

# IFORS' Operational Research Hall of Fame

## Russell L. Ackoff

Co-author of the pioneering textbook on OR and its practice that helped define the field; a lifelong advocate of systems thinking and leading critic (after 1970) of the established 'hard', or mathematical, paradigm in OR.

Born: 12<sup>th</sup> February, 1919, Philadelphia, USA.

Education: B. Architecture, University of Pennsylvania (1941); PhD Philosophy of Science, University of Pennsylvania (1947).

Currently: Anheuser-Busch Professor Emeritus of Management Science, The Wharton School, University of Pennsylvania.

Key positions: Assistant Professor, Philosophy and Mathematics, Wayne (State) University, 1947-1951; Associate Professor and Professor, Operations Research, Case Institute of Technology, 1951-64; Joseph Lucas Visiting Professor of Operational Research, University of Birmingham, 1961-62; Silberberg Professor of Systems Sciences and Anheuser-Busch Professor of Management Science, University of Pennsylvania, 1964-86; August A. Busch, Jr. Visiting Professor of Marketing, Washington University, St. Louis, MO, 1989-95; Chairman, INTERACT, 1986-.

Awards: D.Sc (Honorary) University of Lancaster, UK, 1967; Silver Medal, Operational Research Society, 1971;



George E. Kimball Medal, ORSA, 1975; D.Sc (Honorary) Washington University, St. Louis, 1993; D.L. (Honorary) University of New Haven, 1997; Doctor Honoris Causa, Pontificia Universidad Catholica Del Peru, Lima, 1999; D.Sc (Honorary) University of Lincolnshire & Humberside, UK, 1999; Award for outstanding achievement in Systems Thinking and Practice, UK Systems Society, 1999.

Fellow: American Statistical Association, International Academy of Management, Institute for Operations Research and the Management Sciences.

Key OR roles: President of ORSA, 1956-57.

Russell Ackoff has had a distinguished career in operational research (OR) both as an academic and as a practitioner. His influence on the early development of the discipline both in the USA and in Britain in the 1950s and 1960s is hard to over-estimate. However, by the 1970s he had become trenchant in his criticisms of technique-dominated OR, and powerfully advocated more participative approaches. These criticisms have had limited resonance within the USA, but were picked up both in Britain, where they helped to stimulate the growth of Problem Structuring Methods, and in the systems community world-wide.

Ackoff's intellectual formation, in architecture and philosophy, is unusual among Operational Researchers. The background in philosophy was one he shared with his early close collaborator, C. West Churchman, who was also his colleague at Case Institute's Department of Engineering Administration in the 1950s. (Ackoff had been Churchman's first doctoral student.) Their self-defined mission was to set up an Institute of Experimental Method to apply philosophy to societal issues, to which end they established one of the pioneering graduate programmes in operations research. Together (and with EL Arnoff) in 1957 they published *Introduction to Operations Research*, the most influential early OR textbook. (It was not, however, the very first text – that distinction goes to Maurice Sasieni.)

In 1964 Ackoff moved to the Wharton School at the University of Pennsylvania, where he set up a series of graduate programmes which moved progressively away from OR's quantitative/computational norm. In parallel, he headed a sequence of research centres funded by his outstanding success in selling projects to business – and many students and faculty were involved in these also. But in 1986 he resigned his post at Pennsylvania to set up his own INTERACT institute, which he still heads.

It was during the 1970s that Ackoff registered increasing disillusion with the course and conduct of OR. This was expressed in trenchant prose under such titles as “The Future of OR is Past”, and “OR, a Post-Mortem”. In explaining this ‘apostasy’ it is necessary to identify the key philosophical and practical elements which underpinned

Ackoff's approach to OR. It is indeed these ideas, as they have developed, that constitute his most lasting contribution to the discipline.

In their pioneering text *Introduction to Operations Research* Churchman and Ackoff (together with Arnoff) laid emphasis on two critical characteristics of OR, which will be discussed below. The book drew attention to the increased differentiation and segmentation of the managerial function after 1900 that had led to the emergence of 'executive-type problems' of a complex nature. The purpose of OR, defined as finding 'the best decisions relative to as large a portion of total organisations as possible', led to the first principal characteristic of the discipline, namely its consistency with a systems approach. The second key element was the need for a team approach based upon an eclectic choice of disciplines. Since 'most man-machine systems have physical, sociological, economic and engineering aspects... (t)hese phases of the system can best be understood by those trained in the appropriate fields'.

The emphasis on the interdisciplinary approach to decision-making was to be one of Ackoff's continuing concerns. By 1961 he was already registering his unease at the undue narrowness of OR models for too often failing to incorporate 'psychological and social variables' (Ackoff, 1961). He also expressed strong reservations about the trend towards 'suboptimization' and, more critically, the fact that OR models were being applied to 'problems of limited scope'. A continuing emphasis on specialised modelling techniques, he foresaw, could fuel a search for problems to match those techniques, rather than the 'strong problem orientation' that was needed.

Distinctive elements in Ackoff's orientation towards application were his interests in 'national' planning (involving central functions of national governments) and in the social responsibility of OR. From the later 1950s onwards, Ackoff acted as consultant to the governments of a number of developing countries, India and Mexico in particular, with a view to devising improved organisational systems. On the basis of this experience Ackoff was concerned to highlight the 'cultural' obstacles to economic development, including corruption, paternalism, patronage and conformity. All of these had the potential to convert well-intended programmes into 'means for strengthening the

deficiency they were intended to remove', not least by precluding considerations of other, superior, development strategies.

Ackoff's solution to this dilemma was rooted in his own definition of 'development' as 'possession of a desire for improvement and the ability to bring it about. It is more a matter of innovation and knowledge than it is of wealth'. He therefore argued that 'effective development planning cannot be done for some by others. The others must do it for themselves, though they can be helped by professional planners' (Ackoff, 1977).

For Ackoff the delivery of advice by the professional planner – in this case the operational researcher – lay at the core of the discipline's 'social responsibility'. He drew attention to the essential distinction between the 'professional' and the 'servant'. While the latter owed blind loyalty to one master, the professional had a social and moral responsibility to serve all participants and stakeholders (Ackoff, 1974). (The implication, that all conflicts are resolvable to mutual satisfaction, was however disputed at the time – see Goodsman et al (1975), Rosenhead (1975) - on the grounds that material interests of those involved can be contradictory. A similar view could indeed be taken about Ackoff's view of development, which excludes the material and political dimensions, for example the influence of the developed world in maintaining the condition of underdevelopment elsewhere.

Ackoff's 'participatory planning' – in effect, 'plan or be planned for' – was a clear forerunner of 'interactive planning' which was to be one of his major preoccupations in the 1980s. Interactive planning could be applied wherever the planning process could benefit from the motivation and commitment resulting from the direct participation of relevant stakeholders. Even more so than participatory planning, interactive planning was rooted in Ackoff's desire to 'improve the future'. The role of the professional in this is to stimulate open and free debate, to enhance the creativity of stakeholders in designing both a desirable future for themselves and ways to bring it about.

There are three further way-stations in the evolution of Ackoff's thought on the practice of OR, set out with erudition and careful thought in some notable publications. Thus, *On Purposeful Systems*, published in 1972 with F.E. Emery, provided key insights on how systems thinking relates to human behaviour: to the extent that individual systems are purposive, knowledge and understanding of their aims can only be gained by taking into account the mechanisms of social, cultural, and psychological systems.

The fact that these systems were experiencing profound change could be attributed to the end of the 'Machine Age' and the onset of the 'Systems Age'. The Machine Age, bequeathed by the Industrial Revolution, was underpinned by two concepts – 'reductionism' (everything can in the end be decomposed into indivisible parts) and 'mechanism' (cause-effect relationships). According to Ackoff, the beginning of the end of the Machine Age and the beginning of the Systems Age could be dated to the 1940s, a decade when philosophers, mathematicians and biologists, building on developments in the interwar period, defined a new intellectual framework. The key development was the new systems approach, defined by Ackoff as follows:

A system is more than the sum of its parts; it is an *indivisible whole*. It loses its essential properties when it is taken apart. The elements of a system may themselves be systems, and every system may be part of a larger system (Ackoff, 1973).

The dawn of the systems age saw the post-1945 spawning of new sciences of management and new forms of engineering practice, including OR, cybernetics, systems engineering and research, and the communications sciences. This held out the prospect of interdisciplinary research on a scale capable of comprehending an increasingly complex and volatile world.

By the 1970s, however, introversion and jurisdictional disputes between disciplines had set in. A narrow and inward-looking OR, Ackoff argued, was simply not broad enough to research effectively the operating characteristics of our social system that most urgently needed research. Problems such as discrimination, inequality, the inefficiency of public services, required Systems rather than Machine Age solutions. In the meantime, however, the 'messes' of unstructured reality were being murdered by

reducing them to problems, which were then murdered by reducing them to models, which in turn were murdered by excessive mathematics (Ackoff, 1973).

Ackoff's second way-station was reached in 1977 when he argued that the increasing centrality of optimisation and objectivity in OR amounted to 'opt-out' - a withdrawal from reality. In a turbulent economic and political environment 'it is silly to look for an optimal solution to a mess.' As for 'objectivity', he contested the conventional view that it requires the exclusion of influence by *any* ethical or moral value held by the researchers or others involved. For OR, Ackoff argued, objectivity cannot be the absence of value judgements in purposeful behaviour – because purposeful behaviour *cannot* be value free. In short, 'there is no concept as value loaded as objectivity, and no activity more value-full than science' (Ackoff, 1977).

Ackoff's final way-station was highly controversial. In two papers delivered to the Annual Conference of the UK Operational Research Society held at York in 1978 he brought these elements of his critique together. The first of these launched a scathing attack on the OR community in general, but with a particular condemnation of OR in practice and of academia in North America. Once again, he called for a new paradigm for OR rooted in a holistic systems approach in order to break away from the limitations of the ever-increasing 'mathematisation' of OR. The second paper described the content of the latest teaching and research programme that he had developed at the University of Pennsylvania, in order to demonstrate that it was possible to escape from these limitations. This new Social Systems Science ('S<sup>3</sup>' for short) programme engaged in the kind of transdisciplinary activities, including interactive planning, that were what 'we thought OR should have become'.

S<sup>3</sup>, therefore, was the embodiment of Ackoff's rejection of mainstream OR as it had developed since 1950. As he stated later, 'I did not abandon [OR], [OR] abandoned me' (Ackoff, 1987). By that time Ackoff was proclaiming the complete irrelevance, in his view, of OR (in its production and distribution, output-oriented guise) to problems above the purely tactical level. OR workers had been and were being increasingly

marginalised and downgraded in organisations, due to their inability to engage with messes and purposeful choices.

How does this leave Russ Ackoff's lasting heritage? He has certainly left us a range of challenging written work, which continues to resonate – and he is still writing. His writing style is both muscular and readable (paralleling his outstanding skills as a public speaker). Commonly the approach is polemical - directed to establishing a conclusion from clear premises and definitions, rather than to a discursive examination of possible viewpoints. He likes an argument, but he expects to win. His career is notable, as a friendly commentator put it, for “the devastating critical judgements for which he has become well known” (Friend, 1992).

In terms of institutionalisation of his precepts the record is patchy. There is no effective academic home-base staffed by people working in his spirit – in part perhaps because, since Churchman, he has not established continuing partnerships with colleagues of comparable stature. But the phenomenon is more significant than that –for in the United States his direct influence is now hard to find in the academic OR community. While there are operational researchers who hold his work in high esteem, their numbers are small. Indeed among younger generations of operations researchers his name is now almost unknown. In effect, since his apostasy of 25 years ago, it is as if he has been written out of the official OR canon.

Elsewhere though the picture is different. The British OR community has had a close relationship with Ackoff since he took a sabbatical year in the United Kingdom in the early 1960s. He formed close and lasting links with the leading British operational researchers, Stafford Beer and Pat Rivett. It was no accident then that his explosive papers of 1978 were delivered in Britain. And there they were taken not just as a criticism but also as a challenge, and an active debate ensued. His critique of traditional OR (if not his offered solution of interactive planning) became widely accepted, and helped to generate a different participative approach to OR, now known as Problem Structuring Methods, which has developed its own dynamic.

Round the world, Ackoff's work is highly regarded, for example, among operational researchers in Sweden, and also in Denmark, where the early relationship he established with the leading 'hard' operational researcher Arne Jensen opened up a space for people to work in a more socially conscious framework. Through other key relationships he has a continuing OR presence in such countries as Mexico, Peru, India and New Zealand. - and this despite the fact that Ackoff formally severed his ties with OR (or at least its dominant tendency) more than a quarter of a century ago.

When Ackoff gave up on OR he identified himself with the systems movement. And the systems community world-wide is a constituency where his writings, both early and late, have been enormously influential. One measure of this is the recent 4 volume set of readings on Systems Thinking (Midgely, 2002). When 47 leading international experts in the field were asked to nominate articles for inclusion, more papers by Ackoff were proposed than by any other author.

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