

A Heritage of Science

The Commonwealth of Science. ANZAAS and the Scientific Enterprise in Australasia, 1888–1988. ROY MACLEOD, Ed. Oxford University Press, New York, 1988. xvi, 417 pp. + plates. \$45.

Speaking at the jubilee congress of the Australian and New Zealand Association for the Advancement of Science in 1939, the historian Ernest Scott observed that “the Australia that we know was born in the Scientific Age.” Cook’s first voyage of 1768–1771 was primarily in response to the Royal Society’s request for observations of the transit of Venus across the disk of the sun (in 1769) from a suitable location in the Southern Pacific, and only secondarily a voyage of exploration of the southern Pacific itself. As the editor of the present book emphasizes in his introduction, “No one surrounded by the ubiquity of Cook and Banks and the eponymy of Botany Bay can escape the significance of science in our colonial heritage.” And the welding together of separate state associations to form ANZAAS in 1888—the centenary of which was the occasion for this book—was quite self-consciously recognized by many of the protagonists as a trial run for federation of the separate states themselves (an event finally accomplished in 1901).

With the early history of the country so entwined with scientific issues, and with a sustained tradition of individual excellence in particular areas of science that continues to the present day (Australia sits out in the tail of the distribution of any measure of scientific attainment—such as citations—divided by population size in developed countries), it is odd that science plays so small a part in Australia’s self-image. In his thoughtful introduction and two following chapters, MacLeod addresses this anomaly. The recurring clichés of egalitarianism and mateship, nationalism, and the rights of labor continue to animate and characterize the social history of Australia, despite attacks from Connell and others over the past 20 years. The mythic images of Australian heroes may be discordant with reality (Crocodile Dundee is hardly an appropriate image for what is in fact the most urban society in the world, with more than 85% of the total population living in the capital cities), but they create a mind-set that is uncomfortable

with “the elitist, internationalist and managerial image expected of modern scientists” (p. 2). MacLeod also discusses the various tensions between nationalistic tendencies to construct a culture of science directed to Australian problems and sustained by indigenous institutions, and other tendencies to look for direction and approval from centers in Britain and, to an increasing extent, in the United States and Europe; these tensions have manifested themselves in different ways over the years, but they are no less real today than they were a century ago.

The remainder of the book is divided into two parts, one dealing with the histories of individual disciplines (biology, geology, physics, chemistry, anthropology, and the social sciences) and the other examining the relations between science and society (science and the environment; agriculture and mining; health services; economics and technology).

I would have enjoyed the survey of individual areas more if they had focused on the science itself and how it was shaped by the constraints and opportunities of time and place. But most of the authors have stuck conscientiously to what I imagine were their instructions and given us mainly histories of, for example, Australian physics in relation to ANZAAS. An exception is the chapter “Education, social science and the ‘common weal’” by Turtle, who gives a fascinating account of the interplay between psychology and educational theory and practice, as reflected in the policies of government departments of education. Her description of the beginnings of the institutionalization of education and psychology and its manifestations in child research, anthropometric surveys, IQ testing, and education policies gives full play to the role played by “section J” of ANZAAS, but the emphasis remains squarely on the subject itself, and on the peculiarly Australian reflections of themes originating in Britain and elsewhere.

In my own subject, some of the central figures on the international stage in the middle years of this century were Australian: Andrewartha and Birch’s book on animal ecology, despite a professed disdain for theory (especially Nicholson’s theories about density-dependent regulation), was influential in carrying ecology from its older, natural-historical style into the more analytic

mode of today, and Nicholson’s theoretical ideas and laboratory experiments were central in their time and are still widely cited. Why did this small country, at this time, contribute to ecological science out of all proportion to its size? Were the new ideas partly stimulated by the conspicuous ecological dramas consequent upon deliberate and accidental introductions of Old World species into a very different and long-isolated island flora and fauna? Unfortunately, the “what ANZAAS did next” format of the chapter on the life sciences leaves no room to pursue such questions about Australian science, and the only mention of Andrewartha, Birch, or Nicholson (none of whom were biggies in ANZAAS) is a single reference to Birch in the later chapter dealing with the history of the Society for Social Responsibility in Science in Australia.

Most of the chapters in the section on the interactions of science and technology with society manage to transcend the ANZAAS-history straightjacket, to say interesting things about, for instance, the political economy of technology and science in Australia (Wheelwright and Crough) or the possible future of technology and employment in the “post-industrial society” (Encel). These chapters touch on matters that are central to the future of Australia, much less Australian science. The country is currently wrestling with the transition from being a supplier of primary products (the sheep and wheat I learned about in school with pride) to distant Western powers or, more recently, nearer and newer Asian powers. Whether Australia will emerge as a truly independent nation with industrial and service sectors that are self-sustaining or will become a kind of southern Pacific banana republic is not yet clear. Certainly a commitment to education and to research-based industrial change is needed if the Lucky Country is to keep rolling high numbers.

The social and political forces that militate for and against a favorable outcome for Australia are set out in this book and most clearly in MacLeod’s opening chapters. MacLeod’s thoughts on the tensions between the egalitarian rallying cries of modern democracies and the elitist necessities of science (we do not vote on the inverse-square law) have relevance beyond their Australian setting. In the United States, for instance, a mood of raucous populism has led not merely to cynical political maneuverings over investigations into fraud but to canceling of a survey of Americans’ sexual habits (rates of changing partners and so on) aimed at better understanding of, and more accurate predictions about, the AIDS epidemic. Thus *The Commonwealth of Science*, especially in its opening chapters, addresses

larger issues than just the history of the Australian analogue of AAAS. The subject-by-subject chapters, however, will by and large have a more restricted appeal to those who have an interest in the narrative history of scientific institutions rather than ideas or their changing social contexts.

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Supraterrestrial Enterprises

Race to the Stratosphere. Manned Scientific Ballooning in America. DAVID H. DEVORKIN. Springer-Verlag, New York, 1989. xiv, 406 pp., illus. \$39.50.

Manned ballooning has been associated with science from its origins, as Charles Coulston Gillispie's *The Montgolfier Brothers and the Invention of Aviation* demonstrates. In the volume at hand, David DeVorkin has examined this association in the context of the manned stratospheric balloon flights of the 1930s. By a comparison with Project Apollo, he has illuminated patterns of poli-

tics and patronage characteristic of such scientific spectacles.

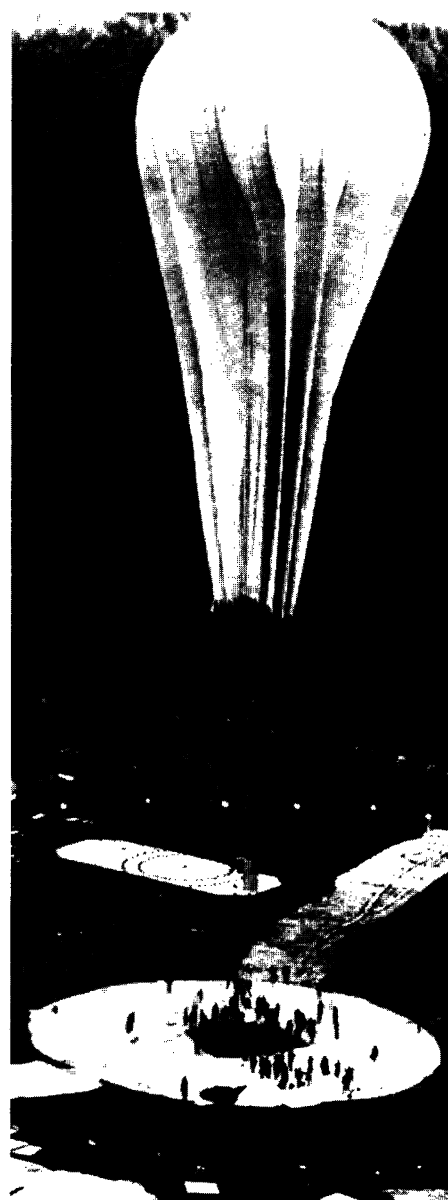
Auguste Piccard's penetration of the stratosphere in manned balloons in 1931 and 1932 stimulated Soviet and American emulation in the name of science and national prestige. DeVorkin traces in detail the American side of the story, which he calls a "synergistic social conditioning process [in which] science inevitably became a marketing tool." Science, however, got short shrift in the process, as the exigencies of manned flight, balloon technology, and patronage crowded out experiment.

As DeVorkin illustrates in the case of studies of cosmic rays, one of the more glamorous and adventurous fields of physics in the 1930s, manned balloon expeditions promised much but delivered less than unmanned balloon-sondes, which paid greater scientific dividends despite their comparative lack of appeal to patrons eager to shatter manned-flight altitude records as well as to acquire new scientific knowledge.

The adventures and misadventures of Auguste Piccard's American emulators, who included his brother Jean and Army Air Corps Captain Albert W. Stevens, are portrayed against a background of patronage



Jean Piccard and the gondola under construction for ascent into the stratosphere at Chicago's 1933 Century of Progress exposition. Backed by the National Research Council and utilizing materials contributed by the Dow Chemical, Goodyear, and Union Carbide corporations, the expedition "was to be a showdown between two American titans of physics," Arthur Compton and Robert Millikan, who held divergent views about the origin of cosmic rays. The first flight of the balloon ended unintentionally in a nearby railroad yard, where the balloon was torn to bits by treasure hunters. After a second, more successful flight both Compton, who had been an enthusiast for the venture, and Millikan, a skeptic, "expressed some satisfaction with their results" but turned their attention to other enterprises, while Piccard, who had been excluded from the flight, characterized Compton as a "swindler." [From *Race to the Stratosphere*; Dow Chemical Company]



Preparation for the launch of the first Explorer balloon near Rapid City, South Dakota, 28 July 1934. The two Explorer flights resulted from an initiative by Army Captain Albert W. Stevens, an aerial reconnaissance specialist. Stevens solicited and obtained financial support from the National Geographic Society, which needed to provide "well-crafted and visually rich accounts of exploration and discovery [for] its vast and hungry market" while maintaining "the dignified vestiges of its origins as a patron of . . . research." He also sought scientific participation from, among others, Robert Millikan, whose concerns included not only cosmic ray research but strengthening of the Weather Bureau, and Lyman Briggs of the National Bureau of Standards, the status of which was in jeopardy owing to the Depression. The scientific agenda included cosmic-ray experiments and studies of the upper atmosphere and the solar ultraviolet spectrum. The Explorer flights received much publicity, but "the scientific return, although gratifying, did not compare with" that of contemporaneous unmanned flights. Moreover, the altitude reached, 24 kilometers, "was the practical limit set by [available] technology." [From *Race to the Stratosphere*; National Geographic Society]