NEWS AND VIEWS

Dawn in the Rudolf Basin

from a Correspondent

Late Cenozoic fossils were first discovered in the Lake Rudolf Basin in 1902, when a selection of Pliocene forms were collected in the Omo Valley of south-western Ethiopa. Systematic work by C. Arambourg in 1933 established a rudimentary geologic sequence here and published a massive palaeontological inventory. Detailed studies began in 1966, with the encouragement of Emperor Haile Selassie, leading to an international Omo Research Expedition in 1968, initially based on the University of Chicago, the Musée de l'Homme and the National Museums of Kenya. The American team was supported by the National Science Foundation (Washington) as well as the Wenner-Gren Foundation and led by F. C. Howell (Berkeley); after exploring the Omo region in 1966-67, intensive work was continued north of Shungura in 1968-73. The Paris group, supported by the Centre National de la Récherche Scientifique and directed by Arambourg and, after his death at 84, by Y. Coppens (Musée de l'Homme), worked south of Sungura in 1967-73. The Nairobi group, led by R. E. F. Leakey (National Museums of Kenya), spent one season in the Omo and then shifted activity to the eastern margins of Lake Rudolf, in Kenya. With support of the National Geographic Society and National Science Foundation, and ultimately including workers from Berkeley, Harvard, Iowa State University, Dartmouth, Birkbeck College, and Cambridge, the East Rudolf Expedition operated annually since 1968. Altogether, over 1.5 million dollars have already been expended in what is unquestionably the most comprehensive palaeo-anthropological enterprise to date.

Despite the usual preliminary reports, published information has not always kept pace with the successive field seasons. Furthermore, although relationships between the groups have been remarkably cordial over the years, scientific interchange and comparison of results have been less satisfactory. Consequently, with so much already invested, it is commendable that the Wenner-Gren Foundation and National Geographic Society deemed it desirable to sponsor an unprecedented 'workshop' on 'Stratigraphy, Palaeontology and Evolution in the Lake Rudolf Basin'. This was organised by Leakey, Coppens, G. L. Isaac (Berkeley), and Howell, and was specifically designed to bring the key scientists together. Some 38 participants assembled at the National Museum, Nairobi, from September 8 to 20, 1973, interjecting a 4-day field trip to East Rudolf and an additional day in the Shungura area of the Omo. Four days of discussion, based on preprinted and circulated papers, were focused on (a) stratigraphy, sedimentology, and geochronology; (b) evolutionary biology of the key non-hominid vertebrate taxa; (c) hominid morphology and evolution; and (d) hominid activities and ecology. Following the excursions, a final day of general discussion concluded the conference. The wealth of information presented in papers and discussion defies adequate summation, and it is fortunate that publication of revised papers is planned, and negotiations with the University of Chicago Press have begun. Several key issues emerged during the discussion and deserve attention.

Interpretation of the geology proved to be most controversial. The East Rudolf sequence, established primarily by C. F. Vondra and B. E. Bowen (Iowa State University), includes some 325 m of sediment deposited along two stream systems on the north-eastern margins of Lake Rudolf. Radiometrically (F. J. Fitch, Birkbeck College; J. A. Miller (Cambridge) these beds range in age from 4.5 to 1.2 m.y. In the field the East Rudolf sediments proved to be carefully interpreted by standard sedimentological criteria, with reference to contemporary depositional environments. Excellent taphonomic studies by A. K. Behrensmeyer (Harvard) have also elucidated the nature of diverse fossil assemblages, although excavation of several of the key hominid sites was poorly coordinated with either sedimentological or taphonomic work. The Omo Valley sequence is represented both by 230 m of sediment (Mursi, Nkalabong Formations) along the north-western margins of the basin, dating from greater than 4.4 m.y. to less than 3.9 m.y. B.P. (K. W. Butzer, Chicago), and a further 700 m (Shungura Formation) in the Omo type area, dating from greater than 3.7 m.y. to 1.2 m.y. B.P. (J. de Heinzelin, Gent; F. H. Brown, Utah; J. Chavaillon, C.N.R.S., Paris). The Omo sequence is related to a distinct sub-basin of Rudolf, namely an early Omo River or its key local tributaries. Interpretation of the Mursi and Nkalabong beds is based on comprehensive particle-size studies, in relation to the modern Omo Delta, and basic methodological comparability was evident with East Rudolf. The Shungura Formation, although stratigraphically subdivided and mapped in meticulous detail, lacks sedimentological study and raised controversy in the field; in particular, many visiting geologists felt that the deposits were generally related to lower energy levels than envisaged by De Heinzelin, with the lower stratigraphic units possibly delta fringe, interdistributary or fluvio-lacustrine (rather than riverine fluvial) and the central units delta plain (rather than floodplain). Not all of the many palaeosols recognised with the Shungura (P. Haesaerts, Gent) were convincing in the field, and relevant laboratory analyses have only just begun. Relative stratigraphic correlations between the Omo and East Rudolf are impeded by these methodological problems, and mineralogy of the widespread volcanic tuffs (I. Findlater, Birkbeck College; Bowen; Brown) has so far proved of limited help only.

The faunal successions of Omo and East Rudolf do not match directly with the dates presently assigned to the strata. The elephants, suines, and certain bovids (V. J. Maglio, Princeton; H. B. S. Cooke, Dalhousie; A. W. Gentry, B.M.N.H.; J. M. Harris, Nairobi) of the Omo (and to some extent, of other East African sites) suggest that if the Omo dates are right, the East Rudolf radiometric dates are, relatively speaking, several hundred thousand years 'too old'. However, these East Rudolf $^{40}Ar/^{39}Ar$ determinations are age spectra datings, the best of their kind,

and find support from the palaeomagnetic work (A. Brock, Nairobi). Thus, by comparison, the 'standard' K/Ar dates of the Omo Valley may possibly be systematically too young. Since palaeomagnetic work has only begun in the Omo, and since no cross-dating has been attempted, the issue could not be resolved. Also, alternative explanations of geographically isolated macro-environments or different ecological adaptations in contrasting settings could not be adequately explored due to the non-comparability of sedimentological interpretation between the Shungura type area and East Rudolf.

Fossil hominids played a relatively subdued role at the conference. Explanatory discussion of the cranial and dental morphologies was brief, and interpretation cautious. Many views expressed are already published, except for papers on the East Rudolf hominids by B. A. Wood (Middlesex Hospital Medical School) and M. H. Day (St Thomas's Hospital Medical School). These two authors expressed divergent views on the possibilities of statistical differentiation of post-cranial materials into distinct lineages. Particularly useful was stratigraphic classification of East Rudolf and Omo hominid materials (Wood, Howell). 'Non-robust' cranial materials at East Rudolf begin with specimen 1470 near 3.0 m.y. B.P. and the outstanding KBS archaeological site (Isaac, Behrensmeyer) at 2.6 m.y. B.P.; robust forms span a range from greater than 2.6 m.y. to 1.2 m.y. B.P. 'Non-robust' teeth in the Omo first appear about 3.5 m.y. B.P., but verified archaeological materials (Chavaillon; H. V. Merrick, Berkeley) are no older than 2.0 m.y. B.P.; robust forms here primarily date 3-2 m.y.

Altogether this 'workshop' marks a milestone in palaeoanthropology, that reveals the strengths and weaknesses of the art. Much has been gained over the traditional study of fossils in isolation, by working in multidisciplinary groups whose broad range of results are increasingly effective for integrated interpretations. Nonetheless, multidisciplinary teams do not by themselves ensure a successful interdisciplinary approach, and the equally vital, contributing earth scientists and biologists commonly have lower priorities in terms of support and in decisions affecting expedition strategy. It is, for example, significant that the research priorities now recommended by the workshop consisted of a more comprehensive earth science programme (geophysical investigations, regional mapping, sedimentology, and palaeopedology) and development of limnological and palynological research in the area. This underscores the disappointing reality that all the effort expended in the Rudolf Basin has barely begun to demonstrate micro-environmental contexts characteristic of the still elusive hominid lineages suggested by the fossil remains.

K.W.B.

The Southern African Wildlife Management Association Symposium

from a Correspondent

The Southern African Wildlife Managment Association made history this June (4 to 8, at the University of South Africa) when it convened the first large-scale international Wildlife Conservation and Utilisation Symposium ever to be held in Southern Africa. Attended by over 600 delegates drawn from America, Britain, the Continent and several parts of Africa, this convention was the direct outcome of the previous year's course on Wildlife Capture Techniques and Practical Aspects of Wildlife Husbandry which could only accommodate half the applicants. It is evident that in this era of rapid scientific advance the wildlife field is, at last, coming into its own on the scientific level. It is now a recognised fact that the conservation of wild animal species depends on efficient scientific wildlife research programmes encompassing every aspect of this much neglected field of endeavour.

Dr R. F. Dasmann, senior ecologist of the IUCN at Morges, Switzerland, delivered the keynote address which remained a central theme throughout the week:

"The 1970s are a decade of decision for the future of the human environment. For many areas of the world, and in particular those which still support a representative native flora and fauna, this may be the last decade in which a decision can be made to ensure their preservation in a natural state. The rate of change is rapid and it will continue to accelerate throughout the decade. The last remaining wilderness regions will soon be brought within the complete domination of technological civilisation unless some unpredictable reversal of trends takes place, and unless a deliberate effort is made during the seventies to set aside large areas of the world's ecosystems, the chance to do so will not come again".

This sobering aspect was brought home even more harshly after the conference opener, Mr S. P. Botha, Minister of Water Affairs and Forestry, pointed out that a mere three per cent of South Africa is preserved as natural parks and game reserves. Dr Dasmann presented many wide-ranging facts and figures regarding conservation utilisation and the individuals involved in the implementation of policies and scientific research techniques. In criticism of the latter, he stated that some "... wildlife biologists developed narrowly scientific and sometimes callous views of the animals that they seek to manage".

In five days the most astounding range of material appertaining to wildlife was amply covered by 95 speakers. Dr E. A. Zaloumis and Mr Peter Milstein spoke of the conservation of wetland habitats. The country's potential in regard to waterfowl areas was enormous, but they said that state authorities must assume the major role in conserving prime wetland areas in a planned system for posterity.

Mr Rocco Knobel, head of the National Parks Board, raised the point that study of people visiting game sanctuaries was essential if what is being protected is to survive. Education, he suggested, is the answer, an issue highlighted again and again during the week.

So also was game ranching and the difficulties imposed by nature conservation ordinances on ranchers who were battling to establish balanced wildstocks. Advice for this growing field was sought and not often available. Relevant government departments should review the situation and create a vital advisory service to serve those owners of private nature reserves and game farms who wish to conduct their concerns in a balanced, scientific manner.

A multitude of varying subjects, from the status of the tsetsefly in relation to game conservation and utilisation (Dr F. F. Kolbe) to lion predation in the Kalahari (Professor F. C. Eloff), wildlife capture techniques (J. H. Oelofse), oceanographic research (Dr A. E. F. Heydorn), fur seal-management, lanner falcon research and management were brough into focus and discussed in the all too short periods set aside after formal presentation periods ended.

Professor H. J. van der Schijff (Pretoria University) expounded on the food value of wild trees for wild animals, followed by an exposition on wild plants by J. K.