# OLDUVAI GORGE

## VOLUME 3

Aerial view of Olduvai Gorge

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## EXCAVATIONS IN BEDS I AND II, 1960–1963

BY

M. D. LEAKEY

WITH A FOREWORD BY

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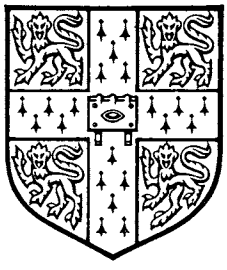

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# OLDUVAI

*For every day there was something new; small things most of them, but always of surpassing interest.*

– A. TINDELL HOPWOOD

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# Introductory Note to the 50th Anniversary of the Discovery of 'Zinjanthropus'

The Olduvai Gorge in the Republic of Tanzania came to the attention of the world shortly after my mother Mary discovered the 'Zinjanthropus boisei' skull on July 17th 1959. The field of African prehistory, and in particular the study of human evolution, has changed and developed dramatically over the past 50 years. I am particularly pleased that Cambridge University Press have decided to republish the 5 monographs that comprehensively cover the many scientific studies that have been undertaken on the Olduvai material collected by my parents, Louis and Mary, working with a number of colleagues. As the Golden Anniversary of the discovery approaches, it is timely to reflect on the importance of that find.

I was lucky to arrive at Olduvai two days after the discovery and I well recall the excitement of the occasion. My parents were operating on a very tight budget and the field season was short. Fortunately, on hand was world-renowned photographer Des Bartlett who, aided by his wife Jen, fully recorded on film the first few days of excavations and reassembly of bone fragments back in camp. As pieces were glued back together, and the shape of the skull and its morphology became clear, my parents showed uncharacteristic and unrestrained emotion! At the time, ages for fossils were wild guesses and radiometric dating had not been done anywhere in Africa. The best, guessed age for Zinj was a little more than 500,000 years. Some months later, a real Potassium/Argon date was obtained by Jack Evenden and Garniss Curtis, and the 1,750,000 age was announced. This ignited huge excitement worldwide and for the first time my father was able to raise financial support for extended field work at Olduvai. Everything changed. The unqualified enthusiasm and support of the National Geographic Society from 1960 onwards had a major impact on the later work at Olduvai, and indeed on the growing international interest of Africa as the cradle of humanity.

Since those first exciting years at Olduvai, the investigation of human origins has gone forward and extended to many other sites in Africa. The age of hominins has been taken back to beyond five million years and the collected fossils and lithic records are now numerous. International multi-disciplinary teams are working in many parts of the world and, with the exception of a few fundamentalist 'flat earth' types, the acceptance of the fossil record of our past is widely accepted. Much of this has come about because of the initial Olduvai finds.

The pioneering work at Olduvai was the launch of this fantastic 50-year period when we as a species have come to realize and appreciate our common evolutionary past. Olduvai, conserved and protected by the Republic of Tanzania, remains as a landmark in the epic story of humanity, and these monographs are a wonderful testimony to that landmark.

Richard Leakey, FRS

# FOREWORD

J. DESMOND CLARK, C.B.E., F.B.A.

This is the book that archaeologists and anthropologists the world over have been waiting for—and they will not be disappointed. Here, exactly set out, is the description of the cultural record contained within the lower half of the sequence at Olduvai Gorge—that unique result of the Rift Valley faulting, cut through the game-covered grasslands of the Serengeti Plains in northern Tanzania. Nowhere else in the world have such outstandingly significant finds been made as those that have come from these 350 feet of stratified lacustrine and volcanic sediments. The land surfaces they contain have preserved some of the richest assemblages of fossil fauna from the African continent and some of the most exciting evidence of the activities of early man that has contributed immensely to improved understanding of our own human origins and the evolving record of inventive ability and manual skills that are the sole prerogative of man.

The concentrations of tools, food waste and other indications of hominid activity now being uncovered on the buried surfaces of the occupation sites of Olduvai form the very basis for understanding the way of life and capabilities of the hominids, once we are able to interpret the evidence correctly. And, as if this *embarras de richesse* were not sufficient, the list of finds of the hominids themselves is unique in the number, biological variability and range of time they cover.

The knowledge of these we possess today we owe to Louis and Mary Leakey and others associated with them in their systematic exploration of the Gorge. The thoroughness and the perseverance over many years with which this investigation has been carried out has resulted in the discovery of no less than seventy-two archaeological sites and has rightly earned for the Leakeys the admiration and thanks of scientists and laymen alike. Indeed, there can be very few instances where the dedicated research of some thirty-nine years has been so spectacularly rewarded.

Up to 1960 most of the work carried out at Olduvai was necessarily on a small scale, but in that year, and subsequently, the National Geographic Society provided financial support of an order that gave the Leakeys the opportunity for the larger, more intensive operations that they had always hoped for and which have now been so amply justified.

Some of these specialist results have already appeared in the first two of the new series of volumes devoted to Olduvai which, when complete, will ensure that this is—and rightly—one of the best documented of any of the localities where early man has been found. The present volume, the third in the series, is by Mary Leakey and describes the cultural remains contained within Beds I and II of the sequence and shows the relationship of these to the various human fossils.

I have had the privilege of knowing Mary Leakey and her work for twenty-nine years and it gives me very great satisfaction to pay tribute here to her fine record of meticulous research and reporting. Her earlier excavations at the 'Neolithic' sites of Hyrax Hill and Njoro River Cave set a standard for Africa that has never been surpassed and she has applied these same methods, working backward in time, at sites of Lower Palaeolithic age and so at Olduvai. In doing so she pioneered a new dimension in Palaeolithic research, making possible the study of human behaviour from the distributed remains on *living floors* of this remote period at a time when it was generally believed that such occupation sites had almost all been destroyed by natural agencies.

Today such methods are *de rigueur* for all investigations of Palaeolithic living sites, but in the

1940s when Mary Leakey was digging Olorgesailie and Kariandusi, they were unheard of, and even the very existence of such sites was unsuspected. In the hard, compacted and consolidated sediments of the East African Rift, the uncovering of a living horizon and the fossils upon it is accomplished only by prolonged patience and most careful and tedious work with the smallest and most delicate of tools. When there is added to this the glaring, shadeless heat of a summer's day at Olduvai, it is possible to appreciate just a little of what we owe to Mary Leakey and her team of skilled and dedicated assistants.

Although the stone artefacts from the bottom of the Olduvai sequence are not the oldest known, they provide the only complete and undisturbed evidence of the range of tool forms in use and the kinds of occupation sites with which they are associated from about two million years ago, through the earlier part of the Middle Pleistocene. The sequence is all the more impressive since it is securely placed both in relation to the geological and palaeo-geographical evidence obtained by Dr Richard L. Hay, who has been able to correlate the stratigraphy at the main and side gorges, but also within the chronological framework established by the potassium/argon method of radiometric dating. Indeed, the potassium/argon programme for Bed I is 'one of the most comprehensive ever undertaken for a single stratigraphic unit' and now establishes the rate of human biological and cultural change in the earlier Pleistocene.

The Oldowan Industry has for many become identified with the manufacture of 'pebble choppers', so that the record of forms from the excavations described in this volume will come as a revelation of the greatest significance for taxonomic studies. Here are artefacts that conventional usage associates typologically with much later times (the late Palaeolithic or even later)—diminutive scraper forms, awls, burins (even on truncations), *outils écaillés*, and a grooved and pecked cobble.

The slow but growing complexity of the Oldowan tool-kits and the sudden appearance of the early Acheulian is superbly documented by records of excavations carried out over a period of two and a half years at some ten occupation sites, two kill sites, twenty-seven sites where the material is diffused through clays or tuffs and three sites associated with stream channels.

The precise meaning behind the presence in the middle of Bed II of two parallel-evolving traditions—the Acheulian and the Developed Oldowan—is, perhaps, one of the most important of the many problems facing students of the Lower Palaeolithic today and more than one explanation is possible for the results of the work so far carried out at Olduvai. We may hope that the discovery of more culturally associated hominid fossils at the Gorge will show whether the primary cause of this was due to biological differences or cultural behaviour.

Besides the stone artefacts a number of tools of bone and ivory showing evidence of percussion flaking and usage have also been identified. A study of the chipping on the utilised stone flakes and fragments provides, in addition, fascinating evidence for several different patterns of wear due to use. The book gives the complete composition of all the archaeological horizons and discusses the significance of the differences revealed by the preliminary comparative work. At the same time it provides the basis for further comparative studies in the future.

No less important than the descriptions and analytical tables are the superb illustrations of the stone and bone implements. There are very few illustrators of archaeological material who can approach the standard set by Mary Leakey and in the present instance these drawings are especially valuable because it is not easy for anyone not accustomed to working with quartz and some of the lavas readily to discern the flaking patterns.

If the composition of the tool-kits is likely to give rise to no small measure of surprise, this will be even more the case when the associated evidence is studied and the distribution of all of this on the living floors is taken into account. A study of the plots of some of these occupation areas cannot fail to arouse respect and admiration for the nicety with which everything is precisely located and identified. This is uniquely important

material and the most exciting available anywhere to archaeology for understanding the behaviour of the early hominids. The stone circle and smaller associated concentrations on the DK living-floor; or the relationship of the inner concentration to the peripheral scatter on the FLK ('*Zinjanthropus*') floor; the butchery kit associated with the channel and swamp clays with elephant, *Deinotherium*, *Pelorovis* and *Equus* carcases; and the groups of bifaces in pairs at site TK are only *some* of the many intriguing and intensely interesting patterns shown by these plots.

The magnitude of the work involved in the analysis can in part be appreciated by realising that there were often more than 1,000 artefacts associated with each archaeological level—the '*Zinjanthropus*' floor had 2,275 artefacts; there were 3,510 bone specimens from this horizon and FLK North produced over 14,000 rodent remains from levels 1 and 2 alone.

All the bone has been identified down to Order and Family level; the percentages of the various parts of the animals represented have been calculated and these remains are demonstrated to be the food waste of the hominids.

Of equal interest is the description of the stratigraphic and cultural associations of the thirty-four hominid fossils found in the Gorge, many of which have previously received only brief or, as yet, no mention in print. *Homo habilis* is now definitely associated with six occupation sites with stone tools of the Oldowan Industry and it would, indeed, appear that he was the maker of these tools.

The fact that so much hominid material has been collected is again the direct outcome of the energy and patience that Louis and Mary Leakey bring to bear. Few would have thought it worth while to excavate and sieve an area 300 × 40 sq. ft. at the site of the *H. erectus*? fossil eroded from VEK in Bed IV, but by so doing Mary recovered a significant part of the skull. Similarly, few would have had the patience to set about the reconstruction of the Hominid 16 skull lying in over 1,500 fragments down the slope of Maiko Gully.

Mary is a direct descendant of John Frere, whose discovery at Hoxne in 1797 can be said to have begun the study of Palaeolithic archaeology. Whether she derives therefrom some of her interest in archaeology, her eminence in the field today is directly the result of her own painstaking thoroughness, long experience and the significant contributions she has made to the archaeology of Africa. Recognition has been accorded her in many ways and, most fittingly so, in an honorary doctorate from the University of the Witwatersrand.

Here in this book one is made to realise the essential unity of early man and his culture and the reader finds himself face to face with a record of events which, although incomplete, is the clue, once we can read it aright, to the changing patterns of behaviour that made possible the cultural progress that leads up to modern man. So unexpected have been many of the discoveries at Olduvai that we very confidently expect there will be many more. Dr Mary Leakey's subsequent work on Beds III and IV will help to make even more complete this unsurpassed record of humanity's beginnings.

# ACKNOWLEDGEMENTS

My husband and I particularly wish to express our thanks to the Government of the United Republic of Tanzania for permission to work at Olduvai, and to the National Geographic Society, Washington D.C. for their continued financial support, not only of the excavations but for building a laboratory at the Centre for Prehistory and Palaeontology in Nairobi, where the Olduvai cultural material has been studied, as well as making a generous subvention towards the cost of publishing this volume. Our thanks are also due to Mr Henry Fosbrooke, former Conservator of the Ngorongoro Conservancy Unit, for his courtesy and assistance in matters connected with Olduvai.

I am deeply indebted to Professor R. L. Hay, not only for his help in the field and in reading through the manuscript of this book, but also for contributing the section on the geology and permitting his correlated sections to be published here, in advance of his own volume on Olduvai. My sons, Jonathan and Richard, and my daughter-in-law, Mollie, have been of invaluable assistance to me in the field. My former daughter-in-law Margaret has also checked the manuscript in detail and has devoted six months to working on the faunal material in the laboratory. She is responsible for preparing the faunal tables in chapters IX and X and the list of faunal comprising Appendix B. I cannot adequately express my gratitude for her patience and invaluable assistance.

The people who have helped the work at Olduvai, either directly or indirectly, are too numerous to name individually but I would like to take this opportunity to thank them all. Particular thanks are due to Mrs S. C. Savage, Dr Maxine Haldemann-Kleindienst, Dr John Waechter and Dr Glynn Isaac, who took charge of the excavations for short periods during my temporary absences from Olduvai, and to Mr Michael Tippett who was my assistant for two seasons. Mr George Ranney proved of invaluable help in measuring sections. Miss Claire Taylor and Miss Kathleen Lyons also took an active part in the excavations.

The African staff, under the supervision of Mr Heslon Mukiri (who has now completed forty years of fieldwork), deserve our sincere thanks for their consistently high standard of work. A number have shown outstanding ability, not only in excavation but also in recognising fragmentary hominid material and in developing delicate fossils. On the photographic side we are most grateful to Mr Des Bartlett, who filmed the unearthing of the '*Zinjanthropus*' skull and who also took stills of living floors; to Mr R. I. M. Campbell, who has photographed many specimens, including the utilised bones; and to Mr Guy Blanchard, lately attached to the National Geographic Society, who took the magnificent aerial view of the Gorge published as a frontispiece to this volume.

Dr and Mrs A. W. Gentry have been responsible for a great deal of preliminary sorting of the faunal remains from the excavated sites. Mrs Gentry has undertaken a detailed study of the Olduvai bovid material and I am indebted to her for many of the identifications published in Appendix B. Mr Martin Pickford, Miss Jane Flatt and Miss Rosemary Owen have also helped in sorting the faunal material, while Dr Bernard Verdcourt has kindly undertaken the identification of the few Mollusca from Olduvai. To all of these I would like to express my thanks.

Professor P. V. Tobias has been good enough to check the chapter on hominid discoveries and augment the bibliography, for which I am most grateful.

Dr J. Walsh of the Kenya Department of Lands and Mines has kindly carried out identifications of rock samples. I am also grateful to the Department itself for supplying the equipment and the skilled services of the late Mr Goate for dynamiting the tuff overlying the deposits at DK I.

I also have to thank Dr Lewis K. Napton of the

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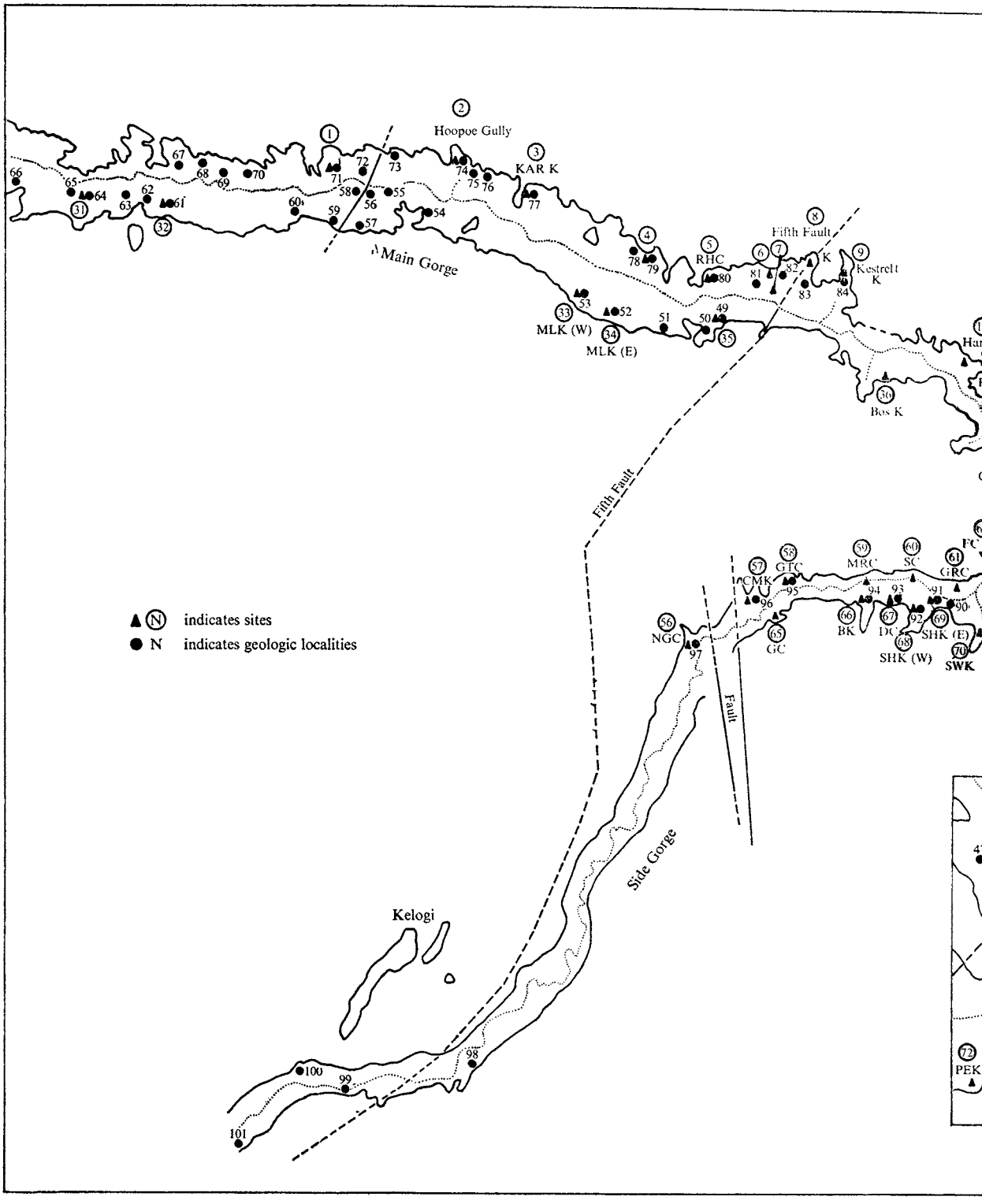
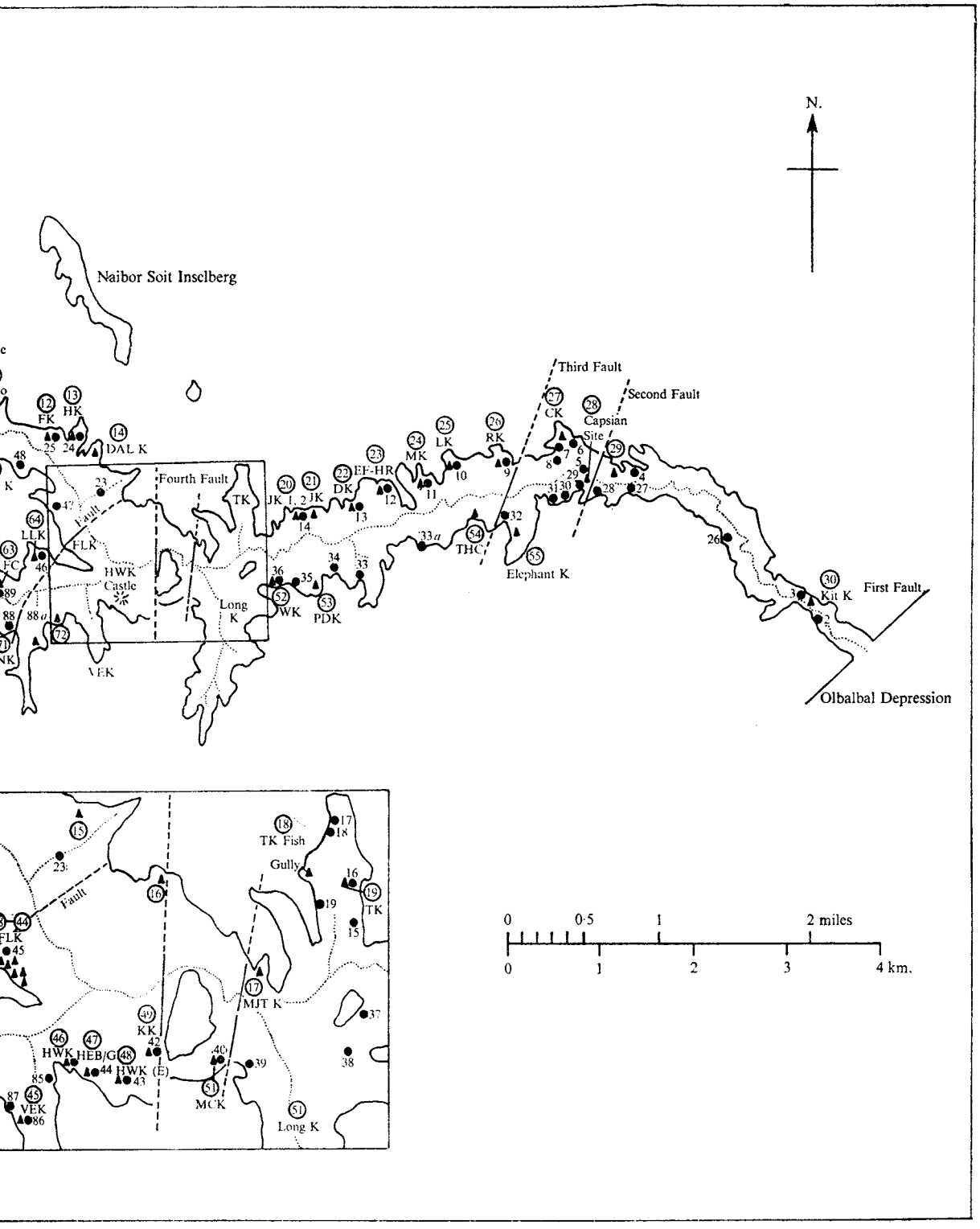
Department of Anthropology, University of California, Berkeley, for his report on the fossil dung from FLK North. Miss Irene Sedgewick has kindly devoted many days to checking the proofs of this book, for which I am most grateful.

It remains for me to place on record my deep appreciation of the co-operation, encouragement and help that I have received from my husband. He most generously made over to me the direction of excavations at the Gorge and has since accepted without demur my re-evaluation of the cultural material, as well as giving me every assistance in the preparation of this volume.

M.D.L.






MAP. Sketch map of Olduvai Gorge to show the positions of the sites and geologic localities.