

# NATURE

No. 4149 SATURDAY, MAY 7, 1949 Vol. 163

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## WESTERN CIVILIZATION AND FREEDOM OF THOUGHT <sup>55/6</sup>

THE scientific outlook and scientific power increasingly dominate our age," writes Mr. John Bowles in his recent book "The Unity of European History", and in words strongly reminiscent of those used by H. A. L. Fisher in "A History of Europe" Mr. Bowles continues: "but unless traditional humanist values can be adapted and preserved, the progress of science will be empty and catastrophic. The study of the European past demonstrates the unity of Western culture, the values of the Christian and the Humanist tradition and the pernicious limitations of nationalism and class war. In the light of such knowledge, science can build a society which combines the power of modern technique with the spiritual depth of old experience." Mr. Bowles's political and cultural survey is written largely around a sentence of Mr. Winston Churchill's speech at The Hague Congress of Europe on May 7, 1948, as text: "We shall only save ourselves from the perils which draw near by forgetting the hatreds of the past, by letting national rancours and revenges die, by progressively effacing frontiers and barriers which aggravate and congeal our divisions, and by rejoicing together in that glorious treasure of literature, of romance, of ethics, of thought, and of toleration belonging to all, which is the true inheritance of Europe". To the scientific element in that inheritance Mr. Bowles possibly does less than justice, particularly to its cultural and political significance. Nevertheless, his book displays the vitality as well as the success of European civilization, and he shows clearly how much we have to learn from past ages as to the real nature of the dangers that threaten us to-day.

Like the Russian historian, Restovtzeff, Mr. Bowles sees in the failure of the upper class in the Roman world to extend their culture to the rural and the urban proletariat the fundamental cause of the decline of ancient civilization; and he observes that civilization is dependent on an individual creative genius, on the maintenance of a favourable environment for its realization and upon the preservation of intellectual standards. "No more than Græco-Roman society can modern society continue stable unless the masses participate in the minority culture without lowering its quality. It is the cardinal task of modern civilisation to preserve such standards, to democratise culture without debasing it, to transmit a modernised version of traditional values to the masses and to create a public opinion which respects knowledge."

The recurring theme throughout the book is that freedom of thought and the Christian respect for the individual are the very roots of European civilization, and Mr. Bowles shows from what diverse sources the tradition is derived. He quotes Spinoza that "the ultimate aim of government is not to rule by fear . . . but to free men from fear . . . to enable men to develop their minds and bodies in security and to employ their reason unshackled"—words which are strangely pregnant again to-day; and on the other hand, he shows the evil that flowed from Hegel's

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MACMILLAN & CO., LTD.,

ST. MARTIN'S STREET, LONDON, W.C.2.

Telephone Number: Whitehall 8831

Telegrams: Phisus 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 £4 10 0, payable in advance, Inland or Abroad

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attack on individual rights and impartial law. He brings out, too, the way in which the increase in population, the intricate world-wide structure of modern industry, the revolution in transport and so on have made imperative a planned international and economic order.

Even where Mr. Bowles simplifies too much, he rarely fails to show that the outstanding characteristics of Europe have been freedom and initiative, reflecting a fortunate environment, and that from this enterprise have flowed a brilliant and diverse culture and unprecedented scientific power, the immense advantage of which Western Europe has enjoyed over the rest of the world through its long lead in scientific and industrial techniques. He does not rest content with stressing the dependence of the democratic way of life for its continuance on a co-ordinated drive to ensure self-government and the rule of law in national and international affairs which will guarantee freedom from fear; with the planning of economic life to ensure freedom from want; with the maintenance of freedom of worship, thought and speech. He also points to definite responsibilities in this field on the part of professional organisations.

The vitality needed to deal with contemporary dangers, Mr. Bowles reminds us, can only be maintained by preserving the widest freedom of thought. Such freedom has been the secret of all the great creative epochs, as of modern science itself, and with it now must go the maintenance of independent professional organisations, strong enough to influence public opinion and the policy of the State, and uniting professionally competent experts in a common front. If this freedom and unity can exist, a creative civilization can continue: the alternative is totalitarianism.

Mr. Bowles thus regards professional organisations as possessing the same vital functions for civilization that were visualized by Sir A. M. Carr-Saunders and P. A. Wilson in their study of the professions published some sixteen years ago. They saw vocational associations, with the emphasis shifted from mere organisation to vocation or service, as providing professional men with permanent anchorage and shelter, from which secure positions they could set out to shape organisations into instruments for the fulfilment of their purposes. Carr-Saunders and Wilson had then sensed something of the oppression which the rising totalitarian systems were to exert, and of the need for democracy to brush away inefficiency and organise a free society for the good life. The years between have emphasized the continuing reality of that threat, and the dependence of progress upon a minority of creative minds functioning in an environment of freedom of thought and utterance.

To maintain intellectual standards and the intellectual freedom in which alone they can be preserved is a first responsibility of all professional associations. Some such bodies have always had special responsibilities in this matter, and have rarely for long been unmindful of them. Dr. A. Mansbridge noted, for example, in "The Kingdom of the Mind", that all the old universities of Europe represent historically the development of communities for common interest

and protection in the pursuit of learning; and, above all things, their story is the story of European unity and citizenship. Recognition that the universities and professional institutions have a part to play in the defence not merely of freedom of expression but even of freedom of thought itself, should not lead us to overlook their continuing contribution to European and indeed world unity. Moreover, the conditions in which alone science and scholarship can flourish, or even exist, are those where respect for truth and respect for persons are inherent in the general social tradition.

The essential basis of unity for Western Europe is not a political creed but a belief in all the principles linked with an indispensable principle of liberty, and the defence of that liberty is not primarily a political issue but a responsibility resting on all such institutions as universities and professional associations as well as religious bodies. Moreover, as Prof. R. B. Goldschmidt recently emphasized, it is only in the last two decades that there has been any serious interference with the freedom of science by Governments. There have always been organised groups of different types who clamoured for such interference, but in the nineteenth century even the worst reactionaries did not go so far as to abolish the freedom of teaching. Incidentally, Prof. Goldschmidt takes the same view as Sir Robert Robinson, in his presidential address last year to the Royal Society, that in Great Britain the immediate danger to the freedom of science is less of direct attack than of relative depreciation of fundamental research in comparison with technological applications. The body scientific can only flourish when all its organs are in a healthy condition, and where there is a social tradition which respects truth, even abstract truth, for its own sake.

The most important chapter in Prof. G. S. Ghurye's recent book, "Culture and Society"\* is that in which he deals with this question, and more generally with the part the universities have to play in creating and maintaining civilization and culture at a high level. Just how high cultural values are to be created and maintained, or how the passive practitioners of culture are to turn civilization into culture, he does not indicate; but very clearly he regards it as primarily a task to which the universities must contribute the inspiration. He recognizes that there are potentialities in planning which tend to work against individual development and realization; and that a planning society, if it cares for civilization and culture, must strengthen its universities. He reminds us that it is the business of social organisation to provide conditions wherein individuals can realize themselves to the fullest; while the strengthening of the universities involves both full autonomy in the body politic and redressing the balance of studies, now tilted heavily in favour of science and technology, so that the humanistic studies are adequately developed.

Here Prof. Ghurye is positive and emphatic, and although his otherwise somewhat discursive survey

\* Culture and Society. By Prof. G. S. Ghurye. (University of Bombay Publications, Sociology Series No. 1.) Pp. x+237. (Bombay and London: Oxford University Press, 1947.) 30s. net.

of nineteenth- and twentieth-century thought gives no clear answer to the questions: "What is culture?", and "What is civilization?", he may well have helped his readers to find their own answers. His book should correct some shallow thinking. Like Mr. T. S. Eliot, he recognizes that the whole of European culture is largely the product of Christianity. Like Mr. Eliot, too, he urges the maintenance of standards and the return to the study of those subjects by which the essentials of culture are transmitted; but he shows something which Mr. Eliot does not, namely, the seed of faith in our humanity. Prof. Ghurye has not entirely lost that faith in the power of man to preserve the best of his old culture while creating from his own spirit a new culture. He demonstrates anew the relevance of much of the thought of Whitehead, Russell and others to this problem of the nurture of a free culture in which creative thought is possible, and the vital necessity of free institutions under a democratic regime. Though he touches only the fringe of the political field, the implication is plain: that the universities, professional associations and the learned societies must take thought and care that the life of the society in which they are placed is not so ordered as to preclude the essential conditions for their work.

An immense responsibility thus rests on the universities and the professional bodies, including the learned societies; but it carries no implication that scientific men and other scholars are inherently qualified to be the saviours of society. They must, indeed, meet the fresh threat, wherever it comes from, to their right to declare and sustain by argument what they believe to be true, a right which has long been the condition of the whole intellectual life of Western Europe. On the right to make and test hypotheses through observation and experiment, to proclaim freely and discuss the conclusions to which inquiry leads, there can be no compromise. When that way is imperilled, scientific workers are bound to join, with fellow men of learning and of every walk of life, to safeguard the continuance of those free institutions through which the great heritage of Western culture has flowed, or they repudiate the very spirit and method of science.

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## OSCILLATING STARS

### The Pulsation Theory of Variable Stars

By Svein Rosseland. (International Series of Monographs on Physics) Pp. viii+152. (Oxford: Clarendon Press, London: Oxford University Press, 1949.) 18s. net.

**CEPHEID** variable stars—the name given to stars which behave like  $\delta$  Cephei—have played a distinguished part in modern astronomy. Their most characteristic feature—that there is a definite relation between period and median absolute luminosity—was discovered by Miss Leavitt in 1912 when investigating the Lesser Magellanic Cloud. Owing to this relation, the measurement of period and apparent magnitude allows one to compare the absolute and apparent luminosities, and so affords a reliable

estimate of distance, once the zero point of the period-luminosity curve has been fixed. In this way, Shapley determined the distances of the globular clusters, and Hubble determined the distances of the extra-galactic nebulae.

This would be sufficient glory for any ordinary type of star, but Cepheids have other claims to distinction. Originally supposed to be close binaries in virtue of the periodic shifts in their spectral lines, they were identified by Shapley in 1914 as stars in a state of pulsation, and it was Eddington's attempt in 1917 to give Shapley's hypothesis a precise mathematical form that led Eddington to investigate the equilibrium of non-pulsating stars as a norm, and so to put forward his celebrated theory of the radiative equilibrium of the stars. In another direction, the slow secular decrease in the periods of Cepheids led Eddington to an estimate of the rate of stellar evolution. Since then, their intriguing features have led a host of observers to make refined observations of their light-curves and velocity-curves, and a host of mathematicians to elaborate the pulsation hypothesis.

For several years now, Prof. S. Rosseland, of Oslo, and his co-workers have been engaged in studies of solar and stellar hydrodynamics, and the present admirable volume from his pen gives a detailed account of the application of hydrodynamics to the case of stellar pulsations. It contains not only the classical pioneer investigations of Eddington, but also the less well-known recent researches of the American and Dutch schools, together with many hitherto unpublished results of Rosseland himself. The whole book is written in a most attractive style. Rosseland uses his earlier experience in the analytical dynamics of the quantum theory to put the theory of radial pulsations of spheres of gas into canonical, Hamiltonian form, and exhibits it as a branch of the grand theory of oscillations of dynamical and thermodynamical systems. The issues are thus presented in a form which will appeal by its generality to a large class of readers over and above those professionally interested in variable stars.

Almost every theoretical astrophysicist has had a shot—many of them substantially more than a shot—at solving the outstanding problems which Cepheids offer on the pulsation hypothesis, such as the skewness of the velocity- and light-curves, and the coincidence of maximum luminosity with maximum velocity of approach of the stellar surface. The full bibliographical references given by Rosseland make the reader realize how great a loss the subject suffered through the early death of Woltjer, the Dutch astronomer; and what important contributions have been made recently by Martin Schwarzschild, son of one of the fathers of astrophysics, by Ledoux, the Belgian worker, by Miss Kluyver and Wesselink in Holland, by Biermann in Germany, and by Cowling in Great Britain.

What is the present position of the pulsation hypothesis? Rosseland chooses the wise course of not advocating any particular form of the hypothesis; but attempts to bring out the real difficulties involved and to develop general methods of attack capable of application whatever new observational features the future may have in store. To me it seems that the well-tried methods fail on the whole to account for the phase-relation in Cepheids. It seems incredible that the various causes of phase-lag treated by Rosseland and others should accumulate up to exactly a quarter-period, or that combinations of