

SATURDAY, JANUARY 28, 1933

No. 3300 Vol	. 131
CONTENTS	
CONTENTS	PAGI
The Census of India	. 109
The Spirit of Research. By E. F. A	. 111
Hydrodynamics. By S. G	. 112
Oceanographical Work of the Carnegie. By J. S. C.	. 114
Short Reviews	. 115
Origin of Tektites. By Dr. L. J. Spencer, F.R.S.	. 117
Recent Research on the Vitamins	. 118
Obituary:	
Mr. C. F. Beadles	. 122
Prof. R. Donaldson. By Prof. J. M. Beattie	. 123
Dr. Malcolm E. MacGregor	. 123
News and Views	. 123
Letters to the Editor:	
A New Impulse Generator for Three Millio	n
Volts.—T. E. Allibone, F. S. Edwards an	
D. B. McKenzie	. 129
Energy of Cosmic Rays.—Prof. E. Regener	. 130
Organic Compounds of Gold.—Prof. C. S. Gib) –
son, O.B.E., F.R.S	. 130
Iodoacetic Acid, Glutathione and Tissue Glyoxe	t-
lase.—Dr. Frank Dickens	. 130
Structural Formulæ of the Chlorophylls.—Pro	£.
James B. Conant and Emma M. Dietz	. 131
'Raw' Weather.—Prof. Sidney Russ, C.B.E.	
H. E. Beckett	. 131
Molecular Fluorescence of Antimony.—Jea	
Genard	. 132
Absorption of Light in Cæsium VapourDr	r.
H. J. J. Braddick and Prof. R. W. Ditchbur	n 132
Reversal of the Current from a Cuprous Oxid	е
Photo Cell in Red Light.—Dr. H. H. Pool	
and Dr. W. R. G. Atkins, O.B.E., F.R.S.	. 133
Twisted Trees.—H. G. Champion	. 133
	5.
Lockyer	. 134
Heterogony and the Chemical Ground-Plan	
Animal Growth.—C. H. Waddington .	. 134
The Constant of Gravitation, G.—Prof. V. V.	
Narlikar	. 134
Research Items	. 135
Astronomical Topics	. 137
Air Waves from Experimental Explosions. By D.	
F. J. W. Whipple	. 138
British Industries Fair. Scientific Instrument Sec	
TION	. 139
Prevention of Roof Falls in Mines	. 140
Fatigue Limit of Medium Carbon Steel	. 140
University and Educational Intelligence .	. 141
Calendar of Nature Topics	. 141
Societies and Academies	. 142
Forthcoming Events	. 144
Official Publications Received	. 144
Recent Scientific and Technical Books S	upp. iii

Editorial and Publishing Offices:

MACMILLAN & CO., LTD. ST. MARTIN'S STREET, LONDON, W.C.2

Telephone Number: WHITEHALL 8831
Telegraphic Address: PHUSIS, LESQUARE, LONDON

The Census of India, 1931*

HE Government of India showed both a commendable wisdom and a grasp of the realities of the situation in publishing an abstract of the main statistics of the census of 1931 while the Third Round Table Conference was still in session in London. The figures which are included in the abstract are of the greatest significance. Indeed, they are vital for an appreciation of the essence of the matters under discussion. By sheer weight of numbers, they bring out the magnitude of the problems involved in the proposed constitutional changes; and by indicating tendencies in the movements of population, they afford guidance in judging the possibility of permanence in an arrangement which aims at the form of democracy, but will depend for its working upon a delicate adjustment of the relations between different sections of the people.

The magnitude of the figures alone is stupendous. The destiny of more than three hundred and fifty millions of people is in the balance. The total population of India, as actually given, is 352,837,778, of whom 271,526,933, inhabitants of British India, are to receive the benefits and privileges of democratic institutions—the vast majority of them, however, for the present, in an attenuated form—and the remaining 81,310,845, natives of the Indian States, will be brought within the constitution of India under the scheme for federation.

The area of the Indian Empire, according to the latest estimate, is given as 1,808,679 square miles. This gives on the census figures of total population a mean density of 195 per square mile, the maximum being found in Cochin State, with a population of 814 to the square mile. In British India the most thickly populated area is Bengal, where there is a population of 646 to the square mile. The most sparsely populated areas in the Empire are Baluchistan with 5, and British Baluchistan with 9 to the square mile.

The statistics of total population, impressive as they are, must be taken in relation to the fact that they represent an increase in the ten years which have elapsed since the last census of 10.6 per cent. This rate of increase contrasts with an increase of 1.2 per cent in the previous decade, and has not been equalled since the period 1881-91; but there is no reason to suppose that

* Census of India, 1931. Abstract of Tables giving the Main Statistics of the Census of the Indian Empire of 1931, with a Brief Introductory Note. Pp. 16+2 maps. (Calcutta: Government of India Central Publications Branch, 1932.) 9d.

with continuing improvements in sanitation and hygiene and the reduction, if not the elimination, of the incidence of famine and plague, a rate of increase substantially little lower will not be maintained, unless some unforeseen cause should introduce any serious modification in the conditions of life among the general run of the population.

Notwithstanding fluctuations in the decennial rate of increase, the growth of population since 1881 represents an increase of 39 per cent. A part of this, however, is due to the extension, from time to time, of the area brought under the operation of the census.

Enfranchisement, however gradually extended to a population of this size, would be an undertaking of sufficient magnitude in itself, especially among a population which speaks some 225 languages, exclusive of dialects, and ranges culturally from the level of a jungle tribe to those whose standard of civilisation may differ in kind, but does not differ materially in degree, from that of a member of an equivalent class in European society. In India, however, as must by now be generally appreciated, the initial difficulty is complicated by sharply marked divisions of race and creed which have given rise to the 'communal' problem. An electoral system, based on a territorial allocation of representatives, has to be adapted to represent justly different races and different creeds, each of which has its own social organisation and habits and, inevitably, its own distinctive and peculiar bias in political outlook arising therefrom. Even in the fairly homogeneous communities of the West, the problem of minorities has never been solved satisfactorily, although many attempts have been made. It has been said that the only right of a minority is that of turning itself into a majority. In India, if only the warmth of discussion and the wealth of argument were taken into account, it might not unreasonably be concluded that minorities alone had a claim to consideration.

This sensitiveness to the claim of minorities, abnormal as it would at one time have appeared to the average citizen of a European State, arises, it is seen, from a very real and irreconcilable incompatibility in thought, habit and religion between the different sections of Indian society, which, particularly as between Hindu and Moslem, at times flames out into acts of open hostility. The facts which the constitution will have to face are revealed in the tables of enumeration according to religions.

Taking the principal religions only, but omitting Buddhism which, practically, is confined to Burma, in all India there are: -Hindus, 239,195,140; Moslems, 77,677,545; Sikhs, 4,335,771; Tribal, 8,280,347; Christians, 6,292,763. In British India, the predominant factor is the relation between Hindus and Moslems: and within the ranks of the Hindus, the relation of the castes to the Exterior Castes, or, as they are more popularly known, the Depressed Classes. Here the figures are Hindus 177,727,988, of whom 40,254,576 are numbered among the Depressed Classes. Moslems number 67,020,443; Christians, 3,866,660; Sikhs, 3,220,997; and Tribal, 5,779,709. important than the totals, however, is their distribution and interrelation in the various provinces, upon which the question of representation has to be decided. In the fifteen provinces (including Burma and the Andamans) under which the figures are given, the Hindus are in the majority in ten, while the Moslems predominate in Bengal, the Punjab, Burma (not counting Buddhists), Baluchistan and the North-West Frontier Province. The Sikhs number 3,064,144 in the Punjab, exceed forty thousand in the North-West Frontier Province and the United Provinces of Agra and Oudh and are present in eleven other provinces in varying degree, the numbers, however, being relatively small.

Incidentally, it may be of interest to note the definition of Exterior Castes adopted for census purposes, which differs in certain respects from that of the Franchise Committee of the Round Table Conference. It includes all castes which are excluded from access to schools, wells, public bathing places, temples and in some cases burning ghats, which are refused for service as barbers, tailors or washermen, from whom water is not accepted, and who convey pollution by contact The Depressed Classes had exor proximity. pectation of abolishing, by a declaration of equal rights to be incorporated in the constitution, the regulation or custom of exclusion from schools and other like places open to the higher castes, and other distinctions of inferiority.

The figures relating to the religious communities gain in significance when viewed proportionately, especially in their bearing on the political problem. In the decennial period, the increase in the Hindu population has been 10.4 per cent; but among the Moslems it has been 13 per cent; or, expressed in ratios per 1,000, the Hindus have fallen from 684 to 682, while the Moslems have risen from 217

to 222. This latter figure is the continuation of a steady increase which has been going on for the last half-century. The tribal figures also show a decrease in the decade—from 31 per thousand to 24, but this does not necessarily mean that the tribesmen are decreasing in numbers. It is probably to be accounted for in greater part as due to transference to the number of Hindus, in accordance with the process of Hinduising the tribal religions which has been in progress from time immemorial.

Among the remaining figures which may be regarded as having special significance in relation to the transitional phase through which India is now passing, are those giving the degree of literacy, the proportion of urban to rural population, and occupations.

The figures for literacy show a marked advance. The number per 1,000 aged five years and more who can read and write is 156 male and 29 female. In 1921 the corresponding figures were 122 male and 18 female. The number of literate females is now more than four millions, whereas thirty years ago they numbered less than a million. Among the Depressed Classes in British India, the percentage of literacy is 1.6.

The real India, it is always said, is the India of the rural population and the agricultural classes, although the urban population may be more in evidence and may thereby, in changed conditions, obtain more and more a preponderating voice in the affairs of the people. The urban population is undoubtedly growing and may be expected to increase more rapidly as India becomes industrialised and draws a proportion of the rural population to the towns, as it has already begun to do, for example, in Bombay. Since 1921 the increase in the urban population has been 0.9 per cent and it now numbers 11 per cent of the total. In occupations, agriculture accounts for 66.4 per cent of the working population. There is some doubt as to the exact numbers engaged in organised industry; but they are put at about 3,250,000 and at a maximum not exceeding 5,000,000, while the number employed in establishments governed by the Factory Acts is 1,553,169.

These, then, are the more significant of the figures which give the statistical side of the problems confronting those who have to frame a constitution for India. Their object is to adapt an essentially western institution to an eastern community, in which caste, the antithesis of democracy, prevails as the determining factor in the lives of

the vast majority of the community and influences even the Moslem. It may, indeed, be regretted that the opportunity was not sought to develop native Indian institutions; but such regrets are unavailing. It is probable that the die was cast irrevocably in the days when Indian culture was despised and a university system was set up which was devised to throw open to India the way to development along western lines. Time and stress alone can prove the wisdom of the course that has been chosen.

The Spirit of Research

The Spirit of Research. By Dr. T. Brailsford Robertson. Edited by Jane W. Robertson. Pp. xiv + 210 + 2 plates. (Adelaide: F. W. Preece and Sons, 1931.) 8s. 6d. net.

BRAILSFORD ROBERTSON devoted a brief but intensive life to scientific research, during which he found time to write essays of a more general appeal, some of which are collected here in book form. Born in Edinburgh, he went at an early age to Adelaide, and after a period of thirteen years in California, returned there as professor of physiology in 1919, where he died in 1930. This book, which in a sense is a memorial volume, is an all-Australian production: we like to regard it as a symbol that the torch of scientific truth burns brightly under the Southern Cross.

Robertson was an enthusiast: he was fortunate to come early after graduation under the influence of another enthusiast, Jacques Loeb, with whom he worked, and later succeeded, at Berkeley, California. Both were sceptics of accepted doctrines, both were men of fearless independence and unbounded energy. It was Loeb's influence that caused Robertson to attack big problems rather than work in restricted fields, and encouraged him to undertake the problem of growth and senescence as his main life work.

It is the spirit of research that counts. Observations, comparison, deduction, trial are the factors which have established all we know from the days of such a primitive act as the production of fire to the latest hypothesis of the structure of the atom. Loeb used a simple shed on the sea shore with an equipment of the simplest and cheapest character for his experiments on the artificial parthenogenesis of sea-urchins, and yet obtained results which are among the most valuable in biology. The modern physicist requires the