

(EMP) effect "the havoc factor". The effect, generated by a nuclear explosion, damages communication, power supply and electronic devices. The West is more vulnerable to EMP than the Soviet Union. However the Soviets have studied it more extensively. Wade points out that American lack of EMP defence is destabilizing, but both books focus on how, in wartime, damages would reinforce each other. The complementary fact — that civil defence, storage of food and medical supplies, and improvement of dispersed medical facilities also would reinforce each other — is not mentioned.

One symposium paper expresses surprise at "an unusual willingness of participants in the symposium to accept the offered predictive results and speculations at face value", and suggests that "we as scientists will ultimately serve society best by examining every aspect of this issue more critically".

Indeed the horrors of nuclear war are sufficient to make peace of utmost importance. Ignoring defence or any other means to deter war is an error. To insist upon a single and final answer to a complex political problem seems particularly tragic.

In July 1953, the *Bulletin of Atomic Scientists* published an article by J. Robert Oppenheimer which includes this paragraph:

[Defensive] measures ... will mean, first of all, some delay in the imminence of the threat. They will mean a disincentive, a defensive deterrent, to the Soviet Union. They will mean that the time when the Soviet Union can be confident of destroying the productive power of America will be somewhat further off — very

much further off than if we did nothing. They will mean, even to our allies, who are much more exposed and probably cannot be well defended, that the continued existence of a real and strong America will be a solid certainty which should discourage the outbreak of war.

Deterrence has emphasized retaliation in an unbalanced manner. Defence can never provide complete protection, but it could save lives, moderate suffering and, most important of all, it could contribute to deterrence. It is regrettable that the possibility of defence was so pre-emptorily dismissed by the conference.

Both books consider the effects of nuclear war in absolute terms. Neither the practice of science nor the practice of medicine can justify the neglect of partial solutions. If we succeed in stabilizing peace, it will be almost certainly through a series of partial successes in which active defence, passive defence and the preparedness to give help in all possible ways will play important parts in the process.

*The Medical Implications of Nuclear War* raises the spectre of nuclear war as the final apocalypse. Wade's book does not. The reader who has never considered the terrible effects of nuclear war can find some useful information in *World Beyond Healing*. It is much more difficult to recommend *Medical Implications*. It is not a useful guide for those who seek ways to prevent war or for those who want to contribute to healing and human well-being should such a catastrophe occur. □

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## Out of Africa

Derek Ager

**Neogene Paleontology and Geology of Sahabi.** Edited by Noel T. Boaz *et al.* Alan R. Liss, New York/Wiley, Chichester, UK: 1987. Pp. 401. \$175, £159.65.

MY FIRST reaction to this book was "where is Sahabi?". Not minding making a fool of myself is one of the advantages I have noticed of advancing years, and I asked six colleagues. Fortunately they didn't know either, though I had the least excuse as I worked not far from there. It turns out that Sahabi is in eastern Libya, and we might have been told so in the title.

Question two was "Was it worth producing such an expensive book about the palaeontology and geology of the area?". The answer to that is definitely "yes". Sahabi has a remarkable record of early Pliocene vertebrates, and a great deal of expertise has here been brought to bear on it by a team of American, Belgian, German, French and Libyan specialists. The book is a report of the first four years of an investigation of one site south of Benghazi, where Italian soldiers first found bones in the late 1920s, and is a detailed and well-illustrated account of an almost unique fauna.

The preservation of vertebrate fossils usually depends on the habitats of the animals concerned. Thus by far the most abundant vertebrate fossils are of fish, crocodiles, turtles and hippopotami. This is because these animals are simply asking to be fossilized in the mud of which they are so fond. There is no way that horses and elephants, lions and snakes will be preserved except in very special sites such as fissures and caves. At Sahabi, however, a great variety of land, freshwater and marine forms are found in the channels at the mouth of a great river system.

The fauna has some Eurasian elements and, surprisingly, some connections with that of Central and South America, but generally it is African in character. The link between Europe and North Africa was probably cut by the salty desert of Late Miocene times, and the Sahabi fauna is largely a relict descended from what was there before. Remarkably, almost everything is present: fish, snakes, crocodiles, turtles, monkeys, whales, carnivores, "elephants", "sea-cows", "horses", "giraffes" and "cattle" (using these terms mostly in a very wide sense). There are also some forms which are rarely preserved, such as water-birds and, perhaps most interestingly, hominids.

Also included in the book is an account of the flora and microfossils of the area, together with a summary of the sedimentology and regional geology, and con-



"Ejecting an intruder" — the illustration comes from Alfred Russel Wallace's *The Malay Archipelago*, an account of his travels in the region and of its biology. The book was first published in 1869, and has recently been re-issued by Oxford University Press with an introduction by John Bastin. Price is £27.50, \$35.