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PLURALISM IN THE ORGANISATION OF HEALTH SERVICES RESEARCH

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Abstract—The variety of methods used in health services research (HSR) embody categorically different epistemological assumptions. These are examined in an effort to contribute to a usable framework for the evaluation of HSR projects, and in the light of a need in the U.K. for adequate institutional arrangements for the promotion and funding of HSR. Research into organisation has revealed that if desired values are not explicitly built into the structure, other values may appear unbidden. The adequate institutional base is one which embodies, espouses and funds a meaningful and practical scientific pluralism. A possible classification is outlined and illustrated and its implications for competition amongst scientists and the social responsibility of scientists are briefly discussed.

The U.K. has had difficulty in supporting a self-confident and productive health services research (HSR) community. This has been partly due to conflicts between professional/academic power groups and partly due to poor communication between researchers and decision- and policy-makers [1]. If matters are to improve, an adequate institutional basis for HSR is essential. These were the conclusions of a recent one-day symposium on the future of HSR in the U.K. [2].

The aim of this paper is to contribute to a practical, that is to say usable and desirable, formulation of what any institutional arrangement must be like in order that it be adequate for HSR. It has been argued that the responsibility for commissioning and long-term maintenance of HSR should most appropriately lie with the Government's health department (DHSS), with the established research councils for medical and social science (MRC and SSRC respectively), with some new HSR organisation, or with some combination of these [3–7]. A more recent suggestion is a special Health Authority within the NHS [8].

The debate amongst researchers has been fuelled by three recent social events: first, the recommendation by the Royal Commission into the National Health Service [9] that an Institute for Health Services Research be set up; second alterations of the DHSS in-house research organisation and return of biomedical research funds to the MRC; third, a major review of DHSS-funded HSR by the DHSS Chief Scientist.

The location of a formally set up HSR institution, that is to say an administrative and resource capability for commissioning HSR, is only controversial insofar as there is doubt as to the existence of a genuine commitment and ability to further HSR. From the researcher's point of view, the fundamental factor in the commissioning process is an understanding by the institution of what the researcher is trying to do. The commissioning institution must understand how he is working and why he chooses certain problems and methods. If such an appreciation is lacking, then any institutional base exists in name only. If an appreciation exists, then the various other issues, political freedom, funding methods, HSR training and career structure, application of findings and so on [10] can be tackled and an effective HSR system may emerge.

Of all these other issues, perhaps the most sensitive and testing of the HSR institution in its understanding of the researcher's task is its responsibility to evaluate scientific work prior to funding and during or after completion of the research. A meaningful evaluation of research will be based on criteria just as any other evaluation is. If we define scientific research as a particular form of knowledge production [11] the criteria easily fall into two categories, epistemological (is this knowledge?) and methodological (is this a production process?).

This paper places the analysis of HSR commissioning in the U.K. context, argues for scientific pluralism, and offers a possible categorisation of research systems. Finally, implications for adequate organisational arrangements are briefly presented. The practical problems in evaluating the scientific merit and policy relevance of research projects are touched on but not tackled.

HISTORICAL BACKGROUND

An outline

Taylor [12] provides a short lucid historical account of the funding of health-related research in the U.K. The more recent events are summarised here. In the 1960s, the Government began to back HSR with substantial funds. As HSR grew, the need for an institutional substructure within the DHSS became apparent, and this was developed in the 1970s following the Rothschild Report [13]. The report recommended the formation of a large complex research commissioning organisation headed by a Chief Scientist within the Department of Health and Social Security (DHSS), and a transfer of 25% of Medical Research Council (MRC) funds to this body. The DHSS invited Professor Kogan of Brunel University to study its Office of the Chief Scientist (OCS) and monitor activities there. The uneven rise and fall of OCS is described in their two reports [14, 15]. In 1980, OCS decided to return the transferred funds to the MRC because the arrangement had been little

more than a paper exercise. Although the MRC agreed, in return, to form an HSR board to be given an additional £2 million, editorials in both the *British Medical Journal* [16] and the *Lancet* [17] questioned the MRC's capacity to understand the type of research required. This doubt was exacerbated by the problems which surrounded the concurrent OCS quadrennial reviews of DHSS-funded HSR units, which are referred to below.

By 1980, the growth of HSR funding had faltered as part of the national and world-wide economic recession. In addition government optimism in the use of research, especially social science research, had been dampened [18]. The effect on HSR and its research community was serious because the DHSS is essentially a monopoly promoter and funder of HSR, and, unlike the MRC, does not tenure its researchers. And, because HSR is applied and interdisciplinary, many researchers were not tenured and could not fit within the discipline-based University system. In theory, funds for HSR might be available from the MRC, SSRC, Universities, Regional Health Authorities, private foundations and elsewhere, but in practice a thriving HSR community in the U.K. depended on government sponsorship [19]. The part of the DHSS responsible for HSR sponsorship, the Office of the Chief Scientist is therefore the focus of concern and attention in what follows; just as it was recently for HSR researchers faced with an evaluative review of their work.

Scientific merit and accountability

The OCS evaluations were themselves evaluated by the Brunel team [20] and the comments below are based on their report [21]. The Chief Scientist is a DHSS employee responsible for the health and personal social services research budget (£13.4 million in 1981/1982); and the then current holder interpreted this responsibility as a duty to uphold 'scientific accountability'. The research team found that in practice this meant the implicit adoption and explicit advocacy of a particular view of science and scientific merit. For example, practical knowledge and scientific knowledge were seen as belonging to different and distinct universes of discourse; research was regarded as a method of legitimating change not stimulating it; and disciplinary rather than domain-based thinking was valued. Most significantly, it was assumed that there existed a unified scientific community with a consensus about the nature of science. If this were so (and Kogan and colleagues were conviced that it was not) then there would be little need for explicit criteria to aid evaluation.

OCS operated as if there were strict rules for scientists to follow which would eliminate error. If there is no guarantee of truth, and many, like Polanyi [22], might accept this as an axiom, then the arrogation of the decision as to what is or is not a scientific problem or a scientific method becomes of profound social significance with overt political and ethical dimensions. The validity, indeed the reality, of the OCS evaluations depended upon the OCS convincing or coercing others (researchers or decision- and policy-makers) to accept the evaluation as true. Henkel and Kogan [23] describe the painful breakdown of a peer-review and funding-evaluation process when the commissioning body becomes captive to scientific assessors who abjure a pluralist position.

SCIENTIFIC PLURALISM

Theoretical debate and informal discussion in the last two decades appear to endorse the view that methods in the social sciences are not only distinct from those in the medical sciences but enormously varied in themselves [24]. "A research tradition" writes Galtung [25] "that dogmatically outrules one or more (varieties of approach) only demonstrates its own limitations". HSR is a domain drawing on a variety of fields including clinical medicine, psychology, sociology, economics, politics, management science, information science, geography, demography, epidemiology, anthropology and others. These different fields have developed norms and values which channel and constrain research work. Even within fields, research activities and style of enquiry vary greatly.

It is to be expected therefore that HSR should encompass a large variety of research activities and at least several quite distinct scientific outlooks. Raymond Hainer, who pioneered the application of the behavioural sciences to research and development organisations in the U.S.A., concluded that differences of outlook among scientists were often so great as to prevent adequate communication [26]. Maruyama [27, 28] has described ways that individuals living within different world-views misinterpret each other. He emphasises particularly 'dimension-reduction', a form of translation which makes an argument, logical or consistent within one frame, appear blatantly false, illogical or devious within another; and 'monopolarisation' in which individuals seek for and base their work on *one* truth, *one* theory, or *one* method and are emotionally threatened by heterogeneity. He comes to the important conclusion that between some scientists, communication of basic views may be impossible [29].

In the light of this, it is not surprising to find sociologists claiming and demonstrating that criteria of scientific value are by no means dominant in the evaluation of research work. Prestige, career openings, reward systems, social values, institutional forms and such like contribute to channelling and supporting or suppressing knowledge output [30, 33]. These findings do not contradict evidence that scientific eminence is determined by the quality of a scientist's output [34].

Empirical studies support informed opinion and sociological exposé. Hudson, for example, has identified two distinct kinds of thinkers, convergers and divergers [35, 36]. The former prefer to work on manageable, well-defined problems which lead to a single best or right answer. They look for value-free and technical solutions, and argue issues similarly. The divergers prefer ill-defined problems with many solutions. They are oriented to whole systems, perceive in value-laden terms and tend to the pejorative and the personal in their argumentative and conceptual style. The concern in this paper is not primarily with the personality or cognitive style of scientists but with the research that needs to be done and its evaluation. Personality is implicated both because it is likely that certain problems will appeal more to one

type than to another [37], and because Hudson's work suggests that members of one group will not naturally or easily appreciate the preoccupations, arguments and style of presentation of the other.

Mitroff's studies of the Apollo moon scientists [38] provide specific evidence that this argument holds in at least some fields in the natural sciences [39]. He uncovered several categories of scientists corresponding to different ways of thinking and working. His scientists' perceptions of each other's competence and scientific performance were highly emotionally charged and often dramatically contradictory [40].

Solving social problems: the reality of pluralism

It seems unlikely that emotions should run more sedately in HSR, and they do not. The U.K. symposium referred to destructive conflicts of interest between individuals working at different points of the spectrum in health-related research [41]. This spectrum was seen as extending from biomedical through clinical to HSR, and the example of conflict provided was the advocacy of the randomised controlled trial as a general model for HSR evaluation. One consequence of such conflicts has been a struggle for possession of the key legitimating terms, *science* and *research*, whose meanings tend to be either widened or narrowed as outlook, or perhaps self-interest, dictates.

HSR has been developed and financially supported in the U.K. to help solve pressing practical problems by using the methods of science [42]. It has been indicated above that the work of science might best be described as 'knowledge production', so it should be noted here that problems can often be solved, or solve themselves, without new knowledge; and that much knowledge production is not geared to practical problems. In other words, science and practical problem-solving need not be purposefully linked. This holds in practice: Acheson for example, has pointed out that much high quality HSR does not appear in the conventional scientific literature [43].

Lindblom and Cohen [44] surveyed a wide variety of activities which both produce knowledge and contribute to social problem-solving, many outside the academic scene and many only very indirectly related to problems, and suggested that the most apt label for this work is 'professional social inquiry'. Kogan *et al.* [45] took a more restricted view, and for their description of HSR research used Cronbach and Suppe's phrase "disciplined inquiry" [46]. The U.K. medical press looked on this expression with approval [47, 48].

The difficulties in using social science for social problem-solving were examined in the U.S. in the late 1960s [49–51]. It was noted that discipline-oriented studies and their institutions were not generally responsive to social problems, and provided a hostile environment for social inquiry. Recent examination [52] of funded problem-oriented research in the U.S. (including HSR) revealed several categories of activity that fell outside the conventional definitions of research and development (R & D) work [53].

Implementing pluralism in HSR

If the preceding arguments for pluralism are accepted, then the challenge of implementing arrangements which embody multiple viewpoints and approaches remains. One solution would be to have multiple funding arrangements. If, for example, every major University had a Department of Health Service Studies with tenured research-oriented staff then the chances for a broad variety of studies to emerge are greater than if a single Institution run by a powerful Director is set up.

In the U.K. where the dominant funding body, OCS, is headed by one person, that person's commitment to pluralism becomes the crucial variable. Assuming such OCS commitment, the problem with heavy governmental centralisation of funding power is operationalising pluralism in a way that seems fair to the researchers involved and that meets criteria of public accountability. In addition, because HSR is applied, research must be policy-relevant and must be understandable and potentially usable by decision- and policy-makers.

The variety of HSR is enormous and any summary of its extent or content would be inevitably incomplete. The main issue, as regards scientific pluralism, however, is not the subject of research but the way the subject is approached. A sole commissioning institution (or whatever body oversees a system with many commissioning institutions) needs to ensure that the principal research methods and perspectives are available for use when necessary. The varieties of research approach are limited and in the remainder of the paper I will provide a simple model of the research process and then a five category classification of research approaches which might be useful for commissioning and evaluation. I do not claim this is the only categorisation which might be useful, but rather that it is a possible and testable model.

MODELLING RESEARCH

Model of the process

HSR involves the use of disciplined inquiry aimed at solving practical problems in health services. Any model of the research process, and hence any critical evaluation of the research must therefore include the practical problem. The form of the inquiry and its relation to the identified problem are the obvious subjects for peer scientific scrutiny. More peripheral and more political is the issue of whether the problem ought to be investigated. With this in mind, the research process may be schematised as shown in Fig. 1.

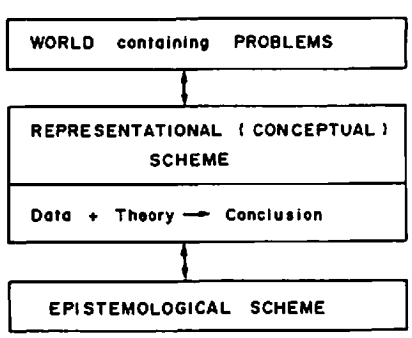

Fig. 1. Model of the research process.

The real world containing decision- and policy-makers with their problems, including some they may be unaware of, is the object of inquiry. The researchers attempt to model a problem qualitatively and often quantitatively, so as to present information on its nature to those who have the responsibility to take action on it. The method by which they develop a representation or conceptualisation of the problem involves the use of data and theory [54]. Theory either leads to the selection of data, or assists in its processing so as to generate a conclusion which may be the desired solution or point towards one.

All research activities are founded on some epistemological scheme which is not uncommonly left implicit by researchers as they construct and use theory and data. The unselfconsciously-held philosophical assumptions determine what counts as knowledge, what can be assumed to be true and how method is to be rigorously developed and applied to the particular problem. Peer review, therefore, is largely about how well epistemological assumptions have been translated into methods and adhered to in procedures.

This model is very similar to the model for the production of common knowledge used to solve everyday problems by the man-in-the-street. Einstein [55] described "the whole of science ... as ... nothing more than a refinement of everyday thinking"; and Bronowski [56] noted that in his efforts to discover, explain and control the parameters of his world, the ordinary man generalises, theorises and tests hunches in much the same way as the scientist. One of the important differences between the two lies in the degree and refinement of explication demanded of the scientist. In everyday life, not only epistemological assumptions but also the method and representational scheme tend to be left unstated. Nevertheless, when a decision-maker is asked to account for his actions, he is usually expected to describe or construct his understanding (model/representation) of the problematic situation and show how the information (data) at his disposal and his ideas (theories) led him to certain conclusions on which his action was based.

Describing the research process in a form easily accessible to those who must use the results may contribute to improving communication and implementation of HSR findings [57, 58].

Model of a useful classification

The next step is to create a classification of HSR built upon the above general model of the HSR task. Any useful classification would be expected to implicate simultaneously and coherently all three components of that model: the world, the representation, the assumptions. In other words, it should be possible to provide simple explicit formulations for each category of the classification and these should distinguish different types of problems, different uses of data and theory, and different methods and criteria for their assessment (see Fig. 2). If this could be achieved, then the first step towards implementing a pluralist commissioning institution would have been made.

Classification Type	A	B	C	etc
Epistemological characteristics				
Implications for method				
Relation between data and theory in representational scheme				
Real world use and HSR applications				

Fig. 2. Model of a useful classification. Each cell should contain a distinct explicit formulation.

Ideally the classification should encompass all forms of systematic knowledge production. Such a scheme would both distinguish and link scientific evaluation which focuses predominantly on method with practical evaluation which focuses on useful application.

As epistemological assumptions are the foundation and justification of knowledge, and underpin the perception and appreciation of problems as well as providing legitimacy to method, they offer a promising starting point for the development of a classification. This approach differs from classifications which start with what researchers do, but it should end up by distinguishing usefully between various research strategies and activities.

The initial task of the epistemological categories would be to make simple distinctions in the way truth is assigned within the representational order. In particular the relations and status of data and theory in the research process must be articulated. Then the implications of each position for the nature of reality as perceived by the scientist working in that mode should be clarified.

Particular methods and ways of assessing methods should flow from these initial formulations, and the appropriate way that scientific knowledge develops should be revealed. Each epistemological mode is to be defined so as to be discrete and self-sustaining, allowing adherents to spend a lifetime believing in and generating knowledge based on its assumptions (though some may switch among the modes). As a result criticisms from without a mode should be well-developed and characteristic. Aside from such expected criticisms, which aim to deny validity or even prevent the public articulation of key epistemological assumptions, there will also be inherent dangers from over-dependence on each mode or the application of the mode indiscriminately to all problems.

Each mode should be related specifically to real world problems, that is to say, to a particular type of knowledge output. It should also be possible to identify conditions, such as nature of problem or type of researcher, for which that mode is most suitable and conditions under which it is inappropriate.

A REQUISITE CLASSIFICATION

Jaques and colleagues have suggested that activities generated by human purposes naturally stratify hierarchically into five levels [59]. Beer [60, 61] has independently postulated that systems which can 'survive' can be seen to consist of five levels, each of which is a viable system nested within a metasystem. Although

Table 1. Labelling levels of epistemology

Abstract level or system [59–61]	Nature of truth (labels often used by social scientists)	Singer-Churchman inquiring system [63–66]
I	Analytic formal	Leibnizian
II	Experiential empirical	Lockean
III	Synthetic structural	Kantian
IV	Conflictual Dialectical	Hegelian
V	Pragmatic	Singerian

his findings are, like those of Jaques, derived from study of organisation and management. Beer is equally adamant that the five-tier hierarchic model is generally applicable to systems which can be subjectively defined and are expressions of human purpose. Problem-oriented HSR is of this nature, and hence an analysis along Jaques's or Beer's lines would appear feasible. A literature search revealed that a five category hierarchical structure of epistemological levels had already been developed. This classification emerged from an attempt to design inquiry systems which regarded science as part of the reality of the social system which it wished to investigate. Singer [62–64], his pupil, Churchman [65, 66], and his pupil, Mitroff [67–69] have articulated features of this structure over the past half century [70], and their classification shows a variety of features which are congruent with the abstract principles of the five level scheme [71]. If the scheme permits the large variety of formulations required of it in the previous section, then it can be adjudged useful at least. Whereas in the previous section we have referred to epistemological mode or category, from now on we will refer to epistemological level or system (Table 1). It is to be emphasised that the Roman numerals I–V assigned to the levels are not to be taken to signify that one level is more complex or more valuable than another.

An application of Churchman's classification to the model of the research process described above is, as it turns out, not difficult and the results are briefly summarised in Table 2. Table 2 contains formulations which, it is expected, will be easily recognised by researchers. Within the confines and purpose of this paper, the content cannot and need not be elaborated.

To ease study of Table 2, the classification is illustrated below using research of my own at each of the levels taken from various fields; and reference is made to various HSR workers in the U.K. to demonstrate that pluralism is a present reality [72].

System I: truth is formal

The researcher's trust lies with ideas which are self-evident and can be manipulated by rules which are axiomatic to form patterns which model the real world. The real world of data is too confusing to be directly approached, except through such models.

I used this approach for examining the economic rationale for organising doctors [73]. The basic idea was that a number of doctors (P) compete for a finite resource (R) which they use up in very small amounts (r). Using simple mathematics, it could be shown that when $P > 20$, the loss to a doctor expending r becomes very small. A variety of consequences were then deduced: depredation of R, attempts to increase R, and regulation of medical practice. The model was applied to the U.S. and U.K. health care systems which were treated as identical. The apparent differences lay in the fact that in the U.S., R = finite population of patients, in the U.K., R = finite amount of money. Data obtained by others was used to show that predictions of the model held; and this confirmation was used to justify further predictions [74].

Within U.K. HSR, two substantial fields of DHSS-funded research of this sort are notable. Operations research studies problems which relate to systems of activities and has developed methods for simulating and modelling needed technical and programmatic changes. Data collection is subsidiary to the primary task of mathematical description of the system under study. Areas of investigation have included work-load allocation, planning, information transfer, waiting-lists, supplies and servicing arrangements [75–77]. In the DHSS, the Operations Research Division (ORS) is administratively distinct from OCS and has its own comparatively small budget of about £1 m. This separation reflects an unwillingness to let OCS handle this form of research [78].

The creation of models of appropriate organisation in response to requests from the NHS or Social Service Depts. has been pursued at BIOSS (Institute of Organisation and Social Studies, Brunel University) in the Health Services and Social Services Research Units [79–81]. The models, images of how things ought to be, are built up from elemental notions of aim, function, task, authority, accountability and so on, and developed through intensive field-work; but the use of systematic data collection to construct the model or judge its adequacy in practice is explicitly rejected [82].

System I products (formal deductive systems) such as statistical theory and economic theory, not developed within HSR, are used in the practice of HSR at later levels.

System II: truth is empirical

The researcher at this level places his faith in the facts of simple observation and the widespread freely obtained agreement from others about them. This level depends on system I assumptions, for example, the idea of a fact is taken for granted.

My early research concerned the mapping of the visual field on to the thalamus and was built on and with facts [83]. The study commenced with an acceptance of the existence of neurons, action potentials, maps of the cat brain, on–off stimulation in visual fields and so on, as these were all part of an agreed network of factual propositions based on earlier observations. The new observations suggested an alteration of previous networks of facts (theories) concerning naso-temporal overlap and representation in certain nuclei, and indicated the need for further specific observations. The published conclusions resulted from carrying out the same simple experiment a number of times, and this experiment could be easily described in enough detail to allow replication by others.

In HSR, facts and factual propositions (inductive generalisations) are frequently a desirable output. Surveys of geriatric care, general practice, drug prescribing habits, obstetric management, patient attitudes, and other topics such as those carried out under the direction of Dr Ann Cartwright at the Institute for Social Studies in Medical Care (London) are prime examples of system II research [84–86].

The DHSS commissions factual reports from the

Government's Office of Population Censuses and Survey and from academic researchers on an enormous variety of topics. In addition, its Statistics and Research Division provides an annual tabulation of HSR-salient statistics (population, finance, manpower, hospitals, patients, morbidity, dental services, pharmaceutical services, child care, psychiatric care, etc.) for use by interested researchers [87]. Such statistics may be combined to develop indices of notions like 'health status' or 'hospital complexity'.

Because facts carry much automatic influence and can be created through freely-obtained and widespread agreement, a system II approach to the unknown has been devised which creates facts to aid planning or political decisions. The Delphi method, for example, manipulates the judgements of experts to give them 'fact' status and so offers a social technology for handling the future [88, 89].

System III: truth is synthetic

The researcher at this level believes in the integration and interdependence of data and theory and draws on and attempts to reconcile both system I and system II approaches.

Table 2. Levels (systems) of epistemology

Label	Scientific focus and source of certainty	Assumptions	Relations between data and theory	Development of scientific knowledge	Nature of output	Health service application
I Formal	Data varies and is difficult to know and interpret, but theory is sure and has determined data	The model or theory derives from elementary formal (often mathematical) truths. It reveals or embodies a fundamental enduring structural feature of reality	Models uncover the data that can be fitted to the model. Theory and data are separate	Elementary formal truth leads by deduction to a network of ever-expanding more general formal propositions and truths	An application of a model to a situation	Development of usable model to solve discrete technical, programmatic or personnel problem
II Empirical	Data is sure, prior to, and determines theory	All propositions can be reduced to simple observations. Validity comes from widespread freely obtained agreement	Data justifies the model-theory and is separate from it Theory is risky and dependent on data	Elementary empirical judgements (raw data, observations, sensations) lead by induction to a network of ever-expanding, increasingly more general network of factual propositions	Empirical content on its own	Collection and tabulation of required information: surveys, empirical model building, trend extrapolation
III Synthetic	Data and theory are contingent on each other Research must therefore focus on their interaction	Data derives from theory and vice versa, hence there will be multiple views of reality	Theory and data are inseparable, each depending on and interacting with the other	Multiple or sequential testing of alternative hypotheses	Selection of a preferred alternative	Assessment of different options according to agreed criteria. Defining and evaluating alternatives to meet given objectives
IV Conflictual	Data is irrelevant or meaningless by itself. It generates opposing theories. These may lead to an encompassing theory, which resolves conflict and contradiction	Any issue is dialectical i.e. generates two opposing views	As data supports either theory, it must be kept apart to avoid obscuring the issues	Meaning of data is incomplete if there are not two opposing conceptions	Exposure of assumptions and conflicts	Analysis of health and social policy decisions and resource allocation implications. Developing an alternative out of conflicting proposals
V Pragmatic	Data and theory are irrelevant or meaningless by themselves Conclusions are the focus and source of certainty	Purposes dominate Truth depends on the ability to define objectives or conclusions which create means and then define new goals discovered through enquiry	Data, theory and conclusions are all highly linked	Reinterpretation of past and present leading to a conceptualisation of alternative futures	Usable definitions of terms leading to social action	Continuous development and monitoring of implementable changes involving new social relations. Action where social and psychological values and the "irrational" use of personal power are involved

To determine the most useful intervention in patients suffering from chronic lung disease, I found myself adopting a complex research design [90]. Patients with dyspnoea from chronic obstructive airways disease have widely varying degrees of disability and distress despite having similar physiological limitations. It is not known why this is so, but psychological and social factors are believed to be involved. However there was no single model or net of facts on which I could depend. Instead, it seemed necessary to construct and select from a variety of models of psychosocial causation, based partly on available facts (II) and current theories (I), and suggest different modes of intervention. Assessment of interventions required the collection of data pertinent to the various theories. A randomised controlled trial of four modes of intervention (routine physiological assessment, psychoanalytic therapy, expressive psychotherapy by psychoanalysts, supportive therapy from a nurse) was implemented. Expressive therapy by psychoanalysts was found to be significantly superior than the routine assessment in reducing psychiatric morbidity, and supportive therapy by the nurse was found to be significantly inferior. However, further models of intervention, more refined models of the most successful intervention mode, or slighly different versions of the least

Table 2—*continued*

Assessment of methodology	Sense of certainty of output	Usual criticisms	Inherent danger	Suitable if:	Abused when:
Internal coherence and consistency of theory, robustness and richness of application	Very uncertain because model may be totally inapplicable or artificial in the actual situation	Model looks like a self-fulfilling prophecy i.e. 'true' by definition	Proliferation of theory with lack of concern for data	(1) Well-understood and well-defined problem (2) Researcher believes in and understands the model (3) Researcher understands the problem	Situation is not well understood. Model is applied superficially Researcher does not understand the problem Model is over-extended or over-elaborate
Reliability and validity	Uncertain because experience is fallible: truth depends on agreement to 'objectivity' and 'factuality': facts get very complicated on close inspection	Excessive reliance on general agreement. Loss of extreme possibilities	Proliferation of data with lack of concern for theory	(1) Well-structured problem (2) Strong consensual agreement as to its nature (3) Simple experiment or data collection (4) Researcher has a 'feel' for data	Ill-structured problem is made to look well-structured. Hard data is limited and confusing. Consensus on data is lacking
Best fit between data and the hypotheses Quality of indices and controls	Maximum certainty because many perspectives and possibilities are examined	The underlying level I (theory) and level II (data) assumptions are too easily by-passed	Proliferation of alternative hypotheses with lack of concern for action or values	(1) Ill-structured problem but a plan of the system is available and a section can be defined and focussed on (2) Objectives are clear (3) Researcher takes a balanced and unbiased view	Single clear formulation or simple experiment is available. Overall plan is unavailable or objectives are confused. Concern with non-feasible or trivial alternatives. Researcher is biassed
Validity of the conceptual structures which interpret the data	Uncertainty leads to vacillation between alternatives or polarisation	Loss of contact with specifics and specific issues Lack of concern for purposes of the actors	Generation of unnecessary conflict	(1) Ill-structured problem whose true nature is in doubt and subject to intense debate (2) Opposing objectives (3) Experts disagree and no other tool is available (4) Researcher capable of intuitive reasoning	An optimal solution is available Problem is well-structured and consensus exists
Explication of hidden ethical commands which permeate the system. Degree of refinement and precision of response at any point	High uncertainty because the state of play is continually reinterpreted; new variables and components are easily added to the system; and social psychology of researcher and actors are included	Shows little concern for reliability and validity, consistency, certainty, or conflict and power issues	Generation of unnecessary complexity, uncertainty, and individual awareness to violation of values	(1) Ill-structured problem explicitly concerned with the future and social action (2) Objectives unclear (3) Researcher capable of reflective reasoning	Simple alternatives must be decided Feasibility is less important than other criteria: e.g. certainty

successful mode immediately suggest themselves for testing in another study. Such a study would be costly, complicated and still leave open a range of further options for comparison.

Much HSR seems to call for this approach because so many issues implicate multiple relevant perspectives or call for comparison of a range of alternatives.

The large Social Medicine and Health Services Research Unit at St Thomas's Hospital and Medical School (London) directed by Professor Walter Holland carries out a wide variety of studies which typify the level III approach. Their Annual Report for 1980 [91] reveals that one research group is estimating the rate of respiratory illness in different home environments; the next is assessing the effects of the availability of school milk; another investigates the reaction of schoolchildren to education about the role of smoking and diet on health by creating two groups out of a single longitudinally-studied cohort, a fourth compares the medical outcome of different ward designs; and so on.

The randomised control trial so strongly advocated for wider use in HSR by Cochrane [92] and Dollery [93] and the cost-benefit analyses of economists [94, 95] are prime examples of methods based on system III assumptions.

System IV: truth is conflictual

The researcher believes that any issue has two antagonistically opposed sides, each supported by System III assumptions. These are dialectically interrelated in that each side implies the other, and can be synthesised to provide a broader model of the problem.

Within psychoanalysis, narcissism is generally agreed to be a complex and confusing subject [96, 97]; and it has become the focus of intense conflictual debate. Two major opposing theories have emerged in recent decades which define and describe narcissism and narcissistic phenomena quite differently. Research papers follow one line and exclude the other, and in debates any clinical material (data) presented to support one theory is routinely reinterpreted to support the other. My approach here was to describe the situation in detail and defend the validity of each viewpoint [98]. Then I demonstrated that the two viewpoints were dialectically related and that they could be understood in the light of a particular universal childhood experience [99]. An awareness of this dialectical interplay and its synthesis allowed exploration of implications for clinical treatment [100].

Health services offer much potential for opposing interpretations of data and the range of conflictual polarized issues is great: public vs private care; pluralistic vs monistic system; professionalism vs bureaucracy; central control vs local autonomy; individualism vs collectivism; preventive vs curative; care vs cure; health vs illness; quality vs equity; political-incremental vs rational-managerial decision; community vs hospital; acute vs chronic.

In HSR, this is typically the field of policy-studies. For example Rudolf Klein, Professor of Social Policy at Bath, not uncommonly commences his regular articles in the *British Medical Journal* by stating the particular dialectic he intends to discuss. A recent paper was entitled "The strategy behind the Jenkin non-strategy" and the opening sentence posed the dilemma of "how to strike a balance between central direction and local autonomy" [10]. Health care for the aged receives a similar handling when Armstrong [102] analyses the policy problems: these are found in typical level IV fashion to be based on a "cognitive contradiction" between gerontology (= life and natural death) and geriatrics (= illness and pathological death).

System IV assumptions also permeate some forms of sociological investigation and analysis. The research sociologist may collect or emphasise data which supports one theory and ignore or downplay other data or alternative theories. 'Critical theory' explicitly aims at exposing assumptions through dialectical disagreement; and the desired result is the uncovering of hidden values and generation of conflict [103]. Merton's [104] advice to the social theorist to consider manifest and latent functions also appears to be rooted in System IV assumptions. The latent function (or dysfunction) is, he implies, the antithesis of its manifest function. Davis has generalised this approach to all interesting social theories: great theories are no more than the direct opposite of the assumptions of the audience, and their truth or falsity is irrelevant [105].

Workers trained in the British tradition find the above ideas and practices, based on the notion that data is irrelevant or hopelessly biassed, disturbing and distasteful. Professor William Paton, addressing the Academic Assembly of the British Postgraduate Medical Federation, refers to the canonisation of conflict and to sociological geese who offer "no more than speculative theories put in the form of assertions" [106]. Professor George Brown, the noted sociologist, whose work appears to be based on level III assumptions [107, 108] describes this disconnexion of theory from data, which latter he equates with research, as a "puzzling feature of contemporary sociology" [109].

From the point of view of many sociologists the epistemic principle of agreement is something of a sham, because those with power are the ones who determine which facts will be agreed to. The exposure and discomforting of power elites is a historic sociological mission; and this was reaffirmed by Philip Abrams, late Professor of Sociology at Durham speaking to the Centenary Meeting of the British Association [110, 111]. He distinguished between "argumentative knowledge" and "authoritative knowledge" and claimed that the role of sociology was to provide the fuel for political debate, to make politics more sensitive and strenuous not to settle issues or to provide certain answers.

System V: truth is pragmatic

The researcher's faith is placed in both data and theory only insofar as they are part of conclusions which enable action in the social world, otherwise they are irrelevant. The researcher is oriented towards the future and explicitly incorporates an ethical dimension in his findings.

When a family comes for help with its difficulties, often a member with emotional or behavioural disturbance, its problems can be tackled with family therapy, which is based on the principle that there needs to be a change in the way family members interact. Many practitioners specify in detail the final results if treatment is to be

deemed successful, and then gear therapy to achieving these goals [112, 113]. My colleagues and I believe that such an approach does not always do justice to values of autonomy and dignity. We have described a quite different approach to the family in which the therapist only specifies the direction of therapy, and leaves the family members open to choose their own new way of functioning [114, 115]. Working with such general objectives demands a particular therapeutic approach. The therapist must become, temporarily, part of the family system so as to explicate the hidden and conflictual value and meaning systems within the family. He must create the possibility of a new future for the family based on a different understanding (i.e. new knowledge) of the past and the present, but the restrictions on change imposed by the actual nature of the family members in their particular social and cultural context must also be recognised.

System V assumptions call for the researcher to participate in, and create knowledge through the definition of (social) reality. Such an approach seems particularly relevant to innovations which have to be implemented both centrally and peripherally within organisations, involve alteration in the social relationships within the system and impinge on other social systems [116, 117]. Argyris [118] argues that the aim of research of this type must be to generate valid information which helps the client make informed and responsible choices and *develops his internal commitment to those choices*. Given the contestability and contentiousness of social things and the lack of awareness that reality needs to be defined by those in positions of power, it is not surprising that the process and findings are sometimes met with incomprehension.

Within HSR, the principal figure operating in this fashion has been Professor Elliott Jaques, who has directed the Health Services Organisation Research Unit at Brunel University. His output is founded on the use of field-work combined with a stringent and repeated process of conceptualisation and formulation to develop valid usable social concepts [119, 120]. However, this has not always been understood [121, 122].

Trevor Gambling, Professor of Accountancy at Birmingham University, like Jaques, has taken a whole systems view and has inevitably expanded accountancy to a theory of society. He argues that accounting practice is about magically boosting social morale and that its data can be manipulated to look hard. By his own report, he is misunderstood; he finds academic barriers to publication and his research projects seeking to determine the changing nature of accounting in practice tend to fail through disinterest or active opposition [123, 124]. In operational research in the U.S.A., both Churchman [125] and Ackoff [126, 127] have endeavoured to introduce a similar pragmatic and total system approach, apparently also with little success [128–130].

The problem of researcher detachment and ethical commitment within a turbulent emotional and value-laden field is significantly increased by his intimate connection with action and change. Because the research process at System V challenges assumptions, generates complexity, requires actors to explicate their value conflicts, and evokes uncertainty in the context of immediate decisions, it is easily perceived as threatening; and the findings, disconnected from their origins, may be dismissed as unsubstantiated or simplistic.

DISCUSSION OF THE MODEL

An important source of the current conflicts within HSR in the U.K. has been identified. This is the unrealistic belief of those holding the purse strings that the scientific community is unified rather than disparate. The attempt to impose inappropriate consensus on dissenting researchers has inevitably provoked destructive conflict. If consensus could be reached on the nature of differences between researchers and their methods, a beginning will have been made in grappling with the enormous problems of assessing the value and quality of research work. Sub-groups of researchers, themselves, if unencumbered by fundamental differences in their vision, might be able to develop useful criteria and techniques for evaluating each other's work, and conflict might then be manageable or even harnessed constructively.

Five such sub-groups embodying five categorically different problem-solving research approaches based on non-commensurable images of reality have been identified and their work has been described and illustrated (mainly in Table 2). The distinctions have been recognised by considering the activities of practising scientists, including the author, and noting repetitive annihilating criticisms between scientists working in different ways [131]. Before outlining the implications of this analysis for the national organisation of HSR, some questions require examination. First, is any particular level a preferable research approach for any particular health service problem? Or, put more extremely, should the label 'science' be reserved or restricted to certain levels? Second, how is this classification related to current descriptive categorisations of research?

Choice of system (or level)

The usual arguments for restricting the labels 'science' or 'research' to selected levels lose significance because they tend to reflect the typical assertions or criticisms applicable to each level and be part of a desire for a unified scientific community. All the systems described lead to knowledge and may contribute to problem-solving. They can do so scientifically insofar as a sound systematic process of inquiry is used. The prime purpose in making distinctions between what is and is not science is to reduce confusion and maintain identity [132], but if the social result is schism and excommunication within the scientific community then another solution may be desired. The alternative pluralistic approach need not blur distinctions or threaten identity and can welcome complexity, uncertainty and disagreement. Tolerance and understanding of the validity of differences could lead to fruitful collaboration.

The classification makes it clear that much of the System II approach so dominant in biological sciences, and the System III approach so important in clinical research, is directly applicable to HSR. However, Systems II and III like the other levels are only

fitted for certain problems, so those who say the biomedical approach is not always applicable are also correct.

Particular issues may require research work at several levels. For example, very well-structured problems are most easily handled by Systems I and II, while ill-structured problems demand a System III, IV or V approach. The attempt to define a clear problem from an unclear issue is characteristic of System III. It breaks down when the situation is so complex and confusing that it is not even clear whether there is a problem. Substantial research using System IV and V must then be conducted to reveal more about its nature.

The epistemic principle of agreement [133, 134], so strong in System II and also powerful in Systems I and III, becomes replaced by the value of disagreement in Systems IV and V. Examining the assumptions underlying agreement or disagreement as a scientific criterion will be immediately recognised as a System IV inquiry. Disagreement and the challenge of assumptions behind agreement seem to be associated with integration of values into the research process and a loss of confidence in the supremacy of data [135]. At levels I to III, value issues either appear before research commences (built into the design and data selection decisions) or afterwards (in the interpretation of the results). At level V, the research process engages the values of the decision-/policy-maker as a substantive part of the inquiry and evaluation of the process of inquiry [136].

Problems may need to be tackled from multiple angles and at different levels. For example resource allocation issues often involve level III and level IV inquiry; examination of potential health service developments usually requires both a model of the development (I) and information on its likely use (II). Because many problems are posed as ill-structured issues ('impact of unemployment on health care'), they not only allow redefinition as questions in a variety of disciplines but also at all levels. Any researcher will attempt to redefine problems so as to fit the System he prefers to work in and in the light of his training, institutional pressures, likelihood of funding, available assistance, personal interest and so on. The choice of System is then usually vigorously defended.

Currently used classifications of scientific research

(i) *Descriptive labels.* The current approaches to the controversial topic of research method classification are either purely philosophical and distant from research practice, or descriptive and easily used by scientists and others but confusing. Most labels rapidly lose meaning on close scrutiny. Certain research groups, for example, have tried to capture labels like 'problem-oriented' or 'hypothesis-testing', but this paper started from the well-accepted premise that *all* HSR has these characteristics. 'Experiments' (i.e. trial and test procedures) are not restricted to one System and the mundane and sometimes pejorative label 'descriptive research' is easy to apply to forms of research at all levels.

'Evaluation' is a particularly important label. Because System III research is essentially about comparing hypotheses, i.e. about attributing value to them, it has tried to capture the phrase and the funds which accompany it. However, evaluation can also be brought about by exposure of assumptions using System IV; evaluation is a continuous process at V; and at I and II evaluation is inherent in framing and answering questions. System III evaluation is insufficient, inappropriate or impossible when promptness is preferable to precision, when the need is not for the best solution but for any feasible solution, or when there is a 'one-shot' or total-system intervention.

Similarly, the phrase 'action research', possibly originally referring to System V work by Lewin [137] has been applied to work at all levels. Almost immediately, Chein *et al.* [138] discribed diagnostic, participant, empirical and experimental versions which seemed to operate with a variety of assumptions.

(ii) *Dichotomous classification.* A large variety of human concerns have generated philosophical schools, and though most have an epistemological branch few have more than a peripheral or indirect relation to research work. As a consequence, Susman and Evered [139] in their search for some philosophical legitimation for their conception of action research could enlist the support of praxis, hermeneutics, existentialism, pragmaticism, pragmatism, process philosophies and phenomenology. Research has its own concerns and requires articulated assumptions which serve its particular purposes, not such a hodgepodge of philosophies at second-hand.

Although scientists are reluctant, not improperly, to enter another field on its own grounds, they should not be averse to asserting their own assumptions and guiding principles. At times they are keen to do so. This enthusiastic ability is most evident in the face of some violation of or threat to deeply held assumptions; or when a desire exists to expose the inadequacy of the assumptions of colleagues. Most classifications generated by researchers in this way and naturally used by them are dichotomous. This should not now be surprising, because exposing assumptions is usually performed via level IV inquiry which typically generates opposing viewpoints [140].

The reader will be familiar with the controversies which advocate some method or epistemological base for research: hard vs soft data; quantitative vs qualitative methods; positivistic vs non-positivistic science; objective vs subjective evaluation; biassed vs unbiassed reporting; explanation vs understanding; prediction vs making things happen; detachment vs engagement; thinking vs feeling; reductionist vs holistic. As indicated in Table 2, the main output of such an approach is a raising of awareness, not a provision of solutions. Pushed too far, dialectical inquiry and debate become acrimonious, excessively repetitive and time-wasting; and such inquiry is never a guide to action.

When there is a truly dialectical debate on an important issue whose nature is still unclear, comprehension within some larger scheme is urgently required [141]. In some cases it is possible to soften the polarisation and reduce, if not resolve, intense conflict by describing the dialectic as a continuum, that is to say by moving inquiry from level IV to level III. For example, Cherns [142] faced with the conflict between discipline-oriented approaches and problem-

oriented approaches converts it to a four category continuum.

The preferable approach is to remove the very ground of conflict by creating a higher-level synthesis which accepts the dialectic and puts it into perspective. This may be aided through level V inquiry: by regarding the key accepted notions in the dialectic as confusing and complex objects for deeper study, it may be possible to develop new meanings in the context of a commitment to devise a practical means of proceeding. This essay has attempted such an inquiry.

INSTITUTIONAL IMPLICATIONS

This paper has elements of a level I approach to the problem of evaluating scientific research insofar as it uses a model developed by others. Alternatively, it might be regarded as a level III inquiry insofar as it is based on the author's own experience meshed in with current theories in the philosophy of science. The underlying spirit is however level V.

The level V approach opposes artificial isolation of systems which in practice interact. Knowledge generated at all levels interacts and both well-structured and ill-structured health service problems demand attention. As a result, a variety of disciplines and whole fields of research have been swept into this inquiry into HSR and made bed-fellows [143].

Another level V feature is that it is written in the imperative rather than the indicative. The paper at I or III would say 'This is *a way*' or even 'This is *the best known way*' to classify HSR, leaving the prescription implicit or covert. At level V, it says "This classification has been devised specifically to assist in organising and evaluating HSR: *take* it as *the* way until something better comes to mind, or stay in the current difficulties'. This proposition is offered because it is testable, believed to be 55–60% right on the Milosz scale [144] and capable of further substantial elaboration in the service of practical organisation of HSR (cf. [71]).

Such a command with its potentially profound effects on society and the lives of researchers must be justified ethically, and not just by the need to reduce uncertainty or to produce an elegant or practical model; otherwise it simply reflects the authoritarian attitude so objected to in the OCS review. The ethical presuppositions in this case are the right for individual scientists to work in the system they find most natural, the importance of reducing destructive conflict among scientists, and society's need for its problems to be tackled with all the scientific means available.

The general rule for biological and social processes is heterogenisation [145]. A homogenous scientific community is unable to provide for work on the full range of health-related social problems which HSR must tackle, however comfortable it may feel for those included within it. If, in addition, that homogenous community speaks in the indicative, HSR is in danger of covert authoritarian rule.

If the command stitched into this paper is heeded, what might it imply in terms of institutional base, funding and research evaluation? The comments which follow simply aim to open the debate.

Institutional base

No single independently funded HSR-Institute engaged directly in research of its own choosing would be likely to encompass the total range of HSR methods, unless it were very large. An unusual Director might manage to promote them with 40–50 staff, but a board of Directors and over 100 staff sounds more realistic. This starts to feel like a domain-based University, and the creation of such an institution would become a political issue.

For purely commissioning purposes, there is no reason why an HSR Council could not provide funds for the total range of HSR. Similarly, in principle, the HSR panel of the MRC might be able to. The difficult and challenging task would be to ensure that members of these bodies, especially the Chairmen, understood and valued scientific pluralism.

Funding

Any arrangements for funding should ensure the existence of research at all epistemological levels. This means that all scientists should not be in open competition against each other. Competition among scientists has more relevance to work within systems than between systems. For each system, there must be a certain minimum resource of competent practitioners and posts to ensure ongoing development of methods, to provide adequate training and career structures and to act as a competitive spur to each other. Society, not science, will suffer if any approach is neglected and so society should be concerned with the balance between systems. A special NHS Health Authority with responsibility for HSR deserves consideration as a method for providing the necessary public accountability of any HSR board or council.

Research evaluation

Peer review mechanisms focused on method are essential. Method must be understood to stand on two legs, one lodged in the specifics of the problem to be solved and the other in the image of reality adopted. It is necessary therefore that the peer share both the epistemological base, as well as being conversant with the domain of the problem.

There is a variety of ways, applicable to all levels, by which the scientific legitimacy of knowledge production might be decided. A preliminary and contestable list might include careful reference to other knowledge sources, especially within the scientific world; public description of the methods used in obtaining the knowledge; publication of the knowledge for use by other researchers; systematic development of knowledge; an active quest to improve methods; and acceptance of peer assessment as described above.

Less relevant to assessment would be any appeal to norms such as faith in the moral virtue of rationality, non-rationality, emotional neutrality, commitment, scepticism/dogmatism and the like. Appeal to one or other side of these norms is no substitute for a detailed exposition of assumptions and intentions and their translation into useful research work [146]. The awareness and use of such assumptions is a personal matter and adherence to them a quality which defines a scientist's life. Indeed, it could be argued that "only the scientist (himself) can tell...whether he

is or is not being scientific at any given moment" [147].

CONCLUSION

The aim of this paper has been to suggest the nature of a usable framework within which HSR commissioning and evaluation, both thorny problems, could be meaningfully developed: meaningfully, that is to say, to the practising researcher, to the public and its decision- and policy-makers, and to the wider scientific community.

Evaluators from the scientific community focus explicitly on method and implicitly on epistemological foundations; decision- and policy-makers focus on types of problems and research output; and researchers operate with data and theory using methods to solve problems. A classification of research is offered that can bring these three groups and their foci together in a way that fosters mutual understanding and constructive cooperation.

It is argued that society, by funding HSR, provides the wherewithal for scientists to offer a level of needed practical usefulness. It is therefore incumbent on the scientific community to ensure that all available methods will be used and appropriately evaluated. This requires an acceptance by scientists that HSR inherently demands fundamentally different styles of inquiry based on differing images of reality. Such styles and images constitute the identity of individuals and groups, hence institutional mechanisms are essential to ensure that society does not fall into the grip of scientific homogeneity, or become racked by fruitless turmoil.

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54. Data and theory are potentially confusing terms and the brief definitions here are contestable: *Data* is that which purports to correspond directly with the real world i.e. 'things'. *Theory* is that which purports to correspond with our expectations of the real world i.e. 'propositions'.
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72. I use my own work, in HSR and other fields, because I have some intimate and detailed knowledge of the mental processes and experiences connected with it and am not uncomfortable with the epistemological propriety or limitations of each approach. My reference to other HSR researchers is essentially impressionistic. A formal research study of researchers to test and, if need be modify or elaborate, this classification would be feasible as the issues are alive and meaningful for them. It could sustain a tradition of research into HSR organisation which the DHSS plans to discontinue.
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131. Rapoport noted that most researchers seem to wish to deny validity to many forms of useful research (Rapoport R. N. Three dilemmas of action research. *Hum. Rel.* **23**, 499–513, 1970). The documentation of devastating condemnations of work at a different epistemological level to the critic's own has not been included in this paper. It has been assumed that most readers have been on the giving and /or receiving end at some time. Table 2 provides some indication of the sorts of criticisms that tend to be repeatedly made.
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140. Researchers often appeal to philosophers for justification in a level IV way i.e. using those that support their contentions. However, because this paper is not written in such a spirit, and I have no expertise in the discipline, it seemed best to eschew philosophical references altogether.
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143. Brown has come to a similar conclusion in a recent paper. Brown V. A. From sickness to health: an altered focus for health-care research. *Soc. Sci. Med.* **15A**, 195–201, 1981.
144. "When someone is honestly 55% right, that's very good and there's no use wrangling. And if someone is 60% right, it's wonderful, it's great luck, and let him thank God. But what's to be said about 75%? Wise people say this is suspicious. Well and what about 100% right? Whoever says he's 100% right is a fanatic, a thug and the worst kind of rascal". An Old Jew of Galicia. Quoted in Milosz C. *The Captive Mind*. Secker & Warburg, New York, 1953.
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146. Much criticism of social scientific method seems not so much concerned with the nature of knowledge as with implicit assumptions about the nature of human beings or social life (Lessnoff M. *The Structure of Social Science*. Allen & Unwin, London, 1974). It is irrelevant however to argue that a method which treats people as objects is wrong, if, for the purpose of the study, it is right. This is because all research under-dimensions reality. Such a method may, however, be judged unethical or politically unwise. The current state of the ethical and social regulation of science contributes to these confusions.
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