## NATURE

No. 3847 SATURDAY, JULY 24, 1943

Vol. 152

## CONTENTS

	age
Leadership in a Dynamic Society	85
The Amaravati Sculptures. By E. J. Thomas	87
Comparative Vertebrate Anatomy	88
General Astronomy in Spanish	89
Development of Botanical Investigations at Rothamsted	91
The Operational Calculus. By Prof. H. T. H. Piaggio	93
Preservation of Museum Objects in War-time. By Dr. H. J. Plenderleith	94
Obituaries :	
Sir Thomas Middleton, K.C.I.E., K.B.E., C.B., F.R.S. By Sir Rowland Biffen, F.R.S.	97
Dr. Karl Landsteiner, For.Mem.R.S. By Dr. G. F. Petrie	98
News and Views	99
Letters to the Editors:	
Transparent Water-in-Oil Dispersions: the Oleopathic Hydro-Micelle.—T. P. Hoar and Dr. J. H. Schulman	102
Dual Decay of Potassium.—Dr. F. C. Thompson and Dr. S. Rowlands	103
Nature of Tetraploidy in Cultivated European Potatoes.—C. H. Cadman	10
Vitamin B <sub>1</sub> , Vitamin B <sub>6</sub> and Biotin as Growth Substances for some Ascomycetes.—Dr. Nils Fries	10
Breakdown of Paraffin Wax by Bacteria: A Source of Error in Corrosion Tests.—T. Howard Rogers	10
Library Stocks of Periodicals.—Cyril C. Barnard .	10
Research Items	10
Physiologically Active Fractions of Indian Hemp. By B. C. Bose and Dr. B. Mukerji	10
Fisheries Research in Australia	11
New Zealand Earthquakes during 1941	П
Nutrition in Relation to Bone Growth and the Nervous System	11

Editorial and Publishing Offices
MACMILLAN & CO., LTD.,
ST. MARTIN'S STREET, LONDON, W.C.2.
Telephone Number: Whitehall 8831

Telegrams: Phusis Lesquare London
Advertisements should be addressed to
T. G. Scott & Son, Ltd., Talbot House, 9 Arundel Street, London, W.C.2

Telephone: Temple Bar 1942
The annual subscription rate is £4100, payable in advance, inland or Abroad.
All rights reserved. Registered as a Newspaper at the General Post Office

## LEADERSHIP IN A DYNAMIC SOCIETY

THERE is a striking parallelism of thought between the address on "Science and its Changing Social Environment" which Prof. P. W. Bridgman, of Harvard University, delivered to the American Physical Society on January 23, and that of Mr. Herbert Morrison to the Yorkshire Regional Council of the Labour Party at Leeds on April 3.

Prof. Bridgman's opening remarks on the relations of science and society, with his insistence that men of science should not acquiesce too readily in the implication of social responsibility for their discoveries, because society is the servant of science even more, and in a more fundamental sense, than is science the servant of society, are a challenge to lucid thinking in a field where terms are by no means clearly defined or precisely used. Even more fundamentally he directs attention to a danger referred to by Mr. Morrison, of which many scientific workers appear as yet to be unconscious.

In the long run, it is true that society is a better place for everyone when there is intellectual freedom and encouragement and flourishing activity in pure science. Prof. Bridgman urges that now is the time to insist more than ever that society must conform to the pattern of service to science. He suggests that changes now taking place are worsening the position of those who think as compared with those who do not. Social institutions are changing rapidly, and if society is to become a place where intellectual activity is encouraged and intellectual ability prized, those who think must fight for it. If they do not, we cannot assume that society will evolve so that the individual will be allowed to engage in independent intellectual activity.

Prof. Bridgman enters a sturdy defence of the old American conception of democracy as equal opportunity for ability to rise to its natural level, and he challenges outright a social philosophy that attempts to set any upper limit to the value of the contribution which a man of unusual ability can make to his society, particularly in time of war. Our conviction, he says, has not been strong enough that a society is a good society in which intellectual ability is prized and rewarded. We are passively accepting a change in the economic system by which the relative position of all intellectual workers, including the scientific worker, is being debased and in which assurance and commitments made by society in the past are being needlessly scrapped.

In facing this situation, our primary task, Prof. Bridgman urges, is one of education. We must make and seize our opportunity to proclaim our conviction that a society in the long run is the best society where those who have the ability are given every opportunity and inducement to practise the pursuit of truth and of understanding. We must teach our youth a social philosophy which recognizes that society is a means and not an end, and we must give them a technique by which they can discover those ends which they can accept with intellectual integrity as making society worth while.

Prof. Bridgman's views will no doubt meet with some criticism, but there are many scientific workers in Great Britain who will welcome this outspoken appeal for clear thinking. At least we owe it to our American comrades in arms to understand the trend of their thought in this question of international as well as national import. The reflexion of so much of its thought in Mr. Morrison's speech is the more suggestive for this very reason.

Mr. Morrison's address was concerned primarily with the relations between the State and industry in their threefold aspect of full employment, productive efficiency, and wide and fair distribution of the products of industry. The picture he drew of some of the effects of monopoly in a substantial fraction of British industry in the period between the Wars, with the decline of real enterprise, of thinking, planning and invention, and a decline in boldness and the spirit of adventure, is no fanciful picture but a sober warning. It is uncomfortably reflected even to-day, for example, in far too many utterances of the commercial interests to be disregarded.

"A case can be made for private enterprise," said Mr. Morrison, "in appropriate fields There is a very powerful case for public enterprise. There is no case whatever for private unenterprise, for private ownership and control without the spur either of a free market and free competition or of real social purpose. . . . An industry which makes security its sole aim is a menace. Unless private enterprise is prepared to take the risks which are its historic function, private enterprise has no function."

That was well said, and the warning was needed if only as a spur to the fundamental thinking about the relations of State and industry, and the balance between public and private enterprise, that are required if we are to evolve the new social technique or control without which planning may lead us into fascism and totalitarianism. Mr. Morrison spoke wisely also about this very question of control, which he visualized not as restrictive but, given the right methods and the right men, as constructive and stimulating. The dangers of restriction have been clearly emphasized in such studies as Dr. Hermann Levy's "Retail Trade Associations", and it is a main purpose of Prof. W. H. Hutt's "Plan for Reconstruction" to deal with and overcome these dangers.

In the new controls to be developed, Mr. Morrison discerns four elements: expert knowledge of the industry, labour, expert knowledge of the needs and interests of the consumers, and the State. The essential problem is to devise the appropriate means by which these interests and elements can function harmoniously. The State, Mr. Morrison considers, should be represented by officers specially trained to understand and work with industry, whose duty is to watch the interest of the community as a whole. If they have a bias, they should be consumer-minded rather than producer-minded, in order to ensure efficient public-spirited control. Efficiency auditing rather than price control is what is required, and

cost accounting should develop into a profession which should be the watch-dog of public interest.

Guided and informed in this way, Mr. Morrison believes that our monopolies could be made to serve the public need and to promote an expanding and not a restrictionist economy. An industry which consciously pursues social ends can be invigorated thereby as much as by the spur of competition and the free market. He visualizes a place for public ownership where appropriate, and a place for private enterprise also with public control, and resting upon and supporting national policies of social and industrial welfare.

This challenge to closer and more constructive thinking about the relations of State and industry, with its warning about the danger of a policy of restrictionism, finds its reflexion not only in Prof. Bridgman's address but also in other quarters in the United States. Much the same ideas, for example, have been expressed in the American periodical Fortune in different terms. Here reliance appears to be placed on the enforcement of the anti-trust laws, but the danger of restrictionism is recognized as clearly as by Mr. Morrison, and the objective is essentially the same: an economy in which freedom of enterprise is preserved side by side with the social control essential to secure certain minimum standards.

The point is that freedom of enterprise means enterprise and expansion, not restrictionism, with all that is inherent in the idea of adventure and willingness to accept risk. Without that spirit, neither in science nor elsewhere can we make the advances in thought and in technique that are essential if a new world order is to realize the hopes that the present struggle has stimulated. It is not enough just to think of the opportunities which the general loosening up of our social structure under the impact of total war undoubtedly gives us. These opportunities must be approached in the right spirit, seized and explored by creative and fertile minds, alive to the issues involved and willing to examine them and to turn them not to personal advantage only but also to the benefit of mankind.

The great danger is in fact what Prof. Hutt refers to as the frozen imagination of statesmen and officialdom, which refuses to recognize that the present economic arrangements and the ideas on which they are based are antiquated and obsolete, leading to inequality, a substratum of poverty, and insecurity. Under the cloak of a spurious superficial orderliness, due to imposed uniformity and rigidity, our productive arrangements have become increasingly chaotic and unco-ordinated. Productive power has been withheld or exterminated in the interests of the private incomes of sets of capitalists and workers, while technical developments which cause capital values to fall are usually regarded as a threat to prosperity.

Prof. Hutt argues cogently that security, peace and prosperity all depend on the creation of a new order from which the right to restrict production has been banished, and this belief is the foundation of the plan for reconstruction which he outlines in detail in his book. He would reserve for the State only

<sup>\*</sup> Plan for Reconstruction: a Project for Victory in War and Peace. By Prof. W. W. Hutt. (International Library of Sociology and Social Reconstruction.) Pp. viii+328. (London: Kegan Paul and Co., Ltd., 1943). 18s. net.

those basic functions with which the very human and fallible men who form governments can be entrusted, but the planned system for directing the use, under continuously tested foresight, of all the resources in the community, would give our democratic institutions an organized transition away from the authoritarian and monopolistic influences which have been frustrating the forces of order and cooperation.

This plea for both freedoms—freedom to work and plan for the full use of the resources of the community in an expanding economy—is one that is not always easy to follow in its details, but as an attempt to invent or develop new institutions appropriate to the needs of to-day it merits careful consideration. As such, however, it challenges many preconceived ideas, among them the functions and organization of professional workers, and the chapter on professional security is one that claims serious attention from scientific workers. Dealing specifically with the medical profession by way of illustration, the principles Prof. Hutt outlines are intended to be applied in the organization of any profession.

There can be no question that professional organization, however sincerely conceived as an attempt to maintain high standards of professional qualification and practice in the public interest, tends, especially in a legally 'closed' profession, to become unduly conservative both towards advances in professional technique and practice, and towards entry into the profession, as well as unconsciously to place the security and interests of the profession before that of the community in general. This is a natural and possibly inevitable tendency, and Prof. Hutt's proposals represent an attempt to reconcile the interests of a profession and those of the public. He suggests a system of independent control which, while protecting established income rights, would prevent professional organization standing in the way of equality of opportunity and efficient services, opening the entrance to the professions so that the availability of family income to pay for training does not act as a major selective factor.

In what he says of the organization of the medical profession, Prof. Hutt has entered boldly on controversial ground, but the issues he raises must be frankly faced in the discussions now proceeding on the establishment of a State Medical Service; and the more general questions cannot be evaded by scientific workers who are concerned to make their full contribution in the task of post-war reconstruction. Like Prof. Bridgman and Mr. Herbert Morrison. he should stimulate some fruitful and fundamental thinking about the relations of society and science, the mechanics of living in an ordered but progressive society, developing new techniques of social control to serve its changing and growing needs. The clash between freedom and control, individualism and cooperation, the deep paradox and conflict of feelings in the lives of men which is reflected in the institutions they set up to serve their purposes, is given fairly enough, though perhaps not quite so clearly as by C. I. Barnard, whose study of the functions of the executive has a relevance here which deserves attention.

The belief in the power of the co-operation of men of free will to make men free to co-operate; that only as they choose to work together can they achieve the fullness of personal development; that only as each accepts a responsibility for choice can they enter into that communion of men from which arise the higher purposes of individual and of co-operative behaviour -these beliefs, like Barnard's further belief that the expansion of co-operation and the development of the individual are in mutually dependent realities, and that a due proportion or balance between them is a necessary condition of human welfare, are inherent in the views of Profs. Hutt and Bridgman and of Mr. Morrison. It may well be that in his keen analysis of co-operative systems and the structure and functions of organizations in such systems, Mr. Barnard has given us valuable clues for the evolution of the new forms of organization required to serve our new purposes, and for the failure of the old. Certain it is that we must heed his warnings concerning the disregard of informal organization, the recognition of the physical, biological and social factors in cooperation and the confusion of morality with re-The strategic factor in co-operation sponsibility. generally, he reminds us, is leadership. In the dynamic expression of leadership it is moral creativeness, preceding, but depending upon, technical proficiency and the development of the appropriate techniques.

## THE AMARAVATI SCULPTURES

Amaravati Sculptures in the Madras Government Museum

By C. Sivaramamurti. (Bulletin of the Madras Government Museum, New Series—General Section, Vol. 4.) Pp. xviii+376+45 plates. (Madras: Government Press, 1942.) 14.8 rupees.

THIS work is essentially a description of those sculptures and inscriptions of the Amaravati Stupa which are now preserved in the Madras Museum. There are also important slabs in the British Museum; and if they seem there to be as much out of place as the Elgin Marbles, some excuse may be found in the story of their discovery and the dissolution of the monument. It was discovered in 1797 by Colonel Colin Mackenzie of the Trigonometrical Survey at Amaravati, a town on the south bank of the Krishna some sixty miles from the mouth. A local landowner was found to be removing the materials for the establishing of a new town. The Muslims were also removing marbles for their mosques, and they appear to have taken care to efface all signs of idolatry from the slabs.

The story of its subsequent disintegration is not a cheerful one. Nothing of the original stupe now remains, but a good idea of the form of the structure can be gained from the stupes represented on the carvings. The Buddhist stupe, a development of the tumulus, consists, in its Indian form, of a solid hemispherical stone body raised on a low cylinder (in this case about the height of a man) and surmounted by a square structure called the harmikā. In the centre were preserved the relics, either bodily