

than localized lighting with them possible, and it was not until the introduction of high-voltage fluorescent tubes that general lighting at high illuminations with a light of daylight quality became an economic possibility. The more convenient mains voltage fluorescent tube which was introduced later has made this form of lighting much more generally available.

Mr. Winch described how, by a process of repeated interchanges of lamps and measurements between the leading lamp manufacturers, and elaborate colour-rendering tests with many observers, the luminosity distribution of the present 5 ft., 80 w. fluorescent lamp was evolved. The colour of the tube is fairly close to that of illuminant *C* specified by the C.I.E. (6,500° K.), and the colour rendering is adequate for nearly all purposes except those concerned with the most critical discrimination of colour. The daylight colour of these lamps has proved of considerable psychological importance in war-time factories and other situations where natural daylight is largely or completely excluded and where work is carried on for twenty-four hours of the day.

Mr. F. W. Coppin read an interesting paper on "The Use of Fluorescent Pigments in Colour Printing". Owing to the impossibility of ensuring that the printing inks used in photomechanical colour reproduction processes have the theoretically correct hue, compensating corrections have to be made at some stage in the process. For relief printing these correctives take the form of local adjustments to the dot size in the plates, or 'fine etching' as it is called, and for photolithography, hand re-touching of the screen. These operations are highly skilled and somewhat uncertain, and many attempts have been made to introduce the corrections by mechanical methods.

In the fluorescence process blue and green fluorescing materials are included in certain of the paints, and the colour separation negatives are made by mixing with the normal copying light some additional near ultra-violet radiation. The special paints comprise a set of eighteen water colours which are used by the artist under normal lighting conditions. Slight modifications in the normal technique are necessary to produce different hues by mixing colours, in order to avoid upsetting the fluorescence balance.

Arc illumination is used for making the colour separation negatives. For the yellow and magenta printing negatives, the arcs are shielded by special hoods fitted with filters which allow only ultra-violet, blue violet and green light to reach the copy. The correct ratio of ultra-violet to visible light is obtained by adjustable slits and compensating filters, using control patches on the copy-board. The blue-green printing negative is made using a panchromatic plate with the direct light of the arc on the copy and a Wratten No. 29 filter over the lens. For the black printing negative an infra-red sensitive plate is used and an infra-red filter over the lens.

Mr. Coppin showed examples of colour charts prepared with the special paints and reproduced by the method described. For completely faithful reproduction, the hues of the four colour-printing inks should correspond to those for which the fluorescent paints have been balanced, but almost any good set of four colour inks will yield results which are sufficiently accurate for commercial purposes.

OBITUARIES

Prof. Franz Boas

PROF. FRANZ BOAS, who died on December 21 last, was born at Minden, Westphalia, in 1858, and did most of his scientific work in North America, becoming instructor in anthropology at Clark University in 1882 after university studies at Heidelberg, Bonn and Kiel. He worked in physical anthropology, linguistics, evolution of material cultures and social characteristics and ceremonial, besides writing suggestive essays on questions of wide interest and making a notable attack upon the racist theories of Nazidom. Though he thus clearly belonged to what in Britain is sometimes called the Huxley-Haddon tradition of general practice in anthropology, he yet showed, as did Huxley and Haddon, a capacity for detailed observation as well as wide generalization. Among the outstanding features of his scientific work were his studies of the Eskimo in Baffin Land (1883-4) and his plan for and conduct of the Jessup North Pacific Expedition (1897 onwards) to study the relationships of peoples of North America and Northern Asia. As professor of anthropology in Columbia University (1899 onwards), as well as for a time curator of ethnology at the American Museum of Natural History (1901-5), Boas found opportunities to co-ordinate the researches of different workers, and he became a central figure in the field of North American, and especially Eskimo, ethnology.

Boas's observations were much valued even if at times his theories were set aside; in such a field, theory is inevitably in a high degree provisional. He emphasized cultural similarities—the kayak, umiak, harpoon, household utensils, rituals and hero-tales, pictographic art and realistic carvings—between the Eskimo on one hand and the Chukchee and Koryak of north-east Asia on the other. But he rejected the view that the Eskimo peoples and their cultures had originated in Asia and spread to America. The findings of his Jessup expedition led him to think of the Eskimo of Alaska as comparatively new arrivals there from farther east in America. Indeed, he thought that several Palæ-Asiatic peoples of Siberia should be considered to have been immigrants from America. Needless to say, he shared the general view that the original peopling of America was due to movements from Asia; all he added to this was the idea of a backwash. Subsequent work has revealed evidence of older cultures in Alaska; and it is increasingly realized that diffusions of culture and movements of peoples in arctic America and the region around the Bering Sea have been complex, and probably by no means all in one direction; but ancient drifts from Asia to America are universally thought to have been fundamentally important. An Asiatic cradle for Eskimo culture is nevertheless not generally accepted, and Stefansson, for example, has the view that from the forests north of Lake Superior the ancestors of the Eskimo drifted northwards to the Barren lands and thence went on both eastwards to Greenland and westwards to Alaska. It seems established that the arctic Eskimo culture, which has an obvious unity throughout, came into the Arctic two thousand or more years ago, and was once more prosperous than it has been in recent centuries.

Boas believed that the peoples of the extreme south and south-east of South America and those of the north-west of North America must be considered fringing groups imperfectly imbued with the culture

which had developed, in the main, on the American continent, though the roots might be Asiatic; he thus emphasized here again the importance, in his view, of cultural evolution in America. He believed that there were cases of similarities between peoples, due not to borrowing but to psychological factors working parallel to one another. He would, however, have nothing to do with necessarian theories. Totemism, for example, seemed to him to be a term covering a wide range of associated ideas and customs; but neither are the widespread similarities proof of a unitary origin, nor is totemism a necessary expression of thought of a particular stage in human evolution. After suggesting that the Northern Kwakiutl of the Northern Pacific were in a stage of transition from mother-kin to father-kin, he later went over to the opinion that from a father-kin system they were influenced towards a mother-kin scheme and division into totemic clans by borrowing from more northerly neighbours. Sir James Frazer held that the facts agree better with Boas's earlier view.

Deeply aware of the interdependence of all aspects of human life and work, Boas felt that as a teacher he could not easily neglect any. We thus have his comments and contributions in several fields. He thought of primitive art as arising from technical execution and also from the stylized expression of emotions and thought. Stylization seemed to him to give a measure in this field of work, provided it is understood in its broader sense of controlled form. He disagreed with the theory that geometric ornament develops through degeneration of perspective, or symbolic designs because of slurring and inaccuracy; and he emphasized the borrowings of forms and the changes in their interpretation as they pass from one people to another, or from one generation to another. Among one and the same people there may be two or more distinct styles, especially if these are associated with different industries carried on by distinct sections of the group. The desire for artistic expression, in his view, is universal.

In the field of physical anthropology Boas concerned himself to show the rapid mutability of head form, and he published elaborate statistics concerning descendants, of even the first generation, of immigrants from Europe to the United States of America. Some anthropometric workers accepted his conclusions, but some found difficulties in his analysis of the measurements he gathered; and it may be said that mutability of a rapid type is by no means a general feature, if it ever occurs, which is doubtful.

Boas's broad knowledge of material culture, linguistics, social organization, religious ideas and physical characteristics of human groups gave strength and cogency to his fiercely valuable attack on Nazi racism, and on all attempts to trim and distort scientific truth to suit dogmatic schemes in politics or in any other field of expression. He is one of those who have enriched the knowledge and understanding of mankind in more ways than can be specified by giving a list of special discoveries or theories or publications.

H. J. FLEURE.

WE regret to announce the following deaths:

Dr. George Washington Carver, director of the Research and Experimental Station and consulting chemist at Tuskegee Institute, Alabama, the distinguished Negro botanist, aged eighty.

Prof. R. G. Collingwood, F.B.A., late Waynflete professor of metaphysical philosophy in the University of Oxford, on January 9, aged fifty-three.

Dr. C. Tate Regan, F.R.S., lately director of the British Museum (Natural History), on January 13, aged sixty-four.

Dr. Nikola Tesla, the well-known electrical engineer and pioneer of radio telegraphy, on January 7, aged eighty-five.

Prof. Arthur Willey, F.R.S., emeritus professor of zoology in McGill University, on December 26, aged seventy-six.

NEWS and VIEWS

An American Steam-Boat Pioneer

ON January 21 occurs the tercentenary of the birth of John Fitch, the American pioneer of the steam-boat, who while other inventors were struggling with costly and inconclusive experiments built several working steam-boats, formed the first steam-boat company in the world and for a period carried passengers on the Delaware according to a time-table. Fitch was born at East Windsor, Conn., and after working on his father's farm, pursued various callings, including those of a brassfounder and a silversmith. He suffered many misfortunes, made an unhappy marriage, and during the War of Independence was taken prisoner. In 1780 he became a surveyor in Kentucky and later on took to map-making. On a journey in 1785 he conceived the idea of propelling vehicles and boats by mechanical means. Quickly visualizing the value of his ideas, he made models and drawings, secured favourable opinions from public men and during the years 1786-90 made three or four boats which ran with varying success on the River Delaware. In 1791 a French patent was secured and two years later Fitch visited France to

further the exploitation of his invention in Europe. The Terror, however, was then at its height and he soon returned home, having exhausted his means. From that time onwards he strove unsuccessfully against an unkind fate, and died at Bardstown, Kentucky, in 1798, at the age of fifty-three. His merits have not gone unnoticed in the United States, and in 1926 Congress erected a memorial to him where he died.

Pamphlets in War-time

AS in the War of 1914-18, so in this one, pamphlets are much in evidence. There is a saying of John Selden, who flourished in the seventeenth century, that "more solid things do not show the complexion of the times so well as ballads and libels". By "libels", however, Selden meant what we mean by pamphlets, for, as Archbishop Trench remarked, the extent of meaning which a word covers is often gradually narrowed. Any little book (*libellus*) was a "libel" once; now, only such as is scurrilous or injurious. The truth of Selden's saying is seen in the fact that pamphlets were plentifully produced until