weapons are at hand. Environmental sanitation should be used wherever it is feasible, and coupled with health education. Immunization too, has its place. Smallpox was eliminated by a vaccination campaign carried out with military determination, and immunization markedly reduced the incidence of poliomyelitis in industrialized countries. Chemoprophylaxis and chemotherapy are also useful. They greatly reduced the prevalence of yaws and have protected millions of people and domestic animals from parasites. As in the case of chemoprophylaxis against filariasis in

Samoa, quoted by Desowitz, knowledge of the social organization of the people helped.

The essays of Desowitz provoke these and many other thoughts. They are recommended to students of medicine, public health and biology, to administrators of international health programmes and to those who enjoy a good read about science and the world in which we live. □

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greatest of all archaeological excavators General Pitt Rivers". It was to those largely forgotten publications from the end of the last century that Wheeler turned, and with their aid developed systems of recording, with emphasis upon the interpretation and drawing of stratigraphic sections, which transformed excavation in Britain from a pastime into a discipline.

Wheeler's most personal contribution was an unfailing grasp of what he called the Tactics and Strategy of excavation. Those same qualities which produced a first-class soldier (he rose to the rank of Brigadier in the Second World War and fought at El Alamein) and highly effective administrator (Director General of the Archaeological Survey of India) made him a masterly field worker, with an unrivalled perception of the real objectives of the work in hand and of the most appropriate measures for their achievement. Indeed, it could be argued that with Wheeler excavation became to archaeology what experiment is to the physical sciences — the opportunity through clear thinking and careful planning to try out new ideas and to test old ones. Of course British archaeology overseas had other pioneers of field method besides Wheeler — Sir Flinders Petrie, as Wheeler himself acknowledged, or Sir Leonard Woolley or Sir Max Mallowan. But Wheeler was the unflagging advocate of sound field method as the essential basis of further work, and his teaching in the years after the First World War promoted in Britain an awareness of stratigraphic principles which persists today and is ultimately sounder and more productive than the metrical thoroughness of the German school or the statistical enthusiasm of the American.

Jacquetta Hawkes does not perhaps evaluate as highly as she might this particular achievement, although she describes Wheeler's individual excavations fully and well. It deserves to be set in a wider context. For it would be quite possible to see Wheeler's keen sense of problem in fieldwork as anticipating in some respects the deliberately problem-orientated approaches of the "New Archaeology", which grew up in the last decade of Wheeler's life. It is not the inclination of either approach to set great store on facts just for their own sake. Both see the aim of fieldwork as the verification or testing of hypotheses through the gathering of fresh material, and recognize that it is ideas and problems which should determine the excavation strategy. This clear sense of priorities makes *Archaeology from the Earth* an inspiring introduction to fieldwork; still the best introduction, in my view, although many new techniques have been introduced over the past 30 years. And while the author rightly stresses Wheeler's ability to imagine and bring to life the people behind the archaeological record, his encouragement of the technical specialisms of archaeological science — whether conservation or radiocarbon

The making of an archaeologist

Colin Renfrew

Mortimer Wheeler: Adventurer in Archaeology. By Jacquetta Hawkes. Pp.416. ISBN 0-297-78056-5. (Weidenfeld & Nicolson: 1982.) £10.95.

"TURNING out of Pall Mall, I was transfixed by the steely gaze of Mr. Augustus John. 'Hullo, Rikki,' he said; 'still digging?'. 'Hullo, Augustus,' I replied; 'still sketching?'. With these words Sir Mortimer Wheeler (Rik to his friends) began *Still Digging*, his vivacious autobiography, published by Michael Joseph in 1955. Its subtitle, "Adventures in Archaeology", is recalled in that of the biography of Jacquetta Hawkes, now published six years after his death.

There is no more equivocal gift to the biographer than a really good autobiography. The freshness and energy of *Still Digging* make it lively reading today, and its very excellence offers Jacquetta Hawkes something of a challenge, to which she has risen conscientiously and above all sympathetically, making considerable effort to get behind the public persona and reveal the human being.

It is indeed for that persona that Wheeler is still most widely remembered. For those too young to have been viewers, it is difficult to convey the national impact of his charismatic role, back in the 1950s, in that remarkable television programme *Animal, Vegetable, Mineral*. Both Wheeler and the question master Glyn Daniel became household names — they were elected "TV Personality of the Year" in 1954 and 1955 respectively. This was *haute vulgarisation*, in Glyn Daniel's term, popularization at its best and with a serious purpose. It made archaeology both better known and more widely understood, laying the foundation

in Britain not only for more substantial subsequent television coverage (the *Buried Treasure* series, and then *Chronicle*) but also, it could be argued, for the rapid growth over the past 20 years of archaeology as a degree subject which is numerically strong in a number of universities. As the author stresses here, Wheeler was, in his early excavating days in the 1920s, a pioneer of what today might be called public relations. But of course it was very much more than this: Wheeler saw his discoveries in human, personal terms and he never lost the gift of catching the imagination of the non-specialist. He saw, too, that if the ultimate aim of archaeology is to inform us about the human past, it is the duty of the academic not only to research but to communicate. As he wrote in his best book, *Archaeology from the Earth* (Oxford University Press, 1954): "In a simple, direct sense, archaeology is a science that must be lived, must be 'seasoned with humanity'. Dead archaeology is the driest dust that blows".

In his later years, as Secretary of the British Academy, Wheeler made substantial contributions to the development of archaeology in Britain and indeed to the standing of the humanities in general. The British Academy, a much more recent creation than the Royal Society, has even now not quite achieved the active leadership within its own field which its elder sister has among the sciences. That the two are nonetheless at least comparable owes much to Wheeler's leadership during his tenure as Secretary from 1949 to 1968, as Jacquetta Hawkes describes most effectively.

Undoubtedly, however, Wheeler's main claim to lasting fame rests with his work as a pioneer of archaeological field methods. His incisive and systematic approach to the problems of excavation was not entirely new — as he generously acknowledged in the preface to *Archaeology from the Earth*, many of the methods and principles which he used were derived "from those of the

● The third edition of *Digging up Bones* by D.R. Brothwell, published by the British Museum (Natural History) and Oxford University Press, appeared earlier this year. Price in paperback is £8.95.

dating — and his recognition of their place within a more disciplined approach are at least as important.

The author's emphasis is perhaps a more personal one, although she copes well and expertly (being an archaeologist herself) with Wheeler's excavations and research. She is concerned to see Wheeler as a person, dealing as much with the private life (and many loves) as with the public achievement. She begins: "Mortimer Wheeler will rise from these pages as a Hero

IMAGE
UNAVAILABLE
FOR
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Mortimer Wheeler — creator of a discipline.

figure. Of that I feel sure even as I write the very first words of my book". Certainly the remarkably varied career — yet single-minded in its devotion to archaeology — is admirably told. Her earlier chapters and description of the war years inevitably owe a great deal to the autobiography. But surprisingly, perhaps, it is the portrait of Rik Wheeler in his old age, as he is remembered by many today (including myself) which seems the most compelling, indeed moving. Those same qualities of panache, of awareness of the effect of the moment, which may have raised eyebrows (and indeed aroused some enmities) earlier, and which caught the attention of millions of viewers in the 1950s, made him the most splendidly vivacious good company in his seventies and eighties, and a friend and encouragement to many half a century younger than he. They come over well in this affectionate portrait.

Wheeler came to archaeology with a military briskness of mind which helped him to make the subject, in the scientific as well as the organizational meaning of the term, a discipline. Perhaps just as important, he brought with him a zest and a gusto which made it, in a real and un-trivial sense, entertaining. □

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Grounds for doubting the pessimists

P. D. Henderson

The Ultimate Resource. By Julian L. Simon. Pp.412. US ISBN 0-691-09389-X; UK ISBN 0-85520-440-0. (Princeton University Press/Martin Robertson:1981.) \$14.50, £9.50.

WRITING in 1933, Keynes said of Malthus's *Essay on the Principle of Population* that "it attracted immediate attention, and the warfare of pamphlets instantly commenced . . . which for 135 years has never ceased". Hostilities have continued during the half-century since Keynes wrote, and Julian Simon's new 400-page volume is a reminder that not only pamphlets are involved. The issues that Malthus raised so provocatively in 1798 are still live, unsettled and highly contentious.

The main issues are two: first, the extent to which it is possible for human societies to achieve material progress; and second, the effects of population changes on their prospects of doing so. In relation to these, it is still possible to think of the main battleline as drawn between Malthusians and anti-Malthusians, though as in other spheres of conflict there are wide differences of view within each of the two factions.

Following in the steps of the master, modern Malthusians are pessimistic on both issues, or at least inclined to emphasize dangers and limitations rather than opportunities. As to material progress, the possibilities for growth in output are seen as restricted in any given society, and for the human race as a whole, because of constraints on the availability of land or natural resources. From this arises the threat of overpopulation. It is admitted that population growth will create a larger labour force — more hands, as well as more mouths — and thus tend to raise the level of potential output; but given the constraints imposed by nature, not much can be expected from this positive effect. Thus higher rates of population growth will often be a drag on material progress. Conversely, lower population growth may hold the key to sustainable prosperity.

By contrast, anti-Malthusians take a more sanguine view. They are sceptical about limits to growth, while at the same time many of them stress the positive effects of population increase on a society's capacity to produce goods and services. These are the two main themes of Simon's interesting and readable book. The author pours scorn on current pessimism and prophecies of doom — despite one or two favourable references to Malthus himself — and the book may be described as a scholarly polemic.

Most of the argument is directed to the two issues identified above. Part One ("Towards Our Beautiful Resource Future") considers the possible scarcity of natural resources, and deals successively with minerals, food supplies, land, energy,

environmental pollution and conservation. On all of these Simon points out, with some well chosen and carefully presented statistics, that the evidence of recent decades is more encouraging than is generally realized. Thus minerals, food products and energy supplies have over the past century become less costly in relation to wages; world food supplies have grown more rapidly than population; while the expectation of life, which he regards as the best single indicator of pollution, has risen all over the world. In Simon's judgement, all these favourable trends are likely to be maintained into the indefinite future: in the case of the cost of raw materials, he makes an engaging offer to back his assessment with money, by accepting bets from readers who take a different view. He thus rejects completely the notion that economic growth is constrained by the availability or cost of resources.

Part Two is mainly concerned with the effects of population growth on average income per head. In most of the economic-demographic models that have been developed over the past 20 to 30 years, these effects are unfavourable, largely because it is assumed that with more children in the average family the rate of saving and capital accumulation will be lower, and that a higher proportion of capital investment will go towards duplication of facilities (more schools, for example), rather than increasing capital per head. As against this, Simon makes three main points. First, larger families may increase the willingness of individuals to save and invest. Second, there are likely to be significant gains from economies of scale, since total output will be higher. Third and most important, output per head will benefit from "the contribution of additional people to our stock of useful knowledge" (p.196): a larger population means not only more mouths and hands, but also more brains. His broad conclusion, which he argues is consistent with the facts of economic history, is that moderate as distinct from zero rates of population growth are likely to have favourable effects on income per head, at any rate in the longer run, in rich and poor countries alike.

In Part Three ("Beyond the Data") the argument is taken further than the issue of material progress alone, and other values are brought in. Simon holds that enabling an extra person to live and enjoy life has value in itself, and that the well-being of a society has to be defined with reference not just to the average standard of living of its members, but to their total numbers also. He makes a sharp attack on the values and assumptions of anti-natalist bodies, such as Planned Parenthood, and argues that there is no justification for trying to reduce rates of population growth, as distinct