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My friend and colleague, Harold Chemiss spent most of his life studying Greek, science and philosophy and mathematics, the pre-Socratics, Aristotle and above all, Plato. The day after the Japanese attacked Pearl Harbour, he enlisted in the United States Army as a private, as many of your parents did before that. He is a quite intelligent man and by some miracle was put in intelligence work and given more and more responsibility and part of his duty was to interrogate men who had been at Dunkirk in preparation for what might go wrong after D-day. One day he was talking to a radioman who had come rather late to the beach and seen that there were a lot of men ahead of him and lain down on the sand and turned on the BBC. He said, "I listened to the music for a while, then they started broadcasting the news and they told us all about it, how there were these long queues of men, it wasn't clear who would manage to get off, there were dog-fights overhead." He said, "I couldn't stand it, I turned it off, it was too horrible." Though we were interrupted when the bell struck last time, talking in the first place of some quite primitive findings, about how men hear and think and see, a small sample of what we could find to-day and a minute fraction of what will be known before very many years are out, I may remind you about one of Land's experiments I forgot to say something about, in which he takes pictures of a many-coloured scene, a meaningless but many-coloured

scene, two pictures, each with a yellow light, two yellow lights differing very slightly in the shade of yellow, so that ordinarily one wouldn't notice it, and prints black and white pictures and then reprojects these pictures with the same light they were taken, combines them, and when a man looks at them he sees not the yellow light that is there, not the black and white picture that is there but the red, the blue, the green, the yellow that was in the original scene. This has been carried further by another investigator who has put one of the images in the right eye and one of the images in the left eye and that works just as well. The integration, the decoding of this message, the understanding that the different intensities of yellow light mean that something is red or blue, does not take place in the eye. It takes place somewhere where the two signals, sets of signals, from the two eyes join. Now this and the other examples at least reminded us of the inherently active part that the knower takes even in so simple a thing as sense-perception. And to me they cast in some doubt the firmness with which the philosophers of modern times have sought to erect their whole sense of reality upon the sense datum which is certainly the most subtle and beautiful artifact and they also seem to me to suggest the need for a little more practical and homely definition of a word we can't do without and whose opposite we use in reviling each other, the word "objectivity". With the atom and the complementary traits of its description, things are, of course, very much more remote and I recognize that you are taking a good deal on faith and that I was failing to say a great deal that is really part of a good understanding. And just for that reason I want to make a warning. Atomic

doubt on
description does cast/the traditional notion that the physical world is simply

there and its properties imaginable without any reference to the method by which we learn it. It not only casts doubt on it but it shows that this is wrong. But that does not mean that when a physicist goes into a laboratory to do an experiment, he is not certain that the chair he is standing on is not there, he's quite sure of that, and it doesn't mean that he doesn't accept in a perfectly normal way the existence and the humanity and the ordinary human properties of people, just as he understands and uses the physical properties of his instruments as he learned about them and uses the physics of Newton and Maxwell where it's applicable. He's not a professional sceptic, in fact, I think a professional sceptic could never be a scientist, because unless you are very gullible and believe almost everything, you will never find out the one or two things that you maybe aren't allowed to believe. But one does find that there is no unique way to objectify a small system, an atomic system, apart from the arrangements, that means the physical equipment that we use to explore it. Here, unlike the case of what we do in seeing or the dog in hearing or we in listening to language, here the action is, of course, quite conscious, quite free. Here the choice is real. We may, not for moral but for aesthetic or scientific reasons, decide that the time has come to find out where this atomic system is or we may decide that we want to learn another property, complementary to where it is. And here we have knowledge that is essentially partial, not partial because it isn't worth completing it but because the nature of the world is so that the effort to complete it would erase the validity of the knowledge that we started with. And here is the origin, the seat, of a kind of inherent chance in the physical world which is

the very opposite of the picture which Newtonian mechanics seemed to make so obvious - Newtonian mechanics which provide a machine, once wound up, with no flutter, no freedom and no alteration, no turning back, a kind of thing that goes on and on for ever. These aspects of the Quantum Theory were not very happy-making to Einstein. He did a lot to make the Quantum Theory, discovered light quanta, did many other things but when it came out that he wasn't allowed to think of a world which was there and of which our only function was to reflect on it, it bothered him very much. He didn't want a world which had to be described in terms determined by the nature of the observation and the experiment. He and Bohr had a long argument and in the course of it, a paradox, according to Einstein, developed which was refined and simplified and now it takes the following form. Suppose you have recorded an atom, it could be an electron, a hydrogen atom, anything small enough, and you would like to study it and for that purpose you let it interact with, we say collide with, another object which may be somewhat heavier, if you want, and which will give you the record of the state in which the atom was. Well, then, not always but if you arrange it so, you can let this occur with some prior knowledge of what your observing-machine was like. You can let this occur and then you can take your time and make up your mind which of the properties of the atom you are going to measure and realize by what you do with the observing-machine that has interacted with it, that is, you can either, by studying the observing-machine in one way, determine that the atom was in a certain place at a certain time, or you can, by dealing with the observing-machine in another way, determine that the atom had a certain

momentum or velocity and that it was characterized by waves of a certain colour. Now this, for Einstein, was really very rich, that you could give a property to an atomic subject without doing anything to it, only doing something to a machine that had interacted with it, a simple machine that had interacted with it at some time in the past, and he lived out his years, unable to argue against this because it's a completely consistent way of dealing and indescribably successful so that for systems where the mathematics isn't too hard, like a hydrogen atom, we can predict what goes on to one part in 10 billion or more if we could only get someone to observe it that well! Einstein did not argue against it any more. He just went away and wouldn't have anything to do with it. But I think the rest of us accept this as a real discovery, not only about how to describe atoms, but a discovery also about the extent to which our traditional views of objectivity and of the limitations of knowledge are in need of enlargement and extension. And we have come to think, and I believe that this is probably a good idea, that the root of objectivity is not to be found by any invoking of the reality of what it is that we perceive, because this is a self-begging and self-defeating argument. I don't think there's anything wrong with *(veritas) ad aequatio rei et intellectus* but it is hard to acquire and practise. We tend to think that the word 'objectivity' is wisely restricted to circumstances in which we can talk to one another with no, essentially no, relevant ambiguity, to explain what it is that we have done or will do and what it is that we saw or recorded. This ambiguous communication seems to be the mark of science, and of that part of human knowledge, a very great part, which has grown so enormously over the

last decades and century. We have also come to accept as an inherent and natural condition of man that there is no completeness to knowledge, that every time we make an observation in this domain, we lose something and that this has analogues in perception, as we have seen, in communication, as we know, and in all of human experience, that to know, at least to know something new, to discover, we have to act, and to act we have to choose and that in this choice something is lost of potential information about the world. This leaves us, however, with a certain great freedom, a freedom to choose, a freedom to enquire, and a freedom to explore, which applies, of course, not just to the properties of the atom but to the whole vast territory of the world of nature and man which is the subject of science. This also seems very much more in consonance with the general traits of human experience than the Newtonian machine, its predecessor. It seems to have in it room for a sense of freedom which we all have, room for an acute sense of the limits of freedom which we all have. It seems to leave room for an effort, a mandate, a kind of duty to try to get things straight, to understand them, and yet, for the recognition, the acceptance, the happy recognition that in most human predicaments we must act and live even when we cannot understand. There are two more points that really belong to the Tuesday Lecture. One has to do with another aspect of freedom, and there again Einstein took an important and an extreme view. This has to do with the question: When we find order, when we say there is order in the world of nature, that laws are obeyed, that there are simplicities, that things are not as complicated as they might be, that things cohere and are necessary consequences of others, is this something that we create and invent and fabricate or is it something that we find in

nature? Einstein once said that he thought that a great theory was in no way dictated by the facts of nature, that it was a free creation of the human mind. And certainly we all know that a theory or a law is much more than a convenient summary of the facts, that that's a very poor description. It always goes very much further than that, it always tells about facts that nobody knew before, it always predicts things that have essential novelty. It's not a resume, it's a kind of opening. Even mathematics, which is as a natural science, a rather extreme and special case, combines the reflection of experience, common human experience originally, and more recently highly technical experience, with elements of synthesis and imagination, which are, and properly are, judged not only by their liability, that they must be, not primarily by their utility, that they need not be, but by their beauty, by their fitness and, one says, by their simplicity. It is, of course, one of the reasons why the sciences are not all of one piece and reducible to each other but the idea of simplicity doesn't take the same form for different sciences. In physics it takes the form of a general law prescribing, within the limits we can, how consequences flow from knowledge that we have acquired. In biology there are also such laws and they play a larger and larger part in the biological literature. But the more we study those laws, the more complicated everything gets. We are just incredibly complicated from the point of view of machines, or even of atomic machines. The simplicity comes into biology only when you ask a quite unscientific question which is, 'what is all this for, why did organisms develop which have this machine?', then it's still not simple, but these are the organizing and simplifying ideas of

biological as opposed to physical science. There are stories, more than stories there was an ancient development in mathematics, primarily in Sumer and Babylon. Of course it started out as a practical thing like our mathematics of modern times. Its practical importance was in contributing to the technology of the day, in predicting when eclipses would occur and first risings and conjunctions and thus making astrology a somewhat better concern. This was part of the business of running a state the proper way. It was a secular and useful thing as well as a magic one. The mathematicians in Sumer and Babylon developed a most marvellous system of very great subtlety, so good that it was still in use in India less than a century ago, predicting a way of eclipses and predicting them very accurately. The system has no motion in it, there is no model, there is no mechanics, it just consists of a deep understanding of the numerical regularities as they had appeared and as they could be perceived, and analyzed and extended and generalized, not unrelated to what is to-day called harmonic analysis. The experts learned to do it and they did it long after the practical problems were solved and they made it fancier and fancier. And one doesn't know why but one supposes that it was art for art's sake. It was very much the way then that it is in our culture, where mathematics for mathematics' sake has taken hold and a great deal is done that has no visible utility at the moment and no convincing evidence of utility in the future. It probably will be, but these people never applied it to anything else. It is interesting that we have in these contemporary developments of mathematics, remote from practice, remote from application to physics or engineering or astronomy, something of the same virtuosity that we have in contemporary music and in contemporary

art. The very purest mathematics or the very purest modern music, seem to me to have this in common. They are not primarily intended as a direct contribution to public enjoyment, enlightenment or good, and one is delighted when this happens, but it doesn't much happen, certainly not with mathematics, relatively little with music and I mean to say relatively little with art if we compare it with the way in which art was appreciated in Flanders, in the great days of Flemish painting or in Italy in the Renaissance. It seems to have a different role. I think it plays the vivid, decisive and vital role of keeping alive in a small group of people, a set of aptitudes and skills and dedications which is precious to man but which in the larger scene of public practice and general public appreciation has no contemporary appropriate role, no real scope. Yet even with mathematics, it's not so simple. In the last century there first came an effort to show that mathematics could be reduced to setting up rules of manipulation, rules of the game, logical manipulations, what you do with symbols on paper, what you are allowed to do and what makes a mistake and if you did not make a mistake, then you couldn't get anything but a true consequence of what you started with, according to the rules of the game. And in this way, mathematics was rather completely separated from the experience of the world which historically had given rise to it, historically welcomed it, and even in mathematics and in spite of what I say of to-day, it has been hard to invent things though it has been done, which never had any practical application. It was shown about three decades ago by Gödel and since then it's been very much elaborated. But this whole approach for mathematics cannot be carried through. Because if you have a kind of logic that is big enough to talk about the simplest mathematical entity, a number, to

talk about classes of things and not about individual things, then this logic has a property which Gödel proved. In terms of the operations of the logic, you can write down propositions, that is, statements and you can prove of these propositions if you do it right, that they can't be proved true and you can prove of these propositions that they can't be proved false, they can't be proved wrong. It's impossible to make a logic big enough to hold mathematics which is self-contained. If you want, even in mathematics you have to look out and look to some other part of the world, to some other connection, with things outside the system of logic in order to know whether you've made a mistake. To the natural sciences, this going outside itself is repeatedly the very heart of the story. How it really is in all this is much less high falutin and much more human. We start with some rough ideas in common sense in what our teachers taught us of the state of the art, what we learn at school, essentially. We enlarge either by thinking or by doing, preferably, of course, by doing both, the scope of what we are looking at. We try something just a little further than we know the answer to, and we find that there are conflicts and paradoxes. And for a while we patch them up, we say that we can make do that way, and then that's not good enough, partly because patchwork does not hold and we don't quite know what our own patchwork means but also because it's too ugly, it's too disorderly to look like a possible description of nature. We miss the over-arching logical harmony and unity. Aesthetically and practically we think of it as a crisis and that's the moment at which the time is right for a man who is lucky or a man who is a genius to come along, that's the moment at which, with a

minimum imperceptable adjustment like an expert mechanic fixing a machine that just doesn't quite work, there's a change made in the old order, in the old necessity and suddenly a new one is made and now the troubles are encompassed in the new laws and nothing that we knew before has ceased to be true where it was proven. This growth which is conditioned by our tradition, conditioned by our culture, conditioned by what went before, the summary of the experience that is our inherited science, is not something that we just go out and do for the fun of it, believe me. It's not in that sense voluntary, it's forced by new experience, by finding something out that we didn't know before and in the end it involves a new synthesis which is, it is true, in some ways, an invention, but being a true invention it's also a true discovery. What one invents is there insofar as these words can meaningfully be used. I do not think they can be used too much. I think they can be used just that much. And in this sense, they tend to pass the practical tests of objectivity. Let me give you just one or two minor examples. We find, for example, that among the elementary particles of which matter is made up, some are neutral and some have a charge. Those that are charged may have the electron's charge or they may have its opposite, the proton's. This is an abstract fact. You can live your life for years and never notice it! But I don't think there could be anything less inventive than this, this is a discovery. Indeed it is a discovery in the sense that at the moment we think it's something we ought to understand and don't. It's a discovery which we couldn't have invented because we don't understand it well enough to have invented it! Now it's true that the idea of charge was an inventive description of things early

observed by the Greeks, for instance. It was a vivid experience for which this idea was invented but having invented the idea of charge, the statement about elementary particles is not an invention. The fact that light and the neutrinos travel with the velocity of light and don't have any mass to slow them down is a similar discovery. The idea of mass is, of course, an invention going very far back and getting its first reasonably precise definition with Newton. One didn't have to invent the idea of mass, but having invented it, it's not an invention to find the result that there are some objects in nature which have no mass, which travel always with the velocity of light. These are things that are not just lying around on the surface phenomena, but they are not free creations of the human mind, they are creations of the human mind enormously unfree in the sense that they are limited and disciplined by our knowledge of nature. One has to remember, to bear in mind, on the basis of what knowledge and what tradition and what experience we discover these things, they are what give them meaning, but granting that we thus see only part of the truth when we see it in this light we see truth as good as any there is, as objective in any sense that I think makes sense, perhaps a good deal more objective than what we normally accept. Can these discoveries, can this order of nature, be of interest or help to men generally? Is this just a specialist's dish? Does finding out something about objectivity and the conditions of human knowledge, have anything to do with what we think and how we live? It is clear that I think, as do some others, that things that have happened in the physics of this century, particularly Complementarity, perhaps also, but I think not so deeply, the Theory of Relativity, are really very great revolutions in our understanding of nature, of interest in themselves, and of some interest,

surely, as I have tried to use them, of an epistemological and pedagogical and paradigmatic order. Yet it's really so that apart from those who learned these techniques of Quantum Theory, as tools of their trade, as part of their professional schooling, there is very little general, cultural interest in them. A few philosophers of science mention them, a few physicists have them in mind but the level of the discussion is quite low and one could essentially say that since Einstein and Bohr stopped talking, Bohr has continued a soliloquy and because we love him, we troop to hear him but no one takes part in the discussion. I think that this is puzzling. It's led me, many times, after some more or less fruitful efforts to make things better, that is to bring this interesting news which seems so interesting to me to general attention, to ask why it is that sometimes a great change in our view of nature, a great discovery in science resounds through society and changes people's attitudes, their interests, produces a new vocabulary, a new sensibility, in the phrase of Butterfield, "changes our thinking-caps". There is clearly one condition, it seems to me a necessary and I fear, equally clear, that it's not sufficient, and that is that it be possible for people to understand what is being talked about. Without that, it would hardly be expected or hoped that their interests would be based on anything very real. It may be just the nice sound of a haunting word. This is a very tough problem and it is one large part of our trouble. It will take concerted, dedicated work to get honest news of science and its growth into as many ears and eyes as will receive it, many kinds of different work at different levels by different methods but all of them, whatever they're

called, are in some way a form of teaching. Yet here, too, in the aculturation of scientific discovery, there is, I think, an element of the accidental and not the necessary. If you read carefully, or talk with someone who has read carefully, the intellectual history of the 18th Century, it seems really as though Newton were really just an accident, a happy accident. Newton was not a Newtonian and the Newtonians would have thought almost the same general thoughts and argued almost the same general arguments without him. His own discoveries for Newton in no way led him to the view of reality that characterized the 18th Century. It seems to have come more from the rediscovery of antiquity than from the newly growing physics and astronomy. There is thus another condition beside the intelligibility of discovery or its recognizability and familiarity. It is that a discovery should deal with something which makes a difference to us and which occurs in our ordinary life and touches our view of ourselves and our view of our meaning. There has to be some haunting relevance between the discovery and aspirations and hopes in terms of the human spirit which will feed on and be nourished by these findings and find a hope in them and find sustenance. That is what Newton did for the enlightenment. I think that that's what Darwin did, that, in the 19th Century, the time-mindedness and the naturalism and the dwindling rigidity and authority of the time, Darwin provided food for the hopes of men as well as interest in them. I think that it is when science is emerging from common sense and hasn't got too specialized, when its words rightly still reflect our daily experience, that its ideas may move philosophy and men's hearts. This brings me, really, to my central question. This is the question with which I really

opened - the relation between this scientific explosion and the weight and the excellence that we may hope to achieve in common discourse, in discourse about questions of what we regard as essential, questions about what we regard as good, good in our personal lives, good in the destiny of man, good in politics, good in society. In this I have in mind an image of common discourse which to-day is blurred by three related realities, one is the size of our world and its communities, the number of people involved, one is the generally egalitarian and inclusive view in which there are no a priori restrictions on who is to take part in the discourse. Of course, not everyone will, but I think it is just part of the hope of the free world that everyone may. The third is the extraordinary rapidity with which the preoccupations and circumstances of our life are altered, the fact that we have no preparation for the practical judgments which are the testing ground of judgments of right and wrong. What I am here concerned with, as I said before, is an ideal, an image of a part of human life which is inherently, not necessarily, all inclusive, but public and universal and which speaks in terms that are intelligible to all, of things accessible, of meanings, relevant to all. The question that bothers me is why the enormous success surely barely anticipated, not fully realized, and in the long history of human society, I hope long history, never to be fully realized, success of one sort of intellectual activity which is the gathering of the kind of knowledge of which the sciences are samples, this objective and verifiable knowledge, why this success should not have had a beneficial effect on the whole intellectual life. Of course, in some ways it has. It has put out of business pernicious forms of extreme superstition, certain kinds of intolerable provincialism. But if we think back to the early

days, either of the European tradition or of modern society, we see that we were there dealing with a handful of people, people who knew each other well, the citizenry of Athens, a few handful of men who concerned themselves with the structure of American political power, the participants of the 18th Century enlightenment, a relatively few men. They had before them a relatively well digested and common language, experience, tradition and a common basis of knowledge. If we look to-day we see a very different situation, an alienation between the world of science and the world of public discourse which has emasculated, impoverished, intimidated the growth of public discourse and which, in a strange sense, has deprived our discourse of legitimacy. It has given it a kind of arbitrary, unrooted quality. Any man may say what he thinks, "I believe in this, I don't believe in that", it's very hard for us to talk with each other, to understand each other, to persuade each other. In the past, such common discourse rested not only on a common basis of knowledge, not only on the fact that men knew about the same thing whereas to-day all of us know different things. There was a relatively stable and a deeply shared tradition, an historic experience which was the same among the participants. And even more important, there was a recognition, often not explicitly allowed and occasionally explicitly denied, a recognition of the fact that there's a difference of kind in the criteria by which the use and the value of public discourse may be judged and the use and the value, the criteria by which the truth of scientific things may be judged. I should add that in the making of science, as I have said, perhaps too many times, criteria of beauty, criteria that derive from tradition, criteria that derive from human

limitation and fallibility play a very great part, not in determining what's true, but in determining what to look at, how to talk about it, what to go after. These para-scientific things are essential to the existence of any science and a lack of real understanding of this is one reason why the essentially humane and human quality and cultural richness of science has slipped by so many people who regard themselves as cultivated. What I am talking about is that it may be very important to discuss and to analyze things, to explore, to get them tidied up, to do the kind of dissection which you find in Plato's Dialogues, to have them as much as possible in order, to be reasonable about them, to be rational about them, but that these may not be things which are propositional truths in the sense of science, they may not be statements of fact or conditional statements. They are not assertions, verifiable by what we do in the laboratory or with a piece of paper and a pencil, they are normative, they are thematic, they assert how things should be thought of as connected, how things are related, how things should be ordered in importance. Without them there would be no science, there would be, and could be, no order at all, in human life. The logical Positivists, who want to make all knowledge like science, have recognized the very special circumstances in the natural sciences where we renounce very much of meaning and limit what we talk about in scope but by that have come to a special way of determining truth and above all, of finding error. Positivists want to pre-empt the word truth for that. I do not insist that the poet speaks the truth, he speaks something equally important. He may speak the truth but he speaks meaning, he speaks order and this thematic as opposed to propositional discourse is the

typical function of the part of our life that I am concerned with, where law lies, morality, the highest forms of art and traditionally, not always, the practice of religion. It's not best construed as assertions of fact, and usually can't be, about the natural order. It's best construed in terms of commitment and dedication and accounts of experience which are inherently not objective. We know how great is the gulf to-day between the intellectual world of the scientist and the intellectual world, hardly existing, of fundamental discourse on fundamental, general, universal human problems. I have tried to outline in these Lectures how the growth of science has contributed to that, how its incoherence has contributed to that, the fact that one part of it isn't derivative from something simple or from another, how its openness and change and incompleteness have contributed to that, how its specialization has contributed to that. This is a set of circumstances which has largely deprived our public discourse of its first requirement, a common basis of knowledge. It seems to me that this has had a rather bad effect on philosophical discourse, that a whole category of human achievement which grew out of philosophy was shut off from most of us. I won't say either, I can't say, whether in excluding this kind of order and this kind of verifiability, one has not impoverished the discourse but I am convinced that one has. It is very hard to leave out a great contemporary intellectual achievement and one which is as central, which intersects our lives in as many ways and places, which is as much a part, intellectually and practically, as this, to leave it out and not have a bad conscience. I believe that this is no easy problem. I believe that it's not possible, obviously, to have everyone completely

informed or well informed about everything that goes on, to have a completely common basis of knowledge. But I have the feeling that those of us who work in some science have one advantage, not that we know everything, -we perhaps are just as fully aware that we don't - I know one small part of one subject well enough to have a deep sense in me of what knowledge is and a deep sense of what ignorance is. This I think is not perhaps wholly unattainable. This, I think, could be one of the functions of education. It is perhaps not wholly out of the question to bring back to all of us a good conscience about our reasoning by virtue of the fact that we are in honest touch with some of its most difficult, some of its most brilliant and beautiful operations. As to the question of a stable shared tradition, which is another part of the background, I have inevitably been talking about philosophy in a predominantly secular, a publicly secular culture. I have not included as part of the source of tradition a living revelation or a universal, ecclesiastical authority. This is not a matter of preference on my part. If our deliberations are to have, what I say is, to have general meaning in this time and in this world, they must take into account the fact that our culture is secular and may well have to develop as a secular culture. Our tradition, strong though it is, and I think that the European tradition competes well with the Chinese and the Indian in this respect, is buffeted by the eruption of change and we are all aware how unprepared Europe was, and through Europe, all of us, for the tragedies of the 20th Century when it opened, how bitter, corrosive, indigestible many of them have been. I think primarily of the two world wars and the totalitarian revolutions, to take one example. We certainly live in

the heritage of the Christian tradition. Many of us are believers, none of us, believer or not, is immune from the injunctions, the hopes, the order of Christianity. I find myself deeply in anguish over the fact that no ethical discourse of any nobility or weight, no ethical discourse worthy of the Christian tradition, has been addressed by us as a society to the problem posed by the new weapons, the atomic weapons. Of course, there is much prudential discussion and strategic discussion and recently game theory. It's recent, and I can only welcome it because ten years ago there wasn't any discussion of any kind and that was worse. But what are we to make of a civilization which has always regarded ethics as an essential part of human life, and which has always had in it an articulate, deep, fervent conviction, never, I suppose, a majority conviction, never held by the majority, but never absent, a dedication to, what the Hindus call, "ahimsa", the Sanskrit word which means doing no harm or hurt, which you find in Jesus as well, I think, as some of the (Buddhists) and which you find in Socrates, quite simply? What are we to think of a civilization which has not been able to talk about the prospect of killing almost everyone except in prudential and game theoretic terms? Of course, it's not easy to talk about "ahimsa" and returning good for evil as a policy of governments. It seems inconceivable that that could ever be done in their foreign relations and that is why it may not be inappropriate for us to hope, and when we have a chance, even to work a little to the end that governments will not have at their disposition these monstrous powers to do evil which the super powers to-day do have. In 1945 to 1949 when I was quite close to these things, as I now am not, there

have been crucial moments in which the existence of a public, philosophical discourse, not aimed at proof in the mathematical sense, not aimed at verifiability in the sense of biology, but aimed at the understanding of the meaning, of the intent, and of the commitment of men, and above all, of us, that their reconciliation and their harmony could have made a great difference in the moral climate, the human scope of their talents. What difference, I'm not wise enough to say, but I will say that, in all those times when my government and the West generally has seen no special harm in using such weapons, provided only they were used against an antagonist who was sufficiently unpleasant, that we were doing anything wrong. I think we've been in error whenever we said that and that our lack of scruple, which I understand grew out of the horrors of the second world war - it grew out of the growing ferocity of the strategic air campaigns, it grew out of the numbing and indifference that characterized all of us in the last years of that terrible war, - is an indifference bitterly, bitterly deplored by the great men in our government. But nevertheless I think whenever we have done this, we have done a great disservice to the cause of freedom, and to the cause of free men. There is a third condition, a third precondition for public discourse and philosophy and I think this has to do, its absence has to do, with an over-emphasis, characteristic of the Renaissance, natural after the schoolmen, of the role of certitude. You find this, the first words of Descartes are concerned with finding something that cannot be doubted. You don't find this in Plato, you don't find it in such lesser men who made Greek philosophies. The purpose of

their discourse is not the attainment of certainty. It's the exploration of meaning. The purpose is the exploration of what men wish, intend, hope, love and are prepared to do. My belief is that if the common discourse can be enriched by a more tolerant and humane welcome for the growth of science, its knowledge, its intellectual virtue, I don't mean technically, it may be more easily possible to accept the role of clarification and of commitment which is the true purpose of philosophy, of our talk with one another, and not to hang around its neck that dead bird, 'how can you be sure', which has, I believe, stunted philosophy even in its great modern days and which has by now almost driven it out of existence. There are examples in our society of public discourse, not rooted in certainty, not depending on verifiability. I think the bar, to some extent, and the bench to a very great extent, and the professors of law, constitute such a community, and with us in the States the fact that they have hanging over them the question 'what does the Constitution mean?' means that their discourse bears within a narrow framework on the meaning and purpose of society and of organized human effort. I think that you have such discourse in the staff of a military establishment, in the discussion of the strategy and the planning and the understanding of war. I suppose we all hope that we will live to see the time when the problems which warfare is supposed to solve will be taken over by some agreeable generalization of the law. But these, no more than science, are directly applicable to the discourse I have in mind. They are encouraging because they show that things are possible and I am completely of the view that any model of human

discourse, any model of culture, which equates it with science leaves out not only a great part of human life but even a great part of that human equipment and that human dedication without which even science itself would not be possible. What we need is far larger. I think it may be possible, it certainly cannot be easy, in our countries, very much now in much of Europe, the sciences and technology enriching each other have built a great structure of power and knowledge, in technology and industrial society, enriching each other have built a great structure of productive machinery and of gadgetry, of know-how and of resource and industrial society has nourished and been nourished by abundance and abundance is giving us, and will in turn be nourished, by leisure. Now it is clear that more of that abundance and leisure has a place in the public sector of our lives. This is beginning to be recognized in the most superficial sense. In the United States there is much complaining that by dint of acquiring and acquiring and acquiring each for himself the things that we have in common, the cities, the buildings, the parks, the woods, the schools, how they have been let run down and down and down. But that is a fairly superficial sense, I think it's right. But I have in mind the public sector in the sense in which I have used it over and over in these lectures, what we can have in common in our thoughts, our feelings, our talk, our sensibility. I believe that this is the direction we need to try to turn and that if we manage it, even in a modest way, it will be a hopeful example later even for those parts of the world for which the notion of abundance looks thoroughly millennial and who cannot see beyond the attainment

of it and the measures needed to attain it. We need to maintain, and this doesn't need to be said to-day, but there have been times when it did, the negative freedoms of interference and tyranny. We need to extend them somewhat. We need especially to add safeguards which are in a sense peculiar to this time, safeguards to make sure that the almost insoluble problem of communication is not made even more insoluble. We mustn't let any government create a dogmatism and sit on the information that might show that the dogmatism was not the true story. We must not let any government abuse secrecy because it is the swamp out of which incoherence, darkness, lack of understanding, and finally cynicism cannot help but arise. We need to be on guard against philistinism which is the view that if something is a little difficult, or a little unusual, it can't be very good. We need, at least in the university, to make our life-work to combat philistinism. We need, as I have said, changes in the purpose and nature of our education, not just to make it better, everybody knows that, but to have a true taste of new knowledge as a common experience for all and have a deep, steady, sobering sense of ignorance so that men can leave our schools with two things, completely unintimidated by the growth of knowledge, completely prepared to buckle down and learn something new if they take to it or if someone asks them to, and so they are prepared to have the world change as they watch it. Of course, they will be homesick, we're all homesick, but (equipped) so that their youth should have made them fit to encounter what they will encounter. But prior to this, prior to it logically, because without that it won't happen, and prior to it because it's more important, it's not our institutions, but

it's us, we need to learn again to talk with one another and share our sorrows and love and speak of the meanings and the great themes of our lives and life. I cannot believe that at this time and for decades the greatest intellectual achievement and adventure in all man's history is going on in the room next door, we can prosper, unless we generously and bravely open the door. My last Lecture, I think, had a theme. It was that if we are to know and to discover, we must choose and we must act. This Lecture has a theme and that is that if we are to act and to live, we must speak to one another and we must hear.

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