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THE SCIENTIFIC ENTERPRISE AND SOCIAL CONSCIENCE

by

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At the recent annual meetings of professional philosophers last December, there arose in connection with a proposed resolution on Vietnam the perennial question whether philosophers as a professional group should pass resolutions on political issues. From press accounts at the time it appeared that comparable arguments occurred among historians, economists, and others – not only social scientists, but also assembled physical and natural scientists at the AAAS, concerning a variety of proposals for steps toward social action. It is not surprising that in a time of crisis, such as the present clearly is, the problem of the responsibilities of science as science, or rather of scientists as scientists, should constantly recur. What is more surprising is that it should keep coming back in the same old terms and with the same old dichotomies, and – in spite of 20th century philosophy having been characterized as an Age of Analysis – without a clearer analysis of the questions themselves and their presuppositions. It is as if we started with some fixed definition of the scientist, whether the layman's image of a father-figure in a white coat (engendered by TV advertising) or the philosopher's fallibilistic doubter of Introductory Philosophy courses. And it is as if we started with some fixed definition of the social conscience, or what comes to the same thing, the sense of social responsibility, embodying the usual preconceptions of our culture with the hard-line division between the individual and the social. And it is as if we simply held up and compared the two pictures and reported that there was or was not a path between the two conceptions.

Now I want to maintain in this paper that there is something very wrong with this procedure and its results. I want to argue that the scientific enterprise is a historically changing enterprise and its responsibilities do not flow simply from its perennial features but from its place in a given time and a given level of social development. And similarly we shall see that the sense of social responsibility does not take its character from the perennial features of the human conscience alone, but from the whole socio-cultural complex in its historical development. Hence any picture of the relations of the two that we have rests on assumed pictures of the whole of the human world in its operations in our age. Once we realize this we can see how complex is the scope of our problem if it is to issue in genuinely evaluative conclusions about the responsibilities of science in the contemporary world.

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In what follows I shall therefore begin with the changing character of the scientific enterprise, then go on to the changing character of social responsibilities of science. For brevity, I label the sections "The Scientific Enterprise," "Social Conscience," and "... and. . ."

I. THE SCIENTIFIC ENTERPRISE

The material and sociological changes in the scientific enterprise are familiar enough and need be barely indicated. The number of people carrying on the enterprise of science is vastly increased — it is said that there are more scientists now alive and at work than the past total in all human history. Science is more systematically organized in its pursuit, though fragmentary at many points along its front. It has large resources. Basic research is now encouraged and subsidized, not merely applied research. Sociologically, it is not a self-determining field. In spite of the occasional dreams of technocracy or the entry of occasional individuals into the directory of ruling classes, science is the servant, not the Platonic guardian. It has many masters and many strings by which it is pulled, even when it is in the freer atmosphere of the better university, and its practitioners can soothe themselves with a truth-for-truth's-sake ideology. We know that some foremost scientists have even shifted from physics to theoretical biology, despairing of any physical research as being out of the grasp of a war machine. By comparison to the war machine the relation of the scientific enterprise to business and the search for profits seemed almost benign, till sociology produced the concept of the "military-industrial complex"! I need not scan here the range of questions that the more radical scientists today are pressing upon us about the permeation of the scientific enterprise by the immoral aspects of the Establishment. At this point I want to explore rather the internal changes in the scientific enterprise — both in the theory of knowledge and in the practical attitudes of men — that the progress of science has brought about; for it is these changes, I shall argue, that determine the responsibility of scientists in the contemporary world. I want to distinguish four such changes:

- (1) A shift in the view of human interference in the course of events.
- (2) The growth of science to the point where we no longer set up theoretical barriers to its possible scope.
- (3) The development of what may be called an "ecological mode of thought".
- (4) An apparent change in the relation of practice to theory in the scientific enterprise.

(1) *The model of human interference.* Men have always wanted to extend their control of the world and themselves, and in primitive societies we find magical endeavors. But the ideal of science has not always been associated with that of control. In ancient Greek philosophy the ideal of science was the intellectual grasp of the eternal, what could not be otherwise; the purer the science, therefore, the less the extent of human control! The idea of knowledge as power had a slow growth. We can see this clearly in the human attitudes to crisis. First there is a kind of weather-model; you wait till the crisis blows over, if you are lucky. Economic crises were treated in this way till quite recently. Then there is the intervention-model: you intervene but only to remove obstacles and hindrances, so that nature can take its course. This was the medical model under the older teleological approach that nature works for the best. With the Cartesian view of the body as a machine, the idea of fashioning, interfering to shape and control, came to the fore; now some go so far as to see the body as a mechanism with replaceable, even improvable parts. In the social field, resistance to intervention is old. We may recall Aristotle's story, in his *Politics*, of the society in which one who moved a change in the laws had a halter put around his neck, and if his motion lost, he was hanged on the spot. The adulation of tradition, whether in the British conception of the common law as a slow unconscious growth or in a Burkean conservatism, has an almost parallel character – to try consciously to remake, to plan the whole, is to exhibit the height of folly. It need scarcely be added that the contemporary attitude is one of the control-model permeating all fields. It not merely reflects the vast expansion of science, but also the desperate state of many of our problems, in which a weather-model would mean the acceptance of disasters. Of course even the attitude to the weather is changing too: the next generation may think such a name for a resignation-model rather queer and inaccurate.

(2) *The growing scope of the scientific enterprise.* It was barely yesterday that arguments were still popular about the inherent limitations of science. First a sharp line was drawn between the physical and the human-social, and the latter declared out of bounds because it involves the particular, the subjective, the free will, the qualitative, and what not. Then parts of psychology and the social were surrendered, but the cultural and the historical were ideographic, empathetic, value-ridden. We need not track down all the barriers that were thrust aside. Of course, the conception of science and its ways changed in the process; it ceased being the universalistic mechanical-quantitative in the 19th century sense; probability and statistics made their sweep into the human field, generalized and refined mathematical conceptions of order upset the sharp distinction of quantity and quality; and so on. The outcome is that the

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domain of knowledge lies open to the attempts of science. To attempt is not to succeed, of course, but the a priori limitations and the metaphysical limitations seem to be a thing of the past. The domain of ignorance is and will be indefinitely vast. But from a practical point of view it can no longer be used as a priori veto on attempts at knowledge and control. In more stable days, it could be said that no experimental ventures should be made in human life which involved a plunge into the unknown, because disasters might result. Now the same argument often can be urged against not making experimental ventures; for the consequences of continuing in the old ways in a rapidly changing world may be quite as unknowable and quite as disastrous! This argument, of course, does not justify recklessness in experiment; we are learning how reckless we have been. But it also underlines the recklessness of conservatism too. In short, the emphasis falls on responsible inquiry and responsible attempts at control. The burden of responsibility falls with increasing weight on the scientific enterprise.

(3) *The ecological mode of thought.* Part of the recklessness has come not from ignorance but from neglect of knowledge in other fields that either already exists or could be acquired. There is a changed mode of thought arising which we may call "ecological" because it is so sharply illustrated in ecological studies. Its practical side is familiar enough; we have become very sensitive to the way in which attempts at control in one direction have upset the balance of nature in others, as in the case of insecticides and the disposal of industrial wastes. In part this involves a demand that the application of knowledge be carried out in terms of the whole range of relevant knowledge available; in a recent column in the Sunday Times (January 4, 1970) James Reston quotes Prime Minister Clement Atlee's remark that when he concurred in President Truman's decision to drop the atomic bomb on Hiroshima, they knew nothing about the genetic effects of fallout, though in fact, as Reston goes on to point out, H.J. Muller had won the Nobel Prize in 1927 for his evidence of the genetic effects of radiation. Another aspect in the shift in outlook is a demand that one-sided evaluation should not dominate policy; for example, when oil from off-shore drilling springs a leak, the oil industry may worry about the seepage of salt water into oil, and the seashore population about dispersing the oil lest it cover the beaches, but it has also been pointed out that the chemical used to disperse the oil may have a more deleterious effect on marine life than the oil itself!

On the theoretical side, an ecological mode of thought involves a systems approach, in which there is not only a meeting of different sciences in relation to a particular problem, but there may be a recasting of formulations in the hitherto isolated sciences. In this sense it may in part constitute a critique of isolated abstract formulation of knowledge

itself in an unduly narrowed domain – the fallacy, for example, of the presidential candidate in the late 1920's who argued that the American economy was in fine shape but something happened abroad and it spread to cause the great depression. He failed to realize that the very description of an economy in the modern world should be as part of a world-system. It is probably space research which most dramatizes the need for a full picture which combines the work of many sciences. When this is applied to the whole of human life, we begin to think of the planet itself as a space ship, a relatively closed system in which the cyclical processes maintaining a balance have to be known and reckoned with if disasters are to be avoided.

(4) *The relation of practice to theory in the scientific enterprise.* Practical questions are playing a greater role in scientific work today, in some very obvious ways. Experiment itself requires more extended use and organization of resources. In part it is because developed sciences experiment over a broader field, as nuclear blasts in testing involve dealing with the state of a wide geographic area, or medical experiments may require a large population of subjects, or economic and political experiments have to take place in the on-going life of a society. In part it is because the very tools of testing and observation itself become large and complex technological achievements, whether it be the telescopes of astronomy or the standardization of tests in psychology and the use of computers in behavioral science generally. In part it is because the field of practical application may itself be furnishing a test in experience which if not a controlled experimental design may nevertheless add weight for or against a theoretical position; for example, the collapse of a bridge brings to a test the strength of the materials, the appearance of side-effects tests the safety of a drug, the day-by-day sessions of the psychoanalyst constitute some kind of check on the theory of therapy, and so on. And in part it is because the subject-matter of experiment in many areas, especially of social science, may itself be the practical issue of human well-being, so that the experiment itself is one of how effectively to diminish crime or use of drugs, achieve fewer family breakups, and so on; in fact this is widespread enough so that some theoretical attempts have been made to redefine the social sciences by human objectives, for instance economics as the science of securing high productivity and wide distribution without depressions.

In much of this, where the scientific study is of human beings, the integration of practical application and experiment becomes so close that they seem almost two different ways of saying the same thing from two different points of view. Thus in medicine the line grows thin between the experimental effect of a drug and its medical efficacy. In recent

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governmental hearings on the contraceptive pill, one outcome was a recommendation that every doctor regard every use of it by a patient as an experiment.

One could draw an interesting parallel from the history of thought between the integration of the empirical element in science and the symptoms of integration of the practical element now taking place. In the early history of the sciences it took a long time till experience got built into the notion of the scientific enterprise; before that the model of science was wholly mathematical-conceptual, as in ancient philosophy, and experience had merely an outside suggestive role. And in this shift, areas that were "merely empirical" achieved respectability as fit subjects for science. Now practical application too has been traditionally conceived as having merely an illustrative role or a facilitating role. But its closer relations along the lines indicated above seem to bring it near to occupying the place of an insider in the scientific enterprise. Of course the integration of practical application within the complex of theory and experience may be another way of saying that the concept of the scientific enterprise is itself being refashioned. And it may not hold for all of science but only for a growing part. But this would not make the point question-begging, for the significant thing is that the scientific enterprise is thus being historically refashioned.

If the four tendencies outlined constitute a significant account of a trend in our understanding of the scientific enterprise, there will as a consequence be serious inroads on the traditional picture of science as value-free, admitting of individual devotion to the ideal of truth, but having only external relations to values, social policy, practice — in short, on the view that the scientist as individual or the scientist as citizen may have social responsibilities, but not as scientist. The central question to which the preceding discussion points is simply this: how is such a view of science possible in a world in which the scientific enterprise has come increasingly to take a control-stance, to range over the whole of human life, to adopt an ecological mode of thought, and to bring practical application within the scope of its work? Does not such an emerging view of the scientific enterprise itself demand a social conscience?

It is possible, of course, to invoke the metaphysical dogma of the sharp separation of value and fact to offer an a priori barrier to this demand. I cannot here take time to discuss this barrier, which is now being qualified and questioned over a wide field in moral philosophy and the theory of knowledge. But in any case, it must not be assumed that science is equivalent to fact in such a dichotomy; science may very well involve some facts and some values, no matter how strongly the dogma be held to. I should like simply to point to one problem that the view will have to

face. If the scientific enterprise is allowed an internal value of the pursuit of truth, it becomes an empirical matter how far into the value domain this carries the scientist. For he is committed to defending the pursuit of truth as scientist, not merely as citizen or individual. And if the picture of the world should happen to be even that only a particular political policy will preserve the pursuit of truth, and all others will subvert it, he may find himself as scientist committed to political action. Of course, there is the possibility of drawing back. It might be said that while the scientific enterprise, as a human affair, involves values, science as an ideal type of activity which has a place in the enterprise does not. But this, I suspect, is a desperate move. It will end up by saying that the aim of science is not truth, but only to discover theoretical systems to fit accumulated data; and the aim is not even to yield warranted beliefs, but only to show which theoretical formulations are assigned with what degrees of probability on the basis of what evidence. This can, I think, be worked out to a refined extent. But the result will bear little resemblance to what we think of as the scientific enterprise; it is rather a particular redefinition of science, which has the burden of justification on its shoulders. And it would be question-begging for it to argue that it is justified because it would preserve the value-free character of science!

II: SOCIAL CONSCIENCE

The social conscience of a society can be described as a pattern of assumed and felt responsibility for others and concern for the well-being of people and for the solution of dominant social problems of the age. In this sense every society has some such pattern, as it has a specific social structure and specific social institutions. Individuals may, of course, differ in the extent and intensity in which they exhibit it. But the scope of social conscience, its mode of expression, the kinds of topics on which it is directed, are historically variable and can be seen as socio-cultural formations. In fact, the only way really to understand the present character of our social conscience in its major structure as well as its finer shades is to see it as the outcome of a historical development of the last few centuries.

By the 17th century, a new pattern of conscience was in the making. We need not enter into the background of the emerging economic order in which an acquisitive individualism became dominant, nor the religious break with the older authoritarian church as a result of which the lone individual directly faced his God. Soon it came to pass that the individual was no longer enmeshed in the guilt of original sin with its weight of obligations and hopeless struggles. He became increasingly an atomic will, exercising his choice and recognizing no obligation that did not issue from his will. This *moral voluntarism* or, in interpersonal and social

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relations, *moral contractualism*, became enshrined as an individualistic pattern of obligations and responsibilities. It is clearly marked in political, legal, and moral theory. In politics the very state was conceived as contractual in origin: atomic individuals entered with an initial capital of natural rights, and took on burdens only by consent, for the effective maintenance and expression of their rights. In law, the field of contract increasingly took over human relations that had been the subject of institutional regulation; in Maine's familiar phrase, the movement of progressive societies was from status to contract. In the theory of tort and crime, men went far toward shedding fault and responsibility for anything that could not be traced by direct connection to their will-acts or by indirect connection to their negligence.

It is perhaps the abstract regions of ethical theory that show most starkly the character of the shift. The older pattern of duties imposed on men by God's will and applied by derivation from natural law, without consulting individual will or consent, gives way to a primary dichotomy between self and other. In the "other" are telescoped all the intermediate kinds of ties — family, kin, small group, society at large. Moral philosophers in the 18th century, faced with Hobbes' stern egoism, feel it the primary task to justify benevolence, that is, to persuade the individual sitting on his rights and interests to stretch his hand away from himself toward others, his non-self. They seem to think, as Hobbes himself had done, that a sober rationality will take a man beyond himself, even if only to protect himself, and a greater wisdom will find an identity of interest with others, that beneficence will be a good investment yielding appropriate return, or that private profit pursued will redound to public well-being through the greater productivity it brings.

These roundabout routes for mustering a social conscience are familiar enough. Nor were they questions of abstract theory alone. For their anxious character reflected the breakdown in traditional ways of handling widespread poverty, suffering, and social displacement. The career of parish relief and poor laws in England, supplemented by Dickens' novels and the bitter history of trade union organizational struggles, is evidence enough. And the fact remains that by the time the 20th century outburst of industrial progress faced men with the familiar dislocation — industrial accidents, unemployment, poverty, social insecurity — the intellectual equipment for social responsibility was utterly inadequate, and justification for what was socially unavoidable and socially desirable had to be fashioned almost afresh.

I need not recapitulate the familiar story of the 20th century growth of social responsibility and the struggles, both theoretical and practical, that were waged to secure workmen's compensation, unemployment insur-

ance, social security, welfare support, medical care, extension of educational opportunity, and so on. The general character of the moral shift was that something formerly conceived as a matter of individual responsibility or individual hardship – to be unable to get a job used to be felt as a personal failing and to have an accident in industry was one's own tough luck – became conceived of as a burden to be socially carried, paid for either by contribution of those who stood to gain by the work or through the general social tax fund. It is a sombre paradox that often humane treatment was argued for not by seeing a man as a fellow-man, but by seeing him as a factor in production whose depreciation should be borne by those who gain from using it up, just as they had to stand the losses in the wear and tear of machinery! But of course this presupposed that men, unlike worn-out machines, could not simply be thrown on the scrap-heap, or would not endure being so thrown. Nowadays even the scrap-heap has become a problem of social responsibility and the debate goes on whether pollution is to be faced as a social problem met through the tax fund or through throwing the burdens as "external costs" on the enterprises that produced the pollution as a normal part of their operation. But perhaps the best example of how far we have moved in developing a pattern of social responsibility is the current consideration of a guaranteed minimum annual income. About a half a century ago, Bertrand Russell, in his *Roads to Freedom*, (1918), advanced the idea of a "vagabond wage", a minimum support everyone should be given. Russell assumed enough people would want more than that, and so keep the wheels of industry going, and his justification was that those who were content with little because they wanted leisure and philosophy and the pursuit of the impractical should be allowed this option. Compare this today with Milton Friedman's advocacy of a "negative income tax" to assure a minimum income. The grounds are quite different – an attempt to cut through the welfare system and increase individual control over his own spending, a realization that the economy has to give at least minimal support to people and can now afford it, and so on. Friedman's advocacy is of course from the premises of the political right in American economic thought; the center and the left have other grounds. But all three meet on some form of guaranteed annual income. However diverse or murky the roots, social responsibility is clearly expanding its scope.

The growth of a social conscience in all these ways does not, however, spell the end of the individualistic tradition in morality. Strangely enough, it is becoming more, not less powerful, and taking over provinces hitherto marked as social. Perhaps the most extreme form of individualist reconstruction is seen in the rise of individual responsibility *against* authority and the state, as contrasted with the older social conception of

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patriotism and obedience and loyalty. A number of diverse forces had fed this growth of individual judgment. One is no doubt the weakening of patriotism as a dominant binding relation, in the development of the wider loyalties of a growingly unified humanity. A great share of causal responsibility goes to the discrediting of the mystique of the state in the evidence of Hitlerism and its deeds; this is best seen in the outcome of the Nuremberg trials of the Nazi leaders, in which even disobedience to military commands is enjoined where basically immoral action is commanded. Professor Milton R. Konvitz, in his recent book on *Religious Liberty and Conscience* (1968) has called our attention to the fact that this principle of the Nuremberg trials is now established in international law, that the Universal Declaration of Human Rights by the United Nations includes recognition of conscience apart from its relation to religion, that even in Catholicism with its doctrine of papal infallibility, there has been the recognition of conscience in Vatican Council II. not as a new right but as a continuing traditional doctrine; and he concludes that the case for constitutional recognition of conscience in the United States is even stronger than that which supports freedom of association! I think that a third factor in elevating individual judgment lies in the lessons of experience with intellectual repression — for example, such impositions of ideological dogmatism in the Soviet Union as the notorious Lysenko affair and its domination of genetics, or our own experience of the drive for conformity in the so-called McCarthy period of the 1950's. Writing at the opening of that decade, in his *The Fear of Freedom* (1951), Francis Biddle, who had served as Attorney General and now surveyed the growing hysteria, was led to question the whole idea of disloyalty to the government. If government is the servant of the people, how can a man be expected to be loyal to the government rather than the government as servant loyal to the master? Summoning Josiah Royce's conception of loyalty in his *Philosophy of Loyalty* (1908), Biddle concluded that men are loyal to their ideals, and that ideals cannot be dictated but are the individual's own choice. In the 1960's a fourth factor was added in our experience — the Civil Rights movement, in which legality was on the side of discrimination, and later, the opposition to the Vietnam war. The growth of civil disobedience as a technique of social change has thus been rapid, and the movement to give greater legal scope to conscience — for example, to allow conscientious opposition to a particular war, not merely to war itself, as a ground for draft-exemption — is a serious one. In any case, the firmness of contemporary civil disobedience often has the same character as Luther's famous "Here stand I, I cannot otherwise", and the puritanical moral character of some contemporary youth revolt makes us understand the remark of a 17th century secularist who said "I had rather meet coming against me a whole

regiment with drawn swords than one Calvinist convinced that he is doing the will of God."

The ambivalent attitude to individual judgment in contemporary society reflects, I believe, two conflicting forces. On the one hand the growth of corporate enterprise and large-scale organization presses for conformity. But on the other, the very complexity of the technological and social organization and the weight of problems and the rapidity of change in all fields of life demand a high degree of inventiveness, individual initiative in thought, a constant stream of new ideas. And so we have almost the paradox of nonconformity becoming a conformist demand. The weight of individual decision and the lack of social guidance for decision in many areas of life is far greater than it has ever been.

On the theoretical side too, the individualistic form of morality has been growing rather than receding. The treatment of morality as *autonomous decision* was already central to Kantian ethics. He gave it the special form of universal legislation by the free individual for the community of rational beings. Since then the legislative aspect has moved into the background, but the decisional element has become more and more pronounced. This is not a feature of any one type of ethical theory, but fairly common to diverse types. Thus a naturalistic ethics like Dewey's, with an integral stress on the scientific and the social, pinpoints a really moral problem not as one in which a man is fighting temptation to do what is moral, but one in which he is moved by opposing principles or values and has to decide what is the moral thing to do; and traditional ethical theory is recast by him in a methodological vein to provide the best available mode of decision in a flux of human, social and individual, problem-situations, under changing historical conditions. And a subjectivistic ethics like Sartre's, postulating complete human freedom, also focuses on the momentousness of present decision, with no reliance on a God, a human nature, a past trend of choice, a dependence on others' advice, since to reach out to any of these is itself a choice. Sometimes even analytic ethics – Hare, for example, – finds every invocation of principle a prescriptive decision, as sharply as in Sartre's view.

And yet, though individual decision and individual responsibility are the central focus of theoretical developments, it is no longer the old individualism of the atomic self, cut off by initial stipulation from society as its opposite. Dewey's individualism is rather proposing individuality, the rich development of the person, as a social goal for education and morals and social institutions. And Sartre's intensely individual focus has him assume responsibility for all that is immoral around him. A man cannot, says Sartre, shift off responsibility for a war that he had no part in making; for he could always be asked what he has done to stop it. The depth of social responsibility for the individual conscience in the moral

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philosophies of today is central, no longer peripheral or a good business transaction.

If I had time to explore this further, I should want to suggest that what is happening is a long overdue breakdown of the individual-social dichotomy, that both the growth of our knowledge of man and the development of our complex interrelated modern life make this dichotomy less significant for understanding what a man is, what kind of self he develops and what his obligations and responsibilities are. The dichotomy is recognized more and more as the historical cleavage of a particular type of life and society which is going by. It is not yet clear what kind of categories will emerge as central in ethics and human understanding. At the present time that of the active or creative, as against the fixed, looms large, but this too may be reflecting the intensity of change. Yet it does contain the permanent lesson that man's self-knowledge is an active point of self-reconstruction rather than a learning of what is already fixed by nature. This lesson was already clear in the 19th century. In historical terms it is found in the Marxian conception of freedom as the growth of human awareness of the laws of the world and man which enables man to make greater progress in the attainment of his human values. In individualistic subjective terms it is clearly stated by Kierkegaard when in his *Either/Or* he contrasts the Socratic moral maxim of "Know Thyself" with his own maxim of "Choose Thyself." The passage is well worth quoting:

The ethical individual knows himself, but this knowledge is not a mere contemplation (for which the individual is determined by his necessity), it is a reflection upon himself which itself is an action, and therefore I have deliberately preferred to use the expression "choose oneself" instead of "know oneself." So when the individual knows himself he is not through; on the contrary, this knowledge is in the highest degree fruitful, and from it proceeds the true individual. If I desired to be clever I might say at this point that the individual knew himself in such a way as Adam "knew" Eve in the Old Testament sense of the word. By the individual's intercourse with himself he impregnates himself and brings himself to birth.

(Doubleday and Co., Anchor Books, Lowrie translation, vol. II, p. 263.)

And so morality is self-making and society-making and there is no cut between the two. The growth of social conscience in the contemporary world represents a profound transformation in the life of men, breaking into their consciousness and reshaping thought and sentiment, and creating the opportunity for a freer reconstruction. Whatever be the precise

historical and social forces that have brought it about, it has a growing firmness which imparts to it the voice of judgment. It is therefore with this conscience and its demands that the scientist must reckon as he attempts to shape – whether to expand or limit – the responsibilities of his profession.

III: . . . AND . . .

Let us now ask what role the scientist should take in relation to the social conscience, what specific pattern of responsibilities he should accept and assume. On the one hand, the scope of scientific knowledge suggests the greater share in the social conscience; on the other, the high standards of evidence and the disinterested character of scientific inquiry suggest distinguishing sharply between the scientist and the citizen and assigning responsibility to a man as citizen or as individual, not as scientist. In the latter case too, he might even as citizen plead draft-exemption from social activism on grounds of occupation!

There are two ways to deal with this line of argument. One is basically revolutionary in the sphere of thought, for it upsets the categories and dichotomies in terms of which the question is framed. Thus it may well be said that the role-playing which distinguishes between the man as scientist, as citizen, as individual, and so forth, is becoming an increasingly meaningless game, that it will go the way of the older distinctions between the economic man and the moral, or the self as individual and the self as social. There are of course particular moral problems of conflict in virtue of different relationships, but there is no general partitioning of the person and his responsibility; both man and human life are by now becoming too integrated for that, and even in the past such distinctions were never more than relative isolation of systems and practices in a basically unified human life. The second path is less drastic: it is the argument that even if one wishes to preserve the distinctions between the various roles, the decision about what social responsibilities fall within which role is itself a scientific or empirical one, contextual rather than general. The second path is the one I want to pursue here, though I think in the long run the first is the more profound, yet to be more than a general insight it will have to work out its detailed modes of assigning responsibilities.

Suppose then that the scientist argues against taking a policy stand on social matters because as scientist he is aware of the vast amount of justifying evidence needed in authoritative judgment: one has fewer cognitive responsibilities if one judges social matters as a citizen or as an individual, since it permits more subjective judgment! The difficulty is, however, that on many questions the scientist knows the central evidence only as a scientist – the genetic effects of nuclear fallout as a

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biologist, the inflationary effects of the Vietnam war as an economist, the psychological effects of ghetto life as a social psychologist, and so on. As a private citizen, he might have had quite aberrant notions. Of course, part of the evidence may come from other scientific fields, not his own. And part may indeed be just his belief as a layman. If these scruples stand in the way of expressing a scientific social judgment, the scientific thing to do is not to plead subjectivity and individual bias, but to be more precise about the extent of his evidence, and specify credentials. Thus a particular social stand by biologists might be advanced with the addendum: 70% as biologists, 10% as relying on economists, 12% as general intellectual (all intellectuals presumably having a more sharpened sense of evidence or relevance), 5% as citizen (in terms of accepted social obligations), and 3% as individual subjective conviction. Think of the generally educative effect of such pronouncements: if a classification were developed for social judgments, think of the height of sophistication if the public could respond to a flaming headline - "Political Scientists issue 4D condemnation of federal pollution policy; ecologists concur with 2A resolution"!

Sometimes I have the impression that the scientists' plea for exemption from social judgment as scientists is a normative judgment quite parallel to the plea of an occupation for automatic draft-exemption on the ground of its social importance. Scientists are too busy for political activism, or incipient rebellion, or anything of that sort. Yet here again, the answer is unfortunately not open to antecedent determination. Whether or how much rebellion is involved is an empirical matter and depends of the state of the country and the character of the issues. In Nazi Germany, to make a biological assertion about the lack of evidence for Aryan superiority, was probably equivalent to revolt. And in the Oppenheimer case, we may recall, it was a scientific hesitation about the feasibility of the hydrogen bomb that played some part, as well as moral consideration of the consequences of pushing on with its development. But a large part of social action that can fall into the province of scientists is scarcely of this dramatic kind. Many social questions are not a matter of introducing new and revolutionary categories, but of shifting some area from one category that is accepted to another category that is also accepted. Thus if ecologists want a nationally directed water policy or economists and sociologists want a governmental housing industry, they need not be voting on socialism vs. capitalism. The categories exist within our society: for example, our army is a collective institution - we do not advertise a war to be waged by the lowest private bidder. (The post-office is a more customary example.) Nor was the recent suggestion in New York that subway rides should be free, an anarchistic-collectivist aspiration: it was

simply saying that subways should be the same kind of municipal service as garbage collection. Certainly these are social-science issues in large part. I am reminded of the clarity with which, if I recall a newspaper account aright, Milton Friedman, when he was testifying for the negative income-tax, cut through the remark of a Senator to the effect that at least people who got public money in this way should forfeit their right to vote; he replied that if putting one's hands in the public trough warranted loss of the vote, business men would be the first to lose it.

Turning finally to types of social responsibility for the scientific enterprise, a number of different ones may be distinguished. They are ordered from the nearer to the farther out; some of them would fall on individual scientists, some would more effectively be carried out by scientists in associated groups.

There are, first, obligations that arise in the pursuit of the scientific work itself. I do not refer to the moral obligations of truth and scrupulous evidence, but to obligations in the professional and public milieu with respect to the work itself. For example, Bentley Glass, in his *Science and Ethical Values*, lists such obligations as: to publish one's methods and results in such a way that another may confirm and extend the results; to see that one's work is properly abstracted and indexed; to write critical reviews in the field; to communicate to the general public the new great revelations of science; to transmit the knowledge to the succeeding generation. Note that such obligations follow from the state of the field as well as the general objectives of the enterprise; thus proper indexing rises to importance because of the stream of contributions to the contemporary world, so that the dangers of work being lost in plenty are very real in some fields. Again, the obligation to ensure communication to the general public probably reflects the tremendous importance of a wide base of public understanding if the lessons of science are to play a part in the advance of culture and social life; this obligation is distorted if scientists think of it only as a way of ensuring financial support for science. It is not implied of course that every scientist has to be busy on all these fronts. Some of the obligations can be carried out in an organized professional or even institutional way – for example, the rise of scientific journalism as a profession itself – rather than as an additional burden to a scientist who may not be gifted in this respect. But the scientific awareness and assistance in this area is the obligation. Again, while there is no scientific obligation to be polemical in respect to conflicting theories and approaches, the obligation to do critical reviews seems to suggest not only the wider purview of the field but the participation in the sharpening of theoretical approaches.

There are, in the second place, direct social responsibilities to

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others who are involved in the work or come within its ambit. Types of such responsibilities are extremely varied. Familiar examples are medical researchers to subjects; psychological experiments which involve lying to or misleading the subjects (e.g., the extreme case of the Milgram electric shock tests, in which the subject is told to increase an alleged electric shock in order to see where the subject will revolt and draw the line as he watches the faked tortured response); relations of anthropologists to informants in the native villages whose ordinary relations may be quite upset after the researcher's departure; questions of invasion of privacy of informants in modes of research and modes of publication; participant observation as a technique and its effects; and so on.

There is again, the general responsibility, already noted, of maintaining the conditions under which science can be continued. This we saw, may become a matter of direct political participation where the general freedom of inquiry is threatened on a large scale. Other issues may have a comparable status. For example, the imposition of secrecy on research projects where they are connected with military or political applications has been much opposed by scientists as a hindrance to the free flow of scientific communication. The imposition of political qualifications on scientists as a condition of engaging in research is often seen as disruptive of the community of science and its professional criteria. There is no advance way of knowing what kind of conditions may turn out to interfere with scientific work and progress, but when scientists individually or in organized fashion oppose these conditions, it is as a scientific responsibility, or an exercise of a scientific social conscience.

Moving gradually into the social context of scientific work, it would seem to be a scientist's responsibility to know or be aware of the various social relations of his scientific work — how it is supported and financed, what practical purposes motivate the support and the work, what applications are likely to be made of it, who will benefit and who will be affected in what way, and so on. So far I speak merely of the obligation not to remain in the dark on these matters. Many such questions have often been raised — for example, whether certain psychological work is primarily for increasing the efficacy of advertising by finding the depth hold of certain symbols; whether in a given period British anthropological study might have been furnishing the knowledge for the maintenance of empire over native peoples; whether Project Camelot was not, in spite of the latitude for disinterested research it would allow to reputable social scientists, primarily a preparation for preventing and suppressing often needed revolutionary changes; whether particular research in some areas might not be sponsored by industrial interests in order to secure patents and hold back marketing the products to avoid competition with present processes; and so on.

Knowledge about one's scientific work and its context as just indicated would seem to carry some responsibility for decision – whether to abandon the research under these conditions, to do it but make public or agitate against its intended applications, to work out alternative ways of carrying it on, and so forth. With the development of large-scale problems of this sort in our scientific culture, paradigms may well be established in the ethical code of the profession. For example, research in biological warfare might well have been banned by scientists even before its recent partial rejection by national edict; and many fuzzy borderlines still remain to be dealt with. It is not inconceivable that a union of engineers should include in its bargaining with a given corporation, provision of available processes of disposing of wastes that should not be adding to pollution of the environment, just as a teachers' union may include in its bargaining the provision of school breakfasts or lunches for children – in part because of the help this gives to the educational process, in part because of the general obligation for the welfare of those affected.

Where there are major, central, and generally recognized crucial problems affecting the whole life of the society, it may well be a responsibility of all intellectual, scientific and cultural leadership in the community to ask itself what it can do to help face the problems. Thus in our contemporary world one could pinpoint the problems of war, discrimination in its various forms, over-population, pollution of the environment and exhaustion of natural resources as the four great threats to mankind. Hence there would be no question about the scope of social conscience in general with respect to them, and about the obligation of scientists to ask themselves what their fields could do to ameliorate the situation. In fact, the obligation of scientists here is directly greater because of the part science has played in generating the situation, even where its action was directly beneficial as in increasing life expectancy by reducing infant mortality, and much more so where it gave the instruments to blindly acquisitive business institutions. Excellent examples of the way in which this obligation of science to crucial problems and threats was exercised are: the reaction of anthropologists in the '30's to Nazi racialism; of atomic scientists in organizing to agitate for controls of nuclear power against war uses, in the '40's and '50's; the work of psychologists on the psychological study of social issues. The geneticists nowadays are much worried about the impending break-through in their field and the questions of control over human biological development it may raise, even to the extent of what kind of controls would be exercised and in whose hands they should lie.

Let me conclude with a few reflections on the modes of action a sense of social responsibility among scientists may call for. Again there

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is no over-simple answer. We may distinguish individual action, informal group action, and action in structured associational groups. Individual action may take the form of public criticism, or following the demands of conscience about withdrawal from a field of work, or engaging in some form of political action. Informal group action has tended to be ad hoc; it is a familiar feature of our society to see advertisements of scientists on the question of the Vietnam war, or on over-population, or occasionally even on some particular flagrant injustice.

Organized group action is less developed. We may distinguish briefly three types. One is the exercise of negative fighting functions, parallel to strikes by union for specific demands; this has not been employed very much by organized scientists, but is quite conceivable in the present state of things. The second is the exercise of what we may call a ferment-function, to generate all sorts of new ideas and plans and intensify consciousness of the problems and possible solutions (for example even the minimal educative function of showing how decisions are actually come by). The third is what we may think of as institution-making. This last has in some sense been more common than we may think. Thus the development of insurance as an idea was a mathematical discovery which underlies vast social transformation in modern societies, though not directly applied by scientists themselves. Group Medicine was an invention of medical practitioners. The development of clinics for psychotherapy, the growth of schools for mentally ill children, had their rise in the work of professionals and readily passed into government programs. Recent attempts to organize the poor for taking part in a concerted pursuit of their welfare rather than being passive cases also had its professional origins. There is nothing implausible in current suggestions that organized scientists market their own discoveries for public welfare, for example, in drugs or even in certain industries. We may compare the fostering of housing and banks by certain unions, or even the suggestion that Harold Ickes made after World War II that what the government had built up for industry during war production be turned over to a corporation with all veterans as shareholders instead of being sold at a cheap price to industrial corporations. Of course such suggestions run up against the realities of basic power and all the issues of the so-called military-industrial complex in our present society, and the issues of class-structure and class-conflict. But these concern possible outcomes and controversial theoretical analyses. The amount of free play in our society would be tested by social experiments along these lines. My point is simply that there are large avenues for the legitimate exercise of the social conscience of scientists, far beyond the mere expression of a collective voice where there is one. There could very well be a section of the AAAS

on institution-making, and another section on international scientific cooperation, for example on implementing the abolition of biological warfare. It may not even be too early to think about the possibilities of international citizenship for scientists!

There should be nothing surprising in our general conclusions about the scientific enterprise and social conscience. Nearly every group in our society – from business to policemen to teachers – finds no difficulty in talking about its social responsibilities. Why has there been confusion about it in the case of the scientific enterprise? At least one philosophical reason, apart from historical and sociological ones, has been the conception of science – the strange mixture of the timorous and the lordly stance – which attempted to give a single answer in terms of a particular conception of the lone scientist as intrinsically a truth-seeker. I have tried to show that this is both narrow and wide – narrow because it ignores the understanding of the scientific enterprise in terms of its changing historical relations, and wide because the very pursuit of truth itself if faced as a path in the contemporary world carries its practitioner much farther than he may think on empirical and historical grounds. I conclude that instead of a single simple question we have here a whole area of inquiry which calls for an answer by a science of the psychological, socio-cultural and historical relations of the scientific enterprise, that this kind of inquiry shows the responsibilities of the enterprise to be vastly greater and vastly more permeating in contemporary life than the consciousness of the scientist has hitherto generally yielded on isolated introspection, and that it is long past time for consciousness to catch up with the realities it purports to represent.