children at school at six, while formerly less robust six-year-olds were kept at home. Girls are found to mature earlier than boys; but thirteen-year-olds of the latter are found to mature at two different rates, as shown by a bimodal distribution representing maxima in height and weight combined.

An interesting comparison between the Toronto survey and Sir Frederick Menzies's London survey of 1938 is made. Canadian children, as one would expect, are taller than English ones. The London children of 1938 approximate in height and weight the 1923 levels of Toronto. However, the differences between the well-to-do and poorer metropolitan boroughs show the same tendencies as the Toronto ones, the differences being, if anything, less marked in England. A similar extensive study by the U.S. Department of Agriculture (Garment and Pattern Construction) in 1941 of 147,000 white schoolchildren of 4–17 years of age is remarkably close to the Canadian figures.

Economic status of parents: It is found that unskilled labourers and unemployed parents have children who are under-height; but there is striking absence of differences in build, that is, weight in relation to height, between children from poor and prosperous districts.

Diseases and defects: Diseases have no appreciable effects on height and weight, but defects tend to make their owners shorter and lighter for their height, that is, thinner.

Heredity: Children of United States-born parents are taller, and those of British-born parents are lighter than those of Canadian-born parents. Inter-racial marriage tends to increase the height of offspring. Children whose parents are eastern European-born are taller and those whose parents are of western European birth are shorter and heavier.

It is, of course, well known that foreign-born immigrants tend to be in less skilled occupations, while United States-born are often in a higher economic level than the Canadian-born.

The work is lavishly illustrated with charts and tables but one feels, after all is said, that fewer tables and a more detailed discussion of the biological principles governing growth would make this excellent booklet more valuable and instructive. Nevertheless, in these days when the very basis of science is being challenged, and men of science are everywhere engaged on the destructive aspects of their calling, it is refreshing to come across a progressive little book of the type, at once creative and far-sighted. R. E. G. ARMATTOE.

* A Height and Weight Survey of Toronto Elementary School Children, 1939. Pp. 36. Published by authority of the Hon. James A. MacKinnon, M.P., Minister of Trade and Commerce. (Ottawa, 1942.) 25 cents.

RADIO DETECTION AND RANGING

'RADAR', the code name for radio detecting and ranging, has been officially revealed to be one of the foremost scientific developments of the War, according to a statement issued by the Western Electric Co. (*Bell Lab. Rec.*, **21**, No. 10; June 1943). An electronic instrument projects a beam of radio impulses, and these impulses reveal the presence of distant objects by rebounding to the observer. When trained on enemy aeroplanes, still so distant as to be beyond the reach of anti-aircraft guns, 'radar' reports their presence. The system is, of course, unaffected by darkness, clouds or fog.

Under the name of radiolocation the method was credited by Lord Beaverbrook with winning the Battle of Britain. In the South Pacific, according to the article in the *Bell Laboratories Record*, it has been responsible for enemy losses of millions of dollars' worth of ships, aeroplanes and submarines. Radar was developed on the basis of years of research and experiment in electronics, independently in the United States and Great Britain, and credit for the development must be shared by many of the foremost scientific men of the two nations.

The fact that radio waves can be reflected just as