The 'Finalization' Debate in Germany: Some Comments and Explanations

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Some five years ago, a group of researchers at the 'Max-Planck-Institut für die Erforschung der Lebensbedingungen in der industriellen Welt' at Starnberg started a discussion about a thesis on the development of 'science', which later became known as the 'Finalisierungsthese'.[1] At first, the discussion was confined to small academic circles, but it eventually became 'public' at a congress organized by critics of the thesis in Munich in March 1976, where eminent scientists, in various ways, opposed the Starnberg concept of a 'finalized science'.[2] Perhaps the most important aspect of this congress, however, was the way in which the thesis was transmitted, and often falsified, by the mass media — especially by practically all the national German newspapers. I want to concentrate my initial comments on this perspective of the relationship between scientists and journalists, because it reveals most clearly the actual political positions prevailing in West Germany. More generally, the 'debate' shows how a primarily scholarly issue can become politically controversial when it is transported into the public area.

The Antifinalists and the Media

How did the mass media deal with the issue of 'finalization', and what arguments were put forward at the Munich congress by the 'antifinalists'? A brief collection of headlines will serve to demarcate the opposition front:[3]

Fear of a 1984 for German Science? (*Die Welt*)

Science in Danger? (*Süddeutsche Zeitung*)

Confusing Positions in the Republic of Science. Politicization of Science (*Neue Zürcher Zeitung*)

How Science is Menaced in the Federal Republic...to warn the public of demands by neo-marxists. (*Merkur*)

About Science Policy and the Understandable Fear of the Citizen (*Neue Zürcher Zeitung*)

Against Planned Destruction. (*Mitteilungen des Hochschulverbandes*)

Liberty of Science to Retire? (*Die Presse*)

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Using a well known journalistic technique to bring an issue to public attention — that is, to play with fear and danger — most of the newspapers interpreted the position of the antifinalists in a very crude and simple way. Only two newspapers managed to take a more discriminating position. In *Die Zeit*, Ralf Dahrendorf used the headline 'Conspiracy against Science? The Max-Planck-Institut supposedly plans the end of free research', and in another issue of this weekly paper he discussed what he took to be the central point, namely 'The Independence of Science'. And the weekly magazine *Der Spiegel*, commenting under the heading 'Somewhat Unfair', tried to deal with the aftermath of the Munich congress, and the lingering echoes of the debate there. As to the reaction — or should I say action — of the antifinalists, their arguments show how the issue of finalization was reshuffled according to their political orientations: they thus reflect and reveal the true situation in German academia.

In their titles, the papers presented at Munich already indicated the direction of the antifinalists' preoccupations.[4] Thus, for instance, Hans Poser asked 'Can Mathematics be Finalized?', and Gunnar Andersson, 'Freedom or Finalization of Research?'. Nikolaus Lobkowicz, the main organizer of the antifinalists' congress, stated right at the beginning: 'We do not fight for one particular political side, but against the subordination of science under political concepts.'[5] He and many others brought to bear the following line of thought: finalization[6] means scientification ('Verwissenschaftlichung') of politics, and this means politicization of science with the intention of 'emancipation'; it is therefore connected with the specific programme of the 'far-left' Frankfurt School. To some of the congress participants, the Frankfurt School was obviously identical with marxism — or, to put it plainly, with communism. To push this line of thought to its extreme, but nevertheless clear-cut, political position: those who sympathize with the finalization thesis have socialist, or even communist, political tendencies. It is this antimarxist position which seems to have been the antifinalists' common denominator.

The finalists' camp is supposed to embrace, not only academics, but also administrators and politicians. As Kurt Hübner claimed: 'The idea that science ought [sic!] to be finalized is widespread among academic people, among educational politicians in universities and ministries.'[7] And Alwin Diemer made the following analogy with medicine:

> There are three diseases in the way modern science is being produced: politicization, pedagogization, administration. Politicization is an acute infective disease of differing intensity, starting with minor ones, like measles and scarlet fever, up to major infective diseases which eventually become chronic. Pedagogization may be compared with rheumatism, as a disease which starts under conditions of stress; and administration could be compared to tuberculosis because of its 'sneaking' character.[8]

These quotations suggest that many of the antifinalists' arguments are more a reflection of the situation in German universities than of the official philosophy of research policy of the Bonn government. Some of the antifinalists' papers quote a speech by Chancellor Schmidt, at the Max-Planck-Gesellschaft:

> A broadly conceived basic science is an important precondition for progress in science and technology. This kind of science is supposed to be a necessary condi-

> tion for new solutions to the problems of mankind, and to the improvement of their living conditions. Therefore it is necessarily an object of our research policy to link research with the practical problems of our time. To do this we are morally obliged to take into account the degree of hunger and disease in the world, and to do this we are forced, by our own self-interest, to take into consideration the endangering of our natural environment, which is exposed to an ever-growing destruction of the ecological equilibrium.[9]

Dahrendorf, in his discussion of the Munich aftermath, takes the dilemma of modern science policy into consideration when he asks:

> How can the inescapable process of external influence of the direction of scientific research (by setting priorities to financing, collective or authoritative determination of research topics, and so on) be guided through the Scylla of conceived orientation at the expense of non-conformist minorities, on the one hand, and, on the other, the Charybdis of unconceived orientation at the expense of identifiable human needs?[10]

The Starnberg Thesis Summarized

In order to evaluate the antifinalists' scientific and political position, we must contrast their line of thought with a more accurate representation of the real content and meaning of the finalization thesis. Four points may be used to characterize the Starnberg theory:

(a) This theory of the growth of science is an evolutionary theory, in the classic tradition of historical theory — the heritage of nineteenth-century idealism, romanticism and natural philosphy. The growth model (which follows, but does not copy, that of Thomas Kuhn) distinguishes three phases in the development of a scientific discipline: an exploratory phase, a paradigmatic phase, and a post-paradigmatic phase. While, in the first phase, 'empirical and descriptive strategies for the collection of data are predominant',[11] the second phase is characterized by the elaboration of theories (paradigma), a process which eventually attains the status of 'normal science'. At this stage, typical objectives are: the extension and increased precision of theory; improving the fit between data and theory; the elimination of inconsistencies between theories; and the solution of conflicts between established theories.[12] Problems of theory here determine the advance of research. But finally, 'in the course of its evolution more and more disciplines reach the state of post-paradigmatic research.'[13] This stage is characterized more by the *application* of established, paradigmatic theories, and less by spectacular extensions, generalizations or revolutionary transformations of those theories.

So far, the Starnberg thesis contains not very much that is provocative or sensational. However:

(b) The model becomes — and became — politically explosive when it is connected implicitly with the debate on the internal or external determination of evolutionary growth. Here the central, and often misunderstood, thesis is that

> in the post-paradigmatic phase, an orientation of theory development to external goals becomes possible. The reason for this is that in this phase there exists no internal logic which selects and regulates the direction and the problems of scientific development.[14]

While, in the two earlier phases, the development of scientific activities is regulated by forces internal to science (that is, determined by the scientific community itself), in this later state of 'mature' science

> internal regulatives of scientific development become compatible with external ones. The greater the number of stable theories achieved, the greater the potential of the discipline for an orientation of further theory development to external goals.[15]

To put this point more explicitly: research planning is possible if and only if basic research has reached a sufficiently high level of 'maturity'. The crucial question is: precisely *what* can be planned or influenced by external goals? Is it the choice of problem areas, or the selection of research projects? In this sense, the meaning of planning would come close to the common practice in applied research, when the goal is determined by ministries or firms. But this is not the meaning proposed by the Starnberg group: they wish to claim that *the external influence determines the internal structure, the internal logic*. This statement is certainly the most problematic and controversial in the whole theory.

The proposed growth model is distinct from those of both orthodox marxism and idealistic scientific autonomy. Thus, on the one hand, needs external to science (economic, social or political) are held to determine the development of a discipline alone and in all phases; but neither, on the other, is science considered to be an enterprise restricted to the self-administration of Polanyi's 'Republic of Science'. As Ina Spiegel-Rösing has put it:

> Science policy measures which intend to increase the problem-solving capability [of a discipline] must start with the standard and theoretical structure of the discipline concerned.[16]

(c) The model also claims a certain relationship between the cognitive and the social structures of science in the course of its development. Whereas the appropriate institutional setting for the paradigmatic phase is the autonomous self-administration of the scientific community, in the phase of post-paradigmatic development, new communities must be created in partnership with scientists, politicians and citizens.

(d) Finally, the model indicates a relationship between basic science and technology. In the exploratory phase, many disciplines are indistinguishably interlocked with technical fields. But at a later stage, there developed

> an internal dynamic which soon differentiated scientific exploration aiming at theories from technical experimentalism directed to external purposes.[17]

Since its first publication in 1973, the finalization thesis has been the focus of discussions in academic circles, but has not so far led to practical consequences in

science policy making. However, it can be used to legitimate political positions and consolidate political influence — and it can do so relatively indiscriminately. Since terms such as 'maturity' or 'internal logic' are vague, they can be interpreted and manipulated in various political ways. This is, indeed, the key to the whole furore.

The Disputants' Positions and Arguments

Against this characterization of the Starnberg thesis, we can now identify the various political positions of finalists and antifinalists. To do so, we will include criticism not actually presented at the Munich conference. Four positions can be discerned:

(a) From a 'liberal' position (in the European continental sense), the finalization thesis has been criticized for its statement of a 'closed' theory, for its attack on the autonomy of science, for its relative dependence of science on the state and the economy, and for its 'primacy of praxis'.[18]

(b) Conservatives have emphasized the postulate of autonomy, warning against the loss of legitimacy of science, and the tendency towards mass education (as against the university as an élite institution, with a hierarchical structure).[19] Science should be value neutral, theory and praxis disconnected.

(c) A middle-left position (which might be called 'radical-liberal' or 'social-liberal') has attacked the finalization thesis by affirming the independence of scientific institutions as a precondition for social change, and/or by demanding independence from economic orientation in favour of 'politicization processes' (that is, determination of research policy by democratic decision-making).[20]

(d) From a socialist point of view (not represented at Munich), finalization is only half way to social and economic determination of research goals. Criticism from the left of the political spectrum concentrates on three points:[21]

(i) external needs have always determined the development of science;

(ii) according to this, the finalization concept is an internal, idealistic one;

(iii) the transmission processes between social production and scientific development are unclear, or not even stated.

More or less central to all political positions is the idea of the autonomy of science, in its various interpretations. A conservative position holds the idea of the autonomy of science as a hierarchically structured domain, with self-defining legitimacy; a social-liberal position (ranging from laissez faire to interventionalism) favours autonomy in the sense of independence of scientific institutions from state and/or economic interference; and a socialist position seeks independence from the private economy, and favours direct state intervention (or even planning), with emphasis on democratic decision-making processes. In the prevailing political atmosphere in the German Federal Republic, the liberal and conservative directions have by far the strongest influence — with the conservative position dominant in the composition of the Munich antifinalists' congress.[22] The Starnberg group seem to fall into a 'centre-left' position, favouring autonomy at the beginning of the development of a discipline, but exposing 'mature' science to external direction. They argue that theory and praxis cannot be separated, and that the scientist should side with 'emancipatory science'.[23]

Criticism of the finalization thesis can be summarized under three main headings:

(a) The theory is subject to the criticism which confronts all so-called 'stage' theories. Are all three stages and their successive development characteristic for all scientific disciplines? By what criteria can one distinguish one stage from another? Are these criteria (or is the underlying criterion) clear and unambiguous enough to determine precisely when a transition has occurred from one stage to another? Are they (or it) relevant and important enough to describe realistically the development of different scientific disciplines? These are some questions which are critical to all stage theories. Considering the specific form of the Starnberg theory, all disciplines do not necessarily follow a three-stage pattern. Cases such as Agricultural Chemistry[24] and Chemical Engineering[25] seem to suggest that a scientific discipline can be influenced, or even directed, by external goals at an earlier stage of its development: social objectives can be incorporated into its goal-area before the solution of fundamental problems in a specific domain. On the other hand, it is undoubtedly true that an empirically proved theory can be applied technologically: but this is almost a truism. The trouble is that the criterion which distinguishes the post-paradigmatic stage — the attainment of 'maturity' by a scientific discipline — cannot be operationalized clearly.

(b) Similar criticisms can be levelled at the conception of a 'closed' theory, or the idea of the 'finiteness' of fundamental problems within a scientific discipline. How can one determine if a discipline has reached 'maturity', and the corpus of its theories is 'closed'?

(c) Last, but not least, what is meant by the 'internal regulatives' which eventually become compatible with external ones? What does the structure of a theory at the stage of internal orientation look like — and how different does it look at the stage of maturity? It seems that this key conception of internal regulation needs to be clarified if it is not to be left at a metatheoretical level.

The Political Background

I have already mentioned that the attack on finalization was not purely scientific, but was predominantly political. It may be of interest to clarify the background to this so-called debate by outlining some traditional and current tendencies in German academic life. To a large extent, these tendencies can explain the antifinalists' position. The polemic can then be situated in the present condition of universities in Germany, as well as in the broader trends of a 'Two-Culture' society.

The 'Two Cultures' thesis can account for a central tension which we have already seen at work in this debate: the intuitive creativity of the scientific genius 'threatened' by the encroachment of planning in and of science; the autonomy and integrity of the scientific community versus the social orientation of scientific endeavour. But another way of explaining the anti-finalists' position leads to a more narrowly social-psychological perspective. It seems to me significant that all the anti-finalists were socialized in the humanistic tradition: they teach either philosophy or sociology (or both). None has a background in the natural sciences, or is now in any way representative of the corresponding academic subcultures. With this in mind, let us review the most important features and recent trends:

(a) The university is no longer the only (or even the most important) locus of

scientific research. In Germany, as in all industrialized societies, research activity has shifted to extra-university institutes (like the 'Max-Planck-Institutes' or 'Frauenhofer-Gesellschaft'), to institutes of 'big science' (like the 'Kernforschungsgesellschaft'), or to industrial laboratories. This trend is noticeable even in the social sciences: the 'Max-Planck-Institut' in Starnberg, and consulting institutes like 'Battelle' or the 'Wissenschaftszentrum' in Berlin, have all attracted social scientists exclusively doing research.

(b) There has been an enormous increase in the number of students in German universities (from 290,000 in 1965/66 to 330,000 in 1972, and 820,000 in 1977), and hence a heavy load on teaching and administration, with less time for research.

(c) Since the end of the 1960s, the expansion of teaching staff in German universities has led to a change in the relationship between full professors (chairholders) and middle-range positions (Mittelbau).[26] Among other things, this has reduced the prestige of the 'Ordinarius'. Recent interview results show that when compared with other teaching staff, full professors are roughly half as satisfied with their professions as they were ten years ago. In other professions (except liberal ones), own job evaluations have remained approximately constant.

(d) Both government reports and party programmes now favour the explicit direction of scientific research towards social goals. This is, effectively, a politicization of research carried out and financed by central government institutions. In 1974/75, following budget cuts resulting from the economic recession, the universities had to cancel various job-positions. The way this harmful procedure was carried out very clearly demonstrated the extent of external administrative constraints upon academic autonomy and self-administration.

(e) The German word 'Wissenschaft' has a broad meaning, which embraces all types of scholarly pursuit, from the humanities to academic engineering, as well as a narrow meaning, centred on 'basic science'. It therefore tends to exclude the majority of scientists — namely, those working in applied science and experimental development. As a result, in the Federal Republic in 1973, out of one million trained scientists and engineers, only one hundred thousand were officially engaged in research and development.

(f) Finally, there are important trends in the postwar political climate in the Federal Republic. A mood of anti-totalitarianism has been fostered both by the older generations's memories of the Naxi regime and, during the 'cold war', by the confrontation with Eastern European communism. For science, these experiences have led to an almost total subordination of scientific activities to the official ideology. It was this total 'finalization' which the antifinalists referred to as a danger.

Because of these features, trends and developments, reactions against external influences on science have come to the surface. But the so-called 'debate' was not a scientific debate in the sense that one school of thought grappled with another: rather, the finalization thesis was a pretext to unload social and political frustrations. Most of the arguments did not affect the thesis at all: others were directed against trends in modern scientific culture which were supposedly described by, and summed up in, 'Finalisierung'. These arguments, therefore, do not attack the thesis as a political programme: rather, they attack a reality which is, at least in part, explained by the thesis itself.

Some Conclusions

I would like to make a few concluding comments:

(a) As we have seen, the 'Finalisierungsdebatte' was essentially a political debate making use of a theoretical hypothesis. Its political character is indicated by the following points:

(i) the antifinalists have chosen the mass media as a forum for their arguments. This has made the opposition visible, not only within the scientific community, but also among policy makers;

(ii) the common denominator of the antifinalist position is antimarxism, as represented by attacks on terms like 'social relevance of science', 'orientation towards social goals', 'emancipation', 'planning', 'orientation' and 'finalization'. Finalization is interpreted as an attempted scientific basis for the politicization of science, with the intention of a marxist-oriented emancipation.

(iii) the interpretation of the finalization thesis by the antifinalists seems to be determined by their antimarxist position. Basic conceptions appear to have been consciously distorted — such as the erroneous claim that finalists believe that basic science is always open to external orientation, under whatever conditions.

(iv) certain norms of the humanistic disciplines are transplanted to the natural science disciplines. Contradictory statements are put forward: on the one hand, that natural sciences are supposed not to be as value-loaded as social sciences; on the other hand, that the finalization thesis claims that 'mature' natural science disciplines are particularly susceptible to political orientation.

(b) When viewed from either the right or the left of the political spectrum, the finalization thesis has controversial aspects. The finalists' position is best characterized as 'centre-left'.

(c) The finalization thesis is a variation of the politicization thesis, if the latter is understood not only as implying a tendency towards stronger state influence upon (and intervention in) the scientific community via higher financial subsidies and jurisdiction, but also the shift from the private economic determination of major technological advances to their control by democratic political decision-making in the public realm. The critique by left-wing authors concentrates on the fact that the determination of priorities is to a large extent made in the area of private enterprise, towards which the governmental apparatus only reacts in response.

(d) Much of the misunderstanding of the finalization thesis results from an undifferentiated use of the term 'science'. Basic science, applied science, experimental development, teaching and connected service activities (to take the internationally accepted distinctions between the various scientific activities) are all lumped together. More often than not, the norms developed for, and by, basic science are then applied to other types of scientific activity. But there is clear evidence that questions concerning autonomy must be put differently for the various different types of activity. Whereas a policy for science (that is, resources put at the disposal of the scientific community) is more appropriate for basic science, other scientific activities are more in the sphere of influence of the political-administrative apparatus, and are hence more 'open' for science policy making.

(e) Questions concerning planning in/of science must be put differently, not only for different activities, but also for different scientific fields. Antifinalists do not take into account the fact that capital-intensive research (for example, the d e v e l o p -

ment of major new technologies) can and *must* be planned, in order to use resources efficiently, and to prevent creative researchers from time-consuming routine activities. Freedom of research can also result from an optimum (that is, *planned*) combination of men and instruments in team-oriented, capital-intensive research.

● NOTES

1. See G. Bohme, W. van den Daele and W. Krohn, 'Die Finalisierung der Wissenschaft', *Zeitschrift für Soziologie*, Vol. 2 (1973), 128-44. The title of the Starnberg group can be translated as 'The Max Planck Institute for the Investigation of Living Conditions in the Industrial World', and of their paper as 'The Finalization of Science', or 'Finalization in Science'.
2. See K. Hübner, N. Lobkovicz, H. Lübbe and G. Radnitzky (eds), *Die politische Herausforderung der Wissenschaft: Gegen eine ideologische verplante Forschung* (Hamburg: Hoffmann und Campe, 1976).
3. See the collection of newspaper articles from the Munich congress in *Berichte und Stellungnahmen zum Kongress 'Gefährdete Wissenschaft?'* (Essen: Universität Essen, Projektgruppe Wissenschaftsforschung, November 1976).
4. See Hübner et al., op. cit. note 2.
5. Ibid., 7-10.
6. Much hinges on the key word 'Steuerung', which is literally translated as 'steering'.
7. Hübner et al., op. cit. note 2, 89-96.
8. Ibid., 191-92.
9. Quoted in H. Schuster, 'Freiheit oder Lenkbarkeit der Forschung — ist das die Frage?', *Süddeutsche Zeitung* (29 and 30 May 1976).
10. See R. Dahrendorf, 'Die Unabhängigkeit der Wissenschaft', *Die Zeit*, No. 22 (21 May 1976).
11. W. van den Daele, 'Scientific Development and External Goals', in Finnish Academy of Sciences (ed.), *Proceedings of the International Seminar on Science Studies, Helsinki, 11-14 January 1977* (Helsinki: Finnish Academy of Sciences, 1977), 139-75, at 146.
12. See T. S. Kuhn, 'Reflections on My Critics', in I. Lakatos and A. Musgrave (eds), *Criticism and the Growth of Knowledge* (Cambridge: Cambridge University Press, 1970), 246.
13. See van den Daele, op. cit. note 11, 152.
14. Ibid., 153.
15. Ibid., 164.
16. The statement comes from the 'Memorandum zur Förderung der Wissenschaftsforschung', prepared by the 'Stifterverband für die Deutsche Wissenschaft'. See I. Spiegel-Rösing, *Wissenschaftsentwicklungs und Wissenschaftssteuerung. Einführung und Material zur Wissenschaftsforschung* (Frankfurt: Stifterverband für die Deutsche Wissenschaft, 1973), 18.
17. See van den Daele, op. cit. note 13, 163.
18. See, among others, H. Albert, 'Die Idee der Wahrheit und der Primat der Politik', in Hübner et al., op. cit. note 2, 149-58. The phrase 'primacy of praxis' is Albert's.

19. See, for example, N. Lobkowicz, 'Die Zukunft der deutschen Universitäten', *Die Welt* (7 July 1977).

20. See V. Ronge, *Forschungspolitik als Strukturpolitik* (München: Piper, 1977).

21. See Lutz Hieber, 'Zum Konzept der Wissenschaft', *Leviathan*, Vol. 3 (1975), 449-72.

22. In a recent publication, W. Schäfer has summarized the ideology of the participants at the Munich conference in terms of three 'taboos': to think of orienting basic science is prohibited; to think of 'emancipation' as a political orientation of scientists is inadmissable; and the idea of an evolutionary convergence of discourses is not appropriate. The finalists' position is defined by the opposite of these taboos. See W. Schäfer, 'Zur Frage der praktischen Orientierung des theoretischen Diskurses. Ein Plädoyer gegen drei Denkverbote der antifinalistischen Wissenschaftsforschung', in Ch. Hubig and W. von Rahden (eds), *Konsequenzen kritischer Wissenschaftstheorie* (Berlin and New York: W.de Gruyter Verlag, 1978), 81-110.

23. The meaning of 'emancipatory science' is, however, vague, and the concept has been criticized on this ground. Besides being identified with the Starnberg group, 'emancipation' is also a key word of the Frankfurt School.

24. The Starnberg group cite the case of Agricultural Chemistry in defence of their thesis, althoug it is difficult to maintain that Agricultural Chemistry was a 'mature science' in the 1840s. See P. Borscheid, *Naturwissenschaft, Staat und Industrie in Baden (1848-1914)* (Stuttgart: Klett, 1976), 41, and 'Fortschritt und Widerstand in den Naturwissenschaften', in U. Engelhardt, V. Sellin and H. Stuke (eds), *Werner Conze zum 31 Dez. 1975: Festschrift für Werner Conze* (Stuttgart: Klett, 1976), 322. For an account by members of the Starnberg group, see W. Krohn and W. Schäfer, 'The Origins and Structure of Agricultural Chemistry', in G. Lemaine et al. (eds), *Perspectives on the Emergence of Scientific Disciplines* (Paris: Mouton, and Chicago: Aldine, 1976), 27-52.

25. See K. Buchholz, *'Verfahrenstechnik* (Chemical Engineering): Its Development, Present State and Structure', *Social Studies of Science*, Vol. 9, No. 1 (February 1979), 33-62.

26. In 1966, the ratio of full professors to other teaching staff was approximately 1:5; in 1974, it was about 1:3.

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