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Chapter 12 was given as a lecture to the Heidelberg Colloquium on the Problem
of Anxiety chaired by Hermann Lang in 1990.
Chapter 13 was presented in an English translation before the Conference of
Psychiatrists in San Francisco in 1989.

Theory, Technology, Praxis

The Change in the Meaning of Theory

'There is no doubt that all our knowledge begins with experience.' This famous beginning of Kant's *Critique of Pure Reason* surely holds too for the knowledge we possess of human beings. To begin with this includes the sum total of the ever progressing results of natural scientific research, which we call 'Science'. But then there is the empirical knowledge of so-called practice that everyone accumulates in the midst of life – the doctor, cleric, educator, judge, soldier, politician, worker, employee, official. Not only in the professional sphere but also in everyone's private and personal existence the experience that people develop out of the encounter with themselves and their fellow human beings continually grows. Beyond the domain of this experience, furthermore, there is that vast wealth of knowledge which flows towards each and every human being in the transmission of human culture – poetry, the arts as a whole, philosophy, historiography and the other historical sciences. To be sure, such knowledge is 'subjective', that is, largely unverifiable and unstable. It is, nevertheless, knowledge that science cannot ignore. As such, a rich tradition of this knowledge exists from time immemorial, from the days of Aristotle's 'practical philosophy' to the Romantic and post-Romantic age of the so-called

Geisteswissenschaften or human sciences. In contrast to the natural sciences, however, all these other sources of experience have a common quality: what we learn from them becomes experience only when actually integrated into the practical consciousness of acting human beings.

In this regard scientific experience possesses a unique status. The experience that can be validated as certain by the scientific method has the distinction of being in principle absolutely independent of any situation of action and of every integration into the context of action. This 'objectivity' conversely implies that it is able to serve every such possible context. It is precisely this 'objectivity' which was so quintessentially realized in modern science and which transformed broad expanses of the face of the earth into an artificial human environment. Now the experience which has been reworked by the sciences has, indeed, the merit of being verifiable and acquirable by everyone. But then, in addition, it raises the claim that on the basis of its methodological procedure it is the only certain experience, hence the only mode of knowing in which each and every experience is rendered truly legitimate. What we know from practical experience and the 'extra-scientific' domain must not only be subjected to scientific verification but also, should it hold its ground against this demand, belongs by this very fact to the domain of scientific research. There is in principle nothing which could not be subordinated in this manner to the competence of science.

That science not only arises from experience but according to its own methodology can be called 'experiential' or, more familiarly, 'experimental science' – an expression applicable to science only since the seventeenth century – was also articulated as a principle of modern philosophy. In the nineteenth century it led to the general conviction that people had entered into the age of 'positive' science and had left metaphysics behind. This conforms manifestly to philosophical 'positivism' in all its varieties, which rejects conceptual construction and pure speculation. But it also applies to those philosophical theories such as the Kantian which expressly point to the a priori elements in all experience. The philosophy of neo-Kantianism thus developed into a systematic

theory of experience. The concept of the thing-in-itself, this 'realistic' element in the Kantian theory, was rejected by neo-Kantianism – as it was by Fichte and Hegel – as dogmatic, and reinterpreted as a concept marking the limit of the understanding. According to this theory, the object of the understanding poses an 'endless task' for definition.¹ An endless task: that is the only epistemologically tenable meaning of givenness and object. This theory has the decided merit of demonstrating the hidden dogmatism of the sensualist foundation of knowledge. The so-called givenness of perception is not given at all but presents knowledge with its task. The only 'fact' that merits this name is the fact of science.

There were, to be sure, extratheoretical spheres of validity, such as the aesthetic, which demanded recognition and thus brought forth within the neo-Kantian theory of knowledge the theme of the irrational. But that made for no change in the systematic restriction of all empirical knowledge to scientific experience. Nothing which is capable of being experienced can remain withdrawn from the competence of science. If we encounter anything unpredictable, accidental, contrary to expectations, the claim of the universality of science remains uncontested for these things as well. What seems to be something irrational is, in the eyes of the scientist, a phenomenon on the frontier of science; this is how phenomena appear on that border where science finds applications to practice. What occurs in practice as the unexpected and mostly undesirable consequences of the application of science is seen as something altogether different from the irreducible irrationality of chance. According to the essential character of science, this presents nothing more than a task for further research. The progress of science is sustained by its continual self-correction. And practice which is based on the application of science likewise requires that science further and further improve, by continual self-correction, the reliability of the expectations placed upon it.

But what does practice in the above sense mean? Is the application of science as such practice? Is all practice the application of science? Even if the application of science enters into all practice, the two are still not identical. For practice means not only the making of whatever one can make; it is also choice and

decision between possibilities. Practice always has a relationship to a person's 'being'. This is reflected in the figurative expression, *Was machst Du denn?*, which does not ask, literally, what are you doing but, rather, how are you? From this point of view an irreducible opposition between science and practice becomes evident. Science is essentially incomplete; whereas practice requires instant decisions. The incompleteness of all experimental science thus means that it not only raises a legitimate claim of universality, by virtue of its readiness to process new experience, but also is not wholly able to make good this claim. Practice requires knowledge, which means that it is obliged to treat the knowledge available at the time as complete and certain. The knowledge known from science, however, is not of this sort. There is thus a fundamental difference between modern science and the premodern aggregate of knowledge, which under the name 'philosophy' comprehended all human knowledge. This difference is precisely that what we know from 'science' is incomplete and, therefore, can no longer be called a 'doctrine'. It consists of nothing other than the current state of 'research'.

One must make clear the full significance of the innovation which came into the world with the experimental sciences and their underlying idea of method. If one contrasts 'science' with the whole of that knowledge of former times derived from the heritage of antiquity and which was still dominant throughout the high Middle Ages, it is apparent that the conceptions both of theory and of practice have fundamentally changed. Naturally there was always application of knowledge to practice, as indicated by the very terms 'sciences' and 'arts' (*epistemai* and *technai*). 'Science' was after all but the highest intensification of the knowledge that guided practice. It understood itself, however, as pure *theoria*, that is, as knowledge sought for its own sake and not for its practical significance. It was in the Greek idea of science that the relation between theory in this precise sense and practice first came to a critical point as a problem. While the mathematical knowledge of the Egyptian geometers or the Babylonian astronomers was nothing other than a store of knowledge that had accumulated out of practice and for practice,

the Greeks transformed this know-how and knowledge into a knowledge of principles and thus into demonstrable knowledge which one became aware of to enjoy for its own sake out of, so to speak, a primary curiosity about the world. Out of this spirit arose Greek science and mathematics, as well as the enlightenment of Greek natural philosophy and, despite its essential relation to practice, Greek medicine as well. Here for the first time science and its application, theory and practice, parted ways.

Yet this divergence can hardly be compared to the modern relation between theory and practice, which was formed by the seventeenth-century idea of science. For science is no longer the totality of the knowledge of the world and of humankind, which Greek philosophy, whether as philosophy of nature or as practical philosophy, had elaborated and articulated in the communicative form of language. The foundation of modern science is experience in a wholly new sense. With the idea of the unitary method of the understanding, as formulated by Descartes in his *Rules*, the ideal of certainty became the standard for all understanding. Only that which could be verified could have validity as experience. In the seventeenth century, experience thus ceased to be a source or starting point of knowledge but became, in the sense of 'experiment', a tribunal of verification before which the validity of mathematically projected laws could be confirmed or refuted. Galileo did not happen to acquire the laws of free-falling objects from experience but, as he himself says, they came from conceptual projection: 'mente concipio,' that is, 'I conceive' – or, more precisely, 'I project in my mind.' What Galileo thus 'projected' in the idea of a free-falling object was certainly no object of experience: a vacuum does not exist in nature. What he understood, however, precisely by this abstraction were laws within the skein of causal relationships, which are intertwined and cannot be disentangled in concrete experience. The mind isolates the individual relationships and by measuring and weighing determines the exact contribution of each; it thereby opens up the possibility of intentionally bringing out factors of a causal kind. It is thus not altogether wrong to say that modern natural science – without detracting from the purely theoretical interest that animates

it — means not so much knowledge as know-how. This means that it is practice.² It would appear to me more correct, however, to say that science makes possible knowledge directed to the power of making, a knowing mastery of nature. This is technology. And this is precisely what practice is not. For the former is not knowledge which, as steadily increasing experience, is acquired from practice, the life situation, and the circumstances of action. On the contrary, it is a kind of knowledge which for the first time makes possible a novel relation to practice, namely, that of constructive projection and application. It is of the essence of its procedure to achieve in all spheres the abstraction which isolates individual causal relationships. This is the unavoidable particularity of its competence which it has to accept as part of the bargain. What in fact emerged, however, was 'science', with its new notion of theory as well as practice. This is a true event in the history of humankind, which conferred a new social and political accent on science.

The Impact of Technology on Modern Man

It is thus not for nothing that one calls our present age an age of the sciences. There are above all two grounds on which to justify this assertion. First, the scientific-technical mastery of nature has at this moment acquired proportions which qualitatively differentiate our century from earlier centuries. Science, obviously, has become today the primary productive factor of the human economy. But beyond this its practical application has created what is in principle a new situation. No longer is it limited to the premodern implications of *techne*, namely, to filling out the possibilities of further development left open by nature (Aristotle). It has moved upward to the level of an artificial counterpart to reality. Formerly, the modification of our environment was due more or less to natural causes, for example, change in climate (the Ice Age), the influence of the weather (erosion, sedimentation, etc.), droughts, formation of swamps and the like. Only occasionally was it due to the intervention of human beings. Such

interventions were perhaps the deforestation of woods, which turned into barren lands as a consequence, the extinction of animal species through hunting, the exhaustion of soils through cultivation, the drying up of the resources in the ground as the result of exploitation. These were always more or less irreversible modifications. In such cases, however, mankind either saved itself by finding new places to live or learned to prevent the consequences in due time. As for the rest, the contribution of human labour, of the gatherer, the hunter, or the farmer, brought about no real disturbance to the equilibrium of nature.

Today, however, the technical exploitation of natural resources and the artificial transformation of our environment has become so carefully planned and extensive that its consequences endanger the natural cycle of things and bring about irreversible developments on a large scale. The problem of the protection of the environment is the visible expression of this totalization of technical civilization. Obviously, more significant tasks fall upon the shoulders of science, and it must plead in their behalf before that public consciousness which the effects of our technical civilization are beginning to reach. On the one hand this leads to the emotional blindness with which a mass critique of culture reacts to these phenomena, and it is necessary to avert in time the iconoclasm which threatens from this quarter. On the other hand there is the superstitious faith in science which strengthens the technocratic unscrupulousness with which technical know-how spreads without restraint. In both respects science must carry on a kind of demythologization of itself and indeed by its very own means: critical information and methodical discipline. Issues such as the city, the environment, population growth, the world food supply, problems of the aged, etc., thus justly acquire a privileged place among the scientific themes of our knowledge of man. The atom bomb proves itself more and more to be only a special case of the self-endangering of human beings and their life on this planet to which science has led, and which it has to do its utmost to avert.

Within science itself, however, there is also the threat of a similar danger of self-destruction which arises directly out of the

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perfection of the modern business of research. The specialization of research has long since moved away from that orientation towards the whole which as late as the eighteenth century still made possible an encyclopedic knowledge. Even in the beginning of our own century there were still enough paths of well-organized information which made it widely possible for the layperson to partake of scientific knowledge and for the researcher to partake in other sciences. Since then, however, the worldwide expansion of research and its increasing specialization have led to a deluge of information which turns against itself. Professional librarians today carefully consider how they should store and administer - and administration means here expansion - the masses of information which increase alarmingly year in and year out. Specialized researchers find themselves in need of an orientation which is similar to that of the layperson in general as soon as they look beyond the most limited range of their area of work. And this is often necessary for the researchers who find themselves no longer able to do justice to the new problems which they take up with the older methods of their own science. It remains altogether necessary for laypeople who for their political action want not only to be guided by prepared information but to form a judgment. In this flood of information the orientation of the layperson is peculiarly mediated and, hence, dependent.

With this we come to the second sphere in which science has become a new kind of factor in human life, and this is its application to the life of society itself. Today the social sciences aspire towards fundamentally altering the practice of human living together that was shaped by traditions and institutions. Science raises the claim - and it does this on the basis of the technical state of civilization today - of putting social life as well on rational foundations and of freeing the unquestionable authority of tradition from taboo. This occurs explicitly in the case of ideological criticism when it seeks to transform social consciousness by emancipatory reflection, seeing repressive compulsions at work in the structure of economic and social authority. More effective yet, however, because it touches each and every one, is the silent form in which more and more areas of human life are subjected

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to technical domination, where rational automata take the place of the personal decision of individuals and groups.

This represents a fundamental alteration in our life. It is the more remarkable in so far as it is a question less of scientific-technical progress as such than of resolute rationality in the application of science, which overcomes with a new uninhibitedness the durability of custom as well as the restraints present within a 'world view'. Formerly the consequences opened up for us by the new possibilities of scientific progress remained limited at every step by the norms which prevailed, unquestioned and self-evident, in our cultural and religious tradition. One may perhaps recall what emotions were unleashed in the past by the struggle over Darwinism. It took decades until dispassionate, objective discussion became possible; and even today Darwinism still moves people's passions. The natural scientific knowledge of Darwin is, of course, today uncontested; but its application to social life remains exposed to manifold objections. Without taking a stand about the question in this case, one may establish as a principle that the application of scientific understanding to areas where what is called today the self-understanding of man is at stake not only often leads to conflict but also necessarily invokes extra-scientific considerations which defend a right of their own.

Thus today one sees science itself in conflict with our human consciousness of value. I am thinking here of the horrifying perspectives which have been developed on the basis of modern genetics pointing to the alteration of heredity and planned breeding. That does not, indeed, have the dramatic power to shock that Darwinism formerly had. It also does not have the horrible obviousness such as that which the use of atomic energy had for the destruction of human life in Hiroshima. But in the consciousness of all researchers the warning has been emerging that they possess a heightened responsibility for the future of mankind.

When we ask ourselves how this general state of our consciousness is reflected in the main positions assumed by present-day students in anthropology and philosophy, the answer is very varied. A certain more or less well-known standpoint still remains

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the critique of the traditional assertion of the special place of humankind in the cosmos, which in the face of the progress of the natural scientific understanding unmasks itself more and more as a residual prejudice of theology. It enters into the themes of our knowledge of man, wherever the characterization of human beings relative to animals is at issue. This may be precisely the reason why research into behavior today is now enjoying an unaccustomed resurgence of publicity, formerly in the work of Uexküll, today in that of Lorenz and his pupils.³

No one today can imagine that we are really able to perfect the integration we require for our knowledge of humankind. Our progress of knowledge is subject to the law of increasing specialization and, hence, to increasing obstacles to comprehensive-ness. The action of human beings – that is, the conscious use of human knowledge and know-how for the preservation of health or social equilibrium, particularly peace – manifestly lacks a unified scientific basis. It is inevitable that it seeks at times to create this for itself by means of assumptions about a world-view. In retrospect we easily perceive what takes place quite unperceived in the present, namely, how certain insights acquire the power of fascination and then become magnified into a general frame of reference. Such, for example, is the superstructure of the science of mechanics and its transfer to other areas, with all its further developments – with others still to come – produced by cybernetics. Similar in its dogmatic character is the prevalence of the concepts of consciousness and will. The concepts of consciousness, self-consciousness and will, in the form to which they were led by philosophical Idealism, dominated both the theory of knowledge in the nineteenth century and its psychology. This is an outstanding example of the significance which theoretical concepts can possess for applications to the study of man.

This is not the place to analyse the dogmatism in the concept of consciousness as well as in the concept of the soul, a dogmatism which lies in the concept of representation or the content of consciousness on the one hand, and in the concept of the faculties of the soul on the other. It suffices to note the fate of the principle of self-consciousness. This principle, in Kant's concept of the

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transcendental synthesis of apperception, lay at the basis of the Idealistic position. It radiated back as far as Descartes, and forward to Husserl. It succumbed to a critique which began with Nietzsche and became victorious in various ways in our century – for example, through Freud or Heidegger.

For present purposes this critique means, among other things, that the social role of individuals rather than their self-understanding moves into the foreground. What does the self-maintaining identity of the ego mean? Does the ego that vouches for itself in self-consciousness even exist? What is the source of the continuity of its self-sameness? One answer is the 'struggle for recognition', which Hegel described as the dialectic of self-consciousness. Or – antithetically – there is the Christian inwardness for which Kierkegaard, in the sense of 'choice', laid the basis with the ethical concept of continuity. Or is the ego but a subsidiary creation of unity between alternate roles? One thinks here of how Brecht, in *The Good Person of Szechuan* as well as in his theory of the epic theatre, disputes the legitimacy of the old dramaturgical idea of the unity of character. The direction of behaviourist research also presents an example of this dedogmatizing of self-consciousness. The abandonment of the 'internality of the psychical', which is the basis of it, is a positive indication that behaviour patterns are now being studied which are common to animals and humans and which are wholly inaccessible via such a concept as self-understanding.⁴

Yet the contribution of philosophical anthropology to the science of humankind remains considerable, even after the theology of the soul and the mythology of self-consciousness have succumbed to criticism. When seen within the totality of the research situation, the contribution of philosophical anthropology over against the scientific models which cybernetics and physics have to offer would still appear to be of greater heuristic fruitfulness. Indeed, modern theoretical and physiological research on the relationship of consciousness and body or soul and body shows an impressive methodical caution and a gift of invention. Likewise it is impressive to learn from biology and behavioural research how continuous are the transitions from animal to human behaviour and

that one cannot so easily explain, purely from the standpoint of behaviour, the 'leap' to humanity by the specific peculiarities which distinguish humans from the other animals. The progress of research shows that the anti-evolutionary passion which burst forth in the struggle over Darwinism plays no further role today. But precisely when one pushes the human as near to the animal as the phenomena permit and require – and with regard to modes of behaviour, that is astonishingly far – the unique position of human beings surprisingly reveals itself in a particularly vivid fashion. Precisely in their full naturalness they appear as something extraordinary; and the evident fact that no other living being makes its own environment into a cultural world as does man, who became thereby 'Lord of Creation', has within it a new unbiblical power of revelation. It teaches no longer that the soul is of an otherworldly order but, on the contrary, that nature does not have the meaning which the investigation of nature of the past centuries required us to think it had, namely, as 'matter subject to laws' (Kant). The 'frugality of nature', which was a fruitful teleological key conception in the age of mechanics and even today still finds manifold confirmation, is not the only point of view from which to think about nature. For the evolution of life is just as much an event of enormous prodigality.

The standpoints both of self-preservation and of adaptation are losing their key function in research into living beings. The philosophy of institutions, in which Gehlen interpreted the latter as compensation for the biological deficiency of endowment of the 'as yet undefined animal', which according to Nietzsche is what man is, is also affected by this new tendency.⁵ Studies of biologists, ethnologists, historians and philosophers are in agreement that humans are not humans because they dispose of an additional endowment which relates them to an otherworldly order (Scheler's concept of spirit).⁶ But they also all hold that the point of view of inherent deficiencies does not suffice to explain their distinctiveness. On the contrary, what is apparent is the profusion of human capacities and abilities for perception and movement, the unequal distribution of which is characteristic. Plessner called this the 'eccentricity', of human beings.⁷ It

distinguishes them in that they express themselves in behaviour by means of the body – for example, in gestures – but also can, by willing and acting, go beyond the natural endowment of a living being. This is seen, for example, in their behaviour to other human beings and in particular through the 'invention' of war. In this regard, modern psychology also is once again taking a significant stand, precisely because it combines the methods of research of the natural and social sciences with the hermeneutical sciences and tests out the most different methods on the same object.

It is by virtue of the 'eccentric' constitution of human life that the differentiated modes originate in which human eccentricity is worked out. We call this humanity's culture. Not only do the great themes of economy, law, language, religion, science and philosophy bear witness to it as the objective traces which humanity has left behind; there is also, as its other source, the knowledge of themselves which human beings acquire and transmit. Plessner comprehends all this in the formulation that man 'embodies himself'.⁸ Here arises and flows forth that other source of knowledge of humankind which is prior to natural science and which has given and shaped as a theme for researchers into nature their manifold contributions to the knowledge of humankind. For thanks to the knowledge humans have of themselves, the 'science' which seeks to perceive everything that becomes accessible to it with its methodical means is confronted in a special way with the theme 'human being'. Its task of understanding is posed to it as one that is unending, incomplete, continually in view.

What is this knowledge which human beings possess of themselves? Is it possible to understand 'self-consciousness' with the means of science? Does it represent a theoretical objectification of a person which may be compared to the mode of the objectification possessed by an artifact or a tool, which can be designed in advance from a blueprint? Manifestly not. It is true that human consciousness itself, in addition, can in a complicated way be made the object of natural-scientific research. Information theory and machine technology can become fruitful for research about human beings since they clarify the functional mode of human

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consciousness through their models. But this model construction does not claim to *control* scientifically the organic and conscious life of a person. It is satisfied to elucidate by means of simulation the highly complicated mechanism which permits living reactions and particularly human consciousness to function. Now one may ask whether this is not simply an expression of the fact that cybernetics is still stuck wholly at its beginnings and therefore is not yet adequate to its own goal, namely, the natural-scientific understanding of such highly complicated systems. It seems reasonable to me, however, to imagine for a moment a perfected cybernetics for which the difference between machine and living person had really disappeared. Our knowledge about humanity would then find its perfection in its ability to make such machines. With regard to this point one must take to heart Steinbuch's warning that fundamentally there are 'no insights of automation theory or language theory which make possible any differentiation between what man can do and what automatons *cannot* do'.

We are not concerned here, however, with the know-how of machines or the know-how of those who use them. The question is rather what human beings, with their know-how, want. 'Can' a machine also want? That would also mean, can it 'not want' to do something it 'can' do? In other words, is the perfected automaton the ideal of a useful human being? Throughout much of the labour process it is in fact an ideal substitute for the power of human labour; and one of the greatest problems of the future – comparable to what occurred after the introduction of mechanical looms – may become that of integrating these machines into economic and social life.

To this degree automation touches social practice – but, so to speak, from outside. It does not lessen the distance between human being and machine but makes its irreducibility visible. Even the most useful human beings for the one who makes use of them are still fellow human beings and have knowledge of themselves. This is not only a self-consciousness of know-how, such as the ideal self-regulating machine might possess, but is, rather, a social consciousness which governs the one who uses another just as much as it does the latter, or, to put it differently, governs all

who have their place within the social process of labour. Even the mere usufructuary has such a place, if only indirectly.

Thus, from the end-point of a perfected technology, what was from the very first the proper human meaning of 'practice' becomes clear. It is characterized by that very possibility of human behaviour which we call 'theoretical'. This belongs to the fundamental constitution of human 'practice'. Because of this, human know-how and knowledge is perennially not only that which is acquired by learning and experience; it is also the autonomization of means into tools which raises to a higher power the human capacity to learn and to bequeath human know-how to future generations. Implicit in this is intelligent control of the causal context which enables us to direct in a planned way our own behaviour. But this also demands conscious ordering into a system of ends. It will be found that the other main statement of modern research – namely, that human language is fundamentally distinguished from the sign systems of animal communication – also conforms to the oldest insights of Greek thought. This is so in so far as language enables us to make facts and their contexts objective – and this means, of course, to make them openly available in advance for any possible form of human behaviour. The use of means for different ends and the use of different means for the same end depend on this, as does the order of preference among the ends themselves.

The ability to behave theoretically thus is in itself part of the practice of humankind. It is clear without further ado that it was the 'theoretical' gift of humanity which made it possible for human beings to establish distance from the immediate aims of their desires, to restrain their desires, as Hegel put it, and with this to lay the basis of an 'objective behaviour', which manifests itself in the production of tools as well as in human speech. From this arises as a further basis of distancing the possibility of socially ordering, by the ends of the society, all that we do or fail to do.

Obviously, there is a problem of integration in the simplest relationship between knowing and doing. At least since the advent of the division of labour, human knowledge has developed in such a way that it has the quality of specialization which must

be expressly learned. There is then this problem for practice: knowledge, which can be transmitted independently of the situation of action and can thus be detached from the practical context of action, needs to be applied at times in a new situation of human action. Now the general empirical knowledge of human beings which decisively affects their practical decisions is inseparable from the knowledge which has been transmitted by specialized knowledge. What is more, it is an absolute moral duty to pursue knowledge to the greatest possible degree; that means today that one must also be informed by means of 'science'. Max Weber's famous distinction between the ethics of pure intention and the ethics of responsibility was decided in favour of the latter in the moment it was laid down.⁹ Thus the entire abundance of information which modern science can produce from its partial vantage points about the human can never be excluded from the orbit of what is practically of interest for humankind. Nevertheless, in this lies the problem. All practical decisions of human beings depend indeed on their general knowledge. Yet a specific difficulty lies in applying this knowledge in the concrete case. It is the task of the power of judgement (and not, to repeat, of teaching and learning) to recognize in a given situation the applicability of a general rule. This task exists wherever knowledge in general is to be applied; the problem is irreducible. There are, however, spheres of practical behaviour in which this difficulty does not culminate in a critical conflict. That is true for the whole sphere of technical experience, that is, of making. There practical empirical knowledge is built up step by step as it is moulded by the encounter with experience. The general knowledge which science acquires, since it grasps the bases of the events, can take its place alongside this empirical knowledge, and can also serve it as a corrective, but does not render it dispensable.

However, even in this simplest case of knowledge directed towards production, the very idea of which shows the two-sidedness of knowledge and know-how, tensions can emerge; and under the conditions of the modern business of science this simple relation between 'theoretical knowledge' and practical action is increasingly attenuated. Moreover, the term 'business of science'

has already become a catchword which points to the qualitative difference between knowledge and action present within the extreme attenuation of their relationship.

The institutionalization of science into a business belongs to the larger context of economic and social life in the industrial age. Not only is science a business, but all the work performed in modern life is organized like a business. The individual, with a definite assignment of work to do, is fitted into a larger business-like whole, which on its part within the highly specialized organization of modern work has a function which is strictly provided for. But this means at the same time that the function is one which is discharged without its own orientation to the whole. While the virtues of accommodation and adjustment to such rational forms of organization are correspondingly cultivated, the autonomy of the formation of judgement and of action according to one's own judgement are correspondingly neglected. That has its basis in the character of modern civilization and permits the following to be pronounced as a general rule: the more rationally the organizational forms of life are shaped, the less is rational judgement exercised and trained among individuals. Modern traffic psychology, to illustrate this by an example, knows the dangers which lie in the automation of the regulation of traffic. Drivers find fewer and fewer opportunities for an autonomously free decision in their behaviour and thus more and more unlearn how to make such decisions rationally.

The tension between theoretical knowledge and practical application that is inherent in the modern condition can be continually bridged to the extent that science also deals thematically with the problem of application of its respective subject-matter and as applied science concerns itself with this problem. The entire content of what we call technology has this character of being applied science. As such, however, the tension in no way disappears but in fact only increases, as the rule stated above also asserts. One can at this point also express it as follows: the more strongly the sphere of application becomes rationalized, the more does proper exercise of judgement along with practical experience in the proper sense of the term fail to take place.

Problema: ¿qué forma de racionalizar o aplicación?
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This is a process of a two-sided sort, for it also involves the relation between producer and consumer. The spontaneity of the user of technology is in fact more and more eliminated precisely by this technology. Users must accommodate themselves to the rules of its ends and to that extent renounce their 'freedom'. They become dependent on the correct functioning of the technology.

But then there arises for people in this kind of dependence a yet wholly different lack of freedom. There is the artificial creation of needs, above all by means of modern advertising. In principle what is at stake is dependence on the means of information. The consequence of this condition is that both the specialist who acquires new information and the journalist – that is, the informed informer – become social factors in their own right. The journalist is well informed and decides how far others should be informed. The specialist presents us with an unassailable judgement. If no one other than the specialist is able to judge the specialist, and if even misadventures or mistakes can be criticized only by specialists – one thinks of the 'malpractice' of doctors or architects – an area thereby has become in a precise sense autonomous. The appeal to science is irrefutable.

The Primacy of Practice

The unavoidable consequence is that science is invoked far beyond the limits of its real competence. This includes, not least of all, the self-evident range of its own application. It is the merit of the American sociologist Freidson to have looked closely at the 'autonomization' that is expanding, by virtue of the appeal to science, in the practical professions, particularly in the medical profession.¹⁰ He has correctly given the prominence it deserves to the point that pure medical science as such is not competent for the practical application of its knowledge because all sorts of other considerations, evaluations, customary practices, preferences, and even personal interests enter into the picture. From the standpoint of science, which the author assumes with the full rigour of 'critical rationality', the appeal to 'wisdom' is not even valid.

Freidson sees in this appeal nothing but the authoritarian mask of the experts who protect themselves from the objections of the layperson. To raise a standard of objective science to such an extreme is indeed a very one-sided perspective. The criticism, however, of the social and political claims of the experts can in the case of such an appeal to 'wisdom' be quite healthy. It defends the ideal of the free society. By virtue of such criticism citizens make the claim that they will not be disenfranchised by the authority of the experts. All this has a special relevance to the sphere of medical science and art. In the very way in which we describe the discipline we vacillate between the terms science and art, and the insight given by the history of medicine into the tension that marks their relationship is striking. This is linked to the special quality of the art of healing, namely, that this art, unlike the arts for producing artifacts, has as its task the restoration of something natural. Precisely because medicine is concerned with techniques for making artifacts within only a limited extent (since ancient times in dentistry and astonishingly early also in surgery), there still exists, even today, a particularly wide scope for the exercise of the doctor's power of judgement. Everything which we call diagnosis is indeed in formal respects the subsumption of a given case under the generalities of an illness. But in this very 'knowing how to distinguish', which is the real meaning of diagnosis, lies the true art. Certainly both general and specialized medical knowledge belong to this art. But they are not sufficient for it. Misdiagnoses, cases of false subsumption under a universal principle, are in general to be charged not, obviously, to the science but to the art and ultimately to the judgement of the doctor.

Now the craft of doctors is distinguished by the fact that they not only must maintain or restore a natural equilibrium, as is also the case in agriculture or in the breeding of animals, but also are involved with human beings who must be 'treated'. This again limits the range of the scientific competence of doctors. As such, their knowledge is in principle different from that of the craftsman. The craftsman's art can easily defend its competence against the objections of the layperson. The craftsman's knowledge

or know-how finds its confirmation in the success of what it does. The craftsman, moreover, acts by order, and in the final analysis it is use which lays down the standards to be followed. In so far as the order is clear, the craftsman possesses unlimited and uncontested competence. That is rarely the case with an architect or a tailor, because the people who give the order seldom really know what they want. In principle, however, the giving of an order to a craftsman as well as its acceptance is something that is a binding contract, binding together both of the parties with their respective obligations, whose claims are proven by the unambiguous character of a produced piece of work.

In contrast, there is for the doctor no such demonstrable 'work'. The health of the patient cannot be regarded in this way. Although health is naturally the goal of the doctor's activity, it is not actually 'made' by the doctor. Connected to this is something further: the goal of health is not a condition that is clearly definable from within the medical art. For illness is a social state of affairs. It is also a psychological-moral state of affairs, much more than a fact that is determinable from within the natural sciences. All this, which formerly made the family doctor a friend of the family, indicates the elements of medical efficacy of which we today are often painfully deprived. But even today the doctor's power of persuasion as well as the trust and the cooperation of the patient constitute essential therapeutic factors which belong to a wholly different dimension than that of the physical-chemical influences of medications upon the organism or of 'medical intervention'.

The example of the doctor thus shows with special clarity how the relationship between theory and practice comes to a critical point under the conditions of modern science. There is first of all the diagnosis. Today this calls into play such a specialized technology that for the most part there hardly remains anything for the doctor to do but to expose the patient to the anonymity of the clinical apparatus. Very often this is also the case with the treatment. This has its consequences for the whole. In contrast to the family doctors of the old school, the practical experience of clinicians, who in general see their patients only in the clinical

stage, is unavoidably abstract. The inverse, however, also applies to general practitioners today. Even if they still make house calls, they on their part can get only a reduced opportunity for experience. The example thus teaches us that while the development of practical technologies, to judge from appearances, reduces the distance between the general knowledge of the science and the correct decisions of the moment, the qualitative difference between practical knowledge and scientific knowledge actually increases. Precisely because the technologies which are applied are indispensable, the sphere of judgement and experience, out of which the right practical decisions are made, gets smaller. What modern medicine can do is astonishing. But in spite of all the progress which the natural sciences have brought about for our knowledge of sickness and health, and in spite of the enormous expenditure on rationalized technology for diagnosis and treatment which has taken place in this area, the sphere of the unrationalized element within it is particularly high. This shows itself in the fact that even now, as in the oldest times, the idea of the good doctor or even of the medical genius has much more of the prized esteem we think characteristic of an artist than of a man of science. Thus in this case one may less than elsewhere deny the irreplaceability of practical experience and the impossibility of circumventing it. The appeal to 'wisdom', the claim to be a 'wise' doctor, may be an illegitimate means of compulsion where it is raised – that is what it amounts to in the end wherever one appeals to one's 'authority'. As it is a sign, however, of an intensified state of delusion to regard authority simply as something illegitimate which one would be better off replacing by 'rational' forms of decision-making – as if one could eliminate the weight of true authority in any form of human social organization – so too the share which 'experience' has in making one prudent, thinking precisely but not only of the doctor here, is just as undemonstrable as it is convincing.

One will find in all spheres of practical application of rules, and thus in what one calls in general 'practice', that the more one 'masters' one's know-how the more one possesses freedom vis-à-vis this know-how. Those who 'master' their art need to prove

their superiority neither to themselves nor to others. It is old Platonic wisdom that true know-how makes possible precisely a certain distancing from it. It is thus the master runner who can also run 'slowly' the best, the one who really knows who can also lie most effectively, etc. What Plato is saying here implicitly is that it is this freedom vis-à-vis one's own know-how which in fact liberates for the perspective of authentic practice what transcends the competence of the know-how – what Plato calls 'the good', which determines our practical-political decisions.

Precisely in the context of the medical art, we speak of yet another mode of 'mastery'. The doctor masters not only his or her art (as does every capable person); we also say of medical science that it 'masters' or learns to master certain diseases. In this expression the special character of medical know-how is articulated, namely, that it does not 'make' and 'produce' but cooperates in the recovery of the ill. To 'master' a disease thus means to know its course and to be able to control it – not to be master of 'nature' to such a degree that one could simply 'take away' the disease. In the place where medicine most closely approximates to a technical art, namely, surgery, we also speak in this way. But even surgeons know that 'intervention remains intervention.' Thus they, too, when making their decision, will always have to look beyond what their medical competence encompasses. And the more certainly they 'master' their art, the more free they will be in confronting it, and not simply in the sphere of medical 'practice' itself.

The Task of a Comprehensive Science of Humankind

The tension between the specialized knowledge of today and the conditions of practice is thus extremely large. The clarification of the interdisciplinary methodological context within which individual researchers move will only occasionally be productive for them. Moreover, let it not be denied that one of the unavoidable consequences of the modern organization of research is that the horizon of the specialist becomes focused on the methodological

and intellectual state of the specialty. The comprehensive task consists of bringing out the true character of careful and provisional research, in the face of the expectations and speculations of the layperson – and in neighbouring areas the researcher is also a layperson. It is a corrective of a special kind to be aware of the disputability – that is, the provisional and in each case limited character – of that which science knows. Science is thus able to combat the superstition that it can relieve individuals of responsibility for their own practical decisions.

We may ask: does not modern science really investigate more and more spheres and thereby make them subject to scientific control? And surely it is true that in whatever area science knows something the layperson's knowledge loses its practical legitimacy. Nevertheless it remains true that each person's practical action continually crosses the boundary of this sphere. This applies, as we have seen, even to specialists themselves when they must act practically on the basis of their own competence. The practical consequences of their knowledge are not simply subordinate to their own intellectual competence itself. This is all the more true of the great domain of human decisions regarding family, society and state, for which the specialist does not have sufficient practically relevant knowledge to offer and which everyone must decide 'according to their own best knowledge and conscience'.

Thus we ask once again: what can a science of humankind that faces this fact achieve for humanity's knowledge of itself? What can it practically bring about? The fashionable answer today to such questions speaks about a 'change of consciousness'. In fact, one can conceive of this taking place with the doctor, the teacher, and perhaps every other specialist, where they become mindful of the limits of their specializations. They then become ready to acknowledge experiences which are uncomfortable for the private interests of researchers – such as, for example, the social and political responsibility present in every profession where others are dependent upon someone. Since the horrors of atomic warfare penetrated the general consciousness, the term 'responsibility of science' has acquired great popularity. That the specialist is not only a specialist but also a socially and politically responsible

agent, is however, fundamentally nothing new. The Platonic Socrates met his ruin for laying bare the inability of the specialist to rise to this level of responsibility. The moral-philosophical reflection of antiquity thus already posed for itself the question of how far such responsibility extends in view of the unpredictability of the use and abuse of the products of human handiwork. It sought its answer in the domain of 'practical philosophy' by subjecting all the 'arts' to 'political' ordering. Today there is a need of this on a worldwide scale, given the inexorable transformation of all scientific know-how into technology, within the existing economic order, as soon as something promises a profit.

One can also describe the change by saying that a corresponding development of a social-political consciousness has not kept pace with the scientific enlightenment and the technical progress of our civilization. Moreover, the immensely increased possibilities of application which science has created for the shaping of society may be only in the beginning stage. One must thus say that the progress of technology encounters an unprepared humanity. It vacillates between the extremes of an affect-laden opposition to rational innovation and a no less affect-laden craving to 'rationalize' all forms and sectors of life, a development which more and more acquires the form of a panic flight from freedom. Thus the question becomes more acute of how far science itself should assume a shared responsibility for the consequences of its forms of technical application. Moreover the fact remains that the immanent and consistent structure of research has a necessary character of its own. Herein lies the non-negotiable right to the demand for freedom of research. Research manifestly can flourish only at the risk of conjuring up the fateful experience of the sorcerer's apprentice. Every addition to knowledge is, regarding its significance and consequences, unpredictable.

Thus we are not going to be able to speak seriously about charging science as such with the responsibility for the consequences of its progress. This would automatically have the most undesired effects: the dread of responsibility, preference for the 'safe' paths of research, bureaucratization, superficial labelling, and finally aimless drifting. Yet it is true that science acquires an

ciência

know-how → ciência → tecnologia → lucro

qto a ciência sabe disso
"pode inventar"

influence on our life to an increasing degree and, therefore, that the consequences of research possess an ever greater human significance. One thinks simply of the development of chemical fertilization, of chemical preservatives, of the problem of waste disposal (not only in the production of atomic energy but above all in the use of synthetic materials), of water and air pollution. How far must science accept the responsibility for this?

Here too science can only be responsible for what it alone has always been responsible for – that is, in all these matters, to recognize and to seize tasks for inquiry, thereby serving the scientific and practical mastery of the problems which it and its application have created. One therefore asks whether there should not be metasciences – futurology, the science of planning, etc – expressly to take up this task. But in every case this only displaces still further the locus of the ultimate decisions. In other words, it is the task not of science but of politics to supervise the application of the know-how made possible by science. It is also conversely the task not of politics but of science to supervise its own needs, investments in time and money, etc. This is in the final analysis the function of scientific criticism.

But here too the relation between theory and practice is extremely complicated. The theoretical interest (and the prerequisites in life for 'leisure') do not suffice where the business of science itself has become an organized whole, with a division of labour and a large budget. Research needs the political sphere to an extreme degree. Inversely, the political human being – and everyone is such who has a share in political decisions through action or inaction – is more and more dependent on scientific information. This places an increased responsibility on researchers in view of the increased significance which the results of their research can have. They must make its necessity convincing. To this end they must appeal to the general faculty of judgement. They themselves, however, must possess such a faculty of judgement in order to control their own egoism as specialists. It seems to me that here the science of humankind has a further task. The voice of all researchers who look back on their life's work and reflect on its anthropological significance can expect a heightened interest among

all whose social and political consciousness requires information from science. The general question, of what one can say today about problems of human practice from the standpoint of science, becomes linked to the other question: what practical-political consequences do leading researchers draw from their scientific knowledge? With regard to the latter question one must keep clearly in mind that the perspectives of competent researchers are indeed distinguished by their level of information. But as practical and political perspectives they cannot claim the same competence and authority which belongs to the body of information as such. The latter is only a contributing element to the practical deliberation and decision that everyone, by virtue of their own responsibility, performs.

In all this nothing has been said about the credulous separation between information and a practical or political grasp of things. Yet the concept of information, as developed by cybernetics, creates a problem of its own as soon as it involves the practical knowledge of man. What faces us is an 'anthropological' problem. We know it as the practical task of getting correct information. Naturally every machine which stores information carries out certain choices which originate in the programming. It is thus able to take the information which flows into it and continually separate it out again. But it forgets nothing. An enormous superiority, we may perhaps think, which will cause us constantly to complain about the limits of the human memory. But the machine, which forgets nothing, cannot as such remember. Forgetting is not exactly separating out, but it is not simply storing. It is a kind of latency which maintains its own presence. Everything hinges on the character of this presence. To be sure, stored information which one can call forth from a machine has a kind of latent presence. But precisely herein lies the difference. The machine can well exhibit the neurophysiological state called *mneme*. It can also – perhaps some day – imitate the neurophysiological process of 'recollection' (seeking and finding) or that of 'passive' recollection by means of 'a sudden flash of thought'. To this extent it 'explains' forgetting and remembering. But it does not 'know how' to do it by itself, precisely because forgetting is not a 'knowing how'. What is involved in this may become clear to the layperson by

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the example of a word index. The pride of a mechanized index is its completeness. It is guaranteed to forget or omit nothing. Naturally one quickly realizes that such completeness also has its practical disadvantages. A word that appears frequently fills many pages of the index. This at once creates its own form of hiding place for what one is seeking. One then tells oneself that a sought-for word becomes recognizable only through its context. The context index is thus the next step towards making a mechanized index practically useful. But here too the idea of the context is feasible only in an abstractly isolating form. The actual context within which the actual user is really seeking something is not capable, moreover, of classification. Granted, such an index is objective and attains the full objectivity of the given text. Granted, every selective index signifies a subjective interpretation of the text. Granted, this is deplored by every individual user as a defect. For that reason the users will find useful not the 'perfected' index but only the index which corresponds with their own subjective points of view. And that is the one which they compile themselves. Only such an index is so selected that it potentially 'reminds' in all its data. It 'reminds' as the presentation given by the context index of the machine is unable to do. This is so because the latter does not rediscover in itself individual memory traces but necessarily offers everything that it 'knows'. Whether this is helpful to the users in presenting, for example, new observations to them is the question. There will be such cases. But there will also be the opposite, where one is looking something up while one should be reading.

The above example is a special case of a general problem. What a researcher, in the practice of research, is able to make out of information by selecting, separating out, forgetting, letting insights ripen and mature, corresponds completely to what is to be found in the whole range of human practice. Information must be processed by selection, interpretation, evaluation. Where information comes within the reach of a person's practical consciousness, such processing will always be achieved in advance. The concept of information as applied by information theory in no way does justice to the process of selection through which an item of information becomes significant. Even the information on

which the specialist builds up know-how through the logic of research is achieved 'hermeneutically'. This means that it is already limited to what it must answer by its questions. This is a hermeneutic structural element of all research. In itself it is still not 'practical' knowledge. All this is at once modified to the extent that the practical knowledge of human beings themselves becomes an object of science. This science is then no longer one which selects human beings themselves as the immediate object of its research. On the contrary, it takes up as its object *the knowledge* of human beings themselves which is mediated by the historical and cultural tradition. In Germany this is called, in the wake of the Romantic tradition, the *Geisteswissenschaften*.¹¹ The terms of other languages, such as 'humanities' or *lettres*, are clearer in so far as they convey the distinctiveness of the mode of givenness of the experience we actually encounter. In these sciences the logic of inquiry is in principle the same, indeed, as in every other science. But its object is something else. On the one hand, it is the human dimension which 'objectively' vouches for itself in the cultural creations of humankind such as economy, law, language, art and religion. On the other hand and in unison with this, its object is the explicit knowledge of humankind laid down in texts and verbal testaments.

The knowledge thus transmitted is indeed not of the type and status of the natural sciences. Nor is it a mere continuation beyond the borders of natural-scientific knowledge. Researchers into nature, deploring the absence of their exactness, may think unjustly of the humanities as 'inexact knowledge'. It may have the truth of vague intimations, which one calls understanding by introspection. In fact the teaching about humankind which we acquire through the *Geisteswissenschaften* is of an altogether different kind in which the immense variety of what is human manifests itself in its overwhelming breadth. The old differentiation made by the theory of knowledge between explanation and understanding or between nomothetic and idiographic methods does not suffice to indicate the full dimensions of a science of humankind that is self-conscious of its being a human activity. For what is manifest in concrete detail and belongs as such to historical knowledge is of interest not as the particular but as 'the

human' – though it may always become visible only in particular occurrences. Everything human not only means the generally human in the sense of the characteristics of the human species in contrast to other types of living beings, especially animals, but also comprises the broad view of the variety of the human essence.

Without any doubt there is present here an unacknowledged idea of a norm in the light of which the fullness of the noticeable variations and deviations from what we expect from human beings and find valuable is articulated. All practical or political decisions which determine the actions of people are normatively determined and exert in their turn a norm-determining effect. Historical change is thus continually taking place. The knowledge which we owe to the results of research self-evidently plays a powerful role in this. But it is not a one-sided relationship. There are many mutual interactions between the human dimension as discovered scientifically through anthropological research and this intrinsically controversial and relative idea of value.

I am thinking not only of such facts as that researchers cannot always eliminate value expectations or that they will often interpret their findings under the impress of inappropriate prejudices – I am reminded again of the struggle over Darwinism in social research. These are at times overpowering defects in the progress of research. Similarly, researchers will not always be free of the inverted pleasure of discrediting established conceptions – this too will make them one-sided. But this is valid just as much in the positive. There are intuitive anticipations of knowledge, like the knowledge of salvation of the *homo religiosus*, which often has something to say to the doctor, or the 'knowledge' of the poet, which is able to outdistance that of the psychologist, sociologist, historian and philosopher. In short, the normative image of human beings, which, however incomplete and vague, lies at the basis of all human social behaviour, not only does not allow itself to be wholly eliminated in research but also should not be wholly eliminated. This is what makes science into an experience for human beings. All that the science of humankind can achieve in the attempt to bring about an integration of our knowledge of human beings is to unify both streams of knowledge and to make conscious the prejudices carried along by both. A 'correct' image

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of humankind is above all one which has been freed of dogmatism by natural science, research into behaviour, ethnology, as well as by the diversity of historical experience. It will be devoid of clear normative outlines if its scientific application relies on practice in the sense of 'social engineering'. As a critical standard, however, it frees people's actions from rash valuations, both positive and negative, and helps to remind us of the goal of the path of civilization which – left to its own resources – threatens to become less and less a path towards the advancement of humanity. It is thus that the science of humankind may serve people's self-knowledge and thereby practice.

Notes

This chapter was originally translated by Howard Brotz and has been modified by Jason Gaiger and Nicholas Walker.

- 1 Paul Natorp, *Philosophie, ihr Problem und ihre Probleme: Einführung in den kritischen Idealismus*, 3rd edn (Göttingen, 1921).
- 2 Benedetto Croce, *Logica come scienza del concetto puro* (Bari, 1905).
- 3 Jacob von Uexküll, *Streifzüge durch die Umwelten von Tieren und Menschen* (Frankfurt, 1970).
- 4 Philipp Lersch, *Die Binnenhaftigkeit des Seelischen* (Leipzig, 1941).
- 5 Arnold Gehlen, *Anthropologische Forschung* (Reinbek, 1961), and *Der Mensch*, 8th edn (Frankfurt, 1966).
- 6 Max Scheler, *Die Stellung des Menschen im Kosmos*, 7th edn (Munich, 1966).
- 7 Helmuth Plessner, *Philosophische Anthropologie* (Frankfurt, 1970).
- 8 Ibid.
- 9 Max Weber, 'Wissenschaft als Beruf', in his *Gesammelte Aufsätze zur Wissenschaftslehre*, 3rd edn (Tübingen, 1968).
- 10 Eliot Freidson, *Profession of Medicine: A Study of the Sociology of Applied Knowledge* (New York, 1970).
- 11 This term, which is commonly translated as 'human sciences' or 'cultural sciences', literally means, of course, 'sciences of the spirit'. It was coined, with its evident late Idealistic connotations, by the German translator of Mill's *Logic* to render thereby Mill's term 'moral sciences' (J. S. Mill, *System der deduktiven und induktiven Logik*, tr. Schied (1863), book 6: 'Von der Logik der Geisteswissenschaften oder moralischen Wissenschaften'). For a discussion of this term, see my paper 'The problem of historical consciousness', *Graduate Faculty Philosophical Journal*, 15 (Fall 1975), p. 12.