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978-0-521-11535-3 - Collected Papers of Lewis Fry Richardson, Volume 2

Edited by Oliver M. Ashford, H. Charnock, P. G. Drazin, J. C. R. Hunt, P. Smoker and Ian Sutherland

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Throughout his life Lewis Fry Richardson made many inspired contributions to various disciplines. He is best known for his wealth of important work on meteorology, and his ground-breaking application of mathematics to the causes of war. But his field of interest was in no way limited to these, and various aspects of psychology and mathematical approximation also benefited from his novel modes of thought.

Richardson had a rare determination to trust his own ideas, even when they were not well received. These two volumes show that much of his thinking has long been under-rated, and that much of his work was ahead of its time.

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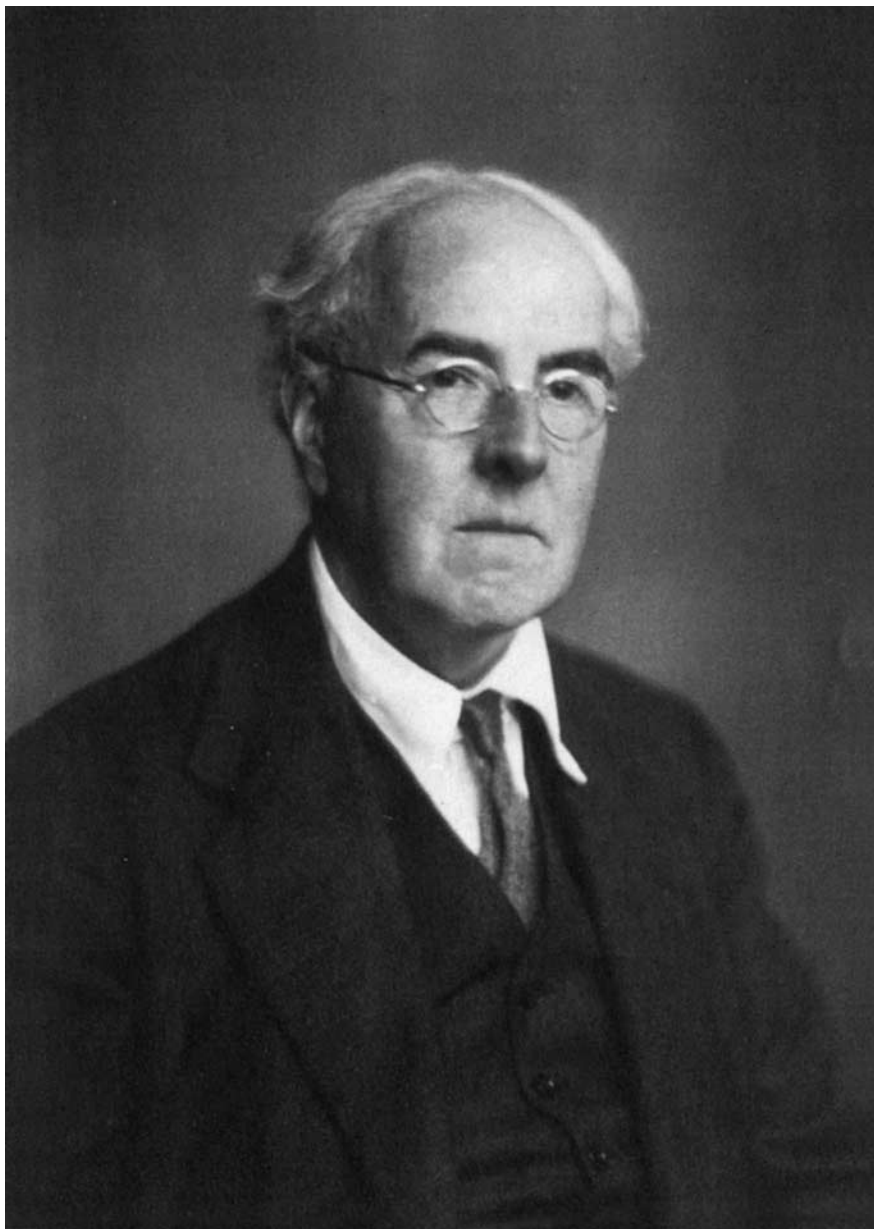
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LEWIS FRY RICHARDSON, D.Sc., FRS

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VOLUME 2 Quantitative psychology and studies of conflict

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Foreword

by Cedric A. B. Smith
Chairman, Conflict Research Society

I have been honoured to be asked to write a foreword to this volume of Lewis Fry Richardson's work. But the best advice to the reader is to go direct to Richardson's writings. Richardson sets forth so well his explanation of what he is trying to do, and why, that any further explanation would be superfluous, and probably not be so clear as that of the author himself.

But it seems useful to think about what Richardson has achieved in scientific and political terms, how it bears on today's world, and how it may influence the future.

During the First World War Lewis Richardson felt that as a meteorologist he was leading a rather comfortable life while so much destruction and suffering was going on at the front. Being a Quaker, he would not be a combatant; but he joined the Friends' Ambulance Unit in order to help the wounded (which, incidentally, says something of his physical and moral courage). This brought him into close contact with the misery, suffering and death involved in the war. In his spare moments he began to consider how to investigate further the causes of war, thus hopefully leading ultimately to its prevention.

The view is often put forward that our code of morals lags far behind our technical abilities. Compare the total elimination of smallpox, once a very common disease, with the widespread misery produced by wars, famines, and other disasters. That view may have some validity, but it might be more profitable to contrast scientific and political attitudes and ways of behaviour. Ideally a scientist regards facts as tests of the correctness of his theories. Most people, when thinking politically, regard facts, whatever they may be, as confirming their previous opinions. The result can be catastrophic.

Richardson's outstanding contribution was to look upon political matters as ones which could be investigated by scientific method. He introduced numerical calculation and mathematical and statistical relations. For example, one can argue verbally that armaments deter wars, by frightening possible aggressors. Or one can argue verbally that armaments promote wars, by stimulating a build-up of armaments by the other side. One can argue verbally until the cows come home. But suppose one collects data about how particular nations build up their armaments, and how often they are involved in wars. Then if one should find that the most heavily armed nations rarely fight, that would throw doubt on the second theory, whereas if the opposite was true, the first theory would seem less tenable. Of course, as every statistician is taught,

correlation does not necessarily imply causation, and such data have to be handled with care. But they can be a useful corrective to seemingly plausible but misleading theories.

Since Lewis Richardson was trained as a physical scientist, he naturally chose the tools which had been so successful in physical science, such as differential equations. He argued that although individual decisions may be unpredictable, in the mass they could average out in a way which behaves regularly and predictably. He found that the arms race before the First World War agreed remarkably well with his postulated differential equations. He also made use of new statistical methods which were rapidly being developed during the period 1920–50. Although there was a precedent in the mathematical and statistical development of economics, Richardson's application of mathematical and statistical methods to politics was an original and heterodox approach, not always welcomed even today by international relations experts. Like many other ideas, this seems obvious once it has been put forward. But it needed Richardson to think of it.

One recommendation which is often very sound, when one is approaching a new subject, is to go to the original papers. Those who originate a new way of thought are often very conscious of the difficulties of the subject, and of the limitations of their approach, and set them out clearly. So it is with Richardson. As one reads his papers, one has almost a feeling of sitting with him, chatting with him as he gradually develops his ideas and his techniques, and explores one possibility after another. Beside the traditional Occam's razor, that hypotheses are not to be multiplied beyond necessity, he had a stylistic one, that complications of explanation are only to be brought in when unavoidable. His prose is lucid, and his mathematical methods are as simple and straightforward as are possible, compatible with his assumptions and the facts. From time to time, there are simple but illuminating remarks, such as 'it would appear that the partial removal of a grievance may stimulate efforts for its total abolition'. Some of his findings may surprise the reader. It would astonish the ordinary good-humoured Briton to know that Britain has been easily the most belligerent nation during the past few centuries.

One may wonder how long it will be before Richardson's work and its successors will have an appreciable influence on political matters. He himself tried to bring it to the attention of political and military decision makers, but with little success. I have heard that he felt isolated, with almost no evidence of outside interest in what he had been doing. He first published his ideas in 1919. Around 40 years later, from 1959 onwards, there began to be a steady growth in centres of peace and conflict research. As so often occurs, there was a considerable delay between sowing the seed and the vigorous growth of the plant. In the meantime, new tools have been developed. Surprising though it may be, although life is full of decisions, there seems to be have been no thorough mathematical approach to the problem of how to make decisions until Wald published his ideas in 1950, and their full significance only became clear with the work of Savage in 1954. In 1944 von Neumann and Morgenstern in their book *Theory of Games and Economic Behaviour* tackled systematically, for the first time, the problems of interaction between the decisions of two or more people, which are still not entirely understood. It has also been found that under certain conditions very small changes in circumstances at one moment can result in very large divergences in the future, making prediction hazardous. These new developments would have been of great interest to Richardson, if he had lived to see them.

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Unfortunately, 70 years after Richardson's 1919 essay, there remains a big gap between the discoveries of the workers studying conflict and cooperation and the still largely traditional attitudes and actions of the political and military decision makers. This is not a matter of minor importance; in addition to numerous devastating conventional wars, the world has already several times been uncomfortably near the brink of unintended nuclear war. Recently tension between the superpowers has greatly diminished. But conventional ways of thinking still persist, and the military are reluctant to diminish their armaments, preferring to invent even more devastating ones.

There is a race between the establishment of a more rational social and political order, on the one hand, and a war which would obliterate civilization on the other. But the gap between theory and practice is closing, even if slowly, as is shown by the creation of centres of conflict and peace research in many countries, and the growing interest in such ventures. The re-publication of Richardson's papers may be a small step towards the encouragement of rationality, and eventually a peaceful and prosperous world order which he would have so much desired.