construction could produce effective results, believes that the establishment of an international research center for work in cartography and meteorology would be desirable. The World Health Organization, on the other hand, would reserve to itself the prerogative of selecting and directing any research on the international level in the field of medicine and public health. The United Nations Food and Agriculture Organization, moreover, does not favor the policy of developing international centers at this time, but proposes rather to encourage and support the scientific work of national institutions.

Whatever the outcome of the consideration of the important, basic question to which this report is addressed, there can be no doubt that the next steps will be taken only after the most widespread consultation with all the organizations and individuals that are competent to contribute toward the making of wise decisions. Now in the planning stage, the whole program may confidently be expected to develop along lines that are both practical in nature and idealistic in goal. Here is certainly a place where the United States may contribute leadership and demonstrate a spirit of cooperation that may bring results of truly epoch-making significance. The universal character of science may yet provide the cement to bind together the broken fragments of humanity into at least a semblance of "one world." It can do so, however, only if the intelligence of science is directed by dynamic good will.

The Chaotic University

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SOME REFORMER once suggested that every judge should be required to spend a week in gaol, incognito. With similar intent, I would require every educator—college president, school head, commissioner, administrator of foundations—to read Aldous Huxley's *Brave New World,* as a dreadful warning, before taking office. Then, as a reward, I would let him read Sir Walter Moberly's *The Crisis in The University.*[1]

Brave New World is an entertaining book, but as a glimpse of utopia it is emetic. It paints just the future world—of gorgeously planned mechanical marvels and material comfort, soulless educational efficiency, and utter poverty of spirit—that many an educator has been thoughtlessly declaring as his aim. In contrast, *The Crisis in The University* glances back on the great past and looks at the present with dismay, but a wind of culture blows through the book and will bring refreshing thinking, (and some hopes as well as fears) to readers who have the long term good of the universities at heart. And it is the privilege of universities themselves—in England, in America, in the world—to be able to take a long term view, to remember a past that stretches back to the age of Pericles, to look forward to the future with enduring purpose.

The Crisis in the University is a book about British universities and their present failure, as the author sees it, to meet their responsibilities. The book is neither a wailing complaint nor an angry condemnation. It is a critical analysis of the working and aims of the universities, by one who has spent his life in British universities, studying and teaching in some, at the head of some, and now putting his own measures to trial in a college of his own founding. The book begins with a discussion of the functions and aims that have been claimed for universities by statesmen, thinkers, and scholars. There is a comparison of the two types of university nicknamed "Oxbridge" and "Redbrick." Redbrick stands for the provincial universities which have grown up in the last century, doing good teaching but offering a meager social life because they are mostly nonresidential, with students commuting daily.

Then follows a statement of present failures and a discussion of remedies. Each remedy is shown to be either spurious in itself or unworkable in modern conditions; till finally the author produces a tentative suggestion of a cure. And there he leaves the reader.[2]

Sometimes a reviewer feels he can extract the es-

[1] *The Crisis in the University.* Sir Walter Moberly. London: SCM Press; New York: Macmillan, 1949. 316 pp. $2.50.

[2] As my colleague Prof. F. F. Stephan put it: "In his main discussion Sir Walter acts like a receiver in bankruptcy, reporting on the universities. He asks, 'What are their liabilities? What are their assets? How can we keep the critical situation from destroying the assets in hand, and get the business of the universities back on its feet?"

sence of his author's theme and save people the trouble of reading the book itself. But this is emphatically not a book to be summed up in a few sentences such as, "The author thinks the universities are going downhill." The book is vital, solid, thorough discussion; so full of good criticism and able comment and apt quotations that I cannot justly condense it—I can only urge all who value our universities to read it for themselves. Sir Walter is diagnosing the ill health of universities of his own country.[3] I believe we in the United States are threatened with much the same ill health; but we are barely aware of the trouble because we are preoccupied with more superficial matters, such as new examinations and schemes of study, which give an appearance of sound health. But as we read Sir Walter's book, you and I will find we too have our doubts about our universities: not of their success in direct teaching and training but whether they are meeting their higher responsibilities of lasting education, of providing spiritual values and maintaining a culture which makes the ultimate difference between an educated civilization and a well-taught system of robots. Let us look at the results of our own work. If we talk with a well-trained lawyer, we are impressed by his knowledge of law and his clear grasp of our problem. We are pleased by the penetrating way in which he pins us down to clearer wording. If we talk with a successful business administrator, we are impressed by his knowledge of his business and his ease in dealing with people. If we talk with a young man just starting on a job, we are impressed by his keenness and growing interest in the special information connected with his work. If we talk with a well-settled householder, proud of his house, secure in his job, we share his genuine pleasure in a well-ordered house, his pride in efficient machines to heat the house or wash his laundry or bring him entertainment. Yet there is something missing, something apart from intellectual information and material comfort and pleasures. Where is the sense of strong guiding values, to shape a life, to command a decision? Where is the enjoyment of intellectual reflection? Where is the fiery interest in understanding which education distilled out of growing civilization and gave to a privileged few, which we now claim to offer to so many? Yes, people have these things. We meet a philosopher here in our daily life, a happy musician there, a real thinker or delighted reader in many a home. Yet these glimpses are too rare. Have our universities done all they can to foster such culture? We believe that in such intangible values may lie the greatest benefits that college years can bestow. But in voicing doubts we are not so much blaming universities for failing to do their work well as questioning their view of what their real work is. And that is always a dangerous and unwelcome kind of question.

The virtues that we miss are not the simple concrete ones like spelling or physics or even an integrated understanding of the social sciences, but intangible things, emotional, moral and spiritual, which add up to a tremendous total, the spirit of man. When we turn to the current generation of students, Sir Walter's concern will certainly touch us. Again we hesitate to embark on such criticism; but it is much easier to read about universities at a distance in another country, and see *their* aims questioned and troubles discussed. So we can start reading Sir Walter's book with a quiet heart. I do not think it will remain quiet for many pages—with Sir Walter's kindly but unrelenting help we shall soon start taking stock of our own universities.

The book starts by asking what universities should provide for the students of today (in addition to the information and direct training, which, if needed alone, could be provided better by technical schools). Sir Walter says:

> When we turn to the primary questions, concerning the things that really make or mar a university, and ask "What are universities for? What effect should they have on their alumni? What are their responsibilities to the outside world?" we are asking questions to which a minority of university teachers return discordant answers and the majority return no clear answers at all. Beneath the façade of development and hopefulness, the British universities of today share with the universities of the world a peculiar malaise and impotence. They have little inner self-confidence, because they lack, and are increasingly aware that they lack, any clear, agreed sense of direction and purpose.
>
> At this moment they cannot give an effective lead because they themselves share, and have shown small sign of transcending, the spiritual confusion of the age.

and he quotes Sir Richard Livingstone:

> What the world most needs and most lacks to-day is a clear and worthy view of life. . . . What do we do to give the undergraduate such a view? I think we must reply, "Little or nothing."

This introductory section is not so much a catalogue of woe as a gentle pointing out of those higher values which the older universities cherished, which we here envy and would cherish too if we had time to attend to them.

Sir Walter then traces the changes in university teaching and life through the following stages in the last 200 years:

[3] *The Crisis in the University* has stirred up some strong discussion in England. A critique of it in *The Cambridge Journal* for June 1949 led to a set of argumentative articles in the *Universities Quarterly*, November, 1949.

(i) The classical university, based on Christian and Graeco-Roman traditions, which he describes with loving care.

On this view the chief duty of the university is to produce good citizens. It should train an élite who are to be the future leaders in affairs and in the learned professions. . . .

Neither training in the technique of particular callings, whether ecclesiastical or secular, nor the advancement of knowledge is its primary function, though it may contribute to each. The training it gives is an initiation of select young people into their cultural inheritance. In Matthew Arnold's words it seeks to familiarize them with "the best that has been thought and said in the world" and so to bind together the generations through their sharing in a common intellectual estate. . . . In the same vein, the authors of the recent Harvard Report on *General Education in a Free Society* define "the abilities to be sought above all others in a general education," as being "to think effectively, to communicate thought, to make relevant judgments, to discriminate among values." In so doing, they echo Newman and imply that the qualities at which Oxford and Cambridge aimed in the middle of the nineteenth century are still of major importance in the middle of the twentieth.

(ii) The liberal university, with insistence on research, a diversity of studies, and a detached academic life.

(iii) The technological and democratic university, which is the present stage, and in some ways a regrettable one. It has come with the growth of science. In this last development, Sir Walter seems to feel that the American universities have led the transition sanely, whereas in England it has been hurried on by war and by changes in the social system.

Within the universities as without, these two influences, the technological and the proletarian, are in course of producing a new culture; and this differs sharply from that in which universities were nourished and took their shape. It condemns liberalism as being aristocratic and fastidious rather than equalitarian, . . . and as exalting a sterile scholarship rather than being frankly occupational and utilitarian. It regards "learning for learning's sake" as an idol to be demolished.

Sir Walter ends this section:

We have had the Classical-Christian university, which was later displaced by the Liberal university. This in turn has been undermined, but not as yet superseded, by the combined influence of democratization and technical achievement. What we have in fact to-day is the chaotic university.

In discussing the functions and aims of the universities, Sir Walter goes far beneath the surface functions and asks what part the universities have played in civilization hitherto and what they shall do in the future. Of course the answer to the second question depends on the value judgments one makes of civilization and its present trend. Some people want universities today to provide first-class technical training. Some go farther and want them to lead in planning and producing planners for a technocracy. Others look nostalgically towards the days when universities were places of quiet and culture, giving to a few the "leisure to learn to live." Sir Walter does not judge thus. He accepts some of the changes of curriculum and general life but he also looks for an element of lasting culture, of intellectual delight and spiritual salvation, which can give much needed guidance.

Finally the argument for a "cultural" education must be judged in the light of the world-crisis. In such a time first things must come first, necessities before luxuries. How this truism is applied to the university problem, will depend on how we picture the challenge of our time. If the world's troubles are due first and foremost to failure to apply systematically appropriate means to agreed ends, then what we need most is more and better experts, and the first task of education will be to produce them. On the other hand if our most intractable divisions are concerned with ends, if they arise from the difficulty which two men find in living together peaceably in a house, or two nations in a world even when food and warmth and clothing and the other necessities of life are amply provided, if the most serious menace is not scarcity but "envy, hatred and malice and all uncharitableness"; the mental commodity most in demand will be practical wisdom rather than specialized expertise. In that case the most urgent and practical service demanded of the universities will be that they should turn out an élite who will be men of judgment and "skilled considerers of human things."

As he sees the chaotic university of today, it has lost its intellectual and spiritual leadership. Its whole body, students and faculty, need a vital sense of right and clear opinion, and the lack of this has brought the universities to a crisis in which they cannot provide for the world. It is indeed a crisis if the universities have lost their leadership. Students do need help to make up their minds on major issues that confront the world. More important still, they need to realize that they must have a mind of their own on such matters. "We cannot without absurdity have an open mind about having an open mind."

The kernel of the crisis, Sir Walter believes, is neutrality of students, of faculty, of the university as a corporate whole—failure to mind about primary problems, failure to be alive to them, failure to realize which *are* the primary problems.

So far as their university studies are concerned, most students are nowhere confronted with the challenge or the opportunity to see life steadily and whole. . . . They may never come of age morally, as persons able to decide and to act as responsible human beings. In prac-

tice, of course, students must and do integrate their lives in some degree, but generally the university does not help them. In this respect it leaves them to the influence of agencies of a sub-university grade, such as the cinema and the cheap newspaper. Indeed by abstention it insinuates an impression that such integration is not a matter of the first importance. . . . The modern university is betraying its students. The more unthinking type of student simply drifts. Some sort of embryo of a working creed he must have; no one out of an asylum can live without it. But his version is uncritical and mainly unconscious, it is picked up at haphazard, and it is muddled and incoherent. He never faces as a whole the social problem or the problem of his personal life. . . . On the other hand, the thinking type of student is concerned, and often passionately, to find a working philosophy of life. He discusses major questions constantly. But since he has little help from the university, his discussion is often callow and has small reference to "the best that has been thought and known." Thus, of the these two types, the former is not being helped to ask, nor the latter to answer, the really fundamental questions; and the university is doing its duty by neither. . . .

We must remember that even for the Christian—and *a fortiori* for the modern university—the ultimate enemy, the enemy with whom there should be war to the knife, is not the ardent and conscientious atheist or totalitarian. It is the trivial-minded irresponsible thinker who does not take seriously his obligation to seek truth and to ensue it.

Having shown why he holds there is a crisis, Sir Walter discusses first palliatives, then remedies. For palliatives he pleads for such things as better residential facilities for Redbrick, and changes of curriculum to include some integrated general education courses. Considering major remedies:

(1) He rejects a return to the historical tradition of classical humanism as impossible in view of the growth of democracy and the advance of science.

(2) Nor it is practicable to return to an explicitly Christian basis—such as the old European universities once acknowledged—except for colleges with definite church affiliations.

(3) He then discusses in detail the claims of "scientific humanism" put forward by keen thinkers and enthusiastic planners. He does not seem to like this cure, although he gives science and scientists themselves full praise. I think he is arguing against a small, rather extreme group; but his refutation is still important to us as scientists. So here are the tenets he ascribes to the scientific humanists. (I have added some comments of my own in parentheses.) (a) Universities should be better organized, with less professorial wastefulness. "Capable administrators abhor waste and inefficiency and earnest reformers abhor avoidable delay," says Sir Walter with his tongue in his cheek. (Save money, economize power. But "Where shall wisdom be found, and where is the place of understanding? Man knoweth not the price thereof. . . .") (b) The universities should lessen their insistence on pure learning, much of which is antisocial, a cloak for the vested interests of the scholar. (The ivory tower may yet be a watchtower for civilization.) (c) Thoroughgoing rationalism is needed. The methods of physical science should be operated over the whole field of knowledge. (The methods of physical science are adjusted to its problems and material. It is dangerous to extrapolate them. Rash attempts to apply them to social sciences narrow the view and distort both problem and material.) (d) The universities must ally themselves actively with the forces making for social progress. (What is social progress? What is truth?)

Sir Walter considers these critical suggestions very valuable as comments with much general truth; but he disagrees with their one-sidedness. In fact their last point, (d), really gives the show away. Such critics or reformers are trying to tie the universities to a particular scheme for the advance of civilization, a scheme of planning. Should not the universities, like the King, be above political parties, even the best of political schemes?

Do we not meet scientific humanism in America, when social scientists ask for integrated courses in physical science to teach their students scientific method; or when physical scientists preach their methods as models for other fields, or even forsake their studies to set the social sciences right?

However much good there is in these suggestions for the future of the universities, there is a flavor of dogmatism, of a cult, which Sir Walter exposes.

The myth that Latin prose provides an adequate basic mental training for the engineer or the administrator is now discredited. But those who would simply, for "Latin Prose," read "the experimental method of physics" or "a training in statistics" are guilty of a similar fallacy.

He refers to a discussion between two groups:

One consisted of "scientific-humanists" who regard the world's chief need today as being further technical advance. . . . Our most urgent requirement is that these advances should go further and faster, and that hunger, cold, disease and distance should progressively be overcome. Against them others, including some scientists, contended that our primary problem is one of human relations; it is how we are going to live together in peace and amity in a world where destructive power has grown beyond all imagination. Our worst trouble is not that there is too little to go round, but that there is not a sufficiently general will that, whatever there is, should go round.

He suggests that trying their cure for the crisis in

the universities would carry our civilization still farther from the life of the spirit, perhaps nearer to a "brave new world."

What then does Sir Walter suggest as a remedy for the crisis? He has no easy cure of clear promise, but he has a suggestion. He, himself a devout Christian, suggests that small Christian groups within the great universities should make themselves felt and heard, becoming what Toynbee would term "creative minorities." He would not try to make the universities officially Christian or even to fill them with Christian teachers or students by some selection process.

> Christians should work for an "open university." This does not mean [one] which is shapeless or neutral. But it means one . . . which is hospitable. . . . No thinking will be suppressed as "dangerous." Above all there will be no "tests for teachers," no articles of faith, . . . prescribed as a condition of service.

But he would say to those who are Christians, "Speak your mind. Even in your academic work let your principles appear. Where you see right or wrong, say so. Continue a discussion into the field of religion or ethics without fear." At first this seems a rather specialized solution, but as one reads Sir Walter's good sense and moderate words one realizes that he, as a wise, believing Christian is advocating in his own terms what would apply in much the same way to groups with other beliefs. I think he would welcome the growth in the universities of other religious groups similarly intent on making their spiritual thinking and moral minding felt. So I would read his advice, perhaps without his entire agreement, as this: Let us, at the expense of some comfort and some academic progress, encourage the growth of serious thinking and ethical discussion, encourage a sense of the value of having values, by means of any groups of people, Christians and others, who will seek a clearer view and speak their minds on the ultimate problems of the day, who feel that "people matter," who would agree, perhaps, with the old saying:

"Labor, art, worship, love: these make men's lives."

The Question of Plasmagenes

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WITH THE PERSPECTIVE of a triumphant chromosome theory of heredity, E. B. Wilson (*5*) could write in 1925:

> Modern genetic experiment has given an overwhelming demonstration not only of the leading role played by the nucleus in heredity, but also of its particulate or corpuscular organization, in the sense that it is composed fundamentally of small entities ("genes," "factors," or the like) that are self-perpetuating and within certain limits independent of one another. We have very little genetic evidence in the case of the cytosome; but the fact that it is available in the nucleus predisposes us to adopt a similar conception of the cytoplasm.

The proceedings of the 1948 Paris symposium *Unités Biologiques Douées de Continuité Génétique*,[1] published not quite 25 years after Wilson's magnificent survey, are useful as a report of progress in the analysis of cytoplasmic heredity. Thanks are due the editors and organizers of the symposium for an imaginative approach. It was originally intended, apparently, to provide a coverage more closely approximating the title; but H. J. Muller, who was to have discussed the chromosomal genes, was unable to participate. The result is not, as might be thought, Hamlet without the Dane, but an attempt to ascertain the principles behind the phenomena of genetic continuity.

What are the advances in the period since Wilson's book was written? They perhaps fall into two categories, those having to do with the chemical identification of the self-perpetuating bodies, and those having to do with the refinements of technique for detecting these bodies. In the first category, combined cytochemical and genetic techniques and the identification of viruses as nucleoprotein in constitution make it seem probable that cellular structures containing nucleic acid possess genetic continuity. The advances in genetic technique, in the detection of extrachromosomal heredity, are not so much advances in principle as in application of the standard Mendelian techniques to organisms in which cellular heredity can easily be studied—the "acellular" Protozoa, and other microorganisms. The newer studies

[1] *Unités Biologiques Douées de Continuité Génétique.* Colloques Internationaux du Centre National de la Recherche Scientifique, Paris, Juin-Juillet, 1948, Vol. VIII. Paris V^e: Publications du C.N.R.S., 1949. 205 pp. 1000 fr.