

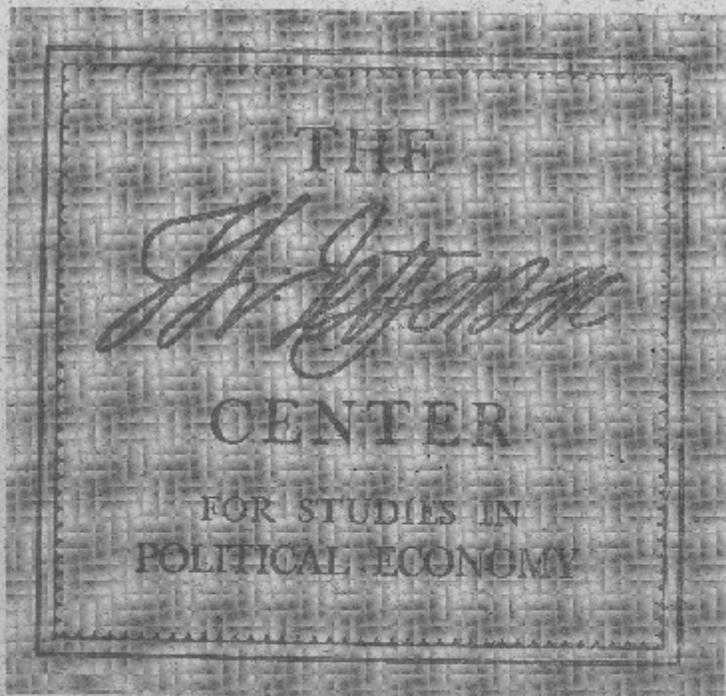
For J. and S.
about Christmas 1961

FOR PRIVATE CIRCULATION ONLY

M.

HISTORY AND HOPE:
An Analysis of Our Age

Michael Polanyi
Distinguished Visiting Scholar



UNIVERSITY OF VIRGINIA

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**Lectures delivered at the
Thomas Jefferson Center for Studies in Political Economy
University of Virginia**

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HISTORY AND HOPE

I. The Destruction of Reality

The title which I have given to these lectures may sound strange; "History and Hope." Yet these words refer to plain facts. The history of mankind falls into two sharply divided periods, two periods of vastly different lengths. The first extends from the beginnings of human society and all through recorded history up to the American and French revolutions. All during these ages men had accepted existing custom and law as the foundation of society. There had been changes and some great reforms, but never had the deliberate contriving of unlimited social improvement been elevated to a dominant principle. The first government to adopt this principle was that established by the French Revolution. Thus, the end of the eighteenth century marks the dividing line between the immense expanse of essentially static societies and the brief period during which public life has become increasingly dominated by fervent expectations of a better future. Such is the history -- the short history -- of hope as a political and social force. Such the justification of entitling an analysis of our age by the words "History and Hope."

In the western countries where it had its origin, the pursuit of these hopes achieved in the course of the nineteenth and twentieth centuries the most humane and most free societies the world had ever seen. It has engendered an intellectual life of unprecedented range and has led to a new flowering of the arts, which rivaled the splendors of Greece and the Renaissance. It has

created immense wealth, more equally distributed than before and thus approached the point of abolishing poverty.

But another stream of the same flow led to different results. It established the Soviet empire which has spread its power and influence during the last forty-four years over a major part of the globe. Thus, hardly had the march of humanity towards its new hopes got under way that it already divided mankind into two rival camps mortally opposed to each other by their totally different visions of progress.

Last June the leaders of these two camps met in Vienna and on his return one of these, President Kennedy, reported that the Soviets and we have wholly different views of right and wrong and above all have wholly different concepts of where the world is and where it is going.

The situation is terrifying; but here in this place, in this university, we are concerned only with understanding it. We must ask how the pursuit of progress has engendered and established over vast areas a system of ideas which mortally conflicts with the original hopes of human progress.

We might be tempted to think that the dominance of Soviet ideologies was imposed by sheer force of arms, but this would leave unexplained how the power of Communist governments originally came into existence at the centers from which it subsequently spread to other parts. We must face the fact that these centers of power were originally established by groups of deeply convinced adherents, who gained influence over broad masses. And we must face also the fact that these ideas, so different from our own, are still echoing

round the globe and gaining followers, particularly among the more educated people. We must acknowledge that these converts embrace these ideas with fervent hopes for humanity, and that they are dedicated to fight and surpress any opposition to them.

The main difficulty in understanding this rise of modern totalitarian ideas is the habit of thinking of it in terms of the conflict between progress and reaction. This is false; the revolutions of the twentieth century are not in line with this conflict. They do not aim at restoring either the dogmas or the authorities shattered by the French Revolution. They are dogmatic and oppressive in an entirely new way which -- by a curious process -- harnesses to its purpose the great intellectual and moral passions by which free thought and popular government were first achieved in Europe and America.

This strange transmutation was first achieved by Karl Marx. In his biography of Marx, Isaiah Berlin describes him at work. "The manuscripts of the numerous manifestoes, professions of faith and programs of action, to which he appended his name" writes Berlin "still bear the strokes of the pen and the fierce marginal comments with which he sought to obliterate all references to eternal justice, the equality of man, the rights of individuals or nations, the liberty of conscience, the fight for civilization and other such phrases which were the stock in trade . . . of the democratic movements of his time; he looked upon these as so much worthless cant, indicating confusion of thought and ineffectiveness in action."

Marx obliterated all references to moral ideals from his manifestoes

for he believed he had far better, more honest and more intelligent grounds on which to achieve these very ideals. He had written: "It is not the consciousness of human beings that determines their existence, but conversely their social existence that determines their consciousness." To him, therefore, a revolution which would transform the existence of society became the only possible embodiment of social ideals. Otherwise ^{they} ~~there~~ were just empty words. Even his own resolve to fight for this revolution was cast in the form of a scientific sociology which predicted that the revolution was inevitable and imminent, owing to the material fact that it would release an immensely increased productive capacity.

Tonight's lecture bears the title; "The Destruction of Reality." The way Marxism transmuted the ideals of human progress into a doctrine of sheer violence is a case in point. It proclaimed a new vision of reality in politics and history, reducing all morality to underlying economic necessities. Moral forces then become illusory and economic forces alone are accepted as real. This is the famous transformation of utopia into a science. In the name of science Marxism destroys the moral image of man and affirms that human ideals are mere derivatives of power and profit.

But it would be a mistake to accept at its face value this description that Marxism gives of itself. The image of a mechanical process of history leading to the establishment of socialism, could not inspire revolutionary passion. But Marxism does inspire powerful passions. The secret of this contradiction lies in the fact that the Marxist conception of history does not

eliminate -- as it pretends to do -- the moral ideals of progress, but absorbs them into its vision of this process. The mechanical machinery of history is in fact seen and deeply felt as the embodiment of all the moral aspirations of man, which, being thus embodied, are assured of inevitable victory by the mechanical laws of history.

The Soviet regime itself is an exact replica of the machinery of history conceived by Marx. It claims to be intellectually superior to all other governments, both past and present, by conducting itself on strictly scientific lines. Hence, the fierce struggle between rival Communist factions about the correct interpretation of the historical situation of the day, and about the correct application of Marxist theory to this situation. Arguments on deciding the Party line are conducted in the sociological terms of Marxism. Yet all the time this allegedly cold, calculating, machinery is fueled by the fierce passions of utopian aspirations; the regime relies for its driving force on the very motives which its scientific theory claims to have exposed as ineffectual.

But this unfortunately does not mean that a government thus constituted is guided by moral considerations. It will no doubt occasionally respond to them, but it will do so only by departing from its theoretical principles. The main behavior of the regime will conform to its theory, relegating the moral passions of socialism to the role of a fuel, blindly driving the machinery of revolutionary power. But when used as a fuel, the moral force of socialism is torn from its original context. It becomes

inaccessible to moral, or indeed any reasonable argument. This is fanaticism; a fanaticism of a kind the world has never seen before. For it is a fanaticism induced by skepticism, which turns to science for denying the reality of moral motives and for reducing them to mere reflections of economic necessities. Communist fanaticism is clearly a product of the scientific age.

But we must recognize also, that moral skepticism would never have produced modern fanaticism, but for the great new tide of political and social hopes engendered by the revolutions of the eighteenth century. I have spoken of the progress achieved by these forces during the nineteenth and twentieth centuries in all western countries. Progress has been slower in areas more distant from its original centers. But the demand for progress has been all the more insistent in these lands among the individuals who fully realized the backwardness of their country. Today, demands for progress and social justice have reached a range and force altogether without precedent in the history of mankind. Thus the catastrophic eruption of Communist fanaticism has been due to the confluence of the two main ideas of the French Revolution. Both scientific skepticism, which originally liberated free thought, and the new tide of humane sentiments which inspired subsequent social reforms, were combined in it. Modern skeptical fanaticism unites these progressive forces in a deadlock which turns skepticism into dogmatism and morality into contempt for morality. This is what I meant by saying that modern totalitarian tyranny does not go back on the French Revolution but is an

outcome of it; that it is another branch of the same pursuit of progress which brought forth the comprehensive humanization of western society since the French Revolution.

Some people have described Soviet morality as an extreme form of hypocrisy. It is true that Soviet representatives sometimes sound unbearably sanctimonious, but the true strength of the Bolsheviks lies in being frankly hard-boiled. We have seen Marx engaged in furiously eliminating all moral professions from his manifestoes. An American analysis of the chief propagandistic writings of Lenin and Stalin shows that ninety-four to ninety-nine percent of the references to the Communist Party and its activities describe it as seizing, manipulating, and consolidating, power. This is not hypocrisy. It is the inverse of hypocrisy -- a skeptical fanaticism, contemptuous of moral motives which it yet uses as raw fuel to feed the cylinders of its political machinery. For some years past, I have used the term "moral inversion" as a label for this peculiar mental structure. The term is useful and I shall introduce it tonight as a guide to other states of mind both inside and outside Communism, that can be best understood as variants of moral inversion.

But I have not yet sufficiently consolidated this concept of moral inversion as applied to the Soviet regime itself. It might be objected that it is simpler to say -- as it is commonly said -- that the Soviet regime is crassly materialist and hence, blind to all moral considerations. But I deny this; I deny that the Soviet regime is materialistic. Materialism is an

indulgence of appetites and a love of comfort. A materialist economic life is one that concentrates excessively on material comforts. But the Russian economic system is the opposite of this. It neglects the most desperate popular needs -- e.g., for better housing -- in favor of ornate skyscrapers and underground marble halls. It deflects untold treasures from the use of consumers in order to plant a pinion on the face of the moon. It revels in production and shies away from consumption. Comfort is sacrificed to the passionate endeavor to conduct production in a particular way that is deemed socialistic, and thus to erect a monumental symbol of the march of Communism to world supremacy. Indeed, we in the West should watch keenly and hopefully for any sign of a true materialism in Soviet Russia. For if the regime once turned to the pursuit of material advantages, it would have lost its fanaticism. Love of comfort may be ignoble, but one may trust it to be reasonable.

The Soviet economic system is in fact another instance of inversion. Just as moral inversion transforms morality into the service of power, so the satisfaction of men's needs is transformed into the service of public splendour. The machinery of industry, invented to provide material comfort, is transformed into an altar for material sacrifice. Western scholars will never understand the Soviet economic system, until they realize the full extent of this transformation.

Inversion applies also, and with disastrous consequences, to the domain of artistic life in the Soviet empire. Just as the ideals of freedom and democracy are unmasked as bourgeois pretenses, while a party dictatorship is

endowed instead with the quality of being intrinsically free and democratic, so also bourgeois art and literature are unmasked, and the glorification of socialism is proclaimed instead as true art and literature. Mental inversion goes indeed beyond this. It inevitably engulfs the very conception of truth; the truth of ordinary matters of fact. It is difficult to say how far the personal obsessions of Stalin have contributed to the creation of that universe of fictitious allegations, on the grounds of which millions of harmless Soviet citizens were sent to the frozen wastes of Siberia. However that may be, Stalin was certainly supported in the vagaries of his imagination by the principle that objective truth was a bourgeois pretense which must be cast out by affirming the partisan character of all truth. He could always rely on the doctrine that party-truth was sacred and to be protected by terror against objections based on mere facts. A belief in factual reality is indeed a subversive principle under totalitarianism.

Admittedly, the pervasive mendacity of the Soviet regime, relying on the principle of party truth, eventually overreached itself and evoked the first major revulsion against the Soviet regime. But this event belongs to a later period.

This may remind us that my analysis has so far given no direct answer to the question, why the ideas of modern Communism have exercised such fascination far beyond the domains of the Soviet Union, and indeed for some time gained the allegiance of many men of highest intellectual distinction throughout the West. But it is clear already from what I have said that

Marxism could claim to satisfy simultaneously the two most active demands of the modern mind. It appealed both to scientific objectivity and to the ideals of social justice. It satisfied the scientific outlook by interpreting man and history in terms of power and profit, and assured at the same time the highest social expectations by identifying social progress with the irresistible course of history.

But one may still ask: Did those responding to Marxism not see the ruthless oppression of their most cherished ideals in the Soviet Union? They did, but they disregarded it, for they had accepted the doctrine of moral inversion according to which the victory of the Revolution was the embodiment of all moral values and was therefore, not subject to judgment by moral standards. The Soviets' declared resolve to act unscrupulously, was taken to certify their intrinsic supremacy over any moral considerations. As Hannah Arendt rightly observed, "Bolshevik assurances inside and outside Russia that they do not recognize ordinary moral standards, have become a mainstay of Communist propaganda"

Soviet Communism has been the most important revolutionary movement of the twentieth century, and the only one effectively articulated in an elaborate theory of itself. The revolutions of Mussolini and Hitler were by comparison amorphous affairs relying on the incitement of hysterical masses by a turgid rhetoric. Yet the way in which fascist dictators transmuted the patriotic sentiments of the masses into a cult of naked power had the structure of a moral inversion. Hitler's frenzy was primary evil but its appeal to the

German youth was moral. Their response was determined by convictions similar to those which Marx had held about the nature of moral motives in public life; they believed that all decency is hypocritical and brutality alone is honest. Hence their disgust of moralizing and their moral passion for unscrupulous violence.

Since popular nationalism was as much an outcome of the French Revolution as were the hopes of unlimited social progress, we may say that all forms of modern totalitarianism have a similar structure. Unscrupulous tyranny is justified throughout by a moral skepticism which converts a flow of generous motives into the blind fuel of naked power. Thus in every case the two main forces of the French Revolution, its skepticism and its generous hopes destroyed each other in modern totalitarianism and revealed thereby a catastrophic contradiction between the major ideas of that great revolution.

But do ideas actually make history? Can the internal contradiction in the ideas which first generated modern liberty, have actually caused in our days a widespread collapse of liberty? Ideas certainly provide the shape, or at least the possible shapes, of historic transformations. It is a moot point, how far the French Revolution was caused by the ideas of the philosophic Enlightenment which preceded it; but there is no doubt that the ideas which the French Revolution proclaimed and spread throughout the world were those of the Enlightenment. And just as this philosophic movement determined the character and the teachings of the French Revolution, so -- I believe -- eventually, the internal contradictions of these teachings have determined in

their turn the character and the teachings of modern totalitarianism.

This is borne out by the profound influence which the self-destructive tendencies inherent in the ideals of the Enlightenment have exercised on modern minds apart from its bearing on politics. Just look how in France itself, where the dawn of unlimited hopes first arose in the eighteenth century, the continuous pursuit of these great hopes has led the present generation of writers to a philosophy and a literature of despair. How, actually using "The Age of Reason" as his title, Sartre demonstrates that the ultimate outcome of the age of Reason is a recognition of the total absurdity of man and the universe, and that this reduces man's freedom to a total arbitrariness. Look how this sense of total absurdity is combined with a violent moral protest. Roquentin, the hero of Sartre's novel "La Nausée," expands his metaphysical nihilism into an attack on the complacency of the fat bourgeois dignitaries whose portraits he views in the municipal picture gallery. This is a combination of logically incompatible affirmations; for if moral values don't exist no one can be said to be morally defective and still less can such an accusation be made with an outburst of moral indignation. These logical incompatibles are fused together here in the same way by which Marx transmuted an absolute moral skepticism into a moral indignation at bourgeois hypocrisy. Such is the structure of all modern nihilism in the sense I shall use the term here. It is a fierce moral skepticism fired by moral indignation. Its structure is exactly the same as that of the moral inversion underlying modern totalitarianism. Herein lies, to a great part, the susceptibility of the modern

western intellectual to the ideas of totalitarianism.

Of course in ordinary parlance "nihilism" means often moral depravity or moral indifference, but I regard this kind of nihilism as unimportant both for the history of ideas and the origin of revolutions. Depraved individuals have often joined company with true nihilists and have become instruments of revolutions. There was a vicious madness in Hitler and Stalin, and they attracted criminal types to their service. But by itself such mentality can only produce a crime wave -- not inspire great literature or make a revolution. This mentality is poles apart from that of the personage first identified just one hundred years ago as a nihilist by Turgenev in his hero, Bazarov. This character, which has made history, represents the rebellious Russian intelligentsia of the 1860's, who repudiated all existing bonds of society in the name of a scientific materialism -- which they hoped would liberate men and make them all brothers. The romantic variant of nihilism that Nietzsche introduced in Germany was likewise a moral protest against existing morality. "This shop" wrote Nietzsche "where they manufacture ideals seems to me to stink of lies." It is in disgust with these lies that he proclaims magnificent brutality as something supremely authentic, honest and admirable.

In France the beginnings of a nihilism motivated by moral protest go back two hundred years. Diderot speaks of it already in 1763 in "The Nephew of Rameau" whose immoralism justifies itself by the hypocrisy of society. Soon after, Rousseau in his Confessions proudly acknowledged his

own vices in the name of nature's naked truth. And later in the century the Marquis de Sade gave an extensive account of his cruelties and lust, deriving a sense of intellectual and moral superiority from a conception of man as a mere machine and from the theory that law is but the will of the stronger.

In nineteenth century France, the first major figure of modern nihilism was that of Baudelaire. After him, the distinguished representatives of this mentality became too numerous to be named here, while around them a whole new social stratum emerged in the modern bohémien, popularizing the rebellious immoralism of their masters. A similar mentality spread at that time through the Russian intelligentsia and spread by the beginning of this century also into Germany, particularly in form of the Youth Movement and to Italy in form of Futurism. It has been said that the European Revolutions ~~are~~^{were} made by the armed bohémiens, and it is certainly true that the rebellious intellectuals of the European Continent were receptive to the ideas of totalitarianism. I believe indeed that their contribution to the rise of totalitarianism was decisive.

But we must stop here and face the fact that these subversive intellectuals of the nineteenth and twentieth centuries have also brought forth achievements of supreme distinction in the arts and letters, and must acknowledge also, that their great works were not unconnected with that very mentality which had such ill consequences in politics. Nihilism has served for a century as an inspiration to literature and philosophy, both by

itself and by provoking a reaction to itself. A loathing for bourgeois society, a rebellious immoralism and a mood of despair have been prevailing themes of great fiction, poetry and philosophy on the Continent of Europe since the middle of the nineteenth century. Modern painting and music have risen rebelliously within this milieu by a deliberate rejection of socially accepted standards. We may actually commemorate the centenary of this great outburst tonight for it was just one hundred years ago that Eduard Manet painted his immortal "Le déjeuner sur l'herbe." Rejected by the official exhibition of paintings, Manet and his rapidly multiplying followers presently founded their own exhibition under the title "Salon des refusés," the Salon of the rejected. The advent of modern music was accompanied by similar public clashes. Throughout the subsequent decades modern art went on battling with academicism. We have got so accustomed to this spectacle that it is generally overlooked that nothing like it had ever happened before. Admittedly, great artists had sometimes gone unrecognized during their lifetime, but never had a whole artistic culture gone flowering through successive generations in systematic opposition to the prevailing standards of the age. And let us face it, that the heroism of the modern intellectuals to which we owe the victory in this long battle, arose from the same subversive temper which often made the influence of these intellectuals politically disastrous.

And there is more to this. Modern art has arisen from a persistently continued destruction of existing artistic realities for the sake of penetrating to strata of harder, more genuine forms of reality. So the "poetic" has

vanished from our poetry, the "picturesque" from our painting, the "harmonious" from our music, gone are heroes and heroines from our novels and plays. All these were rejected in the pursuit of a harsher artistic truth. But can this process go on indefinitely? Must it not presently lead to a complete destruction of meaning? "Dr. Faustus" by Thomas Mann is an inquiry into this question. "In a work of art" Mann writes in one place "there is much that is specious and sham . . ." "The question is whether at the present stage of our consciousness, of our sense of truth, this little game is still permissible still intellectually possible" whether it "still stands in legitimate relation to the complete insecurity of our social conditions; whether all fiction, even in the most beautiful, and precisely the beautiful, has not today become a lie."

So in the end beauty itself and all standards of art are unmasked as lies. Tortured by fear of banality, modern art takes refuge in a complex formalism bereft of subject matter, or else in a naked subject matter so harsh as to exclude any suspicion of humane standards. Bawdiness has never been lacking in literature and art but this has been always a form of levity; it was left to our age to discover a somber and fantastic obscenity, as an ultimate token of intellectual honesty. It seems obvious that the rebellion which evoked modern art and moved it on for a century, cannot fail to exhaust itself, once its product will have ceased to affirm anything and hence leave nothing more to rebel against.

But is not science itself -- true science, which was the main source

of philosophic enlightenment and from which flew the great movement of modern rebellious skepticism -- is it not a safe haven against all the harms of excessive doubt that I have described in politics, in personal morality, in artistic endeavor? Alas, it is not. Scientific rationalism has indeed been the main guide to intellectual, moral and social progress since the idea of progress first gained popular acceptance about a hundred and fifty years ago. But unfortunately, the basic ideals of science are nonsensical. For science does not recognize the existence of any ultimate irreducible entities above the level of elementary particles or their wave-functions. Thus all life, all human beings, and all works of man -- including Shakespeare's sonnets and Kant's Critique of Pure Reason -- are ultimately to be represented in terms of these ultimate particles. The ideal of science remains in fact what it had been in the time of Laplace; namely, to replace all human knowledge by a complete knowledge of atoms in motion. Laplace said that if we knew at one moment of time the exact positions and velocities of every particle of matter in the universe, as well as the forces acting between the particles, we could compute the positions and velocities of the same particles at any other date whether past or future. To a mind thus equipped, he wrote, all things to come and all things gone by would be equally revealed. This is precisely what science still accepts today as its ideal of perfect knowledge; and this ideal is nonsensical for such universal knowledge would tell us absolutely nothing that we are interested in. Take any question to which you want to know the answer. For example, having planted some primroses today

you should like to know whether they will bear blossoms next spring. This question is obviously not answered by a list of atomic positions and velocities at some future moment on May 1st 1962; it must be answered in terms of primrose blossoms. The universal mind is utterly useless for this purpose, unless it can go beyond predicting atomic data and tell us what they imply for the future blossoming of primroses.

Never mind for the moment whether we could actually infer something about primroses or about anything else that we may be interested in from a topography of atomic positions and velocities. It is enough at this stage to make clear that Laplace's representation of the universe ignores as it stands, all our normal experience and can answer no questions about it; that the Laplacian ideal of universal knowledge is actually a state of complete ignorance.

Science has achieved magnificent results in the pursuit of this absurd ideal, but at some point it must always lead science to an impasse and result in absurdities.

Take for example modern neurology. Its discoveries are unrivaled in beauty and usefulness. But neurology reflects the ideal of science by assuming that man is a mechanical automaton, and hence it cannot account for human consciousness and must in fact deny its existence. Three authoritative contributors to the international Symposium on Brain Mechanism and Consciousness held in Paris in 1954 said this as follows. The first said, "The existence of something called consciousness is a venerable hypo-

thesis; not a datum not directly observable" The second, "Although we cannot get along without the concept of consciousness, actually there is no such thing." The third, "The knower as an entity is an unnecessary postulate." These statements express, of course, only the theoretical opinion of the three distinguished scientists. Actually they know like everybody else that consciousness, as for example pain, exists, and that other states of consciousness also clearly differ from unconsciousness. But as scientists they feel compelled to make statements to the contrary.

We meet the same situation in the study of society. Anthropologists must endeavour to describe social groups in strictly scientific terms. And most anthropologists will insist therefore on carrying out their analysis of society without reference to good and evil. Two distinguished anthropologists of Harvard have represented the unspeakably cruel murder of supposed witches as a cultural achievement. "Some social systems" they write, "are much more efficient than others in directing aggression into oblique or non-disruptive channels. There is no doubt that witchcraft is Navaho culture's principal answer to the problem that every society faces: how to satisfy hate and still keep the core of society solid." Another anthropologist has described head-hunting as fulfilling an essential function to the societies in which it is practiced. "The religion of Edystone Islanders" we read, "provided a motive for living and kept an economic system functioning." Head-hunting only proved wrong in this view because it kept down numbers and so made technical progress superfluous, eventually leaving the islanders a prey to

British conquerers.

For this kind of scientific anthropology, social stability is the only accepted value and becomes therefore the supreme value. Yet all the time we know, and the anthropologist knows it like everybody else, that the stability of evil is the worst of evils. He ignores this only in order to maintain a purely descriptive attitude towards his subject in accordance with the ideals of the natural sciences. Admittedly, such anthropology avoids the mistakes of earlier explorers who made no effort to understand the internal structure of primitive cultures and condemned their practices out of hand. Yet on the other hand, the modern anthropologist will tend to draw from his observations such fantastic and morally scandalous conclusions as I have just quoted, and moreover his method will blind him to the forces of moral progress in the societies that he investigates.

This attitude of scientific detachment pervades our minds today. When we hear that the Soviets and we have totally different views of right and wrong, our immediate reaction is to look for the economic and social structure, to which the peculiar ideas of the Soviets of what is right and wrong may seem appropriate. When Khrushchev denounced Stalin's monstrous regime at the Twentieth Party Congress, a leading English newspaper could not help remarking that the historic necessities to which Stalin's actions responded, must not be overlooked.

Scholars, bent on interpreting the economic and social policies of the Soviet regime as rational responses to historic necessities, have woven

a texture of speculations no less fanciful, than those I have quoted from the works of some anthropologists. And what is more, these rationalizations -- just as those of the anthropological analysis of primitive societies -- have obscured the moral and intellectual forces rebelling against the evils of Soviet society. Yet this rebellion has, I believe, been the most powerful trend of thought during the past ten years all over the globe. The belief that the rule of the Communist party embodies all the hopes of humanity, and that its very existence is a full compensation for the fact that it does not fulfill these hopes; that its successes should be ascribed to its peculiar excellence, while its failures be always regarded as incidental -- this peculiar bias of the twentieth century, which protects its own blazing credulity by a steel armor of skepticism; this condition which is capable of combining highest intelligence and morality in a teaching which reduces both of these to mere derivatives of power and profit -- it has ceased to be as stable and seductive as it used to be.

Now^e was this merely a weakening of fervor due to lassitude. No, it was a passionate movement of minds long starved of spiritual substance. We have seen this in the insurrections in Poland and above all in Hungary. These were not rebellions against the Communists but a change of mind of leading Communists. The Hungarian rising went a long way towards victory as a revulsion of Communist intellectuals without aid from other quarters. They demanded freedom to write the truth; to write about real people, real sentiments and problems; to report truthfully on current events

and on matters of history. In demanding this they reverted to beliefs they had previously abhorred and even violently suppressed. I quote this from a speech by a formerly leading Stalinist, a young man called Gimes, who has since been hanged by Kadar in Hungary: he spoke of the doctrine of party-truth which "affected not only those who thought out the faked political trials, but often infested even the victims; this outlook -- he said -- which poisoned our whole public life, penetrated the remotest corners of our thinking, obscured our vision, paralyzed our critical faculties, and which finally rendered many of us incapable of simply sensing or apprehending any truth."

This is where the regime overreached itself. The last forty years have shown that while it is possible to impose unlimited material sacrifices in the name of a revolutionary doctrine; while its immoralism may actually strengthen its hold by appealing to the hard-boiled moral skepticism of our age; the mendacity of such a regime finally becomes unbearable. Fanatical Communists who had at first resolutely accepted its dishonest paintings and novels, and even its theory of party-truth eventually got sick of these. They had to vomit. The word "vomiting" has actually become a technical term in Poland and Hungary for this reversal of inverted man; the act by which he violently turns himself right-way-up.

I have said before that the totalitarianism of the twentieth century did not go back on the French Revolution, but went forward from it to a consummation of its internal contradictions. The rebellion of the Polish

and Hungarian Communists and the revisionist movement throughout the Soviet empire and beyond it, attempt to reverse this consummation. These movements express the demand to go back to the original Enlightenment, before the movements of scientism and romanticism had clashed with the new tide of social hopes and fused with it into a mutual destruction. A visit to Monticello and a look at Jefferson's bookshelf movingly remind us of that happier philosophic age towards which these movements are yearning.

But can we revert to that age today? No, I believe that the lesson of the Hungarian Revolution and of the world-wide tendencies pointing in the same direction, must go beyond this aim. They challenge us to revise rationalist enlightenment and to purge it of its fateful deficiencies.

And this is where we in the universities come in. It is for us to realize the difficulties of the modern mind to the full, and for us to accept these difficulties as our problem.

In the following three lectures, I shall try to exemplify this undertaking. Much of what I shall say will appear to you remote, and all of it will of necessity be sketchy. But I hope that some of you will yet bear with me, when remembering that all I shall say will be a response to the fearful scene of our age which I have exposed to you tonight.

II. The Realm of the Unspoken

In my last lecture I made two observations on the mentality of modern man. I said, first, that scientific rationalism which had shattered dogmatic authority, has proceeded further to call in question the reality of vast areas of our experience, including that of our existence as morally responsible, conscious human beings. I said, secondly, that the destruction of the dogmatic authority sustaining a static society, has released a demand for an unlimited improvement of society and that, in consequence, social ideals exercise today an unprecedented power over the minds of men. Neither of these two observations is new; I could quote a number of book titles in support of either of them. What is new, is my analysis of our modern mentality -- in all its variations -- as a combination of these two aspects of it, as a blend of its scepticism and its idealism: my picture of modern man full of moral passions, the expressions of which his scepticism has discredited. I have shown how this combination accounts for the seductions of nihilism and totalitarianism and, had I had more time, I would have shown also how it tends severely to weaken our own self-confidence, when fighting nihilism and totalitarianism.

Today, and in the rest of this series of lectures, I shall point the way towards a solution of our modern dilemma by an attempt to vindicate the essential human realities which scientific rationalism has called in question.

I admit that I am undertaking this philosophic task for the sake of purposes that extend beyond it, but I believe this to be justified. For any demonstration that man is a morally responsible agent is itself a moral teaching. We may seek therefore this demonstration equally on intellectual or moral grounds.

I have said that there is a considerable literature deploring the destruction of reality by scientific rationalism and -- I should add -- by its emotionalist twin brother, romanticism. These testimonies lend support to my enterprise; but they may also appear alarming. The fact that they have remained fruitless may be taken to show that the intellectual position which they denounce is irremediable. It certainly shows that the remedy to this complaint cannot be had for the asking. It suggests that the remedy can be found only by the uprooting of some basic conceptions which have irresistibly imposed themselves on the modern mind ever since the rise of scientific rationalism about three hundred years ago. This does not mean that I will have to introduce here highly technical evidence, accessible only to people with some special training. No, what I want to do tonight is simply to call your attention to the great and indispensable powers of unspoken thought, to which scientific rationalism has hitherto denied due recognition. This should prepare the way for the Vindication of Reality next week.

The difficulty of this subject is in fact not that it is recondite but that it is too obvious. In the story of "The Purloined Letter" Edgar Allen Poe tells how an important document is hidden away by putting it in a place where

everyone can see it and hence nobody will look for it. The power of unspoken thought of which I want to deal tonight is rather like that; it is so obvious as to go unnoticed.

And even if eventually acknowledged as a fact, it is extremely difficult to convince anyone that this is a matter of vital significance. For it seems unbelievable that such far-reaching consequences of an easily accessible matter should have been universally overlooked. Yet this is precisely what I want to show.

Perhaps I can avoid the dangers of obviousness to some extent if I start with a rather unusual instance of tacit thinking -- even though I could as well have chosen any number of everyday experiences.

A few years ago, a distinguished psychiatrist demonstrated to his students a patient who was having a mild fit of some kind. Later the class discussed the question whether this had been an epileptic or a hystero-epileptic seizure; the matter was finally settled by the psychiatrist: "Gentlemen" he said, "you have seen a true epileptic seizure. I cannot tell you how to recognize it, but you will learn this by more extensive experience."

Clinical practitioners call the peculiar, indescribable appearance of an illness its facies; but we may call it simply its physiognomy, so as to relate it to the delicately varied expressions of the human face which we can likewise identify without being able to tell quite how we recognize them. The peculiar appearance of a species of plants or animals by which experts can recognize a specimen of it at a glance, is the same kind of thing. All

practical classes in universities -- from physics to medicine -- are conducted for the purpose of transmitting a knowledge of things which cannot be adequately described.

People who know a physiognomy but cannot identify the particulars by which they know it, obviously know more than they can tell. They know both the physiognomy and its parts, but in different ways. They know the physiognomy by attending to it, but its parts only by relying on them as clues to the physiognomy. The psychiatrist in my story looked at the patient and at his illness and could tell what it was, but he could not tell what the symptoms were on the awareness of which he relied for attending to the appearance of the illness. The image of the illness is, of course, composed of its characteristic particulars, and anyone who recognizes this image knows, in this sense, also its particulars; hence, if he yet be unable to identify these, this shows that he does not know them in themselves. These are things he knows and cannot tell.

All this is, as I have said, fairly obvious, but it is perhaps even more obvious in the case of practical skills. I can say that I know how to ride a bicycle or how to swim. But this does not mean that I can tell how I manage to keep my balance on a bicycle or keep afloat when swimming. I may not have the slightest idea of how I do this, or even an entirely wrong or grossly imperfect idea of it, and yet go on cycling or swimming merrily. This fact can be analyzed on similar lines as those I have applied to physiognomies. I can say that I know how to cycle and swim by attending to these acts as a

whole, while I know the elementary muscular acts which constitute my skill only by relying on these elements for the purpose of achieving the performances to which I am attending.

Actually, skillful knowing and doing are rarely exercised in isolation; we usually meet with a blend of the two. Medical diagnostics combines them about equally. To percuss a lung is a muscular feat combined with a delicate discrimination of the sounds thus elicited. Accordingly, we speak equally of grasping a difficult subject matter or a difficult skill.

And there is something in common between these two cases which will lead on to another essential feature of our knowing of things, to which we cannot attend in themselves and which we hence know but cannot tell. I have said that we rely on our awareness of these things for attending to something else. This shows that an action is involved here on our part, an action for the purpose of which we rely on these things which we then know, and know only, in terms of the result achieved by relying on our awareness of them, and not in themselves. This act of relying will become clearer by my next example, which is of great interest also in itself. It is the case of visual perception.

It is known that the seeing of an object is the result of an act of our own, and this has been one of the major subjects of philosophy for centuries. Let me show what part is played here by things that we know but cannot tell.

When we look at an object, we see it standing against a background, situated at a certain place, defined by its distance and its orientation in space;

we see it in motion or at rest; it is seen also as having a certain size and a particular color, a certain shape, not only in its contours but also in depth. We see an object in this definite way owing to the adjustment of our pupils, our lenses, and of the convergence of our eyes, which jointly fashion the two retinal images on which the perceived picture is based. But perception is co-determined also by the messages received from the muscles of the eye by which we adjust our eyes, and also by messages from the internal ear, as well as from all the muscles which keep our body and head in position. And an important contribution is also made by memory traces: we tend to see what we expect to see. These internal data both guide the reflexes of our eye muscles in adjusting our retinal images and also control our evaluation of these images, in conjunction with all other relevant stimuli, in terms of our perceptions. Nor is this all that is involved in seeing a thing as we do. Gestalt psychology has been most successful in tracing the far-reaching effect exercised by the peripheric parts of the visual field in determining what we see at its center. Seen in isolation, a cat in different positions may appear to change its color from off-white to dark grey, but when a window is included in the field of vision we see the cat unchangingly as of the same white or grey. For when, while looking at the cat, we notice from the corner of our eye a beam of sunshine coming through a window, the eye automatically allows for the variable illumination of the cat in different positions and sees it always as having the same color.

All these things which go on inside our eyes and other parts of our

body in the process of seeing an object, and the memories which enter into our seeing from the back of our minds, as well as the remote bits of the visual field from the corner of our eyes, are things on our awareness of which we rely for seeing an object in a particular way. In this sense we undoubtedly know these things, but we have little or no knowledge of them in themselves. Our control of these subsidiary elements of perception and our integration of them in the way we see the perceived object may go on almost automatically, but there is always a measure of deliberate attention involved, and this may actually impose a severe strain on the person trying to make out what he is seeing. There is also clear evidence that the skill of seeing things is acquired by a process of learning. Chimpanzees reared in the dark need several weeks of practice to recognize visually even so interesting an object as their nursing bottle.

But before going any further in analyzing these tacit constituents of knowledge, let me try to reassure you that we are in fact moving towards the anxious issues raised by my analysis of our age in my first lecture. I have illustrated there in a number of ways how science, which has been the great liberating force of the Enlightenment and has released the immense intellectual, moral and social progress achieved since the French Revolution -- how this rise of science, has also become an ample source of popular fallacies. And I have traced back these fallacies to a false ideal of science which, though highly fruitful up to a point, leads astray beyond this. I formulated this false ideal in the Laplacian conception of universal knowledge,

as represented by a complete topography of all elementary particles and the forces acting between them. I admitted that Laplace was right in saying that from such information one could predict the atomic topography of the world for any future moment of time, but I said that he had overlooked the fact that such a topography would by itself tell us nothing of interest, and indeed would represent nothing that we could actually experience.

But how could Laplace overlook this? How could it be generally overlooked up to this day? The answer is that the gap between an atomic topography of the world and our actual experience of the world was covered up by a tremendous tacit assumption, an assumption which embodies once more the ideal of science. It consists in the belief, the passionate belief, that all experience can ultimately be represented by the mathematically determined relation of the ultimate particles underlying experience. By this assumption scientific rationalism excludes in principle all tacit knowing. Science might admit, of course, that we know a great deal that we cannot tell, but it would insist that all such knowledge can ultimately be made explicit.

So you see that what I have already said about the realm of unspoken knowledge, collides head-on with the ideal of scientific rationalism, and you may indeed anticipate, that -- once firmly established -- the admission of such tacit knowledge may force a revision of the ideal of science at the very points where it tends to produce its baleful consequences. But this is but a first skirmish in a battle to which we shall presently return in force, armed with sharper weapons.

Let me go on to elaborate for this purpose on the structure and function of tacit knowledge. There is an obvious difference between identifying a disease by relying on our tacit awareness of its symptoms and the act of perceiving an object by relying on our tacit awareness of adjustments inside our eyes and of other clues to which we do not attend in themselves. The image of the illness coincides in space with the position of the clues which serve us to recognize it, but this is not true when we look at an object in front of us. We are aware of the clues of perception in terms of the appearance of an object situated at some distance from the clues, most of which are inside our body. Since this distinction applies to a wide range of unspoken knowledge, I shall try to express it by two different labels and this will bring in a very important conception, namely, the conception of meaning. It is reasonable to say that when we recognize a physiognomy, we are reading the meaning of its particulars, to which we are not attending in themselves; and that, since the physiognomy is located in the same place as the particulars which constitute it, the physiognomy is the internal meaning of these particulars. On the other hand, the way we see an object may be said to represent the meaning of the various clues on which we rely for seeing it in that particular way, and that hence the meaning of these clues is situated away from them -- that it is external to them.

I believe that this analysis largely disposes of the question which has occupied philosophers so much, as to the grounds on which we make

sense of clues inside our body in terms of the way we see an object at some distance in front of us. For this is now but a particular instance of the fundamental fact that we are able to make sense of clues or particulars to which we are not attending at the moment, by relying on them for attending to something else -- so that the appearance of that to which we are attending, may be said to be the meaning of these clues or particulars. Once we have fully realized this way of making sense, the question as to where the meaningful thing will be situated in space becomes a subordinate question. The more so, since the externality of meaning which is so puzzling in the case of perception, can be shown to be merely a matter of degree.

Think of the use of tools. In hammering in a nail we attend to the hammer as it hits the nail, but we do so of course by being aware of the way the handle of the hammer impinges on our palm. The rower is aware of the strain in his hands and arms only in terms of the blades tearing the water. The blind man groping his way by means of a stick is aware of its impact on his palm in terms of the way the outer end of the stick hits on objects in front of him. When using a probe the surgeon feels the point at which its tip touches the walls of a cavity he is exploring. In all these cases, the thing to which we are attending is situated at some distance of the things on the awareness of which we rely for attending to them; in other words, the meaning of these clues is situated at some distance away from the clues; but this distance can be reduced at will to vanishing point.

We may notice that the meaning of clues always tends to be displaced

outside, away from us; and this leads on to a very remarkable fact. It makes us realize that there is one single thing in the world on which we never look upon as an object. This thing is our own body. To feel alive, is to be aware of things going on in our own body -- but not by attending to them; it is to rely on our awareness of things in our body, by attending to things outside. Our body is the citadel of all tacit knowledge. Every time we make sense of the world we rely on a tacit knowledge of impacts that the world makes on our body.

Visual perception is, of course, a particularly striking feat of this kind. But I would include also the way we use a tool or probe. I would agree with Samuel Butler that this is to use them as an extension of our body; that we pour ourselves into the tool or probe, or alternatively, that we assimilate these things to our body. And this gives us the key to the conception of indwelling which is of supreme importance to any adequate theory of knowledge. Since the way we rely on certain things subsidiarily, for attending to something else, is similar to our awareness of our body for making sense of the world outside, we may feel justified in saying that whenever we rely on our awareness of clues or particulars, or tools or probes, for attending to something else, we are dwelling in these as we dwell in our own body. Thus we shall comprise within one single framework of making sense the classical cases of external meaning, as when words mean certain objects, and of internal meaning, as that of music or pure mathematics. This will prove a powerful tool for the vindication of reality.

But we cannot go on remoulding the conception of meaning without first bringing the matter home to the case of words -- of words like 'Peter' and 'Paul' or 'tables' and 'dogs' -- which mean definite tangible objects. Proper names do this of course in a way quite similar to the way we use a probe. A man's name, by itself a meaningless sound, will make sense by being consistently used to point at the person whom it designates -- exactly as the knocking of objects by a stick gradually acquires a sensible meaning. But the case of general terms, as when we speak of tables and dogs in general, is more interesting. For it can also be brought into our scheme of knowing, and this disposes of a puzzle that philosophers have not ceased worrying about ever since Abelard brought it to their attention nine hundred years ago. Abelard pointed out that when we speak of the dog we are not pointing at any definite object as we do when we call a man by his name; the word "dog" is therefore merely a sound uttered with reference to an undefinable range of individual dogs, each of which is different in every single particular. Seven hundred years later, Kant still declared himself unable to resolve the mystery of the way our intelligence forms and applies a general conception like that of dogs. This process he says, "is a skill so deeply hidden in the human soul that we may never guess the secret trick that nature employs here." I do not claim that I can resolve this mystery, but I think I can dispose of it by showing that it is but an instance among many others, of the way we make sense of experience by an act of knowing clues to which we are not attending. Things at the back of our minds were

included among the many clues of which we make sense in seeing an object in a particular way. We can say, accordingly, that the word 'dog' denotes the joint meaning of a great many memories of dogs at the back of our minds; and that this is what is meant by saying that the word 'dog' denotes the concept of dogs. Once we clearly recognize that all knowing consists in attending to the joint meaning of a vast number of clues or particulars, to which we are not attending for the time being -- and many of which we may never be able to identify at all -- we can no longer wonder about the way universal terms are used or applied. Once we see that all knowing has this structure, we shall accept this fact as the cornerstone of our concept of knowledge, and cease to regard any particular instance of it as a puzzling anomaly, as it appeared to Kant.

This may be the point for driving home a curious element in my revised conception of knowledge. According to my analysis, meaning is established always by relying on our awareness of one thing for attending to another. The thing to which we are attending is then the meaning of the subsidiaries to which we are not attending at the time. It follows, that if we can identify any such subsidiary and switch our attention to it, it should become meaningless. This conclusion is notoriously born out for the case of words. Repeat the word table, table, table, twenty times over, attending carefully to the sound, the movement of your lips and tongue in uttering the word and its meaning will become remote and finally dissolve altogether. This is often expressed by saying that words used meaningfully are trans-

parent and that when we concentrate on any particular word as a sound it becomes opaque. The transparent word is like a telescope through which we see its meaning -- while, when rendered opaque, the word ceases to show us things beyond itself and blocks our sight by its own meaningless body.

This is not to deny the possibility of defining a comprehensive entity more precisely by seeking to identify its particulars. Such an analysis deepens our understanding, if it is followed by a reintegration of the particulars. Medical science tries to identify the several symptoms of diseases, and students will learn the list of such symptoms; but such a list will benefit them only if they learn to apply it practically at the bedside. The same is true of motion studies for the improvement of skills. A pianist will find himself paralyzed if he attends to the motion of his fingers instead of to the music he is performing. But finger exercises will improve his performance when he once more subordinates his fingers to his music. This, by the way, is the difference between a pedantic analysis of a great text which destroys its meaning and an analysis which deepens our understanding of it. The humanities studied in universities fall under this judgment.

We may add that the great movement of modern art, of which I spoke last week, has shown in its own way that the destruction of meaning can be the path to discovery. Impressionism was an atomisation of the visual field, disregarding the way its objects are usually seen and under-

stood, and re-integrating the fragments in a novel manner. Soon after, Rimbaud discovered that a torrent of words bereft of their usual meaning, can form great poetry. James Joyce performed a similar feat for the novel, and the movement reached its climax about twenty years ago when Sartre in his masterpiece, *La Nausée*, ushered us into the presence of total nothingness. This novel shows how one can reduce the universe to absurdity by attending to all its particulars in themselves. Then the pebble in your hand, the saliva in your mouth and the words in your ear all become external, impersonal, monstrous items.

I have said last time that this method of discovery can hardly be pursued indefinitely; but this is not my point here. I have brought up Sartre's method of emptying the world of meaning, for it beautifully illustrates the absurdity of the ideal of science -- to which it actually owed its inspiration. I have said, that the ideal of science is represented up to this day by Laplace's conception of universal knowledge, and have rejected this on the grounds that a complete knowledge of all the particles of the universe would tell us nothing that we are interested in; nothing that would answer any questions raised by our experience. I have given as an example the question, whether primroses planted today will blossom next May, and said that this is not answered by telling us what the position of all the atoms of the universe will be next May. But I have left open the question whether it is conceivable that ultimately our question may be answered by an atomic theory of primroses. Scientists as a body would unhesitatingly affirm this, but I think that you can

already see the grounds on which I must deny it. If all meaningful experience can be known to us only by a process which makes sense by relying on our awareness of some things to which we are not attending -- and which we may never know -- then an operation which strictly eliminates this tacit knowing, must completely destroy all meaning. And this is precisely what a mathematical theory of the universe would be intended to do. For to be completely explicit, all the data of a mathematical theory, as well as all the computations based on these data must be presented to us on one single level of awareness. They could all be written out on one immense blackboard, and we could attend equally to everything written on that blackboard.

But, of course, the very conception of a strictly explicit theory of the universe is logically untenable. We have seen that words mean something only by being transparent, by pointing to something beyond themselves, and this is true also of mathematical symbols. A theory of experience can never be wholly explicit, for it can never include its own bearing on experience. Its reference to experience must be the act of someone using the theory and applying it to something known already before, and not hitherto explained by the theory. Hence, in order to mean something, the theory must be incomplete -- it cannot mean anything in itself.

If this argument appears too subtle, I can promise to make it blunter and more telling in my next lecture, by which time I shall have heavier artillery at my disposal. Meanwhile, let me complete this survey of the unspoken powers of the mind, by revealing its highest form, the

supreme achievements of which will spread a new and convincing light on what I have said so far of these powers acting on a lower, more humdrum level.

Let me return to the psychiatrist who, by virtue of his expert knowledge, diagnoses a true epileptic fit. "I cannot tell you how to recognize it (he said), you will learn this by more extensive experience." This shows that in identifying the present case of the disease, the psychiatrist not only relied on his awareness of a whole range of cases which, in spite of their individual differences, he had identified in the past, but that he is confident in his power to identify an unlimited number of future cases, which might differ from those known before, in an infinite variety of unpredictable ways. So the psychiatrist is talking here about things that have not yet happened and, what is more, he is speaking confidently of the meaning that these events will have, though he would admit that the particulars which will have this meaning may never be clearly known to him and may be altogether unidentifiable.

This is, of course, but an instance of the application of a general term, like 'table' or 'dog,' to the facts of experience. Each of the nouns, verbs, adjectives and adverbs of our language is applicable to a vast range of instances both past and future. We expect to continue to speak in our language for years to come of things yet unborne. Each of the few thousand commonly used English words recurs on the average a hundred million times in the daily conversation of people in England and America. As

people continue to speak their language they are assuming that the world is made up of a few thousand identifiable meaningful features, each of which will recur in their joint experiences many million times a day. Thus to use a vocabulary is to claim a detailed foreknowledge of all things to come and a capacity to identify them in terms of this foreknowledge. And, I might add, that any skill that we have mastered entails such foreknowledge, as it embodies the confident expectation of handling by it ever new and unprecedented situations. But all this is only to serve as a prelude to a confrontation with the kind of dramatic foreknowledge we meet in scientific discovery and technical invention.

It is a commonplace that all research must start from a problem. Research can be successful only if the problem is good; it can be original only if the problem is original. But how can one see a problem, any problem, let alone a good and original problem? For to see a problem is to see something that is hidden. It is to have an intimation of the coherence of hitherto not comprehended particulars. The problem is good if this intimation is true; it is original if no one else can see the possibilities of comprehension that we are anticipating. To see a problem that will lead to a great discovery is not only to see something hidden, but to see something of which the rest of humanity cannot have even an inkling. All this is a commonplace; we take it for granted, without noticing the clash of self-contradiction entailed in it. Yet Plato has pointed out this contradiction already in his dialogue entitled "Meno." He says that to search for the solution of a problem is an

absurdity; for either you know what you are looking for, then there is no problem; or you do not know what you are looking for, then you are not looking for anything and cannot expect to find anything.

The solution which Plato offered for this paradox was that all discovery is a remembering of past lives. This explanation has hardly ever been accepted, but neither has any other solution been offered for avoiding the contradiction. So we are faced with the fact that for two thousand years, and more, humanity has progressed by the efforts of people solving difficult problems, while all the time it could be shown that to do this was either meaningless or impossible. We have here the classical case of Poe's Purloined Letter, of the momentous document lying casually in front of everybody, and hence overlooked by all. For Meno shows conclusively that if all knowledge is explicit, i. e., capable of being clearly stated, then we cannot know a problem or look for its solution. And Meno shows therefore also that if problems nevertheless exist, and discoveries can be made by solving them, this proves that we can know, and know important things, that we cannot tell.

I have said that in the case of the most important problems which lead to great discoveries, this knowledge is accessible only to a single individual; it is a distinctly personal knowledge. This personal character of a problem is shown already in the fact that nothing is a problem unless it puzzles somebody. Take the famous paradox of the Liar; that is, the fact that if I say of myself that I am lying, this statement is true only if it

is false. This paradox, known for about 2000 years, was no problem during that time for it was shrugged aside as a mere sophism. It became a fundamental problem of logic when modern logicians began to be puzzled by it.

And no problem will ever be solved unless he who sees it is not only puzzled but obsessed by it. Asked by his pupils, in jest, what they should do to become 'a Pavlov,' the master answered in all seriousness; "Get up in the morning with your problem before you. Breakfast with it. Go to the laboratory with it. Eat your lunch with it. Keep it before you after dinner. Go to bed with it in your mind. Dream about it."

But what is the object of this intensive preoccupation? How can we concentrate our attention on something we don't know? Yet this is precisely what we are told to do by Polya, the classic writer on problem solving in mathematics: "Look at the unknown," he says, "Look at the end. Remember your aim. Do not lose sight of what is required. Keep in mind what you are working for. Look at the unknown, look at the conclusion." (Original italics.) No advice could be more emphatic, nor appear more absurd unless interpreted in the terms of tacit knowing. For to look at the unknown means then, that we should look at the known data, as clues to the unknown; as pointers to it and parts of it. It is this passionate striving to comprehend the known data by looking at the unknown that eventually discloses the unknown in a blaze of discovery. This is, indeed, unspoken thought writ large -- writ as large as the range of scientific genius.

Current theories of the scientific method which inevitably represent it as an explicit process of inference, must ignore the part played by scientific genius. They give a meticulous production of Hamlet without the prince.

But our study of unspoken thought shall reveal yet another matter of major significance. We are told that great scientific discoveries are marked by their fruitfulness; and this is true. But when we are told to recognize truth by its fruitfulness, it sounds like being told to recognize the Snark by its habit of dining the following day. Can we recognize that a statement is true, by appreciating the wealth of its yet undiscovered consequences? This would of course be nonsensical if we had to know explicitly what was yet undiscovered. But it makes sense if we admit that we can have a tacit foreknowledge of yet undiscovered things. This is indeed what the Copernicans must have had when they passionately maintained, against heavy pressure during 140 years before Newton proved the point, that the heliocentric system was not merely a convenient way of computing the paths of planets, but was really true.

It appears then that our capacity to know that a statement is true is to know more than we can tell; that a true discovery which solves a scientist's problem, is itself fraught with further intimations of an indetermined range, and that we accept this discovery as true by committing ourselves to a belief in all these yet undisclosed, indeed yet unthinkable, consequences.

Since we can have no explicit knowledge of these unknown things,

there can also be no explicit justification of a scientific truth. But as we can know a problem, and feel sure that it is pointing to something hidden behind it, we can be aware also of the yet hidden implications of a scientific discovery, and feel sure that they will prove right. We can feel sure of this, because in contemplating the discovery we are looking at it not only in itself, but more significantly, as a clue to a reality of which it is a manifestation. The pursuit of discovery is conducted from its start in these terms; all the time we are guided by sensing the presence of a hidden reality towards which our clues are pointing; and the discovery which terminates and satisfies this pursuit is still sustained by the same vision. It claims to have made contact with reality; a reality which, being real, may yet reveal itself to future eyes in an indefinite range of unexpected manifestations.

Here we catch our first glimpse of the promised land; of the vindication of reality. I hope that the journey that brought us here has not appeared to you as forty years of wandering through the desert.

At any rate, I think I can claim to have followed up my introduction, suggesting that the destruction of reality, imposed by a false ideal of science, cannot be remedied except by uprooting some basic conceptions taken for granted by the modern mind since the rise of scientific rationalism about three hundred years ago.

Several centuries have passed since Descartes asserted in his "Discourse on Method" that the mark of truth was that it gave us clear and

distinct ideas; and up to our own days this Cartesian doctrine has still been emphatically echoed by Wittgenstein in his "Tractatus," when commanding that what cannot be said clearly, of that we should remain silent.

And now I am telling you that all that we know is the meaning of things to which we cannot attend at the time, and the subsequent identification of which is necessarily uncertain and often impossible. And I have gone further, by asserting that the very concept of a wholly explicit statement is absurd. It can have no bearing on experience, except by the tacit act of someone seeing experience in its terms, and the further tacit act of acquiring a previous knowledge of this experience.

All this takes us pretty far -- as I have said it would. But I hope that you may yet go along with it, if you agree that, as I have shown in my last lecture, something has gone profoundly wrong in the development of scientific rationalism, the earliest stages of which have brought such great blessings to humanity.

III. The Vindication of Reality

This Lecture has a tremendous title: "The Vindication of Reality." I am afraid I shall have to go rather fast, if I am to get anywhere near to this task within an hour.

Remember the examples of the destruction of reality I gave you in my first lecture. I told you of neurologists who deny the existence of consciousness and of anthropologists and historians who insist that evil practices, however cruel and senseless, must always be scientifically justified by their social or historic setting. This was the destruction of reality I spoke about; so if I am now trying to undertake the vindication of reality, my aim must be to re-establish the conception of conscious, morally responsible, human beings on grounds assured against assault by a false ideal of science.

Last week I prepared my work for today. I spoke of things we know and cannot tell. I argued that every time we attend to something so that we can clearly identify it, we rely on our awareness of clues or particulars to which are not now attending and which we may never be able to identify at all. In this manner I established that all knowing includes two kinds of awareness, one explicit, the other tacit. I gave an example to show, that if in cases when we can clearly identify some particulars of which we are tacitly aware for the purpose of attending to something else, we switch our attention to these particulars, they lose their meaning. They cease to point

towards the things they have hitherto meant or cease to compose the comprehensive entity which they hitherto formed. Thus the comprehensive entity to which they contributed vanishes from our sight; our understanding of it, indeed our very knowledge of its existence, is destroyed. In other words, a comprehensive entity is not specifiable in terms of its particulars; it is destroyed by the attempt thus to specify it.

Today I will suggest that this is how scientific analysis destroys reality. It arrives at absurd conclusions, such as I have cited a moment ago, by insisting to analyze all complex entities in terms of its more tangible particulars. This is why neurologists must pretend to know nothing about consciousness, this is why anthropologists and historians must pretend to know nothing of right and wrong. They must insist on studying the nervous system, or the economic and social institutions, instead of the conscious morally responsible human beings, because the scientific method compels them to represent experience in more tangible, more objective, terms. The Laplacian atomic topography is but the logical end point of this endeavour; it operates in many stages always reducing higher entities to particulars of a lower kind.

My vindication of reality will consist in showing that the universe is in fact such that my conception of knowing is appropriate to it; that there do in fact exist higher levels of reality composed by comprehensive entities, which include principles that are absent in the lower levels of reality composed of the kind of particulars which contribute to the comprehensive

entities. This is why by relying on our awareness of the particulars situated on a lower level of reality, we can apprehend the comprehensive entities on a higher level of reality, but cease to see these if we desist from using our powers of comprehension and look instead at the particulars in themselves. We shall vindicate reality by repudiating the obsession of scientific rationalism with tangible particulars which leads to absurdities. We shall acknowledge instead our confidence in our powers of comprehension the functions of which science takes pride in eliminating, but which, as I shall show, it nevertheless uses continuously even while pretending to dispense with them.

I am sorry that my leading example for demonstrating the existence of two levels of reality, of which the higher one contains certain comprehensive entities and the lower one contains their parts, will be of no great interest in itself to this audience. I shall chose this example because it is homely and clear, and I promise you that we shall presently move on to more vital cases on which the lessons of our example immediately shed light.

The two levels of reality which I shall first identify will both lie in the domain of inanimate matter. The upper level will be composed of machines. Every kind of machine from typewriters to motor cars and from telephones to pendulum clocks are to be collected here, and each in all possible variations. As to the lower level, it will consist of the parts of machines seen in themselves, as mere inanimate objects, mixed up with

all other inanimate objects of the world.

Let me show first that machines on the one hand and their parts, as mere inanimate bodies, on the other hand, are the subjects of two distinct sciences; machines are studied by mechanical engineering, inanimate bodies by physics and chemistry. A class of machines, say clocks or watches, is characterized by common features which say little or nothing about their physical-chemical composition. There is, for example, an infinite variety of materials of which watches or clocks can conceivably be made, and it is wrong to define watches or clocks in terms which would exclude the use of any one of these materials. The definition which truly establishes the characteristic reality of a machine -- say a typewriter, a motor car, a watch or a clock -- consists in its operational principles. This principle states the purpose of the machine, the function of the parts of which it is composed and the way they interact in achieving their purpose. Such is the definition, such the conception of a machine. If you have an idea for a new machine you will define it in the terms of its operational principles and you may claim a patent founded on this description of it. You will carefully avoid in applying for a patent any reference to the material of which you have made such a machine, or think it would be best made; for if you do this, your patent could be circumvented by a competitor making your machine from some other material. You would, in fact, have failed to define in all its generality the class of objects comprised by the conception of your machine.

Look, on the other hand, at the parts of a machine as inanimate objects. Take a watch to pieces and examine, however carefully, its separate parts in turn, and you will never come across the principles by which the watch keeps time. Let loose an army of physicists and chemists to analyze and describe in detail an object which you want to identify as a machine, and you will find that they can never tell in terms of physics or chemistry whether the object is a machine, and if so, what purpose it serves and how.

This corresponds to the obvious fact that textbooks of physics and chemistry do not deal with the purposes served by machines, while the science of engineering speaks at length of these purposes. Engineering deals with communication, locomotion, heating, lighting, spinning, weaving, and hundreds of other manufactures, and hence can deal also with the way these purposes are achieved by the aid of machines, while physics and chemistry knowing nothing of such purposes, can form no conception of machines at all.

Of course, things which cannot be defined in terms of physics and chemistry can still less be defined by an atomic topography. The Laplacian mind would fail to identify any machine and such arrant blindness disqualifies this ideal completely.

I shall try now to tell you more about the logical relation between the two consecutive levels of reality we have before us in the case of machines and of their parts as mere inanimate objects. This will turn out to be

typical of all consecutive levels of reality and will, therefore, reveal the principle by which we can envisage an indefinite succession of such levels, right up to the level of responsible human beings.

I have said that a machine can be defined only by its operational principle, which tells us what it is for and how it works. This clearly implies also that a machine is something that can fail to work, that can get out of order. But it says nothing more, and can say nothing more, about machines that have gone wrong. It cannot say what may cause a machine to break down. To understand these failures of a machine we must descend to an enquiry of the lower level formed by the parts of the machine, as mere inanimate bodies. In other words, we must call in physics and chemistry and examine the parts by the methods of these sciences. But this must be a peculiar kind of physics and chemistry: a use of physics and chemistry expressly bearing on the operational principles of the machine. In this ancillary role, which is called applied physics and chemistry, these sciences can supply the information necessarily ignored by the operational principles of a machine. This is how engineers use physical and chemical investigations for establishing optimal conditions for the construction and working of a machine and for learning to avoid its breakdown.

We have then two branches of science referring to the two levels of reality comprised in a machine. They are, firstly, the science of operational principles, which we may call 'pure engineering' and, secondly,

physics-cum-chemistry with a definite bearing on the operations of machines. The status of these two branches of knowledge is far from symmetrical. The practical identification of a machine must come first and no amount of physical and chemical testing can achieve this. Mechanical engineering alone reveals the true nature of a machine, by understanding its purpose and the rational means which the machine offers for achieving this purpose; the physical and chemical topography of a machine is, by itself meaningless. This corresponds exactly to the comprehending of a meaningful entity by relying on our tacit awareness of its particulars. The comprehensive entity owes its existence to the existence of the particulars and our knowledge of it is a comprehension of these particulars; but the particulars lose their meaning when we attend to them focally, in themselves. They form the comprehensive entity only by their bearing on it and, what is more, they are identifiable only -- if at all -- by first recognizing the comprehensive entity which they constitute. The importance of this last conclusion will become apparent in a moment.

And now we can turn at last to subjects of more immediate concern to this enquiry. What I have said of machines, applies likewise to the machinelike aspects of animals. It is questionable to what extent living beings can be represented by machines. But there can be no doubt that the animal body does function in some respects as a machine. A great number of patents could be taken out on the operational principles of such organs as the heart, the lungs or the eye, had these instruments been newly invented

today.

This is all that we need for the moment to become aware of a very curious fact; namely, that physiologists unanimously consider the machine-like operations of the body to be explicable in terms of physics and chemistry. To offer a mechanistic explanation of living beings is taken to be synonymous with offering an explanation in terms of physics-cum-chemistry. But this is the exact opposite of what I have just proved for machines themselves. Are we then to reject, as a logical error, the claims of biologists that in explaining living beings as mechanisms they are explaining the functions of the organism in physical-chemical terms? Yes, that is precisely what we have to do. The idea incessantly broadcast throughout biological literature, that the purpose of scientific biology is to explain life in terms of physics and chemistry, is strictly meaningless. This error is admittedly rendered harmless, in the practice of biology, by the fact that biologists never actually try to explain the functions of living beings in terms of physics and chemistry. What they actually do, is to establish the principles by which the healthy organism operates: principles, which insofar as they are mechanical, have the same structure as those of pure engineering. They define the functioning of various bodily organs in the joint achievement of certain bodily purposes. No physical or chemical analysis of a living body can express these operational principles, since neither bodily purposes nor functioning organs can be expressed in terms of physics or chemistry. Far from offering a complete understanding of life, a complete physico-chemical

topography of an organism would be quite meaningless. Physiology is advanced by physical or chemical investigations only if undertaken with a bearing on previously known or surmised operational principles of a living being. Such investigations can only seek to determine the ways in which anteriorly recognized functions of an organism are performed, and to detect the causes of their disfunction; otherwise they contribute nothing to biology. I repeat therefore that the declarations of biologists that they will explain all living beings in terms of physical and chemical processes are a logical absurdity.

Biologists should recognize their great achievements for what they are, and reject on these grounds the conception of the scientific method derived from a misunderstanding of the exact sciences. In doing so, they would not only liberate themselves from the yoke of false pretenses, but may induce physicists and chemists themselves to correct, on similar lines, the conception of their own methods which they currently hold.

We can finally settle accounts here with the Laplacian ideal of universal knowledge. Suppose we had a complete atomic map of the world for all times; what would this tell about a living being, say a living frog? We cannot ask any questions about living frogs unless we know about frogs first and are even able to tell -- at least roughly -- whether a frog is dead or alive. Without the anterior knowledge of these comprehensive features, no Laplacian investigation of living frogs could ever be started. And even so, the information supplied by the Laplacian mind would mean nothing

unless we could discern from it such further comprehensive features, like the existence of different organs and their functions. And we could do so only by identifying the shapes and patterns of organs within the atomic topography, for which we should have to rely on the same faculty for discerning comprehensive entities by relying on our awareness of their particulars, which physiologists normally use when making observations on animals. The atomic fragmentation of the world would only make this infinitely more difficult. Harvey would never have discovered the circulation of the blood if he had had to start from an atomic map of living beings. And, assuming for the sake of argument that a super-Harvey would have achieved this feat, he would have done so by the same faculties by which Harvey guessed how the blood is being pumped by the heart into the arteries and flows back into it from the veins. Neither the conception of the frog nor that of the heart, the arteries, the veins and the blood flowing through them can be expressed in terms of atomic coordinates, any more than a machine can be defined in these terms. And the same is true of course for primroses; we can now see finally why a Laplacian computation of the future position of atoms next spring can say nothing about flowering of primroses at that date, nor indeed tell us anything else that is of interest to us.

What is more, it is becoming apparent, that our analysis of the logical relation between two consecutive levels of reality has equipped us with a mode of reasoning, by which we may be able to destroy systematically,

the typical fallacies engendered in the modern mind by a false ideal of science. The building up of further consecutive levels of reality, right up to that of morally responsible man, will show how this liberation of the modern mind can be continued further.

The next higher level of reality to which I shall ascend now, leaving out for the moment some intermediate levels, is that formed by the active behavior of animals and men. We meet here with individuals governed by an active center. The center coordinates the animal's actions which follow its perceptions and satisfy its drives. This motoric, appetitive, perceptive agency is invariably endowed with the faculty of learning, and the experimental study of learning in animals has been for half a century a major preoccupation of psychological laboratories. Pavlov's experiments on dogs have evoked a mighty movement for interpreting all behavior, including that of man, in mechanical terms. This interpretation was first formulated in America by Watson's 'Behaviourism' about 50 years ago and was upheld since then with unessential variations by many influential works, such as Clark L. Hull's fundamental treatise published 20 years ago, and in our own days, by B. F. Skinner's writings issued from Harvard. All these inquiries are dominated by the determination to represent all behavior, and particularly the process of learning, in terms of a mechanical model and to avoid, above all, the kind of anthropomorphism which would explain the animal's reactions, by considering what we ourselves would do in its place. It is held that only by exercising such detachment can the inquiry be

made truly scientific.

In my opinion it is, on the contrary, only by indwelling that we can understand anything at all about an animal's behavior. You might remember that by generalizing the functions of our body as the center of tacit awareness, I suggested that all tacit awareness is a kind of indwelling, and that this makes intelligible the way we understand the internal meaning of music or pure mathematics. This manner of relying on our tacit awareness of particulars, for comprehending their joint internal meaning, will now prove indispensable for identifying the active center of an intelligent animal or man.

Let me illustrate this on an example from animal psychology. Take the standard experiment of a rat running a maze. It is found that as a result of repeated trials the rat gets to know its way about a maze. Since the particulars of the knowledge acquired by the rat are unspecifiable, the psychologist's knowledge that the rat has learned the maze is unspecifiable at least to the same extent. What happens is in fact that at some moment the rat's behavior begins to show that it has grasped the topography of the maze, because it is behaving in a fashion similar to that which we ourselves, if equipped with the rat's sense organs, would behave if we had just begun to know our way about the maze.

The understanding of the process of learning by dwelling within the unspecifiable manifestations of an animal's intelligence is, of course, only one instance of the way indwelling makes us aware of the animal's active

center. The same process operates at more primitive levels. It is indwelling alone that can make us aware of an animal's sentience, and we owe therefore our entire knowledge of the appetites and perceptive powers of animals to our capacity for indwelling.

So we may conclude that the behaviourist teaching that, in observing an animal, we must strictly refrain from imagining what we would do if placed in the animal's position, is false. Nothing at all could be known about an animal that would be of the slightest interest to physiology and still less to psychology, except by following the opposite maxim of identifying ourselves with a center of action in the animal and criticizing its performance by standards set up for it by ourselves. And we may add that, in spite of their declared repudiation of this method, all significant results obtained by behaviorists themselves are in fact based primarily on this method.

Individuals acting purposefully under the control of an internal center form a new level of reality, situated above the physiological level of automatic functions which I referred to as the machinelike operations of living beings. I have explained there how physiological functions are rooted, just as the operations of a machine, in a lower level of reality which is controlled by the laws of physics and chemistry, laws that say nothing of purposes and rational means for achieving these, and are blind to the very conception of success or failure. The level of an actively centered individual to which we have now ascended is likewise rooted in a next lower level, which is that which formed previously the upper level, *i. e.* the level of physiological

functions.

So we see now three levels of reality successively placed on top of each other. From the lowest, inanimate level we ascended to that of living beings functioning automatically, i.e. to the vegetative or physiological level; and from this we ascended to a third level, controlled by the animal's motoric, sentient, intelligent center. Remember that the first ascent from the inanimate to the living endowed matter with the capacity for going wrong which it previously did not possess. The next step which we have just defined has a similarly tragic success. By rising from the physiological to the actively centered, sensitive and intelligent level, life acquires new capacities together with entirely new liabilities to go wrong. An animal controlled by his perceptions and drives can fall into error. We could never impute error to our intestines or lungs, their functions can go wrong, but they cannot fall into error. In this respect the level of reality on which error becomes possible, is rooted in the lower level of physiological functions, in exactly the same manner as physiological functions are rooted in their turn in the inanimate; but I shall not go into this now, for it can be left until later when I shall survey the whole succession of levels up to the highest level of reality, which we shall meet in the human mind.

Man's mind has much in common with that of the animal; it is a center of sentience and perception and of various drives which we share with the animals. It is also the center of an intelligence, but one that is

much more developed than that of the animal. Owing to his higher intelligence, man has the power of thought. We know a man's thoughts by a similar process of indwelling by which we comprehend a rat's intelligence, but the greater importance of man as compared with rats, justifies us in describing this indwelling in some detail.

When we watch a man's face and try to fathom his thoughts we do not examine his several features in isolation, but view them jointly as parts of his physiognomy. Thus we are aware of far more particulars and relations between particulars than we could identify. It is generally impossible, therefore, to keep track of a man's mental manifestations except by watching them as clues to the mind from which they originate. It is always the mind itself that we know primarily; any knowledge of its workings is derivative; and even so these particulars remain rather vague and largely unidentifiable. This proves that the program of behaviorism which proposes to study the workings of the mind in themselves, without reference to the mind, is totally impracticable.

It shows also that the linguistic analysis of the mind performed by Professor Ryle is mistaken. Ryle tries to avoid Cartesian dualism, and with it also behaviorism, by identifying the mind with the workings of the mind. But this assumes, once more, that we can identify the workings of the mind in themselves -- which is not the case. We can recognize them only as pointers to the mind that works them. To say that the workings of the mind of which we are aware as the mind, are the mind, is to commit

the same logical mistake as to say that the word 'table' which signifies a table, is a table.

But this does not yet explicitly vindicate the reality of the human mind. For this I must refer back to what I said about reality at the end of my last lecture. I spoke there of the kind of foreknowledge which is present in any knowledge of the truth. True knowledge, I said, is fraught with surmises; it is an inexhaustible mine of still hidden implications; and it conveys this awareness of its yet undiscovered consequences, because it is but an aspect of something that lies beyond it, an aspect of reality. Thus I defined reality as that to which true knowledge points, and which yet may reveal itself further, by an indeterminate range of future manifestations. I want to show now that according to this definition all the centers of individuality are real. This will entail a quick survey of the levels of reality in living beings, of which I have mentioned so far only two.

Even when contemplating merely their shapes, living beings can be identified only in terms that attribute success or failure to them as individuals. On this lowest, morphological, level the center of individuality is still very weak. It becomes more accentuated, stage by stage, as we ascend to higher levels; first to the vegetative level of physiological functions; then to that of active sentience and appetitive behavior; and thence again to the level of intelligence and inventiveness, finally reaching the level of the responsible human person. Each higher center is more real than the lower, for each higher one is expected to reveal itself in a

new and ever wider range of indeterminate manifestations.

By these standards the human mind is perhaps the most real of all the things in the world. It excels over that of the animal in the first place by enormously expanding the highest faculties of the animal, an achievement in which the gifts of genius once more surpass by far those of ordinary men. Learning, as performed by animals, can be regarded as the solving of a simple problem, but the same powers of problem solving are manifested on a monumental scale by the achievement of a great discovery. A discovery qualifies as such to the extent to which it is unexpected; that is, to the extent to which it exceeds the range of any explicit rules of inference. Thus the great creative mind possesses the highest degree of reality, by the fact that its workings are supremely unspecifiable. And we may add, in passing, that this eminent unspecifiability of the great mind is but a measure of its insight into more deeply hidden levels of reality confronting it.

Looking at all this from another angle, we see that each higher level of reality, endowed with additional unspecifiable faculties, incurs thereby additional risks to which lower levels are not liable. The inanimate realm from which all life has originally arisen, is unerring and deathless. Life at its very lowest level is endowed with the wondrous capacity of growth by which plants and animals acquire their typical shapes, but this gift brings with it the liability to miscarry by producing malformations. Next, ascending to the level of physiological functions, we find that the

organism has become subject to disabling and eventually mortal diseases. And, as we have seen, the still higher functions of perception, drive-satisfaction and learning, bring with them the capacity for falling into error. Man's higher level of intelligence makes him naturally liable to far greater errors than an animal can make. When reading the works of great thinkers, I sometimes wonder whether human fate would not be safer in the hands of lesser men -- a man of genius can persuade us of any fallacy. And man is not only liable to far greater errors than animals are, he is also prone to failures of an entirely new kind: he alone is capable of evil. But it is too early to go into this here; I have to speak first of the peculiar instrument by the use of which alone man is made intellectually superior to the animal.

I have said that problem-solving is always an indwelling and an assimilation of the known, in order to look through it at the unknown. The superiority of man's intelligence over that of the animal is due almost entirely to another kind of indwelling; the dwelling of his mind in language. Experiments have shown that the tacit powers of a child before it learns to speak, hardly exceed those of a chimpanzee of the same age. The intelligence curves of the two go on rising at about the same rate, until suddenly -- when it learns to speak -- the curve of the child goes up soaring far beyond that of the animal. Since words make sense in an infinite number of ways, language gives man access to an unlimited range of meanings, unknown to the animal.

Even the highest animals show but very faint traces of this highest level of reality. Chimpanzees show their intellectual pleasure in a trick originally invented for hauling in a banana, by applying it to stones or other useless things. The nervous breakdown of a dog confronted with signals ambiguously pointing to the alternatives of 'food,' or 'no food,' is out of proportion with the dog's interest in food. It seems to arise from the intellectual fascination of a puzzling situation. But the range of such intellectual passions is increased myriad-fold in a mind growing up in an articulate culture. Human culture is an edifice of passionate thought, reared by the force of the passions to which its erection offered creative scope, and continuing to foster and gratify these same passions. Young men and women pour their minds into this fabric, so as to acquire the thoughts and live the emotions which it teaches them. And they transmit these in their turn to succeeding generations on whose response the edifice relies for its continued existence.

By contrast to the satisfaction of appetites, the enjoyment of culture creates no scarcity in the objects offering gratification, but widens on the contrary their availability to others. Those who obtain such goods increase their universal supply by teaching others to enjoy them. And a pupil is no detached observer of that to which he attends, nor even an equal partner to it; he submits to its voice, commanding his respect.

We have clearly arrived here at a level overarching the faculties of any individual human mind, a level which we recognize as real insofar

as we acknowledge the intrinsic powers of human thought. The relation of individual minds to this domain of transcendent thought will be the subject of my last lecture next week. And since this relationship includes to a large extent the subject of human responsibility, I shall have to carry forward this matter also to that meeting.

So much the better. For I feel like one of those mountain guides who hustle their flock of tourists up to a peak without giving them a chance to look around. Let us stop here to ask ourselves, how far we have actually got towards a vindication of reality, of the destruction of which I have spoken in my first lecture. The conception of reality has emerged as the correlate of a new conception of knowing. If knowing is an act of comprehending the meaning of clues and particulars to which we are not attending in themselves, then knowing does not refer primarily to any object. It does so only if the things which function as clues or particulars happen to reveal a single comprehensive object. We have seen that there is no such object in view when we contemplate a general conception. But whether this be the case or not, our interpretative powers cannot comprehend a meaningful entity without looking beyond this entity. Our confidence in holding our knowledge of it to be true, points beyond it. For whenever we accept a statement as true, we say that it refers to an aspect of a reality which may yet manifest itself in an indeterminate range of yet unthinkable ways.

We might look also in a more general way at the manner in which

a higher level of reality is rooted in a lower one. I should call this rootedness a logical relationship, because it is a relation of meanings. In the higher level of a comprehensive entity there lies a meaning which is absent in the next lower level, but the higher meaning exists only by its actualisation in the lower level. This actualisation is granted to it at a price. The lower medium which makes the operation of a comprehensive entity possible limits its scope and may cause its destruction. This bearing of the lower level on the higher level can, of course, be recognized only by virtue of some prior knowledge of the higher level. No study of the particulars of a comprehensive entity in themselves can ever represent the entity. Neurologists who deny the existence of consciousness, and students of anthropology or history who pretend to be blind to the distinction between right and wrong do so for they feel obliged by the standards of science to represent comprehensive entities objectively in terms of their particulars, and this is impossible.

But we have yet to familiarize ourselves with our own position in face of this universe of many levels of reality. The great German poet, Rainer Maria Rilke, has said that man has become a stranger in our interpreted universe. He meant the universe as interpreted by science. I believe that if we reflect on the way we henceforth should attend to reality from its lowest to its highest levels, we shall experience a veritable housewarming in this universe of re-vindicated realities.

The false ideal of science, which I had charged with the wholesale

destruction of reality, has relied for its conception of knowledge on the process by which inanimate matter is observed. This was supposed to represent a purely descriptive, strictly value-free, scientific knowledge. But these claims are false. It is true that the laws of mechanics are strict, but any application of these laws to experience requires that we assess the nature of observed deviations from it. We must judge whether they are purely random or show some kind of order. The application of the laws of mechanics to experience takes place in a penumbra of experimental deviations, each of which has to be accounted for in terms of order or randomness if the laws of physics are to make contact with experience.

Yet in spite of these valuations which enter into our knowing of the inanimate, we may agree that this knowing is relatively impersonal. We may then distinguish between the observational knowing of the inanimate, and our knowing of living things in which our judgment of rightness becomes more detailed and more emphatic. For we cannot identify a plant or an animal, except by judging whether it has the right shape by the standards which we consider appropriate to its species. This critical attitude, which the biologist necessarily assumes toward his object, becomes even more elaborate as we ascend from morphology to the study of the organs and their functions, sustaining the life of the animal or plant. All the beautiful discoveries of physiology present as many standards by which to distinguish normal from abnormal functioning of a living being. And as we rise further to the level at which an animal is seen to coordinate

its motions, to perceive the world outside, and to seek satisfaction of its appetites, the criticism implied in biological observation assumes a more pointed character. For it now attributes success or failure to the active center of the animal which controls these doings.

Throughout the compass of biology we find this relation between the observer and his subject; he is always critical of it. But as our study, ascending further, reaches that of man, a change comes over it. Already as we ascended from the more primitive to increasingly active and intelligent manifestations of animals, our indwelling in these had become more intimate. It offered scope for mutual affection between the observer and the observed. But at the human level, we are facing not merely a lovable creature, but a person commanding respect. We may criticize him, but since we enter into equal fellowship with him, we acknowledge that we both share the same firmament of standards. Thus, by a continuous expansion and intensification of the personal element of knowing - corresponding to rising levels of reality - we eventually pass from the "I-It" to the "I-Thou."

Nor is the equality of status between the knower and the known the ultimate point in this progression; for the subject of our knowing may ascend still further and become our master. We then become apprenticed to our subject and learn to accept its criticism of ourselves. The writings of the great masters, to the study of which the humanities are dedicated, offer ways of knowing a greatness to the example of which we entrust our

judgment of ourselves. Here we see outlined the continuous transition between the natural sciences and the humanities; a transition which results in a complete reversal of the relative position between the knower and the known: from an impersonal or critical, to a respectfully guided attitude.

Such is the range of valid knowing, established on the ruins of a false ideal of science by the vindication of reality on all its levels.

IV. A Society of Explorers

In meeting this audience today, I feel like a businessman facing an assembly of his creditors whom he had successfully jollied along by his promises for some time, but who have at last turned round, determined to present all their claims for immediate payment. Realizing this situation, I shall naturally start with a plea for a reasonable settlement. Let me tell you then how I regard my task tonight. I have spoken of the two great ideals launched by the French Revolution. One was embodied in the twin movement of scientism and romanticism: of the liberation of the intellect and of man's individuality. The other was a new tide of social hopes containing varying proportions of nationalism. I have said that these two ideals -- or more precisely two clusters of ideals -- are in essential conflict with each other and that this conflict has been catastrophically resolved in modern totalitarianism, by uniting them in a way which mutually satisfies and destroys them. But I have added that this solution has in its turn proved unstable. I have suggested that the predominant trend of modern thought today, both inside the Soviet empire and outside it, is an urge to escape from the precarious and eventually disastrous solutions presented by modern nihilism and totalitarianism.

But this escape is today a disorderly rout, and we have to shape it into a coherent movement. It is in vain that some former Communists

once more discover ~~their~~ patriotism, or else seek refuge in the bosom of a church, or try to relapse into political indifference; nor will they find satisfaction in the strains of jazz or in the monastic muteness of the beatnics. Having broken out of prison they will, of course, be happy to find any place where they can settle down freely. But we must not be deceived by these immediate reactions; they can offer only temporary alleviation. Revisionism cannot succeed permanently by merely returning to ideals, or to distractions, the instability of which had originally caused the modern mind to descend into disaster. No, we must realize the difficulties of the modern condition to the full, and accept the tremendous task of revising the ideals of the French Revolution so that they be purged of their fateful internal contradictions.

I have made a beginning in this direction in my last two lectures by revising two aspects of scientific rationalism. I showed that all our knowledge is rooted in a tacit awareness of things to which we are not attending at the time, and which we may never be able to identify at all; and I rejected on these grounds the ideal of a knowledge explicitly stating clear and distinct ideas. My acknowledgement that all knowing is rooted in tacit awareness led on to the realization that all knowledge, whether tacit or explicit, is accepted by us as an aspect of a hidden reality, and that if what we believe to be true is in fact true, the reality that we have touched upon may be expected to reveal itself in an indeterminate range of yet hidden manifestations. This was my first step in the vindication

of reality -- of that never fully explorable domain, the conception of which was eliminated by the ideal which would limit knowledge to explicit statements about tangible objects.

Having thus got my foot in the door, I opened it wide last week and have shown you a stratified universe in which each successive higher level of reality was rooted in lower ones. This relationship is essentially unsymmetrical. No higher level can be specified in terms of a lower one. On the other hand, higher levels can operate only within the medium of lower ones and this imposes limitations on the range of their operation. It may involve them in being tainted and eventually frustrated.

I think that this sketch shows already that such a structure of our universe might prevent the mortal clash between the two great ideals of the French Revolution. Any attempt by science to explain the nature and functioning of a comprehensive entity in terms of its particulars would be barred on logical grounds; and any attempt to reduce higher principles, for example of morality, to a mere satisfaction of man's appetites would likewise be barred. And what is more, while the critical destruction of our ideals would be checked, these ideals, so fervently spread by the French Revolution, would be logically barred also from perfectionism.

My analysis of moral inversion (in my first lecture) has already pointed by implication to the menace of perfectionism, but this is the first time that I explicitly named this danger. It is true that the destruction of

reality, of which I spoke, follows logically from the principle of explaining everything in terms of its more tangible particulars, but the motive to carry out this program in real life -- to reduce the universe to absurdity, to reduce man to a bundle of appetites, and politics to implacable violence -- the motive of this self-abomination of man, lies in moral perfectionism. Admittedly, some of the great minds who contributed to this reduction of man were merely didactic, others sardonic -- but the most effective of them were those driven by fury. When Baudelaire a century ago prefaced the volume of his great poems by addressing his public as; "hypocritical reader, my equal, my brother," he gave vent both to this fury and to this self-abasement. Such is the reaction of the modern mind to the spectacle of a society professing high ideals, but falling far short of them in its own actions. Such the intellectual temper which in the name of a severe intellectual honesty denies reality to all that is noble in man.

I could refute the demands of perfectionism simply by referring to the logic by which successive levels of reality are related to each other. For I have shown that the principles of any higher entity must rely for their realization on a lower level of reality and that this necessarily limits the effectiveness of all higher principles; that we can uphold the conception of man's moral responsibility only by accepting the fact that it is necessarily tainted by the very medium which alone can bring it into action.

But this will turn out to be only one-half of my answer. I have said last week that the conception of responsible human action arises within the relation of the human mind to the firmament of thought, from which we receive guidance. This is a limitation of our self-determination from a level above, not below, ourselves. In the main I shall deal tonight with this relationship. It will appear that the level above us, like that below us, enables us responsibly to determine ourselves, but that it also sets its own kind of limits to our self-determination.

The necessity to limit national self-determination by submitting to tradition was passionately asserted by Edmund Burke, by denouncing the French Revolution's sudden attempt to refashion from first principles all the institutions of a great nation. In reply to this, Tom Paine vigorously proclaimed the right of absolute self-determination for every generation, irrespective of its past. Innumerable pages have been written about this discussion and its sequel. The issue has been revived in America in recent years by a new defense of Burke, though I believe the teachings of Tom Paine had previously been predominant in this country. I do not wish to intervene in the American controversy, but I think I can sum up briefly what the situation has been in England during the past 170 years. The most influential political writers from Bentham to John Stuart Mill, and more recently, Isaiah Berlin, are utilitarians. For them liberty consists in doing what one likes, provided one does not interfere with other people's liberty to do so likewise. There is accordingly nothing

either in theory or in law to restrict the English nation as a whole in doing with itself whatever it likes. Burke's vision of "a partnership between those who are living, those who are dead, and those who are to be born," may never have been heard of by these writers; yet in practice -- in actual practice -- it is Burke's vision that controls the actions of the British nation.

We can well understand this paradoxical treatment of the controversy between Tom Paine and Edmund Burke in England. The modern mind was borne in an attack on traditional authority; the very idea of progress, and still more, the unlimited demands proclaimed by the French Revolution, are in principle hostile to tradition. It is of the essence of modern rationalism that we must know explicitly what it is that we believe, and on what grounds we believe it; and that each of us has the right, and indeed the duty, to check these grounds and come to our own conclusions irrespective of what others have believed in the past. Within this framework, Burke's defense of prejudice -- even if the term is used neutrally as signifying prejudgment -- has simply no leg to stand on. We have today no theory of knowledge, compatible with scientific rationalism, for accepting any tradition whatever. But the English are profoundly traditionalist. So the English solution was to save rationalism in theory, while limiting its consequences by adhering to tradition in practice.

It is clear that to acknowledge tacit thought as an indispensable

element of all knowing and as the ultimate mental power by which all explicit knowledge is endowed with meaning, offers a theoretical support for traditionalism. For if we know a great deal that we cannot tell, and if even that which we know and can tell, is accepted by us as true only in view of its bearing on a reality beyond it, a reality which can yet manifest itself in the future in an indeterminate range of unsuspected ways; if indeed a thing that we know is the more real, the wider the range of its unspecifiable manifestations; then the idea of knowledge based on wholly identifiable grounds collapses, and we must conclude instead that the more a thing is worth knowing, the less can we tell what it is and how we know it. The transmission of knowledge from one generation to the other must therefore be predominately tacit.

To see how this actually goes on, we have only to remember the story of the psychiatrist who told his class "you have seen a true epileptic seizure; I cannot tell you how to recognize it, but you will learn this by more extensive experience." What he meant was, of course, that they would learn it from more experience of such cases identified by competent teachers. It is by accepting and closely watching a series of such authoritatively diagnosed cases of epilepsy, that the unspecifiable characteristics of this kind of seizure will finally dawn upon the student and the art of identifying it will be transmitted to him.

This is, of course, the process of instruction in all practical classes; but it applies essentially also to the teaching of theory. No

teacher will be satisfied with imparting a mathematical proof as a chain of formulae connected by formal operations, and no student of mathematics should be satisfied with merely memorizing such a sequence. This would be -- as Poincaré has said -- like recording a game of chess, while noting only that each step obeys the rules of chess. The least that is required, is a grasp of the logical sequence as a purposeful procedure; what Poincaré describes as "the something which constitutes the unity of the demonstration." To convey that unspecifiable coherence which is the meaning of a mathematical proof, is a task similar to that of teaching the characteristic image of a disease.

To the extent to which any knowledge that is to be communicated is tacit, it is based on dwelling in our awareness of its particulars in terms of that which we know. And it is this indwelling, this special way of being aware of the particulars, that the teacher must transmit to the pupil. He can do this only if the pupil will try to share this indwelling. In trying this the pupil must take it on trust that a teaching which means nothing to him at the moment, has in fact a hidden meaning which he can discover by making an effort of indwelling; an effort of the same kind as the seeking of a solution to a problem.

The whole intellectual being of man comes into existence in this very manner by absorbing the meaning of language. The amazing deployment of the infant mind is stirred on by a varitable blaze of confidence surmising the hidden meaning of speech and other adult behavior,

so as eventually to grasp their meaning. And this continues to be true of every subsequent stage of learning; it can be achieved only by entrusting oneself to a certain extent to a teacher or leader. St. Augustine has observed this when -- basing himself on Scripture -- he said; "unless ye believe, ye shall not understand."

It appears then that traditionalism, which requires us to believe before we know -- and in order that we may know -- is based on a deeper insight of the nature of knowledge and of the communication of knowledge, than is a scientific rationalism which would permit us to believe only in explicit statements based on data and derived by modes of inference, which we have previously tested.

But I am not reasserting traditionalism here for the purpose of supporting dogmatism. To argue, as I do, that confidence in authority is indispensable for the transmission of any human culture is not to demand submission to the authority of any particular church. I admit that my re-affirmation of traditionalism might have a bearing on religious beliefs and I would even add that it does strengthen my own religious beliefs; but I want to set this aside here. For I believe that our ideals of critically established truth and of unlimited social improvement must be reconciled primarily on secular grounds. I should hope to derive religious enlightenment and a religious renewal from this reconciliation, rather than invoke the authority of revealed religion for achieving it.

I shall accept, therefore, the dynamism of the French Revolution,

both in its intellectual and its social aspirations, and shall try to show that such self-determination can be saved from destroying itself only by recognizing its own limits in an authoritative, traditional framework which upholds it. I shall concentrate first on one segment of modern intellectual endeavour, which will then serve as an example for outlining this aspect of all intellectual and moral progress in a dynamic society. My example will be the pursuit of the natural sciences.

This may take you by surprise, for modern science was founded by the violent rejection of authority. We are all familiar with the struggle of the Copernicans with the authority of Aristotle, upheld by the Roman church and with the Lutherans invoking the Bible; we know how Vesalius set free the study of human anatomy from the fetters imposed on it by the authority of Galenus. Throughout the formative centuries of modern science, the rejection of authority was its battle-cry; it was sounded by Bacon, by Descartes, and, collectively, by the founders of the Royal Society of London. These great men were clearly saying something that was profoundly true and important, but we should take into account today the sense in which they have meant it. Once the adversaries whom they fought had been defeated, a repudiation of all authority or tradition which had actually aimed only at these adversaries, lost its original meaning and became a fallacious slogan.

The popular conception of science teaches, of course, that science is a collection of experimental or observational facts, which anybody

can verify for himself. We have already seen that this is not true in case of expert knowledge, as in diagnosing a disease. You don't ask the first man you meet in the street, to identify by the aid of medical textbooks an ailment that has befallen you; in fact, you may travel hundreds of miles to find somebody whom you may trust to do so. But this is true, in its own way, also in the physical sciences. In the first place, you cannot get hold of the equipment required for testing a statement of astronomy or of chemistry. And assuming, for the sake of argument, that you could get the use of an observatory or of a chemical laboratory, the chances are that you would damage their instruments beyond repair before you have ever made an observation. And finally, if against all reasonable expectation, you would succeed in carrying out an observation to check upon the statement in question and you then found a result which contradicted it, you would quite rightly consider it extremely probable that you have made a mistake. If words are to mean what they say, then it is certainly untrue that science is composed of the result of experiments and observations which anybody can repeat and verify for himself.

The acceptance of science turns out to be based on authority. But this conclusion means little unless we sketch out, however briefly, the range of judgments controlled by this authority.

The fact that a statement is true does not by itself qualify it to form part of science. For one thing there is an infinite number of statements that are true but of merely ephemeral interest. There are

many true statements also which, though important, belong to branches of knowledge other than science. In fact, apart from its trueness, a statement is deemed to form a substantial part of science in the light of three rival criteria. They are: accuracy, relevance to the system of science, and thirdly, the ordinary, nonscientific interest of the subject. Substantial scientific value is compounded of these three variables in different proportions. Inanimate matter, which is the subject of physics, is much less interesting in itself than living beings; but physics makes up for this by the accuracy of its measurements and the beauty of its theories. On the other hand, the discoveries of biology, for example Harvey's discovery of the circulation of the blood, derive their scientific importance predominately from that which is lacking in physics, namely the general human interest of their subject.

The body of scientific knowledge is what it is only by virtue of the fact, that scientific authority is constantly engaged in eliminating contributions offered to science which lack an acceptable scientific value, as measured by the compounded coefficients of accuracy, systematic interest and the lay interest of their subject matter. The body of science is shaped by these complex value judgments of scientific authority. This shows that in granting authority to science we are granting it confidence of the same kind as that a pupil must have in his teacher if he is to gain from him any knowledge based on the tacit awareness of particulars. It also tends to show that the progress of science could not be pursued, but

for the fact that it is controlled, and to this extent restricted, by an authority which must be implicitly trusted to do this.

But I must go a little further if I am to illustrate how, within the pursuit of science, the fateful conflict between the upholding of our unlimited critical powers and the acceptance of any authority over them is, in fact, resolved. A few years ago there appeared in the British scientific journal "Nature" a table of figures showing with fair accuracy that the time of gestation measured in days of a number of different animals, ranging from rabbits to cows, is a multiple of the number π . The agreement was striking, yet the communication was shrugged aside as a joke. For no amount of evidence would convince a modern scientist that there is any relation between the period of gestation of animals and multiples of the number π . This is an example of the way in which scientific authority keeps rejecting conclusions which otherwise would seem justified by the evidence, if they are in conflict with the accepted view of the nature of things. I could give you any number of instances in which authority is exercised in this sense, and which I regard as justified, indeed as indispensable for the advancement of science.

But in other cases I am doubtful about the exercise of such authority. I think it is possible that the study of extrasensory perception has been excessively discouraged by scientific authority. I am doubtful about a teaching usually described as Lloyd Morgan's canon, which I have seen quoted many times and have never seen challenged, since its enunciations

ation in 1894. I quote its words; "In no case may we interpret an action as the outcome of a higher psychical faculty if it can be interpreted as the outcome of the exercise of one which stands lower in the psychological scale." And -- to take another example -- I altogether disagree with the view which K. S. Lashley expressed on behalf of the participants of the Hixon symposium of 1948, which included the most distinguished representatives of psychology and neurology of our time. Lashley said on this occasion that "our common meeting ground is the faith . . . that the phenomenon of behavior and of mind are ultimately describable in the concepts of the mathematical and physical sciences." I have explained last week why I consider this view to be logically untenable.

These instances suffice to show that scientific authority upholds and imposes a particular system of beliefs concerning the nature of things. If you want to be a scientist, you must accept the major part of the beliefs authorized by science, though you may safely disagree with some of them. And here we meet the striking combination within science of the imposition of an immense range of authoritative pronouncements, combined not merely with a toleration for dissent in some particulars, but granting the highest degree of encouragement to such dissent. While the whole machinery of scientific institutions is engaged in suppressing evidence as unsound, because it contradicts the currently accepted view about the nature of things, the same scientific authorities pay their highest homage to discoveries which deeply modify the accepted view about the

nature of things. It took twelve years for the quantum theory, discovered by Planck in 1900, to gain final acceptance by science. And I remember that as late as 1914 this great controversy was still sufficiently alive to be used as a peg for a little joke. At a dinner party in Berlin, the late Lord Cherwell, then a young graduate student called Lindeman, made fun of the marriage of a fellow student to a rich girl, by saying that the bridegroom had hitherto been equipartitionist, but that he now believed in quanta. Yet by the time another thirty years had passed, Planck's position in science was approaching that hitherto accorded only to Newton. We may say that the authority of science enforces its teachings in general, for the very purpose of cultivating their subversion in the particular.

This attitude is an expression of the view that scientific truth is but an aspect of a reality lying beyond it. An authority which teaches to make contact with this reality, submits in advance to yet unexpected manifestations of reality, and encourages any dissent which aims at making new contacts with reality. The advancement of science depends both on the authoritative transmission of the currently accepted view of nature and on fostering an originality which may fundamentally modify that view. And this duality is consistent with a conception of scientific knowledge as a guide to a reality, with which individual scientists are expected to make their own personal contact.

Here we have the first glimpse of the structure of personal responsibility. We can recognize it by uniting two equally valid ways at

looking at the scientific progress made by a series of discoveries. We may regard this progress as the growth of a body of thought, occurring in the minds of people who happen to be available for realizing the next possible advance of science. This view is borne out by the fact that even discoveries which fundamentally refashion the scientific conception of the nature of things, such as the discovery of quantum mechanics in 1925, can be made simultaneously by three different scientists at different places; so independently of each other, that at least two of them were thought at the time to have given different and mutually incompatible solutions to the problem. Looking at it this way -- after the event -- the growth of ideas seems to be predetermined, and the discoverers who achieve it seem merely to offer a suitable, nutritive medium for their growth.

Yet, looking forward before the event, the act of discovery appears highly personal and quite indeterminate. It starts with the solitary vision of a problem, that is, of bits and pieces which seem to suggest that they may be clues to a hidden knowledge, that they are as yet uncomprehended particulars of a still undisclosed comprehensive entity. This solitary vision must turn into a personal obsession, if any progress is to be made towards resolving its secret. And this vision, this obsession, is about something that no one can tell, and its subject is -- in this sense -- undefinable, indeterminate. Indeed, the process of discovery, by which it will be brought to light, will be recognized as a discovery by the very fact that its result could not have been achieved

by any degree of diligence in applying existing rules of inference. The great discoverer will be praised for the daring use of his imagination in crossing uncharted seas of possible thought.

Yet there is a link here with the alternative picture which represented the growth of scientific thought using the minds of men as a mere medium for its own proliferation. For the vision of the problem, the obsession with it, and the final leap of the mind which arrives at discovery, are all filled from beginning to end with an urge towards their external objective. In these intensely personal acts there is no trace of self-indulgence; for they all express the conviction that there is something there that must be discovered. Originality is dictated at every stage by a compelling sense of responsibility for advancing the possible growth of truth and enlarging thereby the legitimate domain of the human mind. And this fact teaches to avoid the false alternative between the subjective and the objective, by inserting between them the conception of personal judgment exercised responsibly with a view to a reality with which we are seeking to make contact. This conception of personal knowing was implicit already in all that I have said about tacit knowing; for none of this could be called knowing but for its claim, which I endorse, that it seeks to make contact with reality and may often succeed in doing so.

The situation may be clarified further, by realizing that all tacit knowing -- including the process of discovery -- is a personal

commitment to a belief held with universal intent. Its personal pole consists in the way we pour ourselves into it and accept its hazards, and its universal pole lies in the conception of a hidden truth which demands our service for revealing it. We readily acknowledge this seemingly paradoxical situation whenever we are confronted with human greatness. Wherever men have truly spoken in the name of truth, saying, Here I stand and cannot do otherwise, we instantly recognize both the power of impersonal truth and the greatness of the mind upholding it. We pay our respect quite naturally both to the personal and the universal pole of such a commitment.

The example of science has served us to elucidate for its particular case the relation between self-determination and submission to authority. The kind of responsibility which guides and justifies the originality of a scientist, is undertaken within a vast amount of scientific beliefs which he accepts unchallenged. And by the same token, we might be inclined to regard the scientist also responsible for accepting the scientific teachings which he does not challenge. But I have shown before that we must believe, in order to understand; we are therefore merely facing once more in this new context the question whether we can justify the passive acceptance of any beliefs. I think we can, I think we must. For, as we have seen, the advancement of science would be impossible, but for the combination of accepting the teachings of science as a whole and dissenting from them within a limited area. The confidence which

he so lavishly bestowes beyond this limited area and which alone makes him capable of operating independently within that area, we should recognize as the scientist's calling. This calling is not the same for every scientist. The degree of originality any particular scientist trusts himself to possess, will determine the range of subjects over which he will venture to improve on current scientific teachings -- and the range of teachings which he will, more or less passively, accept will vary correspondingly. Every scientist must try to choose a problem that is just large enough for him to master; for his faculties would not be fully utilized if he applied them to a lesser task, and would be altogether wasted on a larger one.

There exists then a rule of responsible personal action in science which requires us to take neither too much, nor too little for granted, so as best to assure the continuous advancement of knowledge. It is this rule that I propose to generalize in a few broad strokes into an answer to the various problems raised by this series of lectures, and more particularly at the beginning of this one.

Each member of a society of explorers, such as we meet in the world-wide community of scientists, pursues a different task. Any single scientist knows little of what the vast majority of other scientists are trying to do and he is neither interested in most of the results which they eventually achieve, nor is he even capable of understanding them. This condition is characteristic of a modern dynamic society, throughout

the whole range of its activities; it is described as 'pluralistic' to distinguish it from a more homogenous hierarchic society. Pluralism is said to exclude the kind of authority ruling the static societies that predominated before the French Revolution; and this is true. But the example of science has shown that this does not mean absence of authoritative control. It proves merely that the structure of authority exercised over a society of explorers is different from that to which a static society must submit. Take once more the example of science. The authority of science is exercised by scientific opinion, but this opinion is not present in any single person's mind and no single person is at all competent to exercise it. For no scientist can judge, nor even understand, more than a tiny fraction of the whole range of natural sciences. Yet they form and uphold a common scientific opinion by what I would call the principle of overlapping neighborhoods. It is enough that each participant forming this opinion be competent to judge an area neighboring his own field of enquiry, and that this neighborhood should overlap with that of other scientists, applying the same standards of scientific evaluation. Such a group forms an element that automatically expands to a general consensus of scientists. For each member of it will be also a member of other groups, and so the chain of overlapping neighborhoods will cover all sciences, ranging all the way from astronomy to medicine. This is how scientific opinion does in fact effectively compare and assess the value of contributions made all over that vast area of which no single

scientist is competent to judge more than a tiny fraction.

A pluralist society is generally controlled by such a mutually imposed authority. As each individual scientist submits to this kind of consensual evaluation, by accepting a place in its chain of mutual appreciations, so we find, more generally, that each person joining one of the numberless independent activities pursued in a pluralist society, joins an appropriate chain of mutual appreciations. And again, as in science, this act is never wholly passive, for each new member modifies somewhat the authority to which he submits.

But here we must supplement our picture if it is to cover all pluralist activities. We must admit that within the chains and networks of mutual appreciation, there are differences in weight of authority. The authority of a distinguished scientist is accepted unquestioningly, in respect of his own field, by most scientists. What is more, the whole body of scientists exercises a similar authority over most laymen. So we find that both distinguished scientists within science and all scientists jointly within society as a whole, function as intellectual leaders in respect of science.

Similar conditions are found in the arts, but are more pronounced there, as they frequently lead to contests between rival leaders. The arts, like the sciences, are most alive in the process of renewing themselves; but artistic originality involves, as a rule, more comprehensive changes of outlook than does originality in science. It tends to produce,

therefore, sharper divisions of opinion between the innovator seeking to establish his authority and the leaders of previously established art forms. Rival schools of thought which in science are infrequent and transitory are essential to a vigorous cultivation of modern art.

Today few members of the cultural leadership, whether in the arts or in the sciences, are wealthy people living on their private incomes, and hence intellectual life depends to a great extent on the material support given to a creative minority by the mass of uncreative citizens. Whether that support is given by private individuals or by public institutions the support can be effective only, if it is granted for the pursuit of the arts and sciences, according to their own standards as established by the authority of their respective elites. Indeed, a society which does not accept cultural guidance from a set of authoritative individuals, cuts itself off from any culture living within its borders.

Admittedly, the presence of sharply divergent schools of thought and art, creates a problem; but I do not think it fundamentally changes the situation. Members of the public may shift their allegiance from one leader to his rival; they may change from the camp of an academician to that of some innovator; be converted to religion, or abandon their faith; drop out of any particular movement and join another. Sanity forbids that such shifts be very frequent, and even so, their scope is limited to choices between potential leaders. The guidance of thought is still left to a small number of individuals who have achieved acknowledged prominence in

certain cultural domains. Our society may be said to possess a single culture to the extent to which our cultural leaders supplement each other; and to this extent these leaders may be said to uphold the common intellectual standards of our society -- both by their own work, and by guiding the appreciation of culture and inducing society to fulfill its cultural obligations. In spite of its dissonant voices, a society of explorers remains united, so long as it believes that these are but reflecting discordant aspects of a realm of thought, yet hidden, but accessible to discovery. And it is the same belief that makes it possible to distinguish -- at least in principle -- between cranks and true innovators in art and thought.

Passing on from cultural to political life in a pluralist society, we are faced with the puzzling fact that changes of mind in politics are accorded legal sanction in the form of self-government. It would almost seem that the unlimited social progress heralded by the French Revolution was entrusted to the collection of a larger number of votes, rather than to the acceptance of new moral truths. But this is deceptive. I have said at the opening of these talks, that the pursuit of the hopes engendered by the French Revolution, has achieved in the West the most humane and free societies the world has ever seen. This was not done through collecting majorities by hook or by crook. It was done by a gradual improvement of society which, for example, in England's history can be traced back to a series of specific movements, appealing to the public

conscience; movements which had usually been evoked in the first place by persuasive individuals, devoted to the advocacy of one particular reform. It was this moral progress of civic thought which was transmuted through the machinery of self-government into acts of social reform. These acts were the practical outcome of an intellectual process, moved by its own passions and guided by its own standards.

Having asserted the necessity of authoritative traditionalism for the progress of science, we hardly need to prove this once more for the process of social improvements. Edmund Burke stands firmly vindicated -- though with an important difference. Tradition has been reasserted, while accepting the unlimited hopes of progress, and indeed as the condition for pursuing this progress ever further.

But at this point where we are moving into politics, the conception of moral responsibility meets with a challenge of a different kind. It is charged with hypocrisy. We are asked, how we can say that public life is guided by moral progress when we see politics dominated by rival pressure groups, jostling each other in the quest for power? Can we even preach these high ideals, while tolerating a society so manifestly falling short of them?

This kind of attack is familiar to us; I have dealt with it when I vindicated higher levels of reality against their destruction when they are identified with their particulars forming a lower level. We must

recognize here again the existence of different levels of reality. Society, as an organization of power and profit, forms one level, while its moral principles lie on a different level above it. The higher level is rooted in the lower one, for moral progress can be realized only within the medium of a society operating as an organization of power and profit; but even though morality can exist only within this medium, it cannot be accounted for in terms proper to this medium.

Our sense of moral and political responsibility must conform to this logical situation. We are creatures of circumstances, but our moral nature does not allow us to submit altogether to circumstances. If a man accepted the circumstances which shaped him -- and which continue to shape him -- as immutable, he would surrender to total absurdity. Social perfectionism reacts against this consummation and thus moves in the right direction, but its aims are self-defeating. Social perfection is a contradiction in terms. For it is impossible to live in society without taking away things that otherwise might be enjoyed by others; and it is impossible to pursue in a society any action consistently, unless one has a definite task of one's own from which others are excluded. These occasions for hurting others cannot be eliminated, and can only be mitigated by some system of rights and powers. To accept a framework of rights and powers which sustains man's nonmoral relationships within society, as a medium within which the moral improvement of society is to be pursued, is to accept the calling of the social reformer. And just

as each scientist must choose a problem which is neither too large for him to solve, nor too small to be worth his while, so a great reformer may call in question a large province of existing society if he feels equal to the task of improving it, while others will take the responsibility for the betterment of a much smaller area of society -- perhaps an imperceptibly small one. The degree to which existing society is accepted as given will vary between greater men and lesser men; but what is accepted as given must always remain predominant.

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I have said at the end of my first lecture that I would exemplify the attempt of revising Rationalist Enlightenment, so as to eliminate the clash between scientism cum romanticism on the one hand and the great tide of social hopes generated by the Enlightenment on the other hand. The main instrument of my revision was a vindication of tacit knowledge, which limits the possibilities of critical thought. From this I derived a conception of reality and went on to build up the image of a universe composed of successive levels of reality. This edifice extended from its base in the inanimate on which man looks down from afar, up to the spiritual firmament that overarches us all. Today I have tried to show that human responsibility in a society of explorers lies in serving the demands of this firmament by seeking to expand and amend it. This is as far as I could stabilize, within the compass of these talks, my conception of personal commitment with universal intent.

This conception of man's actions would limit our critical self-determination for the very purpose of pursuing its unlimited aims indefinitely. If the revisionist movement recoiling today from totalitarianism were to accept some philosophy of this kind, it would do so perhaps as an act of affiliation to the great movements of reform which have so deeply improved society in Western parts of the world since the French Revolution, and have avoided the self-destructive tendencies of the unlimited hopes spread by this revolution.

I think that at our present level of consciousness even these Western societies themselves can preserve their sane and successful progress only if they can achieve a coherent view of things that supports their practice. At any rate, these lectures were intended to convey this need and suggest a possible way for satisfying it.