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Past and Future of Modern Scientific Communities

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PAST AND FUTURE OF MODERN SCIENTIFIC COMMUNITIES*

I. HISTORICAL AND CONCEPTUAL APPROACH

1. FROM THE CLOSED CHARISMATIC GROUP TO THE OPEN FUNCTIONAL BODY

It is very difficult to solve the question of how social thought began. Did the early observers pay more attention to masses, to groups, or to individuals? Although this question has rather an academic character, one can say that in all probability the fathers of modern sociology observed preferentially just those things which attracted their personal interest. It is, however, certain that the interest of the observer is, as a rule, stimulated by the mobility of the object. As long as the masses were quiet, they remained undifferentiated or, in other words, anonymous, but whenever anything was happening among the mob, the observer's mind was immediately excited and he came to distinguish the small groups, the outstanding personalities and so forth. Villani and other early Renaissance Italian analysts wrote about the *popolo di Firenze* until the moment when the antagonistic tendencies of this "people" took the form of the open conflict — at that time they distinguished

* In September 1968, the General Assembly of the International Council of Scientific Unions accepted an invitation by the International Union of the History and Philosophy of Science to undertake an inquiry into various scientific communities and to prepare, under the patronage of UNESCO, a study connecting this problem with modern scientific policy.

As a result of this engagement, in the course of meetings held in Paris and Nairobi in 1968 and 1969, professor Derek J. de Solla Price (Yale University, USA) as the rapporteur of this study, professor Waldemar Voisé (Polish Academy of Sciences, Warsaw) as rapporteur-adjoint, and twelve authors from different countries prepared, in July 1969, a special report about the different questions connected with modern scientific communities.

These are some considerations of the rapporteur-adjoint of this study.

popolo grasso from *popolo minuto*, mentioned the patrician and plebeian leaders and so on. Searching for the sources of the disturbances (if any), they made an effort to decipher the origins of collective and individual actions.

So, not only is the border between pre-sociological thought and psycho-social analysis of social phenomena rather fluid, but also the macro- and micro-sociological trends are confused. Generally speaking, it was so until the second half of the 19th century, that is, until the transformation of social thought from lore to science. Although from that time forth both trends have made a great progress, it appears that the second, in particular, has reached the level which allows us to draw practical conclusions from the more or less theoretical micro-sociological analysis.

For the last few decades sociologists have paid special attention to the specific human collectivities termed communities.¹ In spite of many semantic misunderstandings due to the several senses of this term, it remains important as a concept which facilitates studies in social ecology. Among several different communities, those of the scientists that have often attracted the attention of investigators of modern social life in the last ten years.² Taking into consideration both the mobility (and therefore the perceptibility) of the numerous members of such communities and the visible importance of these communities in our increasingly more sophisticated human relations, this phenomenon is justified and self-evident.³ First of all, however, particular note may be made of the importance of science in contemporary society. In the times of the old "little science" scientific communities arose and transformed spontaneously, whereas in the era of the new "big science" this is inconceivable.

Scientific communities have always existed wherever science existed, but in each epoch their forms have been different. A modern scientific community is doing more or less what religious communities, brotherhoods and fellowships did in the past. The ancient Pythagoreans, the

¹ For definitions see some encyclopaedic publications, e.g., *Dizionario Enciclopedico Italiano*: "Comunità — organizzazione di una collectività sul piano locale, nazionale, internazionale. Senso più concreto: insieme di persone che anno comunione di vita sociale." Roma, 1956, vol. III, p. 108; *Der Grosse Brockhaus*: "Gemeinschaft — Die innere Verbundenheit von Menschen zu einer Gruppe, die auf Grund der Übereinstimmung in wesentlichen Verhaltensweisen gemeinsam oder füreinander handlungsfähig ist." Wiesbaden, 1954, vol. IV, p. 472; *Encyclopaedia Britannica* and A. Lalande's *Vocabulaire technique et critique de la philosophie* noted only the concept of the "community property", but Lalande gives also some another remarks (in footnotes).

² In the heroic age of the communitarian trend W. L. Warner and P. S. Lunt published *The Social Life of a Modern Community*, Yale University Press, New Haven, 1941. This volume describes the cultural life and behaviour of the citizen of Yankee City (some 17,000 people) situated in New England.

³ Of late years see, e.g.: J. E. Holmes, *Science Town in the Politics of New Mexico*, Albuquerque, Department of Political Science of the University of New Mexico, 1967, publication nr 71; G. Lemoine, B. Matalon, B. Provansal, "La lutte pour la vie dans la cité scientifique", *Revue Française de Sociologie*, vol. X, 1969, pp. 139-165.

Hippocratic apprentices, as the collaborators of the Alexandrian Museum, were connected through a dual bond: they belonged both to a sacerdotal and to a philosophic-scientific community. The role of a charismatic element was on the wane in the Aristotelian Lyceum, but it maintained its importance for a long time. It is enough to remind one of medieval monasteries devoted to the cultivation of the "intellectual virtues" and the contemporary denominational universities, both Catholic and Protestant. The well-known medieval description of the Paris university as the *universitas magistrorum et scholarium Parisiis studentium*, nearly literally repeated eight centuries afterwards as the designation of the university in general: "a community of scholars and students engaged in the task of seeking truth",⁴ moves the centre of gravity towards the modern concept of the scientific communities, i.e. the body conceived as a social group, or several groups, having their unity through economic, social, political and, chiefly, scientific functions. This attitude is striking in considering the activity of Italian Renaissance Academies, and Academies in France and England in the 17th century — they were the teams devoted to collective intellectual work.

The general conceptions of such societies formed in this very century had a similar character. Francis Bacon in his *New Atlantis* planned the foundation of the famous "House of Salomon", and at the end of this century Leibniz — in his letters to Prince Frederic III, Tsar Peter I and theologian D. E. Jablonski — planned the creation of learned societies devoted to the development of sciences, arts and letters (*Societates Scientiarum et Artium*); in 1700 he became the first president of the Academy of Science in Berlin.

Comenius was perhaps the first thinker who had the idea of internationalizing this kind of society, not by the election of foreign "corresponding members", but by the creation of an international didactic college. Already in the "Foreword" to his *Great Didactic* (1627–1632) he proposed to create a special body in order to unify the collective aim, to examine the principles of all sciences and accordingly "to perfect the course of human affairs".

The Royal Society, with whose founders Comenius had been associated during his stay in London, was composed, however, of a great number of "influential" dilettantes. In 1674 Newton suggested the removal of the "useless fellows",⁵ but as late as the 19th century, the number of active members was still considerably less than the nominal membership of this institution.

Subsequent structural metamorphoses of scientific communities led to the crystallization, in the 19th century, of two essential types: "ped-

⁴ K. Jaspers, *The Idea of the University*, Beacon Press, Boston, 1959, p. 1.

⁵ J. G. Crowther, *The Social Relations of Science*, Macmillan, New York, 1942, p. 600.

agogical" and "researching", but the border between them was rather fluid, because of the pedagogical activity of many investigators, and the research work of many professors. One can say that such a kind of "personal union" of research and pedagogical activities was typical for the climate of intellectual life at the end of the 19th and the beginning of the 20th century.

This structure was still more complicated because of the formation of many "schools". These are different and rarely institutionalized forms of the scientific community; each is composed of the adherents of a certain scientific idea, formulated by some eminent intellectual personality.

Nowadays, we are witnessing the birth of yet another new kind of scientific community, some modern scientific *polis* constituted of anything from a mere few to a score or to thousands of scientists having the highest qualifications. Such a "scientific city" is a closed world of research; Oak Ridge and Los Alamos in the U.S.A., Akademgorodok (Science City) in the U.S.S.R. and CERN or Trieste in Europe may serve as classical examples. These scientific centres of a modern scientific life are a fruit of the determined policy of the many contemporary countries which tend to create a new *modus vivendi* between the administration of the state as a whole and functional type of scientific research.

But several antagonisms still existing between scientific communities and the makers of science policy in many modern countries show that the present situation can be described as typical for a transition period. In the past, the principal trend consisted in promulgating and preserving the total liberty and autonomy of scientific research. In the future we can hope for a more or less perfect synchronization of the requirements of states and aspirations of intellectuals.

At present, however, both tendencies are pronounced. On the one hand, the modern policy for science aspires to liquidate or, at least, to weaken the relics of the caste system, characterizing many old scientific communities. On the other hand, the scientists are not going to be transformed into simple "government functionaries". In this situation a new form of coexistence must be found, namely one which can pose and also satisfy the specific conditions for scientific creativity. It is from this there arises that aim of science policy which is to co-ordinate two different aspects of modern intellectual life: "personal" and "functional" ones. Beyond any doubt the development of modern science requires harmony between the creative scientific mind and an organizational pattern that can stimulate inventiveness and ensure the best conditions in daily scientific work. In such a way, the goals of a good policy for science do not oppose the interests of state to the interests of scientific communities, but attempt to integrate both these elements in order to reach optimal effects. The example of some developing countries may be very instructive in this domain. The contemporary situation thus confirms

H. G. Wells' prophetic statement that mankind's history resembles a race between education and catastrophe.

Together with other communities, the scientific community is involved with a profound crisis, connected with two phenomena, at least: (1) the professionalization of all scientific activity, and (2) the coming of an increasingly rigorous science policy. The first trend liquidates the possibility of existence of amateurish enterprises; the second means the formulation of imperative requirements by the state. Both lead, in the last resort, to the integration of all intellectual activity by the state, a real "leviathan" — using famous Hobbes' term — still ready to absorb and control all communitarian life. The external activity (both national and international) of the modern scientific community is also subordinated to the same changing forces, because the necessity of an unobstructed exchange of information springs from the firm conviction that only this procedure can clear the way to the highest possible level for science in a country.

So, the reasonable science policy becomes a burning question mostly because of a visible change in the character of a modern state's policy, which ceases to consist of controlling and ruling men, and turns more into a control over production. Furthermore, the old "technocratic", as well as the newer "decisionistic" models for the process of policy-making seem to be already out of date. In place of the so-called "objectivisation of politics" and the strict separation between the role of the experts and the politicians there is a new proposal. This "pragmatist" model of policy-making consists of "a critical dialogue"⁶ which will probably replace the functional separation between the roles of the politician and the scientific advisor, and help to avoid arbitrary judgments in political and economical planning.⁷

So far as can be seen, all these solutions lead to "productivisation" of scientific work, and consequently, to a certain neglect of "unproductive" branches of the natural and social sciences such as philology and pure mathematics. There is more in that than meets the eye because the practical consequences of such a stand might be disastrous for the future of mankind. In the middle of the 17th century Thomas Sprat had already written in his *History of the Royal Society* these warning words: "Knowledge still degenerates to consult present profit too soon".⁸ "Relevance"—he may be warning us—is a bad guide to investment in our

⁶ K. Lompe, "The Role of the Social Scientists in the Process of Policy-Making", *Social Science Information*, vol. VII, 1968, pp. 161 f.

⁷ About the scientific policy and so called "pure research" see: J. J. Salomon, *Histoire de la science et politique de la science, Résumés des Communications de XIIe Congrès International d'Histoire des Sciences*, Paris, 1968, p. 109; *id.*, *Science et politique*, Edition Seuil, Paris, 1970.

⁸ Th. Sprat, *The History of the Royal Society of London for the Improving of Natural Knowledge*, London, 1668, p. 67.

future, and besides, it seems that apparently even totally unpractical study bears rather positive fruits; it may help perfecting the finest of instruments ever known—the human mind.

2. PAST AND PRESENT OF THE OPERATIVE CONCEPT

Giambattista Vico, preparing in the first half of the 18th century the successive editions of his *New Science*, was convinced that man can more easily understand the enigmas of his own products than those of nature, produced by God. Today, however, we have a wholly different judgement on self-observation, and therefore, without an overemphasis on the specifics of our problem, it is useful to recall to readers that the essence of this inquiry consists precisely of the scientific analysis of scientific life, *i.e.* in the conceptualization of the different forms and transformations of an organizational pattern connected with the cultivation of science, technology and letters.

It is necessary therefore to stress that inquiry in this domain has nothing to do with the sociological trend fashionable (first in Germany) in the thirties, which restricted scholars' interest to the theory of social happenings, *i.e.* which handled social phenomena with the same neutrality with which we view geometric figures. On the contrary, in spite of numerous difficulties reverting to the founder of the science of society, who in the 19th century struggled to investigate social rules in the same way as natural ones, we try to understand social events in order to facilitate practical conclusions. Thus, many analyses of "communitarian" trends in our age lead to the formulation of practical procedures for regulated social change, both in a national and international context.

Strictly speaking it was nearly always so, and even in the 17th century the thinkers, fascinated by the reasoning "more geometrico", were inclined, more or less consciously, to regard the scientific establishments as centres of both teoretical and practical investigations. Passing over the very well known exemple of Francis Bacon (as the typical representative of an inductive and experimental trend), we can quote numerous cases of such practical tendency. Many advisers living in various Enlightenment courts and cities in Europe belong to this orientation — Erhard Weigel, for example, projected the creation of a kind of academy of science, art and handicraft and his famous pupil, Leibniz, coined the still existing and terribly potent device of the Scientific Academy in Berlin *Theoria cum Praxi*.

At the present time, when the scientists are giving increasing attention to their own institutions, this very attitude is stricly connected, first of all, with the prominent role of the science as the instrument of the

self-made measure of its own possibilities. So, the old Vico's dream is partly realized owing to the self consciousness and near omnipotence of the contemporary *homo faber*, searching to bear witness of his own possibilities. From this point of view, the scientific self-observation forms a kind of comparative study concerning both man's scientific instruments and man's intellectual power.

Saint-Simon was probably the first social thinker, early in the last century, to turn his attention to the connection between the elaboration of ideas and the formation of society (he wrote in *Introduction aux travaux scientifiques du XIX^e siècle*, 1808, that "la production des idées intervient dans la constitution de toute société").⁹ Since then investigations concerning the independence between human thought and the thinker's social environment have made great progress — the achievements of Max Scheler and Karl Mannheim in this field marked its great importance. Without regard to risk, sociological studies of the morphology of scientific thought are useful because of the possibility of reasonably steering social phenomena and of more consciously implanting the fruitful innovations created by the human mind.

Today, using the concept of the scientific community, we take into consideration either the group formed by a certain collective of men pursuing a scientific-technological activity, or a certain corporation dealing with a complex of problems unifying the intellectual initiative. And in spite of the fact that both aspects are always strictly connected with the activity of every scientific community, one can, nonetheless, distinguish the different features of the "double-faced Janus' head" of the scientific communities. At one and the same time we are inclined to treat them like a traditional collective having a special place within other communities, and we are driven to see them as a kind of a trade union called to accomplish definite function.

Regarded from without, every scientific community looks like a homogeneous body demonstrating a certain *esprit de corps* of all members. Even the terminology seems to reflect this impression as one frequently talks of a "body" (organism), of a "structure" (uniform construct), and so on. From inside, however, the scientific community does not show this solidarity alone. Like every social group, scientists and technologists are exposed to various conflict situations, both external and internal. Historians may easily give us many examples of them, showing that every epoch has its own form for such conflict situations.¹⁰ The first

⁹ G. Gurvitch, *Les cadres sociaux de la connaissance*, Presses Universitaires de France, Paris, 1966, p. 4.

¹⁰ Prof. Dr. B. Sticker, Director of the Institut für Geschichte der Naturwissenschaften in Hamburg (German Federal Republic) prosecuted in Wintersemester 1969/70 the seminar devoted to the conflict situation in the history of science (Galilei, Lavoisier, Humbolt, Nobel, Einstein, etc.).

modern sociological analysis of conflict of this kind made by R. K. Merton in his reflections on *Science and the Social Order*¹¹ shows, primarily, the conflict between the monopolistic ruling Nazi Party and German society of the nineteen thirties, with special attention to the intellectuals.

Another conflict arises inside scientific communities as a result, as Norbert Wiener has stated, of the continual struggle between organization and disorganization. The necessity to maintain the hierarchy on one side, and the need, on the other, to assure the free initiative to all members of the collective leads to very complicated situations.

The novel and partially closed community of the scientific city, forms a specific world of research, based precisely on competition and a system of rewards. It is altogether too early to say anything about the mentality of the inhabitants living in such a community (Los Alamos and Oak Ridge in U.S.A. and Akademgorodok in U.S.S.R), however, a survey conducted in Los Alamos has proved the existence of rather alarming tendencies — a striving to retain the *status quo*, a feeling of superiority among the new élite and general narrow-mindedness among its representatives.¹² The inhabitants of Akademgorodok are perhaps less likely to be exposed to this kind of danger due to the pioneering nature of the undertaking and to the very wide scope of activity undertaken by the centre which lies in a culturally neglected country.¹³ They may however bring forth a group of different social problems and peculiarities. The future will show this new type of mentality, conceivably not just in its scientific but also in social characteristics.

However, it must be said that, independent of specific situations, the scientific milieu seems to be a body having its own intrinsic laws, particularly connected with its fundamental character of conflicts, or rather, with the characteristic conflicts of its members. The recent study of the social pattern of the scientific city¹⁴ shows that the internal system of rewards leads to the necessity of a "visibleness" of all members, stimulating differentiation, cognitive schism, superficial originality, the construction of new paradigms, and so on. The functioning of the city proves the existence of a strong tendency to a growth of competition, personal commitment and self-perceived handicaps in nations.

¹¹ R. K. Merton (ed.), *Social Theory and Social Structure*, Free Press, Glencoe, 1957.

¹² J. E. Holmes, *op. cit.*

¹³ M. A. Lavrientiev, *Revolutionnyi marsch nauki* (Revolutionary March of Science), *Trud*, November 11, 1967, writes about the existence of both the institutes of nuclear physics, geology, etc., as well as of mathematical logic, methodology, etc. He mentions also that several experimental factories were built. Scientific staff of this centre deals with the whole complex of research connected with Siberia demography, development of productive means, problems of agriculture, urbanization etc. — see *Isvestia Sibirskovo Otdelenia Akademii Nauk SSSR* (News of the Siberian Division of the Soviet Academy of Science).

¹⁴ G. Lemoine, B. Matalon, B. Provansal, *op. cit.*, p. 270.

If one enquires deeper about the outstanding features of the modern scientific communities it will appear that the above-mentioned conflicts are not typical for them. We find that it is the constant intellectual activity more than anything that moulds the distinctive characteristics of any community of that kind. This activity guarantees both the maximum of internal integration and the minimum of external intervention. What is more, it impresses a specific stamp on the whole "intellectual globe" surrounding the scientific communities as Francis Bacon said. This very activity creates a kind of an "internal market" where the products of the intellectual work have their own circulation before being exposed to the more or less large circle of readers.¹⁵

Also from this point of view, every scientific community is, once more, a two-faced community, being at the same time "closed" and "open". It is closed because of the existence of a certain internal status determining not only the membership of all members and the formal structure of the whole body, but also its extramural relations and the *façon d'être* of every member. On the other hand, the scientific community can be classified among the open communities since the main criterion of membership is a certain level of intellectual efficiency, which is, by the way not always identical with the possession of a diploma. Even the internal structure of the scientific community indicates an apparently ambiguous character.¹⁶ It is centralized and hierarchical on the one hand, and democratic and full of partnerships on the other. The principle of the uniformity of the management and the subordination of all members to a common goal coexist with the rule of egalitarian rotation (every member can be, potentially, a chief) and the collective moral responsibility of the whole team.

Probably as a result of this internal and external character of the scientific community, we are witnessing today the growth of a new self-consciousness of all members of these communities. These external and internal stresses will, undoubtedly, exist evermore, but some of them must be surmounted and modified in every epoch if the future of scientific communities is to prove worthy of their past.

II. OUTLINE OF COMMUNITARIAN POLICY

After considering what scientific communities were in the past and what they are today, let us consider, finally, what they probably will be. While it seems impossible to describe this problem without running the

¹⁵ The role of the separate offprints in this micro-milieu shows A. Moles, *Sociodynamique de la culture*, Mouton, Paris, 1967, p. 204.

¹⁶ T. M. Mills, *The Sociology of Small Groups*, Prentice-Hall, New Jersey, quoted after the German translation: *Sociologie der Gruppe*, Juventa Verlag, München, 1969, pp. 189 f.

many risks which accompany a massive generalization, we will try to give the form of "generalizing propositions" to these generalizations. It is hoped these will reveal the different possible perspectives of inquiry and also different possible perspectives of realization, if it is true that the perfection of science consists of transition from descriptive to operative sense.

1. INTELLECTUALIZATION OF HUMAN ACTIVITIES

At first it seems exaggerated to lay great store upon reflexions about the future of the scientific communities, but a moment's thought shows that the prospective aspects of this question are at least as important as those connected with the past and present.

The matter becomes perhaps more clear one remembers the two notorious phenomena: the acceleration of the rhythm of history and the growing rationalization of all human activities. Transformations which in the past needed many decades or centuries need only a few years in our age and everything goes to show that this pace will be accelerated further. So, it is not too much to say that today's decisions operate as early as tomorrow and, as the number of decision-makers increases also very fast, the danger of a quick multiplication of erroneous decisions grows. This is, after all, only one side of the main problem which consists in a growing importance of the future in our thoughts and actions, and it is not without a reason that an American sociologist Alvin Toffler writes about "the shock of the future" being a characteristic feature of our times. Here is one of the numerous examples: when a model of an extra rapid typewriter was constructed in the Technical College in Lund (Sweden) immediately a burning question arose of building a robot which would be able to write at the speed of 50 touches per second, this speed being beyond a man's reach. This comparison of our capabilities and the present *status quo* produces a stress changing the whole way of the scientific thinking. Together with a more and more live issue of the scientists' responsibility, the question of shortening the time which separates the present (always faulty) from the future (always hopeful) is the factor stimulating thinking of a constantly growing number of collaborators of every scientific community.

The course of the second process namely the rationalization of our activities can be estimated at present. In the next quarter of the century or so the number of human beings devoted to more or less scientific and technological activities may presumably increase to reach 85 per cent or some other almost incredible proportion of the world's population. As a consequence of this change the following generation will live in an environment where nearly each function will be rationalized, that is to say, at last the intervention of a scientific or technical adviser will

be involved. Such a vision of our future has obsessed the minds of thinkers for many decades. For example, Edgar Allan Poe wrote in his sonnet "To Science" the significant words:

Science! true daughter of Old Time thou art!
Who alterest all things they peering eyes.
Why preyest thou upon the poet's heart,
Vulture, whose wings are dull realities?

A contemporary American scientist writes ironically that in the future each of our steps will need an expert who will teach us to respire, to walk, to run and even to love. For everyone who has read the recently published book entitled *Your Baby's Sex: Now You Can Choose* by an American doctor Landrum B. Shettles it is clear that what once was realm of spontaneousness has now become an entirely rationalized act. Besides, once again it appeared that the actual relationship between the partners became subordinate to a certain vision of the future. So it seems that the knowledge of the "dull realities" will soon "alter all things", i.e. that the science will change completely not only the face of the world of nature, but also human relations, achieving such a level of sophistication that one could both describe and regulate them "more geometrico".

This science-fictional vision of our future can arouse serious objections,¹⁷ but everything goes to show that the "Brave New World" can take this very form. Today one cannot deny that man's attitude towards his environment is more and more cognitive and that human relations consist increasingly of an incessant exchange of information.

2. THE EMPLACEMENT OF THE SCIENTIFIC COMMUNITY AMONG OTHER COMMUNITIES

In this future sophisticated society, what will be the place of the human collectivities devoted precisely to rationalizing human activity? Projecting contemporary status into the future, this is how we can see the problem. Among different amalgamated communities constituting the whole of society the scientific communities will create mankind's "logosphere", that is, modifying Gaston Bachelard's expression, the totality of the mind's scientific production.

In the past, the closed scientific communities formed a kind of Leibnizean "monads without windows". In the future, as they become more

¹⁷ In the United States many sociologists (Theodore Roszak and Paul Reed, for example) show the connection between the actual hippies' "contre-culture" and men's negative attitude towards an increasing rationalization of human behaviour. Another aspect of our future shows the book of the Czechoslovak author, Radovan Richta, *La civilisation au carrefour*, transl. from Czech by L. Klimova, Anthropos, Paris, 1969.

open, they will take the form of "monads with windows"; this is clear at least in view of the example of the Open University in Buckinghamshire (Great Britain) whose organization may revolutionize the traditional system of education and, moreover, the traditional structure of the scientific creativity. Thanks to that, the logosphere will not float over the world as an invariable platonic idea, but will change, over and again, both in form and content. Even by now it is apparent that the amount of knowledge becomes out of date quicker than the sequence of the successive generations. This is why the integration of intellectual methods of controlling the man's education must sooner or later replace the transmission of the inherited knowledge. Supposing that scientific communities exact from other communities an active participation in the common task consisting of the formation of human imagination, feelings, and so on, these other communities will be rightly entitled to expect from scientific communities a collaboration in the efforts to give mental shape to the changing world, to construct new intellectual categories with the view to clarifying and transforming its structure and dynamics. It seems that there would rightly be a place for future scientific communities, obliged to understand and help to change the world.¹⁸ The more that the illusions were shattered of how the high level of the material culture as if automatically influences the growth of the ethical standard, being the base for the human relations. And it is not by accident that the son of the famous physicist Max von Laue warns in the *Bulletin of the Atomic Scientist* that the next generation may charge the very scientists for the awful discrepancy between the intellectual and the moral standard of the mankind.

The incessant confrontation of existing opinions between the different future communities will need, however, a certain cross-communitarian "division of labour". It will certainly not be a light work, taking into consideration the fluidity of the different respective spheres (intellectual, ethical, etc.). Such an arrangement may enable in the future the realization of the task which seems to be very important for rational state policy. That task is to diagnose the divergence which exists between social theory and social practice. This inevitable job needs constant vigilance to synchronize that which really is with that which only seems to be.

The possibilities of realizing this communitarian policy are rather slight, but the utility of any exemplary reflection consists chiefly of permitting comparison between our future tasks and the means available to us at present, assuming, of course, that the solution of one problem

¹⁸ See S. Moscovici, *Essai sur l'histoire humaine de la nature*, Flammarion, Paris, 1968, chiefly p. 376, with the quotation from the A. de Candolle's *Histoire des sciences et des savants*, Genève, 1873, where he wrote about the role of intellectuals: "ceux qui cherchent, qui découvrent, qui inventent, ou plutôt d'une manière générale qui font faire des progrès."

immediately gives birth to the following, and that a change of both our way of thinking and course of action is required in consequence. This untimely remarks about future scientific communities seem to be partly justified because just now the great expectations of modern society are connected with the vision of the future made by intellectuals.¹⁹ Reputed to be a kind of guide-post for present reforms, and, what comes after for the future's vanguard, these utopian ideals seem to follow the lines laid by Albert Einstein, who deplored the present disproportion between the excellence of our instruments and the uncertainty of our goals. But, if the implementation of each idea needs the existence of adequate means, we face now the problem of the exemplary organization of scientific communities.

3. A NEW ORGANIZATIONAL PATTERN

All myths of the accomplished future were, in the past, almost identical with the faith in nearly magic force of organization — enough to remind of the old (and some new) utopias where all human affairs were punctiliously controlled. Today, after many centuries of experience, while still giving great credit to organization, we are increasingly anxious about the well-known effects of over-organization. As a rule, such organization shows all tendencies typical indeed of the perfect. At the same time, however, they seem to be static bureaucratic institutions, inclined rather to guard the *status quo* than to help to develop new ideas.

Thus the importance of the decision-making in the field of the scientific policy grows considerably and Professor Philippe de Woot from Louvain is right when he points out not only the meaning of the problem but also difficulties connected with it. They mainly result from the fact that every decision must be taken by one person, while it is based on the collective amount of information. Hence the postulate arises to train the highly qualified managers, whose broad-mindedness and practical knowledge would promote the development of the whole complex of the state economic, social or scientific policy.

We now see quite clearly that the so-called new organizational level is not identical with the universal regulation of all human activity and that the success of all teamwork gives good result owing to the conjunction of the management's free initiative and the high intellectual

¹⁹ In the article "Für Grosse Reformen ist eine Utopie nötig", *Der Spiegel*, No. 47, November 17, 1969 (concerning the reorganization of the educational system in West Germany), Professor Dr. Goldschmidt, director of the Max Plank Institut in West Berlin, writes: "Für Grosse Reformen ist eine Realutopie, eine Zielvorstellung nötig, der man Chancen der Verwirklichung geben kann." E. Fischer in his article "Pouvoir et impuissance des intellectuels", *Raison Présente*, No. 12, 1969, writes: "L'essence même de l'intellectuel consiste à critiquer la réalité [...] et à ébaucher de véritables utopies."

and moral level of the staff as a whole. Then, as we can understand, the internal consistency of the exemplary scientific community leading to such a partnership must be based in all communitarian policy upon the continuous confrontation of opinion having both a national and cross-national character. This presupposes a blend between pluralism in the methods of administration and internal unification connected with the goals of each team. So, once more, total reorganization would be needed. The principle of obligatory rotation must be observed among the collective management so as to ensure the fluidity of the staff (a kind of "natural selection"), since diplomas could not by themselves ensure competence in a stage when education becomes a lifelong process. In the end, the amount of duties will surely outweigh the number of benefits for all residents of a scientific community.

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The author is conscious of the fact that he crossed long ago the line of demarcation traced both by a silent gentleman's agreement and a simple solidarity binding all members of the scientific community.

Such a question might therefore be drawn up: since one can acquire satisfactory results by working within the scientific communities existing at present, why risk the waste of time and reasoning over a subject so inaccessible that even chronic reorganizers would probably give up the opportunity of demonstrating their abilities by tackling it? We know that putting such prolific questions is the main task of the intellectuals.²⁰ But before we start searching for an answer it is worth considering whether the question is drawn up in a proper way, that means, whether it reflects the heart of the matter which is connected with the present situation and with the prospects of the modern scientific communities.

²⁰ In the interview published in *l'Express*, March 15-21, 1971, Claude Lévi-Strauss said: "Le savant n'est pas l'homme qui fournit les vraies réponses, mais celui qui pose les vraies questions."