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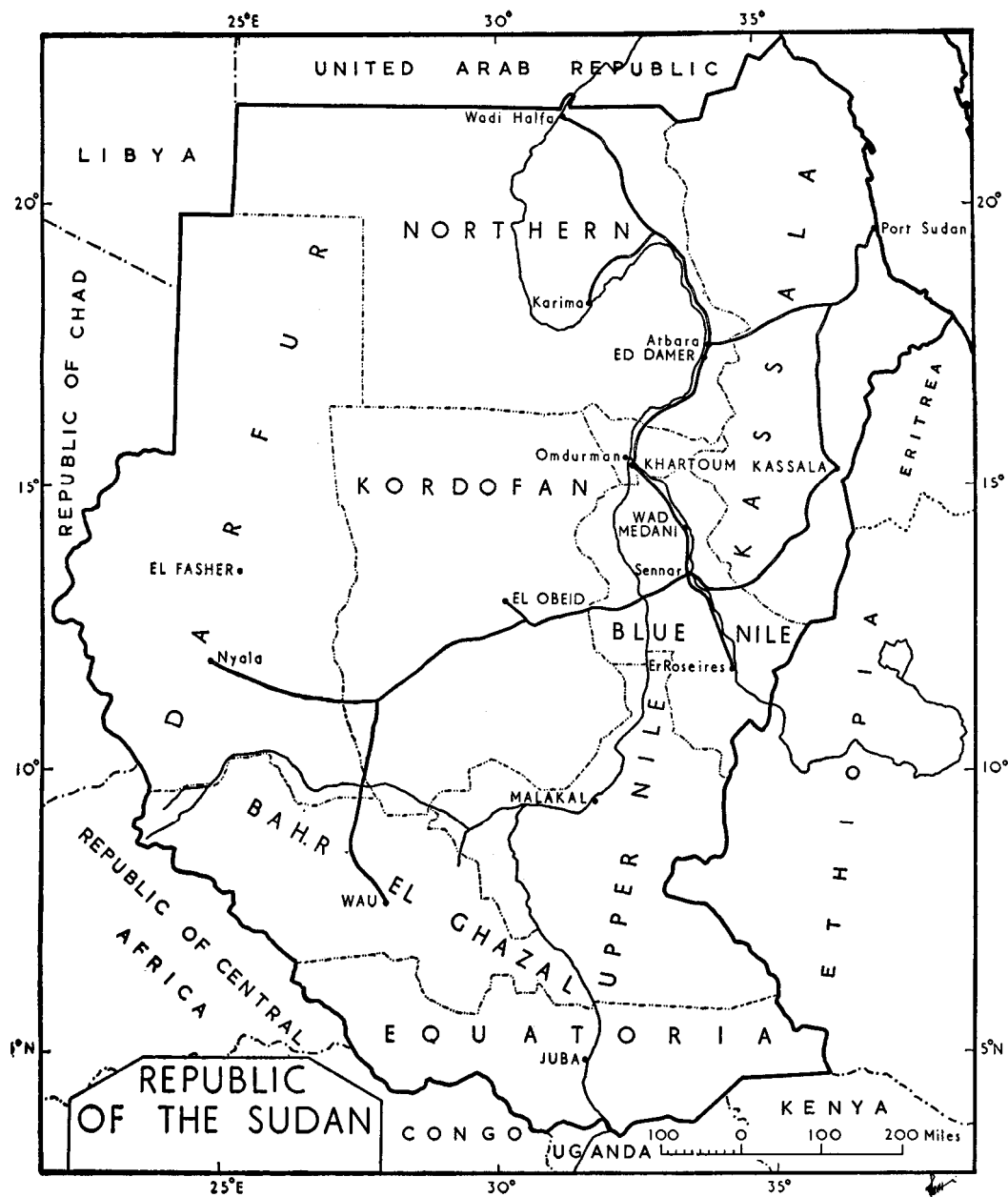
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Transliteration of the Arabic Alphabet

adopted by the Editors of *Sudan Notes and Records*

at beginning of word omit, hamza (') elsewhere ا	dh (coll. d) ذ	gh غ
b ب	r ر	f ف
t ت	z ز	q (coll. g) ق
th (coll. t or s) ث	s س	k ك
j or g ج	sh ش	l ل
h ح	ṣ ص	m م
kh خ	ḍ ض	n ن
d د	ṭ ط	h ه
	ẓ ظ	w و
	‘ ع	y ي

VOWELS

fatha	a,	lengthened	ā
kasra	i,	„	ī
damma	u,	„	ū

The *ḷ* of the article always remains *l*.

The silent *t* (ﺖ) is omitted.

DIPHTHONGS

ى —ai (as in aisle).

و —au (as in mauser).

NOTES

1. The system is not applied to well-known names, such as Khartoum, Omdurman, etc.

2. The vowel sounds of *e* in 'get' and *o* in 'hot' with the corresponding long vowels (*a* in 'gate' and *o* in 'home'), which occur only in the colloquial, are expressed by *e*, *o*, *ē*, *ō*.

e.g. beled, Mohammed, bēt (or beit), hōsh.

Ei may be used as alternative to show the long *ē*.

3. In geographical names the conventional spelling used by the Sudan Government Survey Department is followed, although not always agreeing with the above transliteration.

4. At present phonetic type is not available for proper reproduction of non-Arabic African languages.

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ERRATUM

Vol. XLVIII, 1967, in H. A. Butler, "The Cranial and Cephalic Indices of the Nilotic Tribes of the Sudan", at pp. 156-7: Figures 4 & 5 have been transposed.

SUDAN NOTES AND RECORDS

INCORPORATING

PROCEEDINGS OF THE PHILOSOPHICAL SOCIETY OF THE SUDAN

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TOWARDS A BETTER UNDERSTANDING OF THE KINGDOM OF CUSH (NAPATA-MEROE)

by

B. G. HAYCOCK

There can be little doubt that the type of culture which it is most difficult for the archaeologist to evaluate fairly is the composite proto-historic civilization flourishing in the vicinity of a more advanced centre. One may have a considerable number of temple remains and pyramids of kings, and a fairly complete sequence of names of rulers, and at the same time have little understanding of the fundamental nature and structure of the society. Since the rulers of such peoples tend to assume the colour of older kingships in nearby societies, their inscriptions, unless studied very carefully, can suggest that they were far more dependent on imported ideas than they really were. The other more subtle, but equally serious, danger is that the field-archaeologist may assume that the court art and architecture can to some extent be neglected, and the inscriptional material safely treated as misleading or untruthful, because they give a somewhat unreal picture of the status of the monarch. Thus the undynamic life of minor villages may be presented as more representative of the life of the area than the centres of higher culture, and so the impression given that foreign influences were much slower or less effective catalysts of change than they were in fact. The aim in the following pages is to present reasons for supposing that during the Napatan stage of Cushite culture in the northern Sudan (c. 656 – c. 300 B.C.) Cush was a much more complex culture derived from many sources, African and Egyptian, than some prominent authorities have supposed. This demonstration has already been made elsewhere¹ for the later phases of the culture (c. 300 B.C. – c. A.D. 320).

G. A. Reisner and F. Ll. Griffith, the virtual founders of Meroitic studies, were both far in advance of most other archaeologists of their time in their respective specialities, tomb-excavation and linguistic research, as can be seen from the fact that, although Griffith died in 1934 and Reisner in 1942, their conclusions still tend to form the basis for all discussions on Meroitic civilization, even when part of their ideas is rejected. By 1930 the study of Meroe was more advanced than any other field of African archaeological research except Egyptology. Reisner not only excavated all the known royal tombs, but sought to interpret his findings in a great number of articles².

¹ W. Y. Adams, *JEA*, I, pp. 115–20 and B. G. Haycock, *JEA*, liii, pp. 107–20.

² See the bibliography of Fawzi Gadallah, *Kush*, xi, p. 215.

Regrettably, but perhaps inevitably in a science which was largely the creation of a few enthusiasts, interest in Meroe waned after 1935, and little new field-work was undertaken for nearly a quarter of a century. The interpretation of Reisner, already old-fashioned, became imbued for many writers with a factual strength which it does not possess, although Macadam¹ on the evidence from Kawa was proposing a number of major changes—for example not recognizing the existence of two separate independent kingdoms at Napata in the third and first centuries B.C. As Professor Hintze indicated² there are only two reasonably closely fixed dates after 656 B.C., the year of the Napatan withdrawal from Egypt. In view of this the present writer finds it surprising³ that, on the basis of very slight new evidence from Musawwarat, Hintze considers it practicable to attempt to improve on the tentative early Meroitic chronology of Reisner.⁴

Reisner was careful not to speculate excessively in his preliminary excavation reports about the development of Meroitic culture or art. Probably he was too objective to suppose that even his thorough study of the patterns of tomb-change could give a full picture of all aspects of the life of those times. In part IV of his "Outline History of Ethiopia,"⁵ however, he is less cautious, and makes it clear⁶ that he largely accepted the traditional view that Egyptian art was the most skilful in Africa and that, as this element became diluted (partially by the southward movement of the Napatan state), craftsmanship became repetitive and lacked dynamism after 440 B.C. In 1919, before much study had been made of rock-graffiti in Nubia and in the Sahara, and of the art-forms of Africa south of the Sahara, it was exceedingly difficult to take any other view. He expresses the opinion⁷ that there was a notable renaissance of Meroitic culture under Ptolemaic influence from the third century B.C., which Dunham⁸ later defined from the tombs as lasting until a little later than the time of Natakamani in the first century A.D.

Expert opinion backed up by extensive excavational evidence was apparently unanimous in recognizing Meroe as an area to which Egyptian civilization only expanded at the cost of succumbing to African backwardness, and the popular Hamite theory of Seligman claimed that higher civilization first developed in Egypt or Asia and spread from north-east Africa to much of the remainder of the continent. Arkell, therefore, felt safe, as a prehistorian rather than a Meroiticist, in interpreting Cush, for the purposes of his simplified *A History of the Sudan to 1821* (intended for use in secondary schools), as a state which was at first almost totally Egyptianized⁹ and became very gradually less so, but achieved no notable artistic or cultural successes at home. Nevertheless, to make the picture more interesting he stressed its role as a centre of diffusion of higher culture from Egypt to the *bilad el-Sudan*. The enthusiastic statement of Sayce¹⁰, "Meroe must have been the Birmingham of ancient Africa", could easily be made to fit into this

¹ *The Temples of Kawa*, I and II. See below for details and discussion.

² F. Hintze, *Studien zur Meroitischen Chronologie*, pp. 21–2, and *Kush*, x, pp. 177–8. Hintze no longer regards the date for Ergamenes as closely 'fixed.'

³ B. G. Haycock, *Kush*, xiii, pp. 264–6.

⁴ F. Hintze, *Die Inschriften des Löwentempels von Musawwarat es Sofra*, pp. 13–9.

⁵ *SNR*, ii, pp. 35–67.

⁶ *id.* p. 67.

⁷ *id.* p. 61.

⁸ D. Dunham, *SNR*, xxviii, p. 3.

⁹ A. J. Arkell, *op. cit.*, p. 138.

¹⁰ Garstang, Sayce, Griffith, *Meroe, City of the Ethiopians*, p. 55.

hypothesis by supposing¹ that one of the skills which the Meroites spread was the useful art of iron-working. To crown the theory he suggested that there was strong Indian influence operative in Meroe, since the Cushites undoubtedly had war-elephants, and apparently sometimes used them to ride on², and made *hafirs* (reservoirs) to conserve their scanty water supplies.

Of course what made this theory so attractive was that it offered apparently simple answers to a number of intransigent but key questions in African history, 'How, when and why did divinised kingship become established south of the Sahara?'; 'From what sources did the knowledge of iron-working spread to tropical Africa?' It is still attractive to suppose iron technology came to Chad from the Sudan, though the evidences which P. Huard gives³ seem to me singularly inconclusive proof that it in fact did arrive from that direction. However, to argue that Indian influence came to Meroe, avoided accepting that the Cushites themselves had sufficient skill with wild animals to be able to train the African elephant⁴, which undoubtedly roamed throughout the Butana in those days⁵. In short these ideas made good sense provided one assumed that no tropical African society could have developed any of its own ideas or institutions, did not enquire into other possible centres such as Carthage, Ethiopia, or South Arabia from which new discoveries might have penetrated Africa, and did not follow the archaeological maxim that one should not write about what might have happened without at least some evidence to show that it did occur.

Apart from these rather general considerations certain items in the exegesis of Arkell fail to carry conviction—for example the present writer cannot understand why a *hafir* should be regarded as peculiarly Indian⁶. Surely it would be a natural invention in any thirsty land. In any case one occurs at Musawwarat which is seemingly contemporaneous⁷ with the Lion Temple of Arnekhamani of the third century B.C., if it did not already exist before the temple was built, perhaps to protect it from marauding evil spirits. One cannot, therefore, assume that *hafirs* were only important from the time of Natakamani or indicate that desiccation was becoming worse in the last three centuries of the Meroitic state. Similarly the X-Group hanging bird lamp from Firka⁸ is poor evidence of contact

¹ Arkell, *op. cit.*, p. 147.

² *ibid.* pp. 165–6.

³ P. Huard, *JAH*, vii, 3, especially pp. 389 ff.

⁴ F. Hintze, who has discovered many more representations of elephants in flat relief or in the round at Musawwarat, finds no difficulty in accepting the statement of Arrian that elephants were first used by the Indian and Ethiopian armies, and only subsequently by the Ptolemies and Carthaginians. See *Kush* x, pp. 177–8. M. J. Desanges has, however, expressed his doubts (*Ecole pratique des hautes Etudes*, Section v, *Annuaire*, 1967–8, pp. 116–7) and thinks the idea spread through the Seleucid state to Egypt then to the Sudan. Unless pictures of elephants earlier than those of Arnekhamani are found, this possibility cannot be excluded.

⁵ Pliny, *Natural Histories*, Book VI, pp. 181, ff. gives an account of what was known about Meroe in his time (shortly before A.D. 70). He states that a Roman expedition sent there by Nero reported that "Round Meroe the grass is greener, some traces of woods appear, and the tracks of elephant and rhinoceros can be seen."

⁶ A. J. Arkell, *op. cit.*, p. 166. Using the same vague line of argument as Arkell one could propose the opposite—that reservoirs were introduced to India from the Sudan!

⁷ F. Hintze, *Kush*, x, pp. 188, 196–7 and *Kush*, xi, pp. 219–21.

⁸ A. J. Arkell, *op. cit.*, p. 182 and Fig. 23. L. P. Kirwan, in E. Bacon, *Vanished Civilizations. Forgotten Peoples of the Ancient World* (Thames and Hudson, 1963), p. 72, mentions that several similar lamps were found in the "X-Group" royal graves at Ballaña and Qustul.

overland with modern Ghana. As Arkell indicates, this type of lamp was common in Byzantine Egypt. Possibly the original for the Ghanaian lamps arrived in that region from the Mediterranean in late mediaeval times, if one has to accept that there was a common model, which is far from certain. Professor P. L. Shinnie informs me that the Ghanaian grave where the lamps were found is unlikely to date before the 16th century A.D. To see a close link¹ between the Meroitic *qēre* (*qēr*, *qērē*), the Fur *aba Kūri* and the Zaghawa word *kīri* 'Sultan' would obviously not imply necessarily either that the Cushite royal family fled to Darfur or alternatively that this area was part of the Christian kingdom of Dongola. If the similarity is not a mere coincidence, it would be more likely to show only that a word of this form was widespread² in several languages of the Sudan to mean 'noble' or 'ruler'³ (Meroitic has two words which can be regarded as closely cognate—*qē*, *qēwi* used as a suffix to the names of the dead, and sometimes of the living, as a mark of respect, and *qēreñ*, which seems to mean an 'agent' or 'representative' of a deity or king).

My conclusion would, therefore be that the ideas of Dr. Arkell form a valuable stimulant to thought about the mechanics of culture transmission within tropical Africa, but should be regarded with the greatest caution until much more is known about the origins of civilization in the focal area of Jebel Marra and further West. Then it will probably be found quite unnecessary to believe in Meroitic hyperdiffusionism. Macadam in his recent study, "Queen Nawidemak"⁴ is inclined to adhere to what he regards as the position of Reisner — that Meroe was an isolated outpost of civilization on the Upper Nile cut off by desert and cataract, doomed at last to lose its cultural achievements, to increasing loss of individuality, and to final extinction. He writes, "It was a sad thing, for alone in the 'dark continent,' this was the most genuinely native African people who, at this period of antiquity, had learned to write." However, he does acknowledge that somehow ideas and influences new to Africa may possibly have been disseminated southwards and westwards⁵.

On the whole it seems to me that the Cushites were contented with their home on the Upper Nile, and had only sporadic contact with their main neighbours Egypt⁶ and Axum,⁷ after the XXVth Dynasty. It is almost inconceivable that a culture so closely bound to the cities along the River Nile could have uprooted itself, kings and all, after a crushing defeat by Ezānā in the early fourth century B.C., when its power had already disintegrated⁸ before the inroads of the Black and Red Noba, and marched victoriously westwards across the vast steppe of Kordofan

¹ A. J. Arkell, *op. cit.*, pp. 191–2 and 176–7.

² Cf. my rather over-enthusiastic remarks on the Alur word *kēr*. *Comparative Studies in Society and History*, vii, 3, p. 471, note 34.

³ For the meaning of this word, used for both kings and queens, see M. F. L. Macadam, 'Queen Nawidemak', *Allen Memorial Art Museum Bulletin*, Oberlin, Ohio, xxiii, 2 (Winter, 1966), p. 56 and p. 66, note 65.

⁴ M. F. L. Macadam, *op. cit.*, pp. 45–6.

⁵ He refers to R. Oliver and J. D. Fage, *A Short History of Africa*, p. 51.

⁶ This will be discussed in detail below.

⁷ The bronze bowls found at Haouile-Assaraw (Addis Ababa Museum Journal of Entry Nos. 6 to 9) seem to me the only certainly Meroitic objects found in Axumite territory. Very possibly they represent the proceeds of a raid rather than objects of trade. See for details J. Leclant, *Bulletin de la Société d'Archéologie Copte*, xvi (Cairo, 1962), pp. 296–8 and Plates ix and x.

⁸ For more details cf. e.g. L. P. Kirwan, "The Decline and Fall of Meroe," *Kush*, viii, pp. 163–73.

to Nigeria, even if we did not know that a quite prosperous late variant¹ of Meroitic culture went on at the capital after the campaign of the Abyssinians.

It is hoped that this rather lengthy discussion of the ideas of Reisner and Arkell may be forgiven as an essential introduction to show the older concepts in Meroitic studies and to stress that it is by no means an unmixed blessing that surveys of Meroitic sites began as early as 1820 and extensive excavation from about 1900. Lack of knowledge about most of the other peoples with whom the Meroites came in contact has caused Sudan studies to be regarded as a branch of Egyptology, the Cushites to be seen as pseudo-Egyptian, and their efforts to adapt Pharaonic civilization to their own needs as merely mindless, and usually rather incompetent aping of a more cultured people. Only in the last decade have scholars become aware of the impact of Cush upon Egypt during the XXVth Dynasty, largely thanks to the untiring efforts of Professor J. Leclant,² and appreciated the revival of Pharaonic art³ which they stimulated by re-establishing an effective but sympathetic government. Leclant emphasises that, though they never presented themselves in Egypt as arrogant foreign conquerors, even in Thebes the stronghold of hidebound tradition they frequently were drawn wearing the characteristic 'Headcloth of Nubia'⁴—a clear sign of pride in their origin. Even today it is frequently ignored how great was their achievement in establishing a strong and stable state in the Sudan where such a type of organization was largely an innovation⁵. Even those who see Meroitic influences operating throughout ancient Africa have not felt obliged to admit that only a vigorous culture at home could influence other people.

Often, as in Egyptology, interest in grandiose buildings has tended to stunt investigation of the culture as a whole. As Adams⁶ points out, this trend is still obvious. Moreover, a number of key sites, notably Meroe itself, were subjected to rapacious object hunting in the last century and the early years of this⁷ before the principles of stratigraphy and scientific excavation developed by Pitt-Rivers and, to some extent, Petrie, had won the acceptance in the Middle East which they have since gained. Regrettably the campaign of Reisner to excavate all the royal tombs has never been followed up by thorough investigation of the town and city sites which might make possible an authentic study of the rise and decline of Meroitic culture. The current excavations of Khartoum University under Professor P. L. Shinnie at Meroe and those of the Humboldt University, Berlin

¹ Cf. D. Dunham, *SNR*, xxviii, p. 9. This culture is comparable in the type of burial to the "X-Group" culture of lower Nubia, and both are clearly in a general sense "Sub-Meroitic," but it was much less subject to Byzantine influences. Probably, when the centralizing influence of the Cushite state was gone, local variants were free to develop rapidly. The late date of those cemeteries was first realized by J. W. Crowfoot, *SNR*, vii, pp. 27-8, following the excavation of the royal cemeteries by Reisner. Their exact period and relationship to the "X-Group" culture, as known at Ballaña and Qustul, Jemmai and Firka, is discussed by L. P. Kirwan, *Excavations at Firka* (O.U.P. 1939), pp. 41-3 and 45.

² His latest work, *Recherches sur les Monuments Thébains de la XXV Dynastie* (Cairo, 1965) will probably remain the definitive study of the architectural activities of the Cushites in Upper Egypt for many years.

³ For an appreciation of the qualities of XXVth Dynasty art, see *Egyptian Sculpture of the Late Period* (Brooklyn Museum, 1960), Introduction, pp. 33-9.

⁴ J. Leclant, *op. cit.*, esp. p. 322.

⁵ The Kerma state was quite short lived (?2000-1520 B.C.), and only affected the area north of the Fourth Cataract, so far as we can judge.

⁶ W. Y. Adams, *JEA*, I, pp. 109-10 and *JEA*, lii, pp. 157-8.

⁷ Cf. M. F. L. Macadam, *op. cit.*, pp. 54-5.

under Professor F. Hintze at Musawwarat es-Sufra will do something to clarify the picture and establish a more satisfactory pottery classification,¹ but a great many more sites must be dug before one can have any real idea of how large in area the Napatan-Meroitic state was at particular periods, or what was its effect on the pre-existent, presumably tribal society south of Napata and the zone of New Kingdom Egyptian penetration.

Dr. Adams' articles on "Post-pharaonic Nubia in the Light of Archaeology"² represent a most welcome infusion of new ideas and interpretations into the field of Meroitic studies, which have been too much dominated by the founders of the subject Reisner and Griffith and their respective successors Dunham and Macadam, and in which *faute de mieux* the simplified appreciation of A. J. Arkell has gained an exaggerated popular status. Adams' excavation at Meinarti³ and his "Introductory Classification of Meroitic Pottery"⁴ make a major contribution to our understanding of the date at which Meroitic culture extended to Lower Nubia and the process by which it became superseded by a much more Byzantine-influenced style. He largely destroys the theory⁵ of those who see the whole of Cushite history as a generally continuous process of decline from Napatan times to the end of Meroitic, and exactly equate the decline of Egyptian influences with the onset of 'barbarization.' One may, however, feel that his account of the true Meroitic period would be more coherent⁶ and comprehensible to the non-specialist if he made much greater use of the written evidence. Certainly the graffiti and tombstones of Lower Nubia permit one to discuss the nature of northern Meroitic society and the reasons for its political disintegration in a much more detailed way than he attempts.⁷

His failure to make any effective use of the written part of the archaeological evidence in his interpretation of the cultural history of the Napatan Period is, nevertheless, a much more serious defect. The royal texts of that stage were all in Egyptian, or what the Cushites⁸ considered to be Egyptian, and are, therefore, more readily and fully comprehensible than the later governmental decrees, which, unlike most of the graffiti of Lower Nubia, were usually in Meroitic after the beginning of the second century B.C. At the same time other types of archaeological material about the Napatans are minimal consisting only of the royal tombs,⁹ the pottery from the Sanam cemetery,¹⁰ and the reports of the excavations

¹ The older classifications from Karanog and the royal tombs cover only those types of pot used in burials. Adams' "Introductory Classification of Meroitic Pottery," *Kush*, xii, pp. 126-173, contains all types but as he writes (p. 127) is confined to the later Meroitic pottery of Lower Nubia.

² W. Y. Adams, *JEA*, I, pp. 102-20; *JEA*, li, pp. 160-78; and *JEA*, lii, pp. 147-62.

³ W. Y. Adams, *Kush*, xiii, pp. 148-76.

⁴ See above.

⁵ *JEA*, I, pp. 115-20.

⁶ Cf. B. G. Haycock, *JEA*, liii, pp. 112-20.

⁷ Cf. *ibid.*, especially pp. 112-4 and 117-9.

⁸ The historical texts can be divided into two groups—the Early Napatan of Anlamani and Aspelta in good Egyptian, and the Late Napatan of Amen-nête-yerike, Harsiotef and Nastaseñ. The funerary stelae of Nuri, although containing little historical material, link the two groups together and illustrate the rapid loss of knowledge of real Egyptian during the reigns of Malêwiesamani, Talakhamani and Amen-nête-yerike. (Cf. Reisner, *SNR*, ii, pp. 61-2 and 67 and *Harvard African Studies* II, Excavations at Nuri, pp. 40-1).

⁹ Published by Dows Dunham as *Royal Cemeteries of Kush I (El Kurru)* and *II (Nuri)*, Boston, 1950 and 1953.

¹⁰ F. L. Griffith, *Liverpool Annals of Archaeology and Anthropology*, x (1923), pp. 73 ff.

at the Kawa and Jebel Barkal temples.¹ No Napatan habitation site has ever been systematically excavated. This failure to create a full archaeological record of the Napatan period stands as one of the severest indictments of archaeology in the Sudan, and one hopes that action will be taken to remedy the situation in the near future, but meanwhile one must make the best use of what evidence there is, not just lament that no more is available. It is plainly quite wrong to dismiss the royal inscriptions cavalierly² in a sentence or two as unreliable or untrustworthy without subjecting them to close analysis to see whether any useful information can be wrung from them.³

One's interpretation of Napatan cultural history must be influenced quite largely by whether it is regarded as the parent of the Meroitic civilization, or just as an exotic imported tradition which gradually petered out. W. Y. Adams may be correct in asserting⁴ that the conclusion of the Napatan period is shrouded in some of the same mystery as its beginning, but to suggest that "We must therefore recognize that we have a lacuna in the archaeological record nearly as great as that which separates the New Kingdom from Napatan times"⁵ appears to me to be taking scepticism excessively far. All in all the contention of G. A. Reisner⁶ that the Meroitic culture was directly descended from and linked to the Napatan appears indisputable. Charts II and III in *Royal Cemeteries of Kush II*⁷ seem to me to provide impressive evidence of archaeological continuity between the late Napatans and the first pyramids of Barkal and Bejrawiya South, though stressing that most of the sophisticated funerary equipment found in the Early Napatan pyramids no longer occurred by the age of Harsiotef and Nastaseñ. This can hardly be dismissed as subjective manipulation of the material in order to suggest a doubtfully continuous evolution. The specialized pseudo-Egyptian script of the days of Nastaseñ (stela of Year 8) and the stelae of Talakhamani⁸ and Amani-bakhi(?)⁹ do not differ much from the obscure texts in the Bejrawiya South Cemetery, and there is enough evidence to show that as early as Nuri 6¹⁰ (Anlamani, ?610–595 B.C.) the pyramid chapels were decorated much in the manner which continued until at least the reign of Teqērideamani (A.D. 246–?277). Remnants of decoration¹¹ from Nuri 15 (Nastaseñ, ?338–315 B.C.) and from Nuri 400¹²

¹ For Kawa the sumptuous publication, M. F. L. Macadam, *Temples of Kawa I and II* (Text and Plates) Oxford, 1949 and 1955, is available. Unfortunately the work of Reisner at Barkal has never been published except in preliminary form, G. A. Reisner, 'The Barkal Temples in 1916,' *JEA*, iv, pp. 213–27; v, pp. 99–112 and vi, pp. 247–64.

² W. Y. Adams, *JEA*, i, p. 112 and *JEA*, lii, pp. 156–7.

³ M. F. L. Macadam by his analysis of Kawa VII (Stela of Anlamani) and Kawa IX (Great Inscription of Amen-nēte-yerike) shows how much information about customs and conditions in Napatan Nubia can be wrung from the inscriptions despite the fact that they are intended as religious texts rather than historical sources. See especially his comment on Kawa IX, *Temples of Kawa I* (Text), p. 51.

⁴ W. Y. Adams, *JEA*, i, p. 114.

⁵ *Id.*, p. 116.

⁶ G. A. Reisner, *JEA*, ix, pp. 36–77.

⁷ D. Dunham, *RCK II*, *Nuri*, facing p. 274. See also the discussion in *RCK I*, *El Kurru*, Chapter III, "The Evolution of the Kushite Tomb," pp. 121–32.

⁸ D. Dunham, *RCK II*, Pl. LXIX b.

⁹ *Ibid.*, Pl. LXX c.

¹⁰ *Ibid.*, Pl. xx a, b, c.

¹¹ *Ibid.*, Pl. LXII, c–j.

¹² *Ibid.*, Pls. LXIV and LXV. This building was apparently the funerary chapel in the Late Napatan period.

show an obvious evolution¹ of the style of Anlamani towards typical Meroitic forms.

The historic texts strengthen the links which bind the two periods together by showing, as Reisner was the first to fully comprehend,² that there was a very prolonged period during which the political centre of Cush (i.e. the place where the king normally resided) was at Meroe, whilst kings continued to be crowned and buried in Napata. Subsequent scholars have argued about just how long³ this transitional stage was. It can be affirmed with great plausibility that Aspelta (?595–570 B.C.) had a second royal residence⁴ at Meroe apart from his palace at Napata. One can even claim that Tanwetamani⁵ as co-regent with Taharqa may have lived at Meroe. Some of the royal family, if few kings, continued to be buried at Barkal until the first century B.C. or a little later—though I would follow Macadam⁶ in believing that most or probably all belonged to a single royal house reigning in Meroe. One wonders if as a consolation to Napata for its loss of status as a royal city in the full sense of the term queen-mothers and some lesser princes did not live there as representatives of the sovereign.

In my view the fundamental argument of Adams,⁷ “It is hard to avoid the conclusion that the Meroitic at its peak, far from being a period of cultural disintegration, actually represents the highest level attained by native Nubian culture up to that time,” is becoming ever better substantiated, but that is no reason to disparage the Napatans or unduly stress the differences⁸ between the two periods. Both groups of rulers were endeavouring to maintain a tradition of inscribed stone building with declining success. On the whole it is not their

¹ Further to this one may point out that the distinctive royal ornaments of the Meroitic period are in many cases closely modelled on those worn by the Napatans, and strongly suggest a continuous tradition. For example the elaborate head-dress of Arnekhamani at Musawwarat (F. Hintze, *Die Inschriften des Löwentempels von Musawwarat es Sofra*, Pls. IV and VI) must derive from the XXVth Dynasty prototypes of Tanwetamani and Taharqa. J. Leclant, *Recherches*, pp. 322 ff. and p. 329, stresses how distinctively Nubian the crowns, earrings, and collars with ram heads are, and how this tradition goes on from the Napatan to the true Meroitic age. For these items of Napatan dress see e.g. F. Cailliaud, *Voyage à Meroe*, Pls. 71–3; *Temples of Kawa II*, Pls. LXXIX and LVII; Leclant, *op. cit.*, Pls. I (a), LIII (a), LXIV and LXV; the statue of Tanwetamani in the Merowe Museum; and L. Keimer, *JNES*, x, pp. 225–7, one of the two gold necklace pieces of Amaniastabarqa.

² G. A. Reisner, *SNR*, II, pp. 60–2.

³ Dunham *SNR*, xxviii, pp. 3–6; H. F. C. Smith, *Kush*, III, pp. 20–5; F. F. Gadallah, *Kush*, II, pp. 198–205.

⁴ M. F. L. Macadam, *Kawa II*, Text, p. 240.

⁵ Suggested to me by Dr. M. F. L. Macadam. Tanwetamani ‘came to Napata unopposed’ (Dream Stela 7–8) ‘from the place where he had been’ (*ibid.*, line 6). He then set out for Egypt to recover the ‘Northland.’

⁶ M. F. L. Macadam, *ibid.*, pp. 19–20. Also “Queen Nawidemak,” pp. 64–7.

⁷ W. Y. Adams, *JEA*, I, p. 117.

⁸ The writer is grateful to Professor W. Y. Adams for sending him a copy of his latest observations on Nubia, “The Nubian Campaign. Retrospect and Prospect” in *Mélanges offerts à K. Michalowski* (Warsaw, 1966), pp. 13–30, and is pleased to see that on p. 22 he writes “The Meroitic was the last of the ‘pseudo-Pharaonic’ cultures of Nubia, reaching its peak about the time of Christ. In most respects it is little different from the preceding Napatan culture, although the connecting links between the two are far from clear either archaeologically or historically.” It is satisfying to note also that on pp. 23–4 he concurs with my views in *JEA*, liii. He writes “while there may have been Meroitic outposts at places like Primis (Qasr Ibrim) and Faras in the first century B.C. the bulk of the re-occupation took place at a considerably later date, perhaps not very long before the final disappearance of the Meroitic culture between A.D. 300 and 400”.

There seems thus to be no major difference remaining between our interpretations, though mine is based mostly on inscriptional evidence, whilst his is mainly archaeological.

temples which lead us to take a more favourable view of the Meroites so much as their pottery and their alphabetic system for writing their own language. We hardly know enough about Napatan non-royal pottery to be sure whether the origins of Meroitic fineware were there. Possibly it was simply because the Napatans and Early Meroites failed to maintain a good standard of literacy in Egyptian that the Cushites were eventually driven to invent scripts for Meroitic. What made it hard for the Cushites to maintain a good standard of Egyptian calligraphy was probably not so much incompetence or absolute isolation from trade—foreign objects did arrive¹—as from that small section of priests who alone understood “the god’s words” (hieroglyphic) in late Egypt. Furthermore there were the inherent difficulties of the syllabic and pictographic script with its many words already long obsolete in the more colloquial hieratic and demotic scripts. In the fourth century B.C. the Late Napatans Harsiotef and Nastaseñ were content to write a pseudo-Egyptian language which they at least presumably understood despite its complete lack of traditional Egyptian grammar.² In the mid-third century reasonably correct Egyptian again returned briefly—possibly with the help of a few imported craftsmen who had texts³ of Egyptian hymns available—but when these people were no longer at hand perhaps because of the wars with Ptolemy V, few could write even semi-intelligible Egyptian, and so Meroitic hieroglyphic and cursive were invented quite suddenly by selecting certain letters from the Egyptian scripts. Necessity is often the best mother of invention. It is hard to be sure whether the Meroitic kingdom was really much larger than the Napatan in the Sudan, as Adams implies. Reisner’s⁴ comment that one can hardly say how large the southern territories of the Napatans were is still just. One can show with reasonable certainty that all kings of this period about whom we have any information ruled at least from the third cataract to Meroe. There is good reason for thinking that the territories of Aspelta and Harsiotef extended southward to at least Defeia⁵ ten kilometres north of Khartoum.

It is easy to belittle the Napatan inscriptions. Most of them, though not all, were clearly primarily religious texts, like many ancient Egyptian monumental records, designed to describe ceremonial proceedings of a sacred character, particularly the selection and coronation of kings, and to acknowledge the help and victories given by the god—of course in return for past or promised benefactions. The simple type of religion which saw government by a divinely chosen king as a two-way contract—the king provided temples and endowments, the god victories, health and long life—was uncritically⁶ accepted amongst the warlike

¹ e.g. the rhyton of Sotades found at Bejrawiya South, Tomb 24, dated to about 400 B.C. *Royal Cemeteries of Kush*, v, Figs. 212–4 and p. 383.

² It is hard to doubt that they did little more than translate word for word from Meroitic with the help of some traveller to Egypt who had a confused knowledge of colloquial Egyptian.

³ Cf. the remarks of F. Hintze, *Die Inschriften des Löwentempels von Musawwarat es Sofra*, pp. 21 ff. My feeling from detailed examination of the texts in this work and at the site would be that it is the quality of the stone cutting rather than the good autography or the comprehensibility of the texts which sets the temple of Anekhamani apart from most other late Napatan or Meroitic buildings.

⁴ G. A. Reisner, *SNR*, ii, pp. 63–6.

⁵ J. Vercoutter, *Sudan Antiquities Service Report*, 1957–8, pp. 5–7 and Figs. 4 and 5.

⁶ This can be seen very clearly in the Kawa stela of Anlamani, Kawa VIII, lines 13–6, and 27–8, and the Harsiotef Stela of Barkal, lines 109 ff. Cf. the comments of M. F. L. Macadam, “Queen Nawidemak”, pp. 58–61.

people of the Sudan. Such material lacks objectivity and if addressed to a particular god¹ may make little of important events elsewhere, but that is not to say that it is all a mass of arrogant lies. The concept that a successful military commander should try to write down detached notes on his career as impartially as possible does not seem to have occurred to anyone before Julius Caesar, and has hardly proved a popular habit since his time. To distrust ancient records excessively merely because they give Napatans rulers somewhat unreal status as "kings of Upper and Lower Egypt" is unwise. Commentators on early Sudan history have often entertained the misconception that because a ruler calls himself by Pharaonic titles of thoroughly Egyptian origin, this means that he was pretending to be an Egyptian. For the Napatans Pharaonic culture was just as much their own, as firmly rooted as Christianity in America or Islam in the Sudan. It had lost its exclusively national character of former centuries.

The Aspelta "Election" Stela shows incontestably that the kingship which had come down from the time of Rē was regarded² sometimes as wholly Cushite in character and history, and that even Ammon-Rē, lord of the Thrones of the Two Lands, once the most aggressively Theban deity of the warrior New Kingdom Pharaohs, could be thought of as "a god of Cush."³ This is not surprising when one considers that the worship of Ammon had evidently survived the "dark age" after the New Kingdom in Cush, and had become the chief deity of a new national royal family. Taharqa describes⁴ how enthusiastically Ammon-Rē of Kawa was worshipped by Alara, one of his presumed grandfathers, before Kashta and Piankhy overran Egypt. No temples from between the New Kingdom and the time of Kashta or Piankhy have been discovered in the Sudan, but this is possibly because no archaeologists have been sufficiently aware of what to expect to look for flimsy buildings of brick of the type Taharqa mentions at Kawa.⁵ Because of the lack of competition from other foreign cultures and the conquest of Egypt by the XXVth Dynasty which for a time made all the best craftsmen of Egypt available to the rulers of Cush, Pharaonic influence was stronger over the Early Napatans than at any later stage, but this does not imply to me that there was less inextricable mixture between divergent traditions than later. The Aspelta "Election" Stela seems to me to describe how the people were summoned together following an ancient custom to choose a king by election, but by an evidently pre-arranged process, since this form of choice was obsolete, decided that Rē, the last real god to reign on earth, should choose⁶ their lord, and more particularly that it should be done by Ammon-Rē,⁷ the chief state god of Napata, who lived in the Holy

¹ Probably the Stela of Anlamani and the Great Inscription of Amen-nēte-yerike addressed to Ammon of Kawa, distort the historical picture by their undue concentration on minor events at Kawa concerning that god.

² Aspelta 'Election' Stela lines 8-9: 'It is true that it has been the task of Rē since heaven was created, since the kingship [? of Upper Egypt] began, to make him his beloved Son since the king is the image of Rē among the living. So let Rē place him in this land, that it may be strong.'

³ *Ibid.*, lines 11-3.

⁴ Kawa IV, lines 16-9 (*Temples of Kawa I*, Text, p. 16), and Kawa VI, lines 22-5, *ibid.*, p. 36.

⁵ Kawa IV, lines, 9-15 (*ibid.*, pp. 15-6).

⁶ "Election" Stela, lines 2-7.

⁷ *id.* lines 7-14. This identification of Rē with Ammon-Rē of Jebel Barkal is an interesting example of the syncretism specially common in later Egyptian religion. J. Leclant, *Recherches sur les Monuments*, pp. 262 ff. discusses at length the interpenetration of Ammon and Osiris at Thebes during the XXVth Dynasty. The Aspelta Stela of Prince Khaliut (see below) is addressed entirely to Osiris and Rē-Horakhty, but stood at the entrance to the Great Temple of Ammon at Barkal (published by M. B. Reisner, *Zeitschrift für Ägyptische Sprache*, lxx, pp. 35-46).

Mountain of Jebel Barkal. There is no warrant for the supposition of A. J. Arkell¹ that any part of the action of the "Election" Stela took place other than at Napata. Aspetla was chosen at the second attempt after all the royal brothers had been sent in² and the god had chosen none of them—since he was sent in alone on this occasion, it seems certain that he had been selected by the assembled national leaders. Aspetla is described religiously as the son of Ammon and Mut—the god accepted his earthly qualifications as son of king, the son of Rē, Senkamaniskeñ (?—the name is deleted like all the others in this stela), and of seven generations of evidently adoptive³ "king's sisters" or "mistresses of Cush." In general terms this is evidently comparable to ancient Egyptian oracular consultations⁴, but the idea that the kingly office should pass to king's brothers not sons was strange to Egypt, as was the importance of the female line of ancestors. No doubt the choice of the king by the god was a mere ritual even in the days of Aspetla, but the fact that this fiction was still preserved in the time of Nastaseñ⁵ is evidence of reluctance to make the post officially hereditary. Even the description⁶ of how Alara dedicated his *gswy* (? female counterparts) to Ammon of Kawa and begged him that their descendants might reign, represents a strong nexus of non-Egyptian ideas in the XXVth Dynasty. There seems every reason to believe that the Cushites had some consciousness of themselves as a distinct cultural entity, and that Aspetla played with ideas which can only be called nationalistic, but then as now the Sudan was very open to influences from the more advanced state to the north, and the tendency towards the growth of a local culture not based on Pharaonic models was slow and could at any time be partially reversed by renewed contract.

The other stelae of Aspetla throw more light on the character of this most remarkable of the successors of Taharqa. Most important undoubtedly is the "Dedication" (Madiqen) Stela which undoubtedly came from the Taharqa temple

¹ A. J. Arkell, *History of the Sudan*, p. 144, places the action of the Aspetla Stela correctly at Jebel Barkal; on p. 145 he assumes that it happened at Abu Simbel. In fact there are large amounts of information to prove that for Cushites the Holy Mountain was Barkal, and the pre-occupation of the stela with coronation and kingship makes it certain that Napata is the setting. Cf. J. Černý in R. A. Parker, *A Saite Oracle Papyrus from Thebes* (Brown University Press, R.I., U.S.A.), p. 38, who assumes without comment that it happened at Napata. The only possible justification for Arkell's view is that Rē-Horakhty was worshipped at Abu Simbel in the New Kingdom, and Rē had no known temple at Napata, but one can object to this that the "Election" Stela shows that Ammon-Rē of Barkal was consulted, as equivalent to Rē, precisely because the latter had no temple at Barkal. There is thus no evidence as Arkell assumes that Anlamani had sent his army north to attack Egypt. Unfortunately W. B. Emery, *Egypt in Nubia*, p. 222, and B. Trigger, *History and Settlement in Lower Nubia*, p. 119, follow the erroneous idea of Arkell.

² "Election" Stela, lines 16–22.

³ Cf. M. F. L. Macadam, *Temples of Kawa I*, pp. 125–9.

⁴ Cf. J. Černý, *ibid.*

⁵ Stela of Year 8 of Nastaseñ, lines 4–7, makes it quite certain that Nastaseñ really succeeded in virtue of his position as crown prince. The text runs approximately, 'When I was the good son [i.e. the crown prince] in Meroe, Aman-Nape, my good father, summoned me, saying, "Come, for I am summoning the royal brothers who are in Meroe [I am indebted for the reading 'royal brothers' to Dr. M. F. L. Macadam who calls to my attention his observation on Kawa XLIII, Kawa I, pp. 89–90]. I said to them, 'Come with us to seek him, namely [?]. They said "We will not go with you [written 'me'] for you are his good son, and it is you whom Aman-nape your good father loves."'

Nevertheless, the ancient fiction that the king was elected from amongst the royal brothers was preserved, even long after the kings transferred their home to Bejrawiya.

⁶ Kawa IV, lines 16–9 and note 42 (*Temples of Kawa I*, p. 21).

at Sanam,¹ not as Budge states² from the great temple of Jebel Barkal, since it is entirely about the temple of Ammon-Rē, Bull of Nubia. This seems to me the most unquestionably truthful of all the Napatan texts, since it is the official record of a meeting between a number of very influential officials of the king, mainly members of the treasury, and the priests, scribes and administrators (*hry-tp*)³ of the temple. It is dated to year 3 of Aspelta and describes how the court officials read out a statement pointing out that Madiqēn, "the king's sister, king's wife of the Living One" (the present writer would interpret this as the wife of Aspelta)⁴ had been appointed as a priestess by Pharaoh Anlamani, and naming the amount of foodstuffs which the temple was to pay Madiqēn for her services and, perhaps as the result of a more recent arrangement, to Henuttakhebit her *s3t wrt*, her adoptive rather than eldest daughter, since Henuttakhebit is also described as a "king's sister." The payment will be made forever without any diminution to the ladies and their heirs. Any one who defaces the decree will be killed and his family ejected from the temple service. The temple officers assent to all this.

One can argue about the exact status of the stela, but its general purpose, since it was carved on granite, is clearly to provide a permanent memorial of the obligation of the temple to provide a hereditary pension for the royal ladies and their heirs. In nature it can be compared to the two stelae, one of granite, one of sandstone erected⁵ by Petiēse I a great Egyptian nobleman of the reign of Psammetichus I, in year 14 and year 34, in the temple of Ammon "great of bleating" at El Hibe in Upper Egypt. These were explicitly intended to secure revenues in the temple for his descendants and to protect them against the wiles of the crafty priests. Petiēse I had similarly been granted hereditary⁶ rights at El Hibe by Petiēse son of Ankhsheshonq and confirmed in his position by

¹ *Ibid.*, pp. 50-61.

² E. A. W. Budge, *Annals of Nubian Kings*, p. xcvi.

³ M. F. L. Macadam, *Kawa I*, p. 66. Note 170 remarks that Griffith would have translated this in *Kawa IX* (the great Inscription of Amen-nēte-yerike) as 'chief Magicians.' He rightly prefers 'chief men of His Majesty'. Here they seem indisputably non-priestly temple administrators. 'Dedication' Stela, lines 8 ff. The translation in Budge, *Annals of Nubian Kings*, p. 107, is quite misleading.

⁴ The Napatan royal relationships are most complicated. See *Kawa I* Appendix, pp. 119-31 and also p. 132. Macadam, *ibid.*, p. 50, note 61 thinks that Madiqēn was his sister-wife when Anlamani dedicated her. No doubt this is because of the Anlamani Stela, pp. 24-5, which describes how he gave *snw. f hmwt* to the temples of Barkal, Kawa, P-Nubs, and Sanam. Macadam, *ibid.*, note 59 takes this to mean 'sisters' but it could mean no more than 'cousins', i.e. according to Near Eastern custom 'marriageable sisters.' It certainly can mean this in Coptic (W. E. Crum, *Coptic Dictionary*, p. 343). In any case it is no warrant for making her actually the wife of Anlamani—that she received Sanam the least important of the temples might suggest she was not influential in his time. Her unusual title "king's Wife of the Living One" may even be intended to show in the "Dedication" Stela that she was the wife of the living Aspelta expressly, not the dead ruler.

⁵ F. Ll. Griffith, *Catalogue of the Demotic Papyri in the John Rylands Library, Manchester*. 1909. Rylands IX (The Petition of Petiēse), pp. 7/19, 9/9 and 13/17—14/11 gives details as to the circumstances and purpose for which the stelae were made.

⁶ *Ibid.*, 21, 9 ff., Documents A and B, the rescripts explaining how Petiēse I gained control of the temple of El Hibe in return for his services in having the place freed from the tribute imposed by the Assyrians. Griffith, *op. cit.*, III, p. 43 and 108, expresses doubt about the authenticity of these documents, and the whole course of events in the reign of Psammetichus I described by the papyrus, but on the whole they seem to me genuine documents intended to prove that the Petiēse family controlled El Hibe at that time, and were entitled to claim a share in the temple. It is not impossible that Somtutefnakhte and his father Petiēse might both be described as 'Ship-masters' of Heracleopolis at the same time, if the elderly father was living in semi-retirement.

Somtutefnakhte the son of Petiëse. (These two great 'shipmasters' of Heracleopolis, closely related to Petiëse I acted for the king as virtual regents of Upper Egypt during the earlier years of Psammetichus I). One of the descendants of Petiëse I, Petiëse III was still trying to claim back the rights, which his family had lost at the death of Psammetichus II, in the reign of Darius I (nearly 150 years later). It can be shown that such stelae had definite value as evidence, since the second stela was destroyed¹ by usurpers of the revenues in year 15 of Amasis (554/3 B.C.) to weaken the Petiëse family case. The first was spared because it was not specific, and being granite was difficult to deface. No doubt a first copy of the "Dedication" Stela was made on papyrus in hieratic and signed by both parties, since the colloquial phraseology such as 'the Majesty of Pharaoh,' 'Pharaoh Anlamani' and similar belongs to the business language of contracts.

Nearly all Napatans known are of a royal or semi-royal character, and it is evident that the kings of this period were autocrats reinforced by a monopoly of wealth and learning, and of exaggerated religious status. The social status of the earliest ancestors² of the Napatans buried in the *tumuli* of El-Kurru had been comparatively small despite their alleged wealth in gold, but the kings had been the principal beneficiaries of the union of the Nile Sudan and the conquest of Egypt, and had gained a quite new status as pharaohs who built great stone pyramids and fine temples, and had commemorative texts in the mystic hieroglyphic. This broad division between rulers and ruled persisted throughout the Napatans and Early Meroitic periods, and it is not until about the reign of Amanishakhete (late 1st century B.C.—early 1st A.D.) that one first has much evidence of the emergence of a powerful class of provincial nobles, who commemorated themselves by written texts in Meroitic. However, as in all theocracies, the king needed to project the image of a semi-divine figure protected and chosen by the gods, and this inevitably left much power and influence to the priests. Moreover, the matrilineal and theoretically elective character of the kingship must have encouraged them to meddle in politics. The "Banishment" Stela dated to year 2 of an Early Napatans king, most likely Aspelta, records how carefully the king needed to proceed in dealing with the priesthood of Barkal—even when they appear to have plotted³ against his life. The titulary of the king in lines 1-2, influenced perhaps by that of Tanwetamani in the "Dream" Stela, is designed to stress his position as the ultimate interpreter of the will of the gods and the religious guide of his people. The main text⁴ of the decree reads approximately, "In the second year of his reign His Majesty was on the throne of Geb, and His Majesty went forth to the temple of his father Amanapte, who dwells in the Holy Mountain [Jebel Barkal] to punish the families whom the god hated, called the [incomprehensible—no doubt a Meroitic phrase] to prevent them from entering the temple of Amanapte in the Holy Mountain, because of that thing which it would be abominable to name which they did in the temple of Ammon. They did a thing which the god did not order to be done. They plotted in their hearts to slay a man

¹ Rylands IX 18/4, ff., narrates the events leading to the destruction of the stela by Psammetknepe who was anxious to confirm his position in the temple of El Hibe but could not persuade or force the Petiëse family to give up their claims. Thanks to a partially successful action arising from the destruction of their house (19/1) the Petiëse family returned and drove out Psammetknepe, but found it prudent to leave their claims to the temple revenues in suspense.

² D. M. Dixon, *JEA*, 1, pp. 124-7, is the most recent to reconsider the evidence of these tombs.

³ Cf. H. Schaeffer, *Klio* 6, p. 287, ff.

⁴ Lines 4 to the end.

who had not done evil without orders from the god. The god thrust their words back into their mouths, in order that their boasts might happen to them. He slaughtered them by making them go through the fire of (Sakhmis)¹ to make all the prophets and priests who go into the presence of his god afraid at the extreme greatness of his power. His Majesty said 'As for every prophet and every priest who shall plot in the temple precincts, [the god?] shall not allow their feet to be on earth. He will not allow their heirs to be in office after them, to prevent the temple being served by foolishness(?), that it may be established free from it.' The king insists in effect that by killing the priests and ejecting their heirs he is merely executing the wishes of the angry god.

It is interesting to note that in both the "Banishment" Stela and the "Dedication" stela the king is represented as extremely firm and unyielding with the priests—a great contrast to the way in which the Kawa Stela of Anlamani and the "Election" Stela overflowed with religiosity. In these circumstances it may not be too fanciful to think that the Khaliut Stela made later by Aspelta—no doubt after the Egyptian attack² of 592/1 B.C., since the cartouches of Aspelta, Piankhy and Nasalsa have not been damaged deliberately, although its position at the entrance³ to the Barkal temple would have made it an obvious target—was part of a campaign to rehabilitate him in the eyes of those who considered him an impious ruler whose reign had brought disaster to Napata. The method employed consisted in showing Khaliut, a long-dead⁴ and obscure son of Piankhy, praying to Osiris and Rē-Horakhty for Aspelta⁵ as a worthy and religious king who built temples, provided for their offerings, cared for the cult of the dead and provided tombs for those who had none, and respected priestly rights⁶ to inherit the posts of their fathers. Probably Khaliut, like his father Piankhy, had been noted for his religious zeal, if little else⁷ and so was a suitable figure from the next world to be made to proclaim the virtues of Aspelta. Possibly he may have been the father or grandfather of Nasalsa, and so directly interested in the welfare of her son.

These four stelae have been selected for special study because they all belong to one generation, indeed most likely one reign, and together give an unique glimpse of many facets of an age, the sacred ritual of consultation of Ammon and the coronation of a king, conspiracy and sedition within the main priesthood of Barkal and the drastic consequences, the use of administrative pressure to oblige

¹ For the reading compare the very similar phraseology of the "Dedication" Stela, lines 16–8, describing the punishment from Ammon awaiting bad priests who ignore or deface that stela.

² For this campaign see S. Sauneron and J. Yoyotte, "La campagne nubienne de Psammetichus II et sa signification historique" *BIFAO*, I, pp. 157–207. Also M. F. L. Macadam, *Temples of Kawa II*, pp. 240–1.

³ M. B. Reisner, *ZAS*, 70 p. 35 ff.

⁴ *Ibid.*, p. 36. Also Macadam, *op. cit.*, I, p. 126.

⁵ M. B. Reisner, *op. cit.*, p. 37, stresses this point.

⁶ This assurance was of course very important to the endowed priests of Napata whose whole family fortunes depended on their benefices. Priestly posts were regarded as a heritable right; Cf. the Nitocris "Adoption" Stela, lines 3–4, where Psammetichus I is emphatic that he did not "do what should not be done, and expel an heir from his seat," i.e. did not eject Shepenwepet II and Ameniridis II, the Worshipers of the God, of the Napatan house, from Thebes. Only gross dereliction of duty provided an adequate moral justification for interfering openly with the normal succession, though of course, as has been seen above, in practice priests were often removed from office for financial or political reasons when their relatives in the administration were no longer able to influence the king in favour of the temple or to protect them.

⁷ Khaliut's only titles were "king's son, governor of Kanad" (an unknown locality). The description of his life on earth, Khaliut, 1–3, only mentions his religious zeal.

the Sanam temple to meet its financial obligations despite its religious status, and the glorification of the rather dubious religious enthusiasm of Aspelta by means of a fictitious speech put into the mouth of the doubtless saintly Khaliut. One can see something of the conflicts immanent in a theocracy between the king as religious leader and as a politician skilfully using religion for his own purposes—and the ministers of religion—at once holy and scheming. One can even see something of the dichotomy between the idea of universal monarchy borrowed from the Pharaonic tradition of Egypt, and the slow birth of nationalism resulting from the increasing isolation of Cush and the hostile intentions of the Egyptian king Psammeticus II.

The necessary limits of this article do not permit discussion of the Late Napatan stelae here—though there is no doubt that they do contain important supplementary information about the development of Cushite kingship and society. Fortunately the inscriptions of king Amen-nēte-yerike have been well edited by M. F. L. Macadam in *Temples of Kawa I*.¹ A brief summary of the stelae of Harsiotef and Nastaseñ is available² elsewhere which at least indicates how much the early editors, H. Schaeffer, E. A. W. Budge, and unfortunately quite recently E. Zyhlarz³, were unable to understand in these very difficult and obscure texts. As Macadam has shown,⁴ the Amen-nēte-yerike stela provides worthwhile information about the status of Napata in the later Napatan period. By the time of Harsiotef it was probably a town full of aged buildings crumbling into ruin, which the kings did not care to visit often because they were importuned⁵ by the priests of the northern cities on behalf of the gods, and obliged⁶ to pay for urgent repairs. The stelae of Harsiotef and Nastaseñ also provide much information about their prolonged struggle with the forces of disorder, the nomadic peoples which will one day be most useful when we have a better idea of the regions inhabited by the hostile tribes mentioned. Ultimate success in this struggle gave the Cushite state a new period of vigorous life, and was undoubtedly the foundation⁷ on which the prosperous regime of the third century, centred more exclusively in the Butana, was founded. Obviously a greater degree of security prevailed by them, since they could build large temples in such exposed localities as Musawwarat es-Sufra. The figures of captured enemies and animals⁸ given by Nastaseñ appear quite unbelievable to me, but elsewhere there is little sign of similar falsification of the scale of military successes. No kings claim to have played an incredibly distinguished part in battle. Indeed Anlamani and Amen-nēte-yerike state⁹ explicitly that they stayed in their palaces — obviously this was not because of cowardice, since they mention it proudly, but rather because it was

¹ Kawa IX-XIII.

² B. G. Haycock, *Comparative Studies in Society and History*, vii, 4, pp. 471–5.

³ E. Zyhlarz, *Kush*, IX, pp. 226–57.

⁴ *Op. cit.*, I, Text, p. 50 ff.

⁵ Harsiotef Stela, 4–10, 22–7, 119–21, 124–7.

⁶ *Ibid.*, 24–71 and 119–41.

⁷ Cf. B. G. Haycock, *JEA*, liii, p. 117 top, stresses the supremacy of the Butana cattle peoples from at least the late Napatan period.

⁸ Unless, unlike earlier Cushite figures, they represent the whole animal population of the areas that submitted, not actual captured livestock. Even so they are difficult to credit. There is altogether an air of unreality about the Stela of Nastaseñ which I do not detect in the other Napatan records. His titulary, lines 1–4, is extremely elaborate, the third royal name (the 'Horus of Gold' name) being extended into an extraordinary eulogy, heaping upon him every epithet of power which the writer could think of or invent.

⁹ Kawa VIII, 16–18; Kawa IX, 26–32.

deemed¹ that they could perform a better public service by intercession with Ammon for victory. In describing their coronation ceremonies² Amen-nēte-yerike and Nastaseñ explain in detail the prolonged acts of collective piety necessary to persuade Ammon to accept and listen to the pleas of the new king. Perhaps these late Napatans, disappointed by a long period of difficulty through which Cush was passing, were more aware than the youthful Taharqa³ that divine protection was not automatic.

The aim in this article has been to show how, if the materials already available are properly used, it is possible to obtain a much more satisfactory picture of what the state of Cush and its rulers were really like. Of course one cannot hope to give a complete picture as yet until many more sites have been excavated—and to make an inadequately based assessment does a disservice to the subject, unless its limitations are clearly explained. Kings who are silent may be made to speak if new inscriptions are found. There can be little doubt that the apparent lack of activity by the Middle and Late Napatans will be shown to be partially illusory if their home at Old Meroe is more thoroughly studied. At the same time there is every reason to accept that the many memorials of Aspelta, since they have come not from one place but from many sites throughout his kingdom, indicate that he was the most loquacious of the Napatan successors of Taharqa, and probably one of the most forceful.

One should not over emphasise the achievements of the Napatans, but also future writers should not be too ready to condemn them for their failure to maintain the whole apparatus of Pharaonic culture and kingship. Because a large percentage of the population of the Sudan was nomadic, and riverain kings had great difficulty in exacting taxes from such people, the government was always poor and society could not develop on the same luxurious lines as in Egypt. A simplification of expensive funerary practices was inevitable, as also was growing incomprehension of hieroglyphic, since this type of script was not only an importation, but also an artificial archaic script understood only by a few specialists in its homeland. One can point out indeed that by stages a more functionally Nubian culture was emerging. Napatan ideas of theology were even more confused than Egyptian concepts habitually were, but clearly they made up for lack of knowledge by great enthusiasm. One hopes that new histories in Arabic or English intended for use in schools or for popular consumption will concentrate on these social and economic factors and the way the Napatans held together a genuine state on the Upper Nile, and prevented a relapse into a fragmented tribal society. It is these things which make them the real commencement of Sudanese history. In this way early Sudanese history may be made more relevant and less remote, and popular interest will increase. This in the long run will be of great benefit to the archaeologist whose work will thus be more widely understood and supported.

¹ Even the exceptionally warlike king Piankhy did not take command of his army in Egypt until victory was almost won, but considered that his religious duties had to come first. See particularly Piankhy Stela, 25–6.

² Kawa IX, 81–106. As this describes the coronation no doubt the setting is Napata, though from line 105 one would think that it was at Kawa. The Nastaseñ Stela, 11–22, 27–32.

³ Kawa V, 5–6: 'Wonders have come to pass in the time of His Majesty in the sixth year of his reign, the like whereof have not been seen since the time of those of old, so greatly did his father Ammon-Rē love him. His Majesty had been praying for an inundation from his father Ammon-Rē, lord of the thrones of the two lands, in order to prevent famine happening in his time. Now everything that issues through the lips of His Majesty, his father Ammon grants it to happen immediately . . .'

A CRISIS IN UDUK HISTORY

by

WENDY R. JAMES

I am going to describe some events which took place on the Sudan-Ethiopian border, in the region of the present Kurmuk District, at the turn of the century. This was the period immediately following the Mahdiya (1885-98) when both the Sudan and Ethiopian Governments were trying to establish control of the tough and independent border sheikhs in this inaccessible mountain country. The border sheikhs were mostly immigrants of the second or third generation from the Northern Sudan, of whom a great number had settled in the region during the nineteenth century. The descendants of these immigrants and the local Berta women they usually marry are known as *Watawit*, although they describe themselves as *Danagla*, *Ja'aliyin*, *Sha'igiya*, and so on. The end of the nineteenth century was the heyday of the *Watawit* sheikhs. Their power was based on gold panning and slave trading. The Berta people of the Ethiopian foothills were the first to suffer from raiding and enslavement, and then it was the turn of the plains dwellers to the west of the mountains. This raiding was probably at its maximum just at the turn of the century, when Governments on both sides of the border were trying to pacify the country. Most of the plains people of the region were known as *Burun* to Arabic speakers, a term dating probably from Fung times. The term covered a variety of distinct peoples, including the Uduk-speaking group. The Uduk suffered badly from raiding during this period, and undertook a full-scale flight from their homeland. They remained as refugees away from their home for several years. All this time the Government was aware of conditions in the region, but action was hampered by the fact that the boundary was not marked out between the Sudan and Ethiopia, and so it was not clear under whose authority the pirate sheikhs should be; but with the demarcation of the boundary, completed in this section in 1903, action became possible.

As far as I can, I shall present two points of view upon the events of this period and their significance: firstly, that of the official Government records (primarily the Egypt and Sudan Intelligence Reports, 1892 to 1904); and secondly, that of the Uduk people, from whom some information on this period was obtained during the course of fieldwork in social anthropology carried out in 1966 and 1967.¹ The Uduk people, numbering today some 10,000-15,000,² are distinguished particularly by their matrilineal form of descent, and live on the three Khors Ahmar, Tombakh and Yabus which flow from the Ethiopian Highlands down to the swampy plains of the White Nile (see Map). They are surrounded by similar small but linguistically and culturally distinctive groups, such as the Meban, Jum Jum, Hill "Burun," Koma, and Ganza, all of whom are still today lumped together as *Burun* by local Arabic speakers. These peoples have little in common, except their passiveness in terms of regional politics and history.

¹ This field research was made possible by a grant from the Ford Foundation and by the generous co-operation of the University of Khartoum.

² The 1955-56 Census figure for the Uduk Omodia was 8,300; but for several reasons this was probably a gross underestimate at the time, and the population has undoubtedly increased substantially since then. I hope to discuss these points more fully elsewhere.

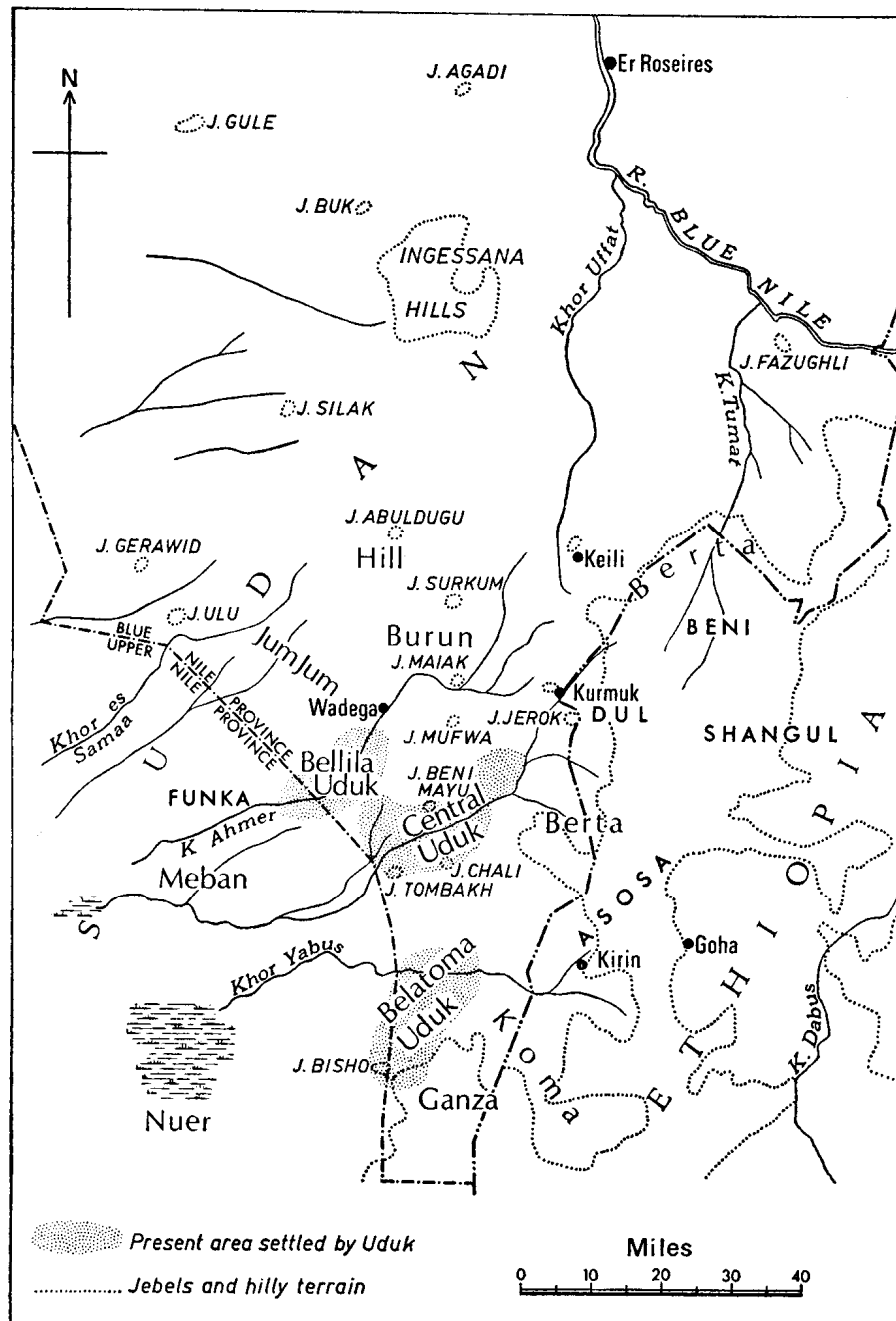


FIGURE 1. The Southern Fung Region

Certainly for the Watawit sheikhs they formed together a reservoir of defenceless, unorganised and unarmed people, an obvious source of loot and slaves.

I shall first outline briefly some background facts concerning the history of the region, and then look at the crucial period of the turn of the century from the official and local Uduk points of view. I shall conclude with a consideration of some sources which throw light on conditions in the region in the early twentieth century, and with an indication of the relevance of this period of history to the present-day sociology of the Uduk people.

The late Fung period and the rise of the Watawit

At the beginning of the nineteenth century the region of the southern Fung was administered from Jebel Gule (see Map). Under the overlordship of Gule, were the three outposts of Fazoghli, Beni Shangul and Keili, each governed by a king or mek. A large area of "Burun" country appears to have been directly under the control of Gule. It is difficult to discover just how far the sphere of Gule extended. I was, however, given some information locally, by Jahalla of Beni Mayu near Chali, who is perhaps 75 or 80 years old. In the old days, he said, before the disturbances, the Uduks were subject to Idris Manji at Gule. Every person had to give one male goat every year to Idris Manji. If a goat died on the road to Gule, they would take its horns to Idris to show him that it had died. The goats were taken by Uduk people themselves all the way to Gule. The Turks had ordered them to pay to Gule. Pijaulu, Borfa, Chali, Bellila, Pambe, Belatoma¹ and also the Meban all had to pay to Gule. There were chiefs at Keili, but Uduks did not pay taxes to Keili. They paid straight to Gule; and Keili itself had to pay to Gule. This information would indicate that the Fung ruling line of Gule had some control over the whole of Uduk country, at least after the establishment of the Turkiya if not before. A. J. Arkell, in an unpublished study of the history of the Berta country,² judges that for the region as a whole there was probably little slavery, and therefore relative peace.

Immigration of merchants and others from the Northern Sudan to the Ethiopian border began before the occupation of the country by the Egyptian Government (1821), but was greatly increased through the opening up of the region by the Egyptians and in particular by the gold expeditions which followed Ismail Pasha's pioneering journey to Fazoghli in 1821. Some immigrants are said to have fled as refugees from the Egyptian invaders to the Ethiopian border area. Some of the early immigrants managed to marry the daughters of existing Fung meks: according to Arkell's notes³ this happened in Beni Shangul, Ghomasha (Dul), and Asosa. By this means, the immigrants eventually manoeuvred the mekships into the hands of their own descendants, ousting the Fung ruling lines. The new rulers acknowledged the Egyptian Government, but its control over them was minimal. A complicated game of rivalry and intrigue between the various sheikhs developed, which is documented by Arkell. It was a game of power politics based on gold, slaves, guns, and the building up of loyal followings among the immigrant community, most of whom married the local Berta women.

¹ These are various parts of Uduk country.

² A. J. Arkell: "A Note on the history of the country of the Berta lying East of Kurmuk within the Abyssinian Frontier—with special reference to the recent discovery of a considerable import of Berta slaves into the Sudan," manuscript in the Central Archives, Khartoum, dated 1928, 12 pp.

³ *Ibid.*

The Berta people were the first local group to suffer from enslavement; at first, to cultivate grain and collect gold for their rulers, but later for export along with the gold, usually in return for guns. The "Burun" peoples of the plains however were still relatively unaffected.

Dervish incursions and the Mahdiya

E. E. Evans-Pritchard in 1932¹ noted the destruction caused by Dervish raiding in the northern hills of the Burun area proper, and the fact that only the Ingessana resisted these attacks. Arkell mentions the devastation caused in Berta country by the Dervishes, and points out that this destruction of the Berta population probably served to increase the power of the local Watawit sheikhs over them. Some of the border sheikhs acknowledged the regime of the Khalifa (established 1885), for example Khogali Hassan of Asosa (after his father had died in captivity in Omdurman); but others did not, for example Wad Tor el Guri of Beni Shangul, whose fame even reached Cairo.² The Dervish raids extended into Uduk country, according to a few accounts I have heard locally.

Wad Basha, an old man probably over 75 years, born in Bellila and living there now, told me that while he was still being carried on his mother's back, the Ansar were causing disturbances in the area. They were killing the Arabs,³ who fled here. The Ansar followed them until they came here to the Uduk people. They were all running from the Ansar, while he was still on his mother's back. The Pambe people were chased by the Fukra until they came to Chali.⁴ Then the Turuk came and killed all the Ansar; but about twenty went to J. Ulu and stayed there.⁵

Another old man, Jahalla, who has been mentioned already, gave some information which appears to refer to Dervish raiding. When he himself was a very small boy, there were disturbances about which his father has told him. A man called Kubri, an Arab from the north, came with soldiers and fought, killed and captured people. He took away their animals. Jahalla himself was left on the path when people were running away from Kubri. This was the first disturbance, and took place before the fighting with Khogali Hassan. Before Kubri came, said Jahalla, the Uduks had many animals. Kubri took them all, leaving just the people, "for Khogali to finish off."

The border sheikhs were very powerful at this time, and as mentioned above, Wad Tor el Guri was resisting the Mahdists. Khogali Hassan, probably during the Mahdiya but after the Dervish incursions, started raiding Burun country to the west. This was probably to build up his own strength against his rivals, among whom the chief were Mohammed Wad Mahmud of Ghomasha (or Dul as it later became known), and Wad Tor el Guri of Beni Shangul.

¹ E. E. Evans-Pritchard: "Ethnological Observations in Dar Fung," *SNR*, xv, I, 1932, pp. 1-61, *passim*.

² Intelligence Reports, Egypt, Nos. 8, 10, 12, 14-16, 18, 19, 22, 23, 25, 26, 28-31, 33, 36, 37-40, 44, 50, 53, 59; these references for 1892-8 concern mainly the resistance of Wad Tor el Guri to the Mahdiya, and his slave-trading activities, which became notorious.

³ The term used implies that these were nomad Arabs, probably Rufa'a el Hoi.

⁴ A distance of roughly six miles. *Fukra* is the Uduk form of the plural of *faghir*, a religious teacher, often used locally to mean Ansar.

⁵ J. Ulu was an outpost of Gule.

Border raids on the "Burun" and the establishment of Government Control (1898–1904)

As soon as the Anglo-Egyptian forces had established their presence at Roseires, in late September 1898, news began to be received, usually through Sheikh Idris Wad Ragab of Gule, of raids by the border sheikhs on the "Burun" peoples. Bimbashi N. M. Smyth, stationed at Roseires, writes on October 24th 1898, that Tor el Guri's family lives at Asuza, and that J. Kirin is Khogali Hassan's stronghold, where he has 2,000 rifles, many of which he was keeping for Tor el Guri. He notes that slaves are collected by the sheikhs in this region "chiefly from the Goma, Amam, Burrun and the JamJam tribe near Keili."¹ The Koma and Jum Jum are here clearly referred to, and since the Uduk live between them and in the plains to the west of the mountain strongholds mentioned, it is very likely that they are the "Burun" being raided at this time. There is a strong possibility that raiding had been going on for some years. There is a steady stream of accounts of individual raids in the Sudan Intelligence Reports from 1899 onwards.

For example, in October 1899, riflemen from Asosa District raided the "Barun Hills near J. Surkum," and took slaves and dura.² Ibrahim Mahmud Hamdi, the brother of Mohammed, the Sheikh of Dul, led a raid from Asosa in March 1900, "against the hills of the Barun tribe, including Surkum, Wadaga, and against Jebel Tabi of the Inkassana tribe . . . The Baruns made a counter attack by night and recaptured a few slaves."³ It appears that local Abyssinian pressure may have been exerted on the border sheikhs to encourage them to keep up the raiding, especially after the lapse of opposition from the Mahdist forces to incursions into Sudan territory. The following passage is based on information given by a "native of Dar Fung" to the O.C. Roseires concerning raids in 1900:

Early in April, Idris⁴ Wad Mahmud Hamdi from Gurat, 30 miles west of Beni Shangul, guided a party of so-called Abyssinian tax-collectors to Gerawid, about 50 miles east of Ahmed Agha; their strength was 50 spearmen and 50 riflemen . . . Ibrahim, mek of Gurat, had raided and taken large numbers of women and children from Surkum, Gerawid and Elberest mountains;⁵ the Barun blacks have suffered most.

In the early part of May, a post of Abyssinians under a man named Fitrawi was at Gokha, about half a day east of Surtum (*sic*) in Beni Shangul, supervising the country of Khogali el Hassan, Mahmud Himeidi, and the Sheikhs of Jebel Khamsa. They were supplied with rifles and ammunition by the Abyssinians, and ordered to raid to the west. Since the fall of Omdurman, 25 villages of the Baruns have been raided.⁶

Again at the end of June 1900 a raid "against the Barun Hills, 50 rifles, under Hamed Mahmud Hamdi from Assosa, took 50 Barun slaves; afterwards with 50 rifles he took 180 slaves from Gumgum. The Abyssinians took the young men slaves as tribute, the remainder were sold to Arab traders."⁷

¹ S.I.R., 60, May–December, 1898, p. 122.

² S.I.R., 71, June–July, 1900, Appendix A, "Raids on Dar Fung," p. 4.

³ *Ibid.*, p. 4. ⁴ Misprint for "Ibrahim". ⁵ I cannot identify the latter name.

⁶ S.I.R., 70, May–June, 1900, p. 2.

⁷ S.I.R., 71, June–July, 1900, Appendix A, "Raids on Dar Fung," p. 4.

In the following Report for July–August, 1900, after information about another raid in mid-July by the people of Asosa on J. Tabi, it is pointed out that the control of these raiders is made difficult because of uncertainty as to whether they belong to the Sudan or to Ethiopia:

Raids have been reported from time to time, and it appears that the raiders come across the border and enter the Nile Valley, as they know that there are but few police.

This raiding will undoubtedly continue until the frontier has been delimited and police posts established along the border.

At present, owing to the debatable ground along the frontier, it is impossible to determine whether raiders are under Abyssinian or the Sudan Government.¹

These comments were certainly to the point; as it turned out, it was only with the delimitation of the frontier that raiding was brought under control (still some three to four years hence).

In October 1900 the Emperor Menelik was officially requested to control raids into Sudan territory. In fact, the Abyssinians had already detained Wad Tor el Guri of Beni Shangul and Mohammed Wad Mahmud of Dul (the brother of Ibrahim) at Showa, and in 1900 arrested Khogali as well; the three of them spent the next eight years in detention, Khogali leaving Hamid in charge at Asosa, living at Kirin.² A brother of Khogali travelled to Omdurman in January, 1901, and requested that the Sudan Government take over Asosa; he described it in glowing terms and pointed out that it had been under the old Sudan Government, and under Dervish rule. Concerning slavery, he has the following remarks to make:

Slave dealing is allowed by the local authorities at Assosa, but the Abyssinians may send representatives to Assosa to stop it, as no slaves are allowed to be taken to Abyssinia for sale. The blacks on the mountains at Assosa offer their relatives for sale when the country is in a state of need, otherwise they decline to do so.³

About a month later, however, we read:

The Mudir, Sennar, received a report from the Mamur, Dar Fung, dated 21st February, to the effect that about a month ago a raid was made by el Khogali's people into the Barun country; they fired on the inhabitants and carried off women, children, and grain. The Barun fled and took refuge in Jebel Jerawid, one of the Idris Ragab's mountains, about half a day from Gule. The raiders were reported to be still in the country, plundering cattle, sheep, and ostriches. The Barun request that these raids may be stopped.⁴

This last report is particularly interesting, for a large proportion of the Uduk population fled to J. Ulu and J. Gerawid possibly at about this time. We may assume from oral evidence (see below) that by this time, the Khors Ahmar and Tombakh were empty of Uduks, although those on the Khor Yabus stayed in their own region, simply taking to the hills, as will appear from oral information to be quoted later.

¹ S.I.R., 72, July–August, 1900, pp. 1–2.

² Arkell, *op. cit.*, p. 5. Smyth, however, gives 1898 as the date when Khogali was taken to Abyssinia (S.I.R., 84, p. 7).

³ S.I.R., 77, December, 1900–January, 1901, p. 5.

⁴ S.I.R., 80, March, 1901, p. 2.

A further mention is made, in April 1901, of raids by Hamed of Kirin into Burun country.¹ Hamed was Khogali's substitute while the latter was in detention in Showa. It is also mentioned that parties of slaves were leaving Keili for the Gezira.

Since little effective action had been taken by the Abyssinians over the border raids and slave trading, when Wingate, as Governor-General, visited Roseires on a tour of inspection in June, 1901, he wrote to the Emperor Menelek as follows:

... I think it only right to inform your Majesty that there is a certain amount of raiding by the wild tribes on those living on the plains, and, as long as this continues, trade cannot develop as it should. I therefore beg your Majesty will instruct your frontier governors to do all that is possible to maintain peace and tranquility, and I, in my turn, will also carefully instruct my officers to do all that is possible to prevent inter-tribal raiding, and to ensure security to the inhabitants and traders.²

However, although at about this time a police post was established at J. Surkum, the raids continued. The Mamur, Dar Fung, reports by letter in July, 1901, that

... the inhabitants of J. Gomgom and J. Morfa have been raided by Ibrahim, Hamed, Nayel and Yusuf Mahmud. The two former are respectively the meks of Dul and Assosa, both of which Sultanates will probably fall to Abyssinia when the boundary is demarcated.

The raiders are said to have killed 50 of the inhabitants and carried off about 100 prisoners.

The scene of the raid is some four to six hours S.W. of J. Surkum, where we have only lately established a police post.

The road by which the raiders entered Sudan territory is probably south of that portion of the frontier recently demarcated by Major Gwynn.³

It is also noted that since the Emperor of Abyssinia has little more than nominal control over these portions of Abyssinia, "the raids are likely to continue, at any rate for the present."

Bimbashi N. M. Smyth, still stationed at Roseires, submitted in July, 1901 a report entitled "Notes on the Abyssinian Frontier near the Blue Nile."⁴ This is the first document of any detail, to my knowledge, giving information on the peoples of the southern Dar Fung. With reference to the problems of frontier demarcation and border raids, Smyth has the following to say:

Dul is celebrated for its gold . . . The big Sheikh Mohammed Mahmud Wad Hemeidi, a prisoner at Addis Ababa, is descended from a Dongolawi who founded Ghomasha five generations ago, subsequently raiding the Berta. The local Mek of Dul is Ibrahim Mahmud Wad Hemeidi. The Watawit under him have a great deal of black blood in their veins. Major Gwynn was treated with scant courtesy in 1899, when surveying in the neighbourhood . . . Taken as a whole, the Watawit of Dul cannot be regarded as deserving of any consideration, if it should appear expedient to draw the boundary line through their midst.

¹ S.I.R., 81, April, 1901, p. 3.

² S.I.R., 83, June, 1901, p. 13. "Wild" is a misprint for "hill" as appeared in a later reference to this letter.

³ S.I.R., 84, July, 1901, p. 1.

⁴ S.I.R., 84, July, 1901, Appendix B, pp. 5-8.

The Burun blacks to their west are constantly raided by them.¹ Smyth's comment about the drawing of the boundary is pertinent: for this is what in fact did happen. Smyth further notes that in Asosa, the Burun and the Dinka are called the "enemy", and are constantly raided; also that Khogali's deputy Hamed is anxious to be on good terms with the Sudan Government. As regards the "Burun," Smyth notes that they speak several languages; and he also remarks on the resulting lack of political cohesion:

As the tribe is consequently unable to act in unison, and is armed with nothing better than bows and arrows and spears, it is not surprising that the Watawit have driven them out of many of their old villages near the foot of the hills towards the plain in the White Nile Valley . . .

It would appear important to get in touch as far as possible with the Burun through the Surkum police post. If this is done there would be no difficulty in delimitating the frontier to the Sobat, and there would be little fear of the Watawit continuing their raids if they knew the Burun had a few rifles with which to oppose them.²

In the first paragraph of this quotation, Smyth might well be referring to the flight of the Uduk to the J. Ulu area, where of course they still are at this point of the story. The Government was becoming increasingly conscious of the need to deal with local unrest before the frontier could be surveyed and demarcated, and Smyth's point is taken up again in the Report for September, 1901. A summary of raids in the Sudan-Abyssinian frontier region was drawn up, together with action taken, from 1899 onwards;³ and this document was submitted to Cairo in the hope that "if Lieut.-Colonel Harrington brings (the raids) collectively to the notice of the Emperor Menelik, he may take some steps to stop them, or, at any rate, that it may to some extent strengthen the former's hand in the negotiations about the frontier in that district, which are still pending."⁴ The summary report mentions most of the raids described above, together with others which involve people other than the "Burun," and gives general information on slavery and arms in the region.

While the tortuous task of defining and delimiting the boundary went on, the Burun were suffering still. Sheikh Idris Ragab of Gule wrote to the Mamur, Dar Fung, on 31st August, 1901, as follows:

I beg to inform you that when you wrote in accordance with the Mudir's orders telling me that His Excellency the Governor-General, when lately at Roseires, had already written to the Emperor Menelik with reference to frontier raids, I informed my people accordingly, and they were much pleased at the news and returned to their homes and began to resume their cultivation. They have, however, been again attacked by these people, the same raiders as in July, who have killed and captured from them their wives and children, more than 150 persons, some of whom have escaped and have reported this to me and have asked me to defend them. I consequently have ordered them to return home, assuring them the Government would take effective measures to guard them. I therefore ask you to refer to the high authority to give me permission to defend these people, and to issue to me 100 Remington rifles, with ammunition, for this purpose, lest my people go to reside under natives subject to Abyssinia.⁵

¹ *Ibid.*, p. 7.

² *Ibid.*, p. 8.

³ S.I.R., 86, September, 1901, Appendix A, pp. 5-8.

⁴ *Ibid.*, p. 1.

⁵ *Ibid.*, pp. 6-7.

It is implied in this letter that the Mufwa-Jum Jum area was the focus of the trouble mentioned, as it had been in July. The Uduk homeland was still deserted, its free population at this time still living as refugees in the J. Ulu region. But they were not safe even there; for we read next that on 25th September, the Mamur, Dar Fung, reported that

... Unrest continues in the south of Dar Fung owing to continued raiding by the Watawit Mohammedans, tributary to Abyssinnia, which is rendered possible by the postponement of the boundary settlement with the Emperor Menelik ...

Aulo Mountain, 1 hour from Jebel Gerawid, was recently raided by Ibrahim Mahmud's men from Dul.¹

"Aulo" (J. Ulu) was of course the main refuge of the Uduk people. It is noted also that renewed preparations for raiding were in progress in Asosa, and that it was rumoured that Surkum was to be attacked, where many fugitives had sought the safety of the Police Post. The comment follows: "It may be assumed that this was circulated with the object of inducing Government to take active measures against the raiders." Local pressure was certainly building up; in addition to the official mention of appeals to the Government, oral tradition testifies to the part played by certain leading men in securing the help of the Government (see section below). Some action was being taken at this time on the other side of the border; the Emperor Menelik on September 22nd ordered his local governor to stop all frontier raiding, and to hold an enquiry.²

But the following January, 1902, more raids were reported; Ibrahim Mahmud was said to have sacked Jebels Kurmuk and Maiak, and in February another report was received that he intended to attack Surkum, the new Police Post.³ Smyth Bey left Roseires with a party of mounted police on a fact-finding tour, returning after some two weeks to report that there had been raiding at Jum Jum and Wadega, but at Kurmuk and Maiak Ibrahim had agreed to levy tribute on the inhabitants instead. Arrangements were made for a Militia post to be established at Sayeda, a good strategical place for stopping these "Abyssinian aggressions." The next month we find that decisive action has been taken in arming the local supporters of Government and giving them military protection: Remington rifles and ammunition were issued to some of the "chief sheikhs" on the frontier, and small look-out posts of about 20 men were placed at such places as Kurmuk, Sayeda, Keili. The Emperor Menelik was again warned of the importance of controlling his subjects, and was informed that arms had been issued to Sudanese tribes in these districts, to enable them to defend themselves.⁴ Very shortly after this, and not surprisingly, an encounter took place between the Sheikh of Gule and Ibrahim Mahmud: the former received news that Ibrahim had crossed the frontier and was moving down Khor Agar to raid the Burun. He at once started in pursuit, and came up with Ibrahim near Fumka. It appears that Ibrahim was on his way to attack the Meban. A short fight took place, in which "Wad Mahmud lost 12 men killed, whilst Idris lost one man and one horse killed and three men wounded; the latter also captured six rifles and recovered two women."⁵

After another raid in June 1902 by Wad Mahmud into southern Burun country, during which 10 women were captured, by rumour to be given to local Abyssinian troops, it is noted that Idris Wad Ragab has been advised to bring the

¹ S.I.R., 87, October 1901, p. 1.

⁴ S.I.R. 92, March 1902, p. 1.

² *Ibid.*

³ S.I.R. 91, February 1902, p. 1.

⁵ S.I.R. 93, April 1902, pp. 1-2.

remainder of the Buruns north of the Kurmuk-Surkum line for safety. In fact, the country immediately south of this line, the Uduk area, had been empty for some time. The "Buruns" now being raided by Wad Mahmud were almost certainly Meban, far to the south-west.¹ At this point, however, unofficial news was received in Khartoum that Wad Mahmud had been taken prisoner by the Emperor Menelik.² Whether this story was true or not is not clear from the Intelligence Reports. But there was an interlude of several months during which no raids on the Burun are reported, perhaps because of the strict local measures which the Abyssinians were said to be enforcing. During the lull, however, the Sudan Government increased its control on the border region; for example, the Mek of Keili was removed from office for unlawful behaviour and a strong post left there;³ and in January 1903, an Inspector and 100 men from the Slavery Repression Department were stationed at Roseires.⁴ Although the Burun peoples were left in peace for a while, other parts of the border region were disturbed; and an interesting first-hand account of the aftermath of a raid near Gallabat is quoted in the Intelligence Report for January, 1903 (No. 102). This account gives a vivid picture of what the Burun peoples had been suffering.

The next information concerning Ibrahim Mahmud appears to be for April, 1903, when we read that his residence is now Jebel Jerok. He had moved as far west as possible, probably away from the tightening control on the Ethiopian side of the border. It was during early 1903 that the crucial portion of the international frontier had at last been demarcated, as far south as the Khor Yabus. It is in connection with the delimitation of the boundary that Ibrahim is mentioned in April, 1903: "It is now definitely settled that Jebel Jerok, the residence of Ibrahim Wad Mahmud, perhaps the most notorious slave-raider on the Abyssinian frontier, lies within Sudan territory." It is curious to note that the boundary actually makes a definite detour around Jerok, quite deliberately enclosing it in the Sudan! Jerok does however belong ethnographically to the west, rather than to the east, of the region. The demarcation of the line however cut off the headquarters of Ibrahim from the country of Dul, which he was administering in his brother's absence. Ibrahim, we are told, was reputed to possess 300 rifles, and his position on Jerok was said to be a strong one.⁵ In May, it is reported that Bimbashi C. E. Wilson recently visited Ibrahim Wad Mahmud, "the enemy of the Buruns," at Jerok, and "explained to him he was now under the Sudan Government and must henceforth abide by its laws." He expressed his willingness to do so, and so a letter was sent to him offering him a free pardon and directing him to report to the Mudir, at Sennar.⁶ In July, he replied that his brother, Sheikh Mohammed Mahmud, had written to him by order of the Abyssinians, telling him not to move. Sheikh Mohammed was at this time still detained by the Abyssinians. Ibrahim's letter goes on to say that he can have nothing more to do with the Sudan Government, unless it effects the release of his brother, for he and his people are under his brother's orders. An official reply was sent to Ibrahim, saying that as his brother was in the hands of the Abyssinians, he could not be Chief of any part of the Sudan, nor had he, that is Ibrahim, been appointed as such, "and therefore his excuse can only be regarded as an open defiance of Government, for which he must be prepared to take the consequences." He was

¹ S.I.R. 95, June 1902, p. 2.

² *Ibid.*, p. 2.

³ S.I.R. 104, March 1903, pp. 2, 9-11.

⁴ S.I.R. 102, January 1903, p. 2.

⁵ S.I.R. 105, April 1903, p. 1.

⁶ S.I.R. 106, May 1903, p. 1.

to report to Roseires by 1st November.¹ In other words, when the boundary had been drawn in such a way that Ibrahim himself was cut off from his country of Dul, the Sudan Government could break him. The game was up, whether Ibrahim and other local people involved realised it or not. Ibrahim probably did, for when the letter mentioned above had been read to him, he said that he "did not on any account wish to see the Government, and that he had no intention of coming to Roseires." He ordered the rifles and ammunition of the two policemen who had brought the letter to be confiscated, and sent armed men after them to speed them on the road to Keili.

Soon after this, Ibrahim is reported to have moved his stronghold from Jerok to J. Suri, near Goha in Abyssinia. Although his relatives were said to be advising him to give up his lawless conduct and submit to the Sudan Government, and although the Emperor Menelik is said to have ordered his frontier officials to arrest Ibrahim if he caused any more trouble, Ibrahim now embarked on a new series of raids into Burun country. He must have known the danger he was running into, but presumably intended to build up his own strength in order to resist the two Governments between whose authority he was almost caught. Idris Wad Ragab at Gule reported that about the beginning of September, 1903, Wad Mahmud raided Jebel Gerawid.² This hill near J. Ulu, was one of the refuges of the Uduk people, where they had been living for at least three years (probably longer). Five Burun were reported killed, and many captured. It is very possible at this point that a certain Abu Magoud, a leader of the Uduk people, left Ulu for Gule or Roseires to complain about the situation of the Uduk and to request official help; his name does not appear in the Intelligence records, but all local informants speak of the part he played in going to fetch the Government forces.

In November, 1903, we read that Wad Mahmud has been officially warned by the Abyssinian authorities that if he gives any more trouble he will be arrested and handed over to the Sudan Government to be dealt with. He was said by the Abyssinians to intend recrossing the frontier.³ In January, 1904, the Sudan Government took action. A patrol was sent to arrest Wad Mahmud, led by El Miralai Gorringe Bey, C.M.G., D.S.O., the Mudir of Sennar. In February, 1904, it is reported that satisfactory news had been received of the expedition which left Roseires at the end of January, with the object of arresting Ibrahim Wad Mahmud, the notorious slave-raider of J. Jerok.

The force was composed of 400 Regular Sudanese Infantry, 200 Irregulars, 100 Regular Cavalry and one Maxim Nordenfelt mule gun. Gorringe Bey surprised Wad Mahmud's stronghold at dawn, on the 11th February. The bulk of the men (Wad Mahmud himself is reported to have been away on a slave-raiding expedition in the Burun country) took to the mountain, at the foot of which their villages are situated, and hid themselves in caves, several of which were of considerable size, and difficult to locate. From these, as they proved, very inaccessible hiding places, they kept up a desultory fire throughout the day and following night. The next morning before dawn, about 70 of the enemy succeeded in escaping from the hill in a S.E. direction . . .

The work of clearing the mountain was continued on the 13th instant. A party of the enemy concealed in the caves and rocks above Wad Mahmud's village, offered a stubborn resistance, but were eventually overcome, and

¹ S.I.R. 108, July 1903, p. 1.

² S.I.R. 111, October 1903, p. 1.

³ S.I.R. 112, November 1903, p. 2.

forced to evacuate their position. Twenty rifles, four prisoners, and various horses, mules and goats are said to have been captured.

It is reported by prisoners that Wad Mahmud returned from the Burun country to his mountain (J. Jerok) under cover of darkness on the evening of the 12th inst., having left his cattle and slaves some six miles away. He appears to have been in command of the party above referred to, but succeeded in escaping with four men in a southerly direction . . .

Our total losses have been 2 men killed, 7 wounded, and 1 horse killed; whilst 36 rifles, 40 men, and 50 Burun slaves, as well as their families, dura, etc., have been captured from Wad Mahmud.¹

Gorringe Bey managed to obtain some information about Ibrahim's flight, and followed him southwards, into what was in fact Abyssinian territory. El Kaimakam G. de H. Smith Bey, one of Gorringe's patrol officers, had been despatched to interview the Abyssinian official at Goha, and it was Smith Bey who actually captured Wad Mahmud and seven of his men on 3rd March, 1904, without further fighting.² It appears that Sheikh Hamid Hassan of Asosa, who had always been well disposed towards the Sudan Government, had enticed Ibrahim to Asosa, and then informed Gorringe Bey of his whereabouts. Ibrahim was sent for trial in Wad Medani and posts of 50 men of the XIIIth Sudanese were established at J. Jerok and Keili.

The death sentence was carried out on Ibrahim Mahmud at Wad Medani on 23rd May, 1904.³

Sheikhs Wad Tor el Guri, Mohammed Wad Mahmud, and Khogali Hassan were still held by the Abyssinians, and were not released until 1908, according to Arkell.⁴ By this time the border region was well under control, and they could cause no more serious disturbances. Sheikh Hamid, supervising Khogali's domain, became sufficiently afraid of the Abyssinian authorities to flee into the Sudan, to Ora, in 1905. There he lived with many others from Kirin, including Khogali's wife, Anna, in a relatively harmless fashion. Minor incidents, including slave-dealing, were reported from time to time, but the power of the pirate border sheikhs was at last broken. From 1904 onwards, the "Burun" peoples were able to settle in their homelands once again and live in peace.

A crisis in Uduk history

I shall now attempt to present the way in which the events described above appear to the Uduk, one of the peoples covered by the term "Burun" in the above accounts. It will be necessary first to describe the way in which the Uduk classify the peoples around them, and the relations they perceive between themselves and others; then I shall try to place the period of destruction in the wider context of Uduk knowledge concerning their own society and its past. Oral accounts, both from eyewitnesses and generalized versions which have become a part of Uduk social tradition, will be used as illustrations.

In the official accounts quoted above, certain social labels are used, which are less ethnic terms than terms relevant to the political situation as seen by Government observers. Such names as *Watawit*, *Burun*, *Abyssinians*, might not be acceptable to the people grouped under them; and yet these labels distinguished the main conflicting elements, from the official point of view. In the same way, in

¹ S.I.R. 115, February 1904, pp. 1-2.

² S.I.R. 116, March 1904, p. 1.

³ S.I.R. 118, May 1904, p. 1.

⁴ *Op. cit.*, p. 5.

order to understand the Uduk point of view upon the same events, we must discover the way in which they classify the peoples involved and thus delineate the situation. The set of terms used, with their implications, provides a framework for interpreting their historical experience.

The word *Uduk* is not an indigenous term and is scarcely ever used by the people themselves.¹ They call themselves '*kwanim pa*, which means "people of the home" or "people of the village," and includes all who speak '*twam pa*, or the "language of the homeland." '*Kwanim pa* can also mean human beings as distinct from animals, or from spirits of the dead. Even though they have quite a wide social experience, coming in contact not only with the varied groups adjoining them but also with nomadic Arabs and Fellata, as well as representatives of Government, they are strongly ethnocentric in their outlook. They travel little, and appear to regard journeys outside the safe haven of their homeland as dangerous. On the margins of the world they know are such fierce and wild people as the *Dhamkin* (Dinka, Nuer and Shilluk) and the *Gale* (presumably Galla). Closer to home are people with whom no special relationship exists, and cannot be trusted, but are quite well known: for example, the *Tabé* (Ingessana) and the *Gwami* (pagan Berta). Some of the immediate neighbours of the Uduk are regarded as blood relatives (*abas*) in a metaphorical sense, for intermarriage takes place. Such related groups are the *Gwara* (Meban), *Aru* (Koma of Yabus), *Gwami Nonu* (Ganza), *Wadke* (Jum Jum; from "Wadega"), *Mufu*, *Carkum* (Hill Burun of Jebels Mufwa and Surkum), *Pur* (Koma of Daga River?)². Some of these groups have the reputation of being treacherous; for example the *Mufu*; and fighting has often taken place in the past between the Uduk and the Meban. However, it will be noticed that the community of those groups with which the Uduk intermarry coincides fairly closely with the former official use of the term "Burun," at least in this locality. The nomad Arabs (Rufa'a el Hoi) who pass through Uduk country are known as *Arab* or *Arab bwasho* (Arabs of the forest); and recent arrivals on the local scene are Fellata (known as such). Neither of these peoples is to be trusted; their distant origin and their habit of roving about in the wild forest without a home precludes trust. Two more major categories of people for the Uduk are the *Bunyan* or *Buny'can*, a term applied to any local people who wear clothes; and the *Turuk*, who include officials of Government, whether of the old Turco-Egyptian or any more recent regime. The term *Bunyan* is applied particularly to the immigrant northern Sudanese of the region (who are never called Arabs), and the arabicised Berta among whom they live. These Berta are sometimes qualified as *Bunyan Gwami*. Because of historical events, the Uduk regard the *Bunyan* as hostile and scheming; and the *Turuk* as their supporters and rescuers. But these terms do not have a rigid ethnic connotation. Descriptive colour terms are also used for people, as individuals; a person is either black, white, or red. But colour terms are not tied to the significant categories of people as seen by the Uduk; black people can become Bunyan by wearing clothes, riding donkeys, and so on; or they can become Turuk by wearing a Government uniform and doing an official job. Similarly, outsiders to some extent can be assimilated into Uduk society, and whatever their colour be termed "real '*kwanim pa*." The socially and politically significant terms for Uduk

¹ I have heard a suggestion that *Uduk* is derived from the Arabic '*atug*, the colloquial form of *ma'tug*, a freed slave.

² The *Pur* are sometimes included in the expression '*kwanim pa*.

history are not colour or ethnic terms at all; they are the generic terms '*kwanim pa*, an expression tying the Uduk people to their homeland, *Bunyan*, and *Turuk*.¹ It should be noticed that the Uduk do not distinguish between the Watawit and the Berta: they are all *Bunyan*.

The events of the turn of the century, from the Uduk point of view, centre upon themselves. It is not necessary, of course, to point out that they knew nothing of Khartoum or Addis Ababa or the international frontier. They saw themselves as the chief victims of the ruthless *Bunyan*, led by *Kujul* (Khogali Hassan), Hamed, *Burhen* (Ibrahim Mahmud), who attacked them and some of the closely neighbouring peoples viciously and repeatedly, until they had to surrender or flee from their homeland; and it was only when some of their own people, led by a certain Abu Magoud, went to call in the *Turuk* to help, that the *Bunyan* were defeated, peace restored, and the people could return to their home area. Now the Uduk are not good historians, in the sense that they do not possess a great body of oral tradition concerning the past. They say, "We know nothing of the past; we are just children, and all the old men have died." Most tales told about the past are in any case accounts given by individuals from their own memories of events to which they were eyewitnesses, rather than standardized legends forming a common body of knowledge. They have only the vaguest notions about their "original" home, which is by general consent in the region of Jebel Bisho, to the south of the Yabus. Stories "from long ago" of a mythical kind relate what happened at the beginning of the world (in the region of Jebel Bisho), and these stories are widely known. But between these mythical tales and the period of raiding by the *Bunyan* there appears to be a gap in general knowledge of the past; the only information concerning the period before the raids I have heard came from very old men who could personally remember the period or who could recall what their fathers had told them (see above, pp. 19-20). There is no common body of tradition concerning life before the raids. By contrast, the *Bunyan* raiding has become a standardized legend, known to everyone through story and song and impinging on many aspects of social life. The period has become a standard reference point in discussing the history of families and clans. In collecting genealogies, for example, I found that informants could never give me names of their forebears more than three generations back from the present adult generation. When trying to pursue genealogies further back than this, or trying to find brothers and sisters of people named in that generation, I would often be told that everyone was fighting the *Bunyan* in those days; or that so-and-so had brothers and sisters, but they were all killed or taken away by the *Bunyan*, and they were lost and forgotten. The loss of women during this time, which was greater than the loss of men (see below), was particularly serious for the continuity of Uduk families, for being matrilineal they reckon their genealogies through women. The reduction of the female population at that time is probably a factor in accounting for the foreshortened genealogies and fragmented pattern of clans today. Present genealogies, in fact, begin about the time of the period of destruction, and I have been able to pursue none further back. It may be that shallow genealogies are to be expected in a fragmented matrilineal society, and that the apparent relation between the limit of genealogies and the period of social

¹ It is worth noting that the Meban use a word similar to the Uduk *Bunyan* in referring to the Abyssinians: *buignon*. Evans-Pritchard notes this widespread use of apparently related terms; for a further example, the Shilluk word *bwony* for "stranger," etc. (*op. cit.*, p. 58).

upheaval is pure coincidence; but general historical knowledge is similarly fore-shortened, and sometimes linked in an explicit fashion with the period of destruction. For example, there is a standard legend which is used to explain the proliferation of small and scattered clan groups in Uduk country. These small groups are sometimes attached very informally to a larger "host" clan group. It is said that such small groups are the descendants of girls found abandoned in the bush, brought in and cared for by the "host" group. Similar legends account for the presence of "client" lineages in a number of societies; for example, the Mandari and the Plateau Tonga¹; but it is of interest to note that among the Uduk, in most cases the rescue of abandoned and lost girls is attributed to one particular phase of history: the period of the *Bunyan* raids. The people were scattered not only during actual raids upon villages, but apparently spent a good deal of time living in the forest, where people, the Uduk say, can easily get lost. It is very likely that a number of girls were lost and rescued in the manner described at this time; but whether this is the case or not, it is important to note that Uduk tradition represents the upheaval as a complete break in social continuity, and attributes some features of present-day society to the destructive consequences of that period. All genealogies, and some clan histories, are seen as beginning anew after the wreckage inflicted by the raids. Some clan-names indicate their origin at this time: e.g. "Jerok," "Ulu." The historical imagination of the Uduk is centred on this period and its destruction of their own society; their view of it is just as relevant for understanding their present-day society as for probing out the historical "facts."

The period of the raids, then, is seen as a complete break in the continuity of Uduk society; and the conditions during the break are represented as being the very opposite of those necessary for ordered social life. By contrast, the period since the raids is seen as one of continuity and settled growth, made possible by the defeat of the *Bunyan*. It seems likely that the period of raiding under discussion is not the only such upheaval that has been suffered by the Uduk; it is possible that they have been repeatedly disturbed in this way. I have heard several mentions of ancient raidings by the Nuer, Galla and Meban, and heard one account of the latter. It would appear that the Uduk see the last period of raiding as simply the most recent of a series of alternations between periods of disorder, death and destruction, when people are "running about in the bush like antelopes" (see below) and periods of peace, order and growth, when women give birth and families develop. Certainly the terms in which the contrast between peace and disorder is represented are of the most incisive kind, given the background of Uduk thought. Conditions during the upheaval are thought of as the very antithesis of social order. For example, the emphasis in informants' accounts on the fact that people were living in the bush and not in the village, like wild animals, without fire, and being rained on at night for they had no houses; that they were living on wild food, and not cultivated food, during the disturbances, points to the basic opposition in the world of the Uduk between the home, the village and the cultivating and cooking activities of civilized people as against the wild outside, the untamed bush with all its dangers. For people not to have a home is for people to be outside society not only in geographical, but also in a symbolic sense. The attitude of the home-based Uduks to the peoples of the forest, the nomadic Arabs and Fellata, who have no proper houses or villages or

¹ J. C. Buxton: *Chiefs and Strangers*, 1963, Chapter VII; E. Colson: *The Plateau Tonga of Northern Rhodesia*, 1962, Ch. I, and other works on the Tonga.

lands to cultivate, is consistent with these notions; nomadic peoples are regarded as being beyond the moral bounds of social relations. By emphasizing the loss of homes, lands, cultivated and cooked food during the upheaval, the Uduk are emphasizing what to them are central values of civilized society.

From the official reports, we cannot trace the details of what was happening in Udukland, partly because of the ubiquitous term "Burun," even though it is clear that a disastrous upheaval was under way in the whole region. But from local oral evidence, a picture can be pieced together of the impact of the Watawit sheikhdoms on the plains people. It will be remembered that two main sheikhdoms were raiding Uduk country: Dul and Asosa (see Map). Dul was under Mohammed Wad Mahmud until he was detained by the Abyssinians in 1900, when his brother Ibrahim Wad Mahmud took over, later making his headquarters at J. Jerok. Asosa was a bigger and probably stronger sheikhdom, at first under Khogali Hassan until he was detained in 1898, and then under his deputy, Hamid Hassan, whose headquarters were at Kirin. Khogali was known as *Kujul* to the Uduk, and was regarded as the arch-enemy; often when they speak of him they do not mean him personally, but simply one of his men. All the sheikhs were regarded as being allies of *Kujul*, and the Berta people were regarded as being solid in their support of the sheikhs (although we know that the Berta themselves were the first to be conquered and enslaved by the immigrant sheikhs). Serious raiding of Uduk country, I suggest, must have been well under way before the detention of Khogali in 1898, for his name to spread so widely as the arch-villain.

The effects of the raiding period on the distribution of the Uduk were briefly as follows. A large number were captured and sold in Asosa, where it is said there are still Uduks today; others were sold to the northern Sudan (there is today an Uduk-speaking woman in Wad Medani, who runs a little shop); others were captured and settled as agricultural "serfs" in village communities near to Jerok (at Gwarayo to the south) and Kirin (at Bade just to the north). These communities were swelled by large numbers of people who came to surrender of their own accord, since conditions were so bad in the countryside. The communities were mainly composed of men, since women were sold as slaves and concubines, and they not only supplied grain for the Watawit overlords but also served in battle. However, not all the Uduk population lost its freedom in this way; a large number from the central and Bellila areas managed to flee to Ulu, some 45-50 miles to the north-west, where there was a sheikh subject to Gule. And in the extreme south, in the Belatoma region, in spite of heavy attack, the people were able to defend themselves to some extent through utilising the stronghold of J. Bisho, and never deserted their homeland. The central and Bellila areas were quite empty, however, by about 1900 or 1901, all the inhabitants having been captured, or having fled to Gwarayo, Bade, or Ulu. And of course it was not until 1904 that Government action made it possible for the Uduk to return to their homes. The whole existence of the Uduk people, as a distinct group, had in fact been in the balance.

This enforced flight from the homeland, and destruction of their society, was of course seen as a radical upheaval by the Uduk. Without homes and fields for so long, without proper village communities, struggling to collect food in unknown wild places, and with the loss and death of so many, especially women and children, there was no basis for ordered social life. But after the return to the homeland, these chaotic conditions were replaced by order once more, and social life could begin again. In terms of this radical contrast which I believe underlies the Uduk view of their recent past, it is not surprising that no stories are remembered

of the period before the upheaval, for no continuity is envisaged through the crisis period; it is seen as a complete watershed. The crisis period is seen today not only as a death, but as a new beginning; and it is understandable that clan histories and genealogies do not go back beyond this period, for they relate to present-day social relationships, which certainly do not date beyond the upheaval. Present-day Uduk society is seen by the Uduk as dating from the settlement of the crisis; beyond that, it is accounted for in popular tradition only by the most general myths.

To support the general interpretation of the crisis in Uduk history suggested above, I am going to quote and refer to various accounts given to me by informants. I cannot here give material to support my remarks on Uduk genealogies and clan histories, but I hope to do this elsewhere.

Firstly, I shall quote an account by a middle-aged man, Ngau of Waka'cesh, in the central area. He had not witnessed the events he describes, but he has a relatively good memory for such historical traditions and songs that are current in Uduk society. Since his account is not first-hand, but derived from common knowledge in circulation today, it may be said to reflect the generally held picture of the events and their significance. It is interesting that those factual details which can be checked against the official accounts are accurate (for example, Ibrahim's escape and capture), which suggests that other details which cannot easily be checked are probably also quite accurate. The emphasis throughout the account on the destruction of settled village life, and the necessity to live in the bush on wild foods, to be without shelter, and so on, should be noted. Paragraphs 6 and 7 came first in the original, but have been placed later in order to put the story more or less in chronological order (the speaker was prompted from time to time).

Text 1¹

The people who used to fight us lived over there [pointing east]. Kujul [Khogali Hassan] led them, and his wife called Amna. They raided people until they were captured by the Turuk. Then they disappeared.

As Wad Ragab² came from there [pointing north], he seized clothes and tore them in pieces—*puw!*—saying, you are wearing the clothes of my father. For Wad Ragab has a mother from the Turuk.³

People fled, all of them. Kujul attacked all the people, and scattered them completely. Burhen [Ibrahim Mahmud] then took the place of Kujul. People fled, all over the whole homeland. The disturbances went as far as Meban country there. People were running about over there. It was Kujul's aim to kill all the people just by himself alone, together with Burhen. The whole population of Pambe was attacked by Kujul, and all chased over there.

Question: Where is the place they ran to?

People fled and lived in the middle of the forest, right there [pointing]. Don't you know those big cooking stones still lying in the red soil land there?

¹ Recorded May, 1967; translated by Shadrach Peyko Dhunya and myself.

² Sheikh Idris Wad Ragab of Gule, who according to this account actively aided the Government forces, tearing clothes off the supporters of Ibrahim. His reported remark presumably means that they were usurping the authority of the Fung rulers.

³ This is an Uduk idiomatic expression, meaning simply that he belongs to the Turuk people, in the opinion of the informant; this idiom is understandable in terms of the matrilineal form of descent practised by the Uduk.

Those stones were just for cooking wild potatoes because people were on the run and used to sleep with the heavy rain falling on them like that.

The people of Bellila fled too. The people of this area also went as far as Ulu.¹ The people of Pambe fled to Ulu. The people of Chali also ran, it is said, to Bade. The people of Gindi went to their own village at Bade. The people of Beni Mayu divided up; some took the way to Ulu and other split off and went to Bade, all of them. The Borfa people went to Bade also. The Belatoma people too, they ran about in their own area. They ran about in their home area.

Abu Magoud went from Ulu because the people were being chased by Burhen. Abu Magoud took the road to the English Turuk there. He went and gathered together all the people of Wad Ragab's place, all of them. Then he came and found the Uduk people at the home of Bade,² near Ulu. Then he went, and they defeated Burhen there at Jerok. Burhen was coming from an attack on the Meban people. Burhen was raiding the Meban people over there, and he came with his band of followers and went up the mountain. He went up the mountain with a small band of followers.

Then there was a certain Turuk called Mis-Mis.³ Mis-Mis was of the English people from over there.

And since then, people have lived in their home areas. They give birth to children and have filled the country now. Abu Magoud led the people home.⁴

Then Burhen ran away. He ran on, and on, as far as a great country of which there are many over there. Mis-Mis followed him, went and captured him there. He followed him and captured him; he came tied up to the great tail of a horse. He was dragged at the back of a big horse, an enormous one. He was brought back, dragged, dragged, came and was made to thresh grain, a pile of grain as high as the top of that roof. He, together with that big fellow Yukur—Basha—the two of them threshed the grain together. A great pile of grain like that roof—all of it. Burhen was tied by the other behind a horse. That was Burhen.

Ah! How many years did people stay away? It was Abu Magoud who led people back and prepared people to settle down at home. People then stayed at home; for they had moved from here to fill up the Ulu area, full, full, full. People had many years there, they say. They had many tens of years! They stayed and cultivated things, including *kala* grain [a sorghum]. People came home because Burhen was defeated by the Turuk.

And that is the story.

My second text is also a generalised account of the disturbances, in the sense that it was given by a middle-aged man, Thuga of Kalagorko, also in the central Uduk area, who was not an eyewitness to the events. His account, therefore, can also be regarded as expressing the essential character of the period, as seen by the succeeding generation of people.

¹ Ngau is referring to his own village in Pambe. All the other names in this paragraph refer to places in Uduk country.

² At Ulu, there was a certain Sheikh Bade, which can easily be confused with the place Bade near Kirin.

³ *Mis-Mis* almost certainly refers either to Kaimakam N. M. Smyth, v.c., who was stationed at Roseires from September, 1898 for several years; or to Kaimakam G. de H. Smith who accompanied Gorrings's patrol (see above). The Uduk would have heard only a strong Arabic pronunciation of "Smith," i.e. *esmis*, which easily produces *Mis-Mis*.

⁴ This paragraph is in the nature of a reflective aside.

Text 2¹

In the past, people did not live a settled life at home. People were chased by the *Bunyan*. They were chased by Burhen and killed, killed, killed . . . People were just running about. People were just running in the bush like antelopes, on and on, on and on like that, running about in the bush. Food was never eaten at all. People were eating wild things in the forest. They only had wild roots which they dug up to eat.

And after many many years, people were frightened, and they went to Burhen and surrendered to him at his home in Jerok. Then he cared for people there. But those people who remained behind, he came from his place there and attacked them again. Some people fled to Ulu. Then others went to Burhen; and when Burhen saw that there were no longer any Uduk people in the villages, he stopped his business of killing, and he looked after people in his country, Jerok, in peace. People spent years and years and they cultivated there.

After that the Turuk came from over there. The Turuk came from there, came, came . . . One Turuk came and found Burhen. He dressed in a ragged garment and went to Burhen, and said to Burhen, 'Oh, my children are hungry. I want to buy some grain, to take to my children to help them. I am very poor.' And Burhen gave him grain. And the Turuk deceived him, and said, 'I heard a rumour that the Turuk will come for you and kill you.' Then he abused the Turuk. Burhen himself abused the Turuk and said . . . ! [a coarse Arabic expression]. Let him come. I will seize him with my hands and he will pound the coffee for me. How strong is he?

Question (W.R.J.): What was the name of the Turuk?

The Turuk was called Mis-Mis. Mis-Mis. He came, then returned with the grain, and went and waited three days. Then he arrived with a group and found that Wad Mahmud had gone from Gwarayo to make war there in Meban country. He waited for him there in Garayo for a long time. Then he [Ibrahim] came home from Meban country and found that Mis-Mis was already in his village at Jerok waiting for him. He was informed by others as they were coming. Burhen began to blow the bugles² from there up to his home. The Turuk were just watching him, gazing at him as he played the bugle. He came and climbed the mountain to his house. Then he slept.

In the morning the following day, the Turuk got up and fought, fought, fought . . . throughout the next night. Burhen ran away from the other into the mountains over there, to the place called Koshol, a mountain in Ethiopia. Burhen escaped in the night, right away. In the mountains there, there was no more shooting, *pew, pew, pew* . . . no sounds of the guns, all was quiet.

And he, the Turuk, followed him. They were following his footmarks, *tukh, tukh, tukh, tukh, tukh* . . . right to Ethiopia in the mountains, where they found some Ethiopians³. They asked the Ethiopians, and said 'Tell us about Burhen. Burhen escaped and he fled here. Where is he? He is around here; we followed his footmarks.'

¹ Recorded December, 1967; translated by Shadrach Peyko Dhunya.

² I am not sure what instruments were intended; the Uduk word used refers to reed pipes.

³ The word used for Ethiopia and Ethiopians is *Gale*, clearly connected with "Galla." It is doubtful, however, if Galla tribesmen are meant.

Some Ethiopians said they didn't know. The Turuk said to them, 'Are you angry? If you deny him and hide him from us, all of you will be destroyed completely'.

One Ethiopian said, 'No, I have seen the man over there in that mountain. You go over to that mountain.'

They went, and went, and found him. They found Burhen and caught him, 'ce'b. Some Turuk were about to cut his throat. But others said, 'No, don't slaughter him. His name is very famous. Let us take him away. Let us take him home'.

Then they seized Burhen and they came and stayed for some time, stayed and stayed. They looked after all the people there [presumably at Gwarayo, near Jerok]. And as he [Mis-Mis] was going away, he told the Uduks: 'Arise, arise, get up and go back to your homeland.'

Then all the people came from there to their homes here. Those from Ulu came back too, and everyone met here in the homeland.

Mis-Mis caught Burhen and took him away down there [pointing north] and they killed him there. And then people lived in peace at last, because of the Turuk. People lived quietly from then, up to the present time. There was no running about. The Turuk looked after people very firmly. People could settle down in their homeland.

Thuga's parents themselves had been in Gwarayo, but he himself was still a babe in arms at the time. His account tallies in many respects with the official story; but the incident of the Turuk leader Mis-Mis (Kaimakam G. de H. Smith) dressing as a beggar in order to spy on Ibrahim does not appear in the official records. The tale is strongly reminiscent in manner of Uduk folk tales, which often centre on a wily character such as the fox outwitting the strong but stupid characters such as the hyena and elephant. It is possible that the Government patrol did send a spy to find out what the situation was at Jerok before they attacked it, but it is hardly likely that Smith, or any British officer would take on this job himself. The whole campaign of the Government is centred in Uduk eyes around the figure of Mis-Mis; and however much truth the spy story may have, it reflects the local view of the clever, wily nature of the Turuk leader.

The account is also valuable in that it indicates that the Uduk community at Gwarayo, near Jerok, was composed largely of people who had surrendered, and who were working for Ibrahim by growing grain. It was obviously preferable to grow grain in peace than to be slaughtered in the bush; and it seems that the news of the peaceful havens of Gwarayo and Bade, where there was a similar community in Hamid's country near his residence at Kirin, reached many fugitives in the bush.

The next account I am going to quote is by a man who remembers the period in question personally. He is Rusa of Beni Mayu, and if we believe his statement that he married at Bade, near Kirin, where he went with others to surrender to Hamid Hassan, the deputy of Khogali Hassan, he must be at least 75-80 years old. The community at Bade apparently started with a nucleus of captured men, who were required to grow grain and sometimes serve as soldiers for Sheikh Hamid. Since it was relatively safe to join this "serf" community, many people went to surrender to Hamid when life in the villages became intolerable. It also appears that certain individuals were actually leading groups of Uduks to Sheikh Hamid; one might guess that he and Ibrahim Mahmud had a network of paid collaborators who would collect up people for voluntary surrender. Bade and Gwarayo appear

to have been communities of the same type, cultivating and fighting for Hamid and Ibrahim respectively. Ulu on the other hand seems to have been a free community of refugees.

Text 3¹

The people of those mountains chased us to Bade. That Kubur²—you can forget him. *These* are the ones who finished off the people³—by killing them with guns, *dip, dip*. Kubur did not come to kill people with guns; he just frightened people. But these others finished off the people with guns, including our mothers. Heh. Our mothers were finished off by the people from over there. Did Kubur take anyone away there?⁴ The people who finished our mothers are from there [pointing]. Some of them would have lived until now. Were they taken when they were old? No—they were all girls. Kubur went empty-handed: but these are the ones who finished the people, in the heart [lit. “stomach”] of the mountains there.

Question: (William Dhupa): Did you run away from your house?

Agi! Were people not running from death? People were running from death. If people had stayed in their huts, would they be alive? Would they not have killed all the people? Heh. People ran away, and that is why you see people alive now. Because they fled. If we had stayed in one place, they would have finished everyone. People were running like antelopes. Heh. We ran in the bush, and we threw little children down in the bush. Young babies, small like this [indicating]. They cried, the cry of *cingkina* in the bush,⁵ while their mothers ran away.

Question: What did you eat in the bush?

We were running from the Bunyan. What could we eat? People were hungry. All the food was left at home.

Question: How many days did you stay in the bush?

How many days? People were running. They cut *'ba'th* wood for shelter, until the rain fell and quenched people's fires. People were seized with the cold. Heh . . . We were just dodging about in the bush, in the bush like that. While some men went off to look out for them. 'Here they are coming!' Then we would pull away the women, and dodge this way, dodge that way . . . We just went to their country there . . . That is why people are alive today. If people had remained around their homes, they would not be alive today. Would he not have finished people? People just went there, in spite of the danger of death.⁶ Yes. They seized people. Then people built houses there. Then he took all the people, and went and fought the Meban. This was when we had already settled down. He collected a lot

¹ Recorded December, 1967; translated by Shadrach Peyko Dhunya and myself.

² Kubur (the same as Kubri of Jahalla's account; see above), and his activities had just been described by Rusa; but I have no space to include this account here.

³ i.e. Kujul, Ibrahim and Hamed.

⁴ The form of the question implies that he did not.

⁵ *Cingkina* refers to homeless, lost people without kin, or sometimes to slaves, or sometimes to bereaved people.

⁶ Rusa is referring to Bade, in Bunyan country; and the pronoun “he” in this paragraph refers to Hamid Hassan.

of Uduks to take there, to fight the Meban. At this time people were planting dura. We produced a lot of grain. He led people to fight in Meban country, leaving the women behind. It was the Bunyan who led everybody there . . .

Rusa goes on to explain that there was a large area for cultivation at Bade, and that people had to pour their grain into a big grain store at the village of Hamid, nearby. They were not disturbed by raids in Bade. He then reflects again on the period of the raiding, saying that Hamid used to go down the Yabus river to Meban country, and that Kujul and the fellow from Gwarayo (Ibrahim) would go through Chali, down the Khor Tombakh to Meban country, where they would all meet up.

Hamid fought people as far as Ulu, when the Uduk were still at home. People were running about, and when he came back [from Ulu] he caught some people on the way and took them home. As he was coming from there, he took people; this was before people went to him there [to Bade]. Heh. Later, people surrendered to him. That is why people are alive today . . . If people hadn't got up and gone, would they be alive? We should all be destroyed. This young Gwarayo fellow was the one killing people with guns. Killed some people, *dup, dup*. Yes! Those people there, were they not shot with guns? Co Dhanyka's brother was killed, in the place where we grow maize. He went and died on the other side of the river . . .

We were taken to Bade by Co Poshko. We went to the Gwami [Berta] area by ourselves . . . Some people from Bambawash went to Gwarayo . . . some of our people [i.e. from Beni Mayu] went to Ulu. We were with the people of Chali [in Bade], then Co Poshko and others went to Ulu. We were taken by him and left there at Bade. Then he took his wife and other women to Ulu . . .¹

Many of my sisters were taken. Taken by the people of the mountains. Not a single man was taken [i.e. from Rusa's family], just the women. Not a single man. Only the women were captured by them.

The last point about the capturing of women rather than men tallies with some official reports to be discussed in the next section. For the Uduk, it was particularly disastrous as they trace their family and clan connections through women. I will quote one last paragraph from Rusa, concerning an incident when apparently the raiders came off worse than their quarry, which gives a good general picture of the raiding period:

We were once attacked at Jebel Borfa, while people were sitting together in one place, as we are now sitting, on a muddy day. Then mules came, *thu'b, thu'b, thu'b*. Then people thought the wind was blowing, because the mules were going *tukutukutukutuku* . . . People said, 'What's making that noise?'—while the Bunyan surrounded everyone. People were just escaping like antelopes—*buw, buw, buw*.² My father's people resisted the Bunyan and shot some with arrows—*dam, dam, dam*. They escaped; they were not killed that time . . . The Bunyan were the ones who were killed, because our people didn't separate brother from brother.

¹ This paragraph contained more details of actual movements which I have no space to discuss here.

² The analogy here is with a large-scale hunt, in which men will surround an area of forest and gradually close in; the animals attempt to leap out of the circle, the word *buw* expressing the idea of leaping.

Rusa also gives an account of the arrival of Idris Wad Ragab (of Gule) and the Turuk, to fight Ibrahim at Jerok, after which everyone could go home in safety.

Another old man, Jahalla (also of Beni Mayu), tells the story of his experiences when he was a boy and was forcibly taken to Bunyan country to work for Kujul. It is not clear exactly where he was taken, but it may have been Asosa. I do not have a verbatim record of this material; notes were made with the help of Shadrach Peyko Dhunya, in April, 1967. Jahalla is probably over 75 years. After giving us some information on the period before the severe raids (see above, section on the Dervish incursions), he tells us that people were then raided by Kujul and Ibrahim. They were "running about in the bush like antelopes," an image used by several informants. Many escaped, to Ulu, Bade, Mufu (J. Mufwa), and some went to a place beyond the mountains, the home of Mahmud. People in Belatoma remained at home.

Jahalla himself, a small boy at this time, the size at which children carry babies, was caught by a man with a gun. He was beaten and taken to join others in a thorn enclosure, at a place called the Fig Tree of Binna (near Beni Mayu). The people there included Meban, and women and girls. There were three Uduk women. Jahalla made a hole in the enclosure and got out. He got his little brother out too by pulling him on a rope. They ran away to their village, farther downstream. Many people were killed by Kujul and Ibrahim.

Many people were so frightened that they went by themselves to Kujul's place, to surrender. Jahalla was among those who went to Kujul's place, together with his small brother. They were kept there. People built houses. It was a very big village, including some Mebans (no Koma). The Mebans were taken to Ethiopia. The people worked for Kujul for many years, carrying wood, cultivating grain which was poured into grain stores for Kujul. Jahalla himself didn't work—he was too young. They stayed there until the Turuk came.

Suddenly the Turuk appeared, from Gule, to help people because they were being killed and taken as slaves, said Jahalla. The Turuk told people to go to the old places where they used to live. They fought with Ibrahim, who ran to Kujul. After the fight, people went home. Jahalla came back to Beni Mayu. After the Turuk victory, there was no more trouble.

A further conversation, recorded verbatim with Danum, a man of over 70 years in May, 1967, gives an impression of the confusion and scattering of people during the raids. He had previously said that during the fighting, you couldn't stay in the village; the Bunyan came and entered your house, taking things, killing people and taking people away, so that people had to sleep in the forest. He then said he was born in the red soil area, at Bambawash in the central area, and grew up there. He was asked by William Danga, one of my assistants:

"Was that the place where the Bunyan came and found you?"

"Yes," he replied, "we ran into the bush, over there."

"And which path did you take?"

"People remained in the bush."

"Then you came back home?" asked William.

"People came home; and then all ran away again. We all rushed towards Berta country there. Then next we had to turn back from there. People turned back from Berta country, and then reached Ulu over there." Danum then explained that people returned home from Ulu when the Bunyan had gone; and

then people settled down, and "began to eat maize in the fields." Danum's second wife was a woman actually born in Ulu. The emphases in Danum's account are the same as in those of other informants; people were homeless, lost in the bush and hounded about by the Bunyan without mercy. Normal social life, with secure homes and fields in which to sit and roast one's own corn on the cob, was impossible for several unhappy years.

I have a number of other eyewitness and second-hand accounts of the period of the raids; but in character they are very similar to those already quoted. I will give only one more text, which is of especial interest since it concerns events in Belatoma, the southern section of the Uduk, in the valley of the Yabus river and the mountains to the south. Informants were generally agreed that the Belatoma people did not vacate their homeland, as the central and Bellila Uduks did. The following story, by Losko who grew up in the Belatoma region, and who is 80-85 years old, explains why:

Text 4¹

Yes, we fought with the Bunyan . . . Ay, Oooh! That great gathering in Jebel Bisho²—that big mountain is where people gathered, while I was there in the Bisho region. It was because of Kujul. Huh. They surrounded the mountain by making a thorn fence. From the top of the mountain, people were jumping down like gazelle, from right up there: *puur-thuku'b!* *puur-thuku'b!*³—in order to stay alive; and that place we call today the home of the Bisho people.

The Bisho people were all dealt with by the Bunyan. They all fled up the mountain, everyone. They ambushed the path. Their elbows were tired from throwing spears, as they sat by the entrance [to the thorn enclosure]; meanwhile, others were rolling rocks down. The rocks killed the Bunyan, *nuru'd*.⁴ Others were struck by spears, *pup*, *pup*. The dead were lying all around, all over the place. Some of those killed by rocks and toothed spears were piled up on top of each other like *this* [indicating a great pile] on the path. Because the path was like *this* [i.e. very narrow and enclosed]. People were lying in wait and spearing them, *pup*, *pup*. Up comes another—he's shot, *pup*.

And then the spears they were carrying were all used up, finished.

Up in the mountain, they were chewing the bark of the baobab, in Bisho mountain there. The baobab bark was chewed, until it was finished up by the people, because they were prevented from going to get water. People were prevented from getting water. They had climbed up the mountain, and they were thirsty, so they were chopping off the baobab bark for water. How wretched they were to have to chop baobab bark for water . . .

Then the Bunyan came up the mountain. People went into the caves. I myself was in a cave. The caves were full up to the entrance. The mountain was full of people.

The ones in the caves survived; others were captured—everyone was captured from the mountain, everyone. Those of the caves remained in the

¹ Recorded December, 1967; translated by Shadrach Peyko Dhunya and myself.

² See Map. The whole of the southern Uduk region is known as the Bisho region to the Uduk, Belatoma to Berta and Arab-speakers.

³ This expression suggests the bounding movement of gazelles.

⁴ This word suggests the heavy rocks crushing everything beneath them.

caves, while others opened a way through [the thorn fence below] and were all scattered, scattered.

And I was there. Huh. It was when I had grown up.

Water was carried like this, over the shoulder, on each side.¹ Brought, brought at night until the cock-crow. *Gala, gala, gala, gala*²—water was brought by men as well. The Bunyan would shout 'Stop!' . . .

The mountain was completely surrounded. Was this a place where people could remain alive and call themselves the people of Bisho? This was not a place where people could survive.

Those who did survive married girls and they gave birth to children: and these are the people of Bisho.

Our people were very thoroughly dealt with by the Bunyan.

Losko gave much more information of value, particularly in relation to the way in which at least one group of Uduks from Beni Mayu allied themselves with the hated Bunyan to kill their own people; and the way in which the Uduk clans, being broken up and scattered during the disturbances, formed pseudo-kinship alliances with each other, which persist to this day.

I cannot discuss the general advantages of using both official and other written records together with oral accounts in making local historical studies, for reasons of space; but I hope that the accounts I have quoted speak for themselves. I will conclude with a short quotation, again from Losko, after he had been describing the disturbances in the central Uduk area:

Everyone fled, everyone, completely. This land was empty. Who could stay behind and cultivate? People were running for their lives. And those who did, are the ones who survived and returned to marry and build up their villages. That is why you see villages around you now.

Conditions in the "Burun" country, early 20th Century

There are a few documents from the early years of this century which give, directly or indirectly, some useful information on conditions in the "Burun" area. The first field report on Burun country was submitted by Major Gwynn,³ who was undertaking the task of boundary delimitation, after a journey from Kirin to Fashoda on the White Nile down the Yabus River, in early 1903. This is, of course, before the battle of Jerok in 1904, and during the period when the central and Bellila Uduks were at Ulu, Gwarayo and Bade, and the Yabus or Belatoma Uduks had retreated away from the river, towards the hills, probably all of them on the south side of the river. Major Gwynn reports that for 43 miles down the Yabus from Kirin, a stretch which is now partly settled by Uduks, the country was deserted, but game was very abundant. For the next 60 miles of the journey, game gave way to a large population of Buruns. This population we can say was certainly Meban. The absence of people on the upper reaches of the Yabus is consistent with Uduk oral tradition which tells of the flight of people into the local hills.

¹ The besieged people presumably had to risk fetching water at night after the baobab bark was finished. Women normally fetch water, of course, but at this time it was so dangerous that men had to go. Water was carried in skin bags.

² The sound of a line of people quietly slipping along with water bags.

³ S.I.R. 106, May 1903, pp. 1-2.

The Inspector of Slavery from Roseires led a patrol from Surkum through Wadea and Funka to the White Nile in March and April 1904, shortly after the battle of Jerok. His comments on the Jum Jum near Wadea were probably just as relevant to the people in Uduk country:

On my first visit here on January 20th with Smith Bey these people were rather shy, but this time they came down bringing eggs, merisa, and honey, and were delighted at the capture of Ibrahim Wad Mahmud, by whom they have been terribly harassed. In fact, although there are about 40 men, there are only six or seven women. There is also hardly a sheep or goat left . . .¹

Shortage of women, and of children, appears to be general in the region at this time; in Funka, the same writer tells us there were sixty men and four women.

In early 1906, Kaimakam G. S. Nickerson Bey led a patrol through the Burun region, and submitted a report in May, 1906, on "Dar Fung and Burun country."² This unpublished report contains valuable comments concerning local sheikhs of the time, as well as notes on peoples, communications, and so on. It seems as though the central Uduk area was still only sparsely settled. Nickerson mentions, for instance, tobacco being grown in the Tabi Hills (Ingessana) and in large quantities on the Khor Yabus; but he does not mention any on the Khor Tombakh, although the name of this Khor is known to him. This suggests the Khor was not yet fully resettled and under cultivation. He notes a large number of repatriated slaves living on the Yabus; these are probably mainly Meban, but may include some Uduks. He visited the village now known as Chali (Jalei in his report), the modern focus of Uduk country, as well as Beni Mayu and other places undoubtedly inhabited by Uduk people (see oral evidence of Jahalla, above; Jahalla and Rusa may even have seen Nickerson Bey and his expedition at Beni Mayu). Nickerson defines the boundaries of the Burun and their sub-tribes as being a line from J. Ulu to J. Kurmuk; J. Kurmuk to J. Borfu and then due south to the Khor Yabus; along this Khor, including both banks and round to Ulu again. The area defined includes most of the present country of the Hill Burun, Jum Jum, Uduk and Meban. Nickerson also heard reports of more Burun living two days' march to the south of the Yabus but did not investigate as he had no camels and the country was waterless. Nickerson realised he was dealing with several different groups, for he writes of "sub-tribes", and notes the existence of the Uduk, probably for the first time in the official record: "The northerly villages of these people call themselves Uddug, a branch of the Burun." However, he considers, "All the Buruns as far south as and including the left bank of the Yabus are one unit. There are no geographical divisions and if they were divided between Sennar and Upper White Nile Province the line would be quite arbitrary and would be very troublesome to administer" (the boundary was in fact drawn through the region). Nickerson mentions that "On the plain between Khor Tombakh and Khor Yabus there are small villages of 10-20 men dotted about five miles apart." The size of each village is roughly the same as today, but today they are scattered much more thickly. Nickerson notes that the Burun sheikhs have little power, and mentions a certain Faragalla as being the biggest sheikhs of the region; he apparently lived near to J. Tombakh. The Uduk leader Abu Magoud is not mentioned by Nickerson, although informants

¹ S.I.R. 120, July 1904, p. 4.

² G. S. Nickerson Bey, "Dar Fung and Burun country," p. 21, 1906, MS in Central Archives, Khartoum.

have told me he was made a sheikh by the Government, and on the map¹ a locality is named after him, suggesting that he was indeed an important man. Of the Burun in general, Nickerson tells us:

The family is the unit more than the tribe, many villages consist entirely of blood relatives, and in the bigger villages families live together. Each village has a sheikh, his power depends entirely on himself, and his strength and intelligence. There is no Sheikh who really rules a large District, some . . . have much influence but merely because everyone can see they are cleverer than the others and stronger and not because of a sort of recognised kingship . . .

They are very communistic in their habits and leave their dura in the forest, their pipes, spears etc. lying about . . .

As far as I saw the individual has great freedom, no one hesitated to express his opinion in public.

Their women are free to marry whom they will . . .

Owing to raids by Ibrahim Wad Mahmud and the Gallas the men outnumber the women . . .

Villages are small at present. People say that the villages used to be large but during the raids they lived in the forest in twos and threes and many people were captured.

The lack of political organisation and of powerful sheikhs is hardly surprising in view of the recent disturbances. Nickerson's comment on the excess of men over women is particularly interesting, and the point will be discussed below. The point about living in the forest of course confirms oral tradition.

The people living to the south of the Khor Yabus, even including those south of the Daga River, were also known as "Burun" in the early days. The following observations, collected in 1927 but from reports of an earlier date,² concern these people (probably Koma and Ganza) but the conditions described were almost certainly common throughout the region in the early part of the century:

Starting from the North, there are two small villages on the Yabus and ten villages on the Khor Daga. Among these villages are an ever increasing number of refugees from Abyssinia, mostly runaway slaves. Quite a number come from Sheikh Khogali . . .

Among the Barun the number of men greatly exceeds that of the women, owing to the fact that when raided by the Abyssinians (who attack at dawn) the women were easier to catch than the men, who invariably fled into the forest without attempting to offer the slightest resistance. The shortage of women is responsible for such disputes as there are, and it is no unusual thing to find a woman who has been allowed to live with three husbands. So long as a man's wife bears him three or four children he does not seem to worry much if she goes off with someone else . . .

The villages of the Barun are completely separate units. In the past, when after raiding one village the Abyssinians used to take guides from it for their attack on the next village, bitter ill feeling arose between villages; this

¹ Sudan 1:250,000 Series, Kurmuk sheet, 66-G.

² Extracts from "Reports on Eastern Frontier District, U.N. Province," 1927; authors are not given for the reports used in this document, nor dates. Central Archives, Khartoum, 102, 112, L.3.

ill-feeling is not likely to disappear during the lifetime of the present generation. It is, therefore, improbable that any attempt to group villages under paramount chiefs would meet with any measure of success. The chiefs as a whole are of little consequence . . .

The general picture which emerges, then, for the whole of the "Burun" of the southern Fung region in the early twentieth century, is one of tiny scattered villages, containing many refugees and ex-slaves, with no overall political organisation and no significant leaders or spokesmen. In these villages we are told there were no children apart from the newly-born; and there were very few women. There were probably very few animals indeed. The lack of women, although general, was particularly serious for the Uduk with their matrilineal form of descent and organisation. Given this dismal picture, it is hardly surprising that clans and families cannot trace their histories beyond this period; that the present-day pattern of clans is apparently fragmented, and that the whole region is very poor indeed, especially in animals. It might be possible to relate the present loose system of marriage relations among the Uduk and some of their neighbours to the conditions of this period. From contemporary accounts, one can appreciate to some extent the degree of upheaval suffered by the Uduk and their neighbours during the period of raiding and immediately afterwards; and one can place in perspective their own accounts of this period. It is no wonder that the emphasis of their accounts is on the total destruction of the conditions of civilised social life.

The wretched conditions of poverty and a shortage of population, especially of women, must have persisted for at least a generation; that is, until the late 1920s. The early writers who visited the Uduk, Pirrie and Chataway, saw them in this condition; and Evans-Pritchard who did not visit Uduk country proper because of sickness but travelled a few miles south of Wadega in 1926 writes of the Uduk: "From what I saw of them they seemed to be a miserable remnant . . ."¹

However, people now live settled lives, women have given birth and "filled the country," in Ngau's words; and Evans-Pritchard's comment would hardly be fair today. Since the chaotic upheaval and social destruction of the turn of the century, their society has developed anew; old social forms may have been fragmented, but new social forms have taken their place. In the realm of belief and cult, in particular, there has been a renewal in Uduk society; they have taken over and developed several cults from neighbouring peoples in the last generation. I hope to document these developments elsewhere; I just wish to point out that the growth of new belief and cult in Uduk society in recent times is consistent with the thesis put forward here of a social renewal following the crisis of social destruction.

¹ E. E. Evans-Pritchard, MS version of article already referred to; Central Archives, Khartoum. 102, 112, L.3.

SOME ASPECTS OF CLANSHIP & DESCENT AMONGST THE NUBA OF SOUTH-EASTERN KORDOFAN

by

JAMES FARIS

Introduction and Background

This paper is oriented primarily toward bringing up to date, clarifying and correcting what knowledge we have of the social organization of the Nuba peoples of the south-eastern corner of Kordofan—particularly the villages of Kao, Niaro and Fungor.¹

The only published material of any consequence on the area is in S. F. Nadel's article entitled "Dual Descent in the Nuba Hills"² in *African Systems of Kinship and Marriage*. Nadel, anthropologist to the Sudan Government from 1938 to 1942, spent something between two and six months working in the south-eastern Nuba Mountains. His 1950 paper, based principally on the village of Niaro, contains a number of inaccuracies and errors, and the paper which follows is both corrective and additive.

It is necessary to comment in general about the type of social organization under examination. Throughout the world are found many societies which have kinship groups, the membership of which is based on tracing common descent from ancestors of one sex (or the other) in a lineal fashion. Traditional Arab society is an example of a society with kin groups (e.g., *khashm bayt*) based on tracing descent from ascendant males lineally. Anthropologists call such kin groups patrilineal kin groups or patrilineal descent groups. Less common but still plentiful are societies in which kin groups are determined by tracing descent lineally from ascendant females, and these groups are called matrilineal descent groups. An example of a society with such matrilineal kinship groups is the Ashanti, the largest tribal cluster in central Ghana; or perhaps even the ancient Napatan and Meroitic kingdoms of Northern Sudan. In Sudan today there are societies with matrilineal kinship groups in parts of the south-western Nuba Mountains, and in Blue Nile Province, amongst the Uduk peoples, currently being studied by Miss Wendy James.

But quite rare are societies which have clear-cut functional kin groups based on both patrilineal and matrilineal descent reckoning simultaneously. The aspects of social organization discussed in this paper surround this latter phenomenon—known as dual descent, double descent, or duolineal descent, as it has been variously reported in the literature. This basically means the simultaneous membership of each single individual, from the moment of birth, in a

¹ This paper is based on two months field research during the summer, 1967. Research was financed by the Ford Foundation through the University of Khartoum, upon the generous permission of the Anthropology Committee of the Ministry of the Interior. I should like to particularly thank Dr. Mohd. Ibrahim Ahmed, Sudan Government Archivist and Secretary of the Anthropology Committee, for his help and many courtesies.

Spellings, which only vaguely approximate local pronunciation for place names, follow the maps of the Survey Department, Sudan Government. All local words have been deliberately omitted from this paper.

² In A. R. Radcliffe-Brown and C. D. Forde (eds.), *African Systems of Kinship and Marriage*, Oxford University Press, 1950, pp. 331–59. The south-eastern Nuba groups are not included in Nadel's major book, *The Nuba* (Oxford University Press, 1947).

patrilineal descent group of his father and a matrilineal descent group of his mother. In south-eastern Kordofan, an individual inherits property of various types from both descent groups, and has numerous other rights and obligations to both kinship groups. The actual *groups* chiefly considered in this paper will be the *patriclans* and the *matriclans* (and sections of clans). A clan is simply a unilineal descent group the membership of which claims common descent from a single ancestor (in the patrilineal case) or ancestress (in the matrilineal case), but where such descent can normally not be traced with precise genealogical accuracy. In other words, a clan is a kinship group based on a *tradition* of common unilineal descent.

With few exceptions, the literature on dual descent is poor. The thesis has frequently been expressed that societies with such descent systems are somehow too cumbersome and complicated to be workable, and the query is often put forward: why go to all that trouble when there are simpler ways of organizing kinship groups? The numbers of "difficulties" involved is given as the reason societies with such descent systems are rare and uncommon, but it can be seen below that not only are societies with such "complicated" descent systems workable, but they may even be more successful than societies with unilineal descent organization in dealing with some of the problems facing any lineally-organized kin group system.

It is true that societies with dual descent organization are rare and uncommon, and the groups described herein are unique, to my knowledge, in Sudan. Nadel documents dual descent for the Tullishi peoples of the western Nuba Mountains, but my own researches indicate Nadel may have misunderstood the Tullishi system. They are today a society with matrilineal kinship groups only, and all property is inherited in the matriline, only "gifts" being transmitted from fathers to sons.

As important as it is, I cannot at this point say anything about how the system examined herein came to be. Data are scarce and confusing, and the ecology, history and origins of the south-eastern Nuba groups require much more research.

Kao, Niaro, Fungor—Clanship and Residence

Kao, Niaro and Fungor are three hillside villages situated around an isolated series of small rocky mountains in the south-eastern corner of Kordofan Province—between Talodi (80 miles to the west) and Kaka (40 miles to the east on the White Nile) at latitude 10° 39' N. These mountains form a rough triangle with Kao at the north-western extremity, Niaro at the north-east, and Fungor at the southerly apex. Fungor is approximately 6 miles from Kao and Niaro; Kao is approximately 2 miles west of Niaro.

The villages—Kao with a population of about 950, Niaro smaller with about 600, and Fungor the smallest with 450–500 men, women and children—speak a common language¹ and consider themselves related to each other and distinct from all others. Many local people do not believe other Nuba exist—giving one some idea of the social and physical isolation of the area from the rest of the Nuba Mountains. Contact is with each other, with nomadic and semi-sedentary Arabs

¹ Undoubtedly a language of Stevenson's Koalib-Moro group of noun class languages (R. C. Stevenson, "A Survey of the Phonetics and Grammatical Structure of the Nuba Mountain Languages." *Afrika und Übersee*, Band XLI: pp. 27–35, 1957).

(there is one permanent Baggara village in the mountain area—Iskut—midway between Fungor and Niaro on the east side of the mountain), and less frequently, with the Shilluk to the east and south.

The villages are each quite compact, though they are divided into a number of village sections or wards. Each village section is independent of the other, even though the outside observer cannot always physically distinguish the boundaries. Children are not allowed to cross the boundaries between the village sections until they are mature, and each section has a large hut with low walls which is where various dances and ceremonies peculiar to each village section are held.

These people are all agriculturalists, keeping some cattle, goats and pigs (the total number of cattle in Kao, for example, is about 250—goats about the same, and fewer than 50 pigs). No man owns more than 15 cows, and many none or only one or two. They farm, first, the area immediately adjacent to their compounds; second, the alluvial areas adjacent to the mountains (mostly with garden crops and tobacco); and thirdly, they have much larger fields at distances of up to 3–4 hours from the village where they grow the bulk of their staple food—the several varieties of slow-ripening dura, dukhn, sesame and some maize. As may be seen below, these differences in field and farm type are reflected in inheritance patterns.

There are today eight named matrilineal clans, the four largest of which have named sections. The clan-section names have event or place attributes, but in only one case is it possible to specify semantically any of the eight matrilineal clan names. Clans without sections are exogamous (exogamy is the requirement to marry outside the group), and in those with clan sections, only the section is exogamous—thus two sections of the same clan are able to intermarry. The largest matrilineal clan has five sections, and there are a total of 17 exogamous units. Most clans and their sections are found in all three villages, though sections of a particular matrilineal clan may be missing in one or another village. In discussing exogamy, it should be mentioned that in Kao, Niaro and Fungor sexual relations with a matrilineal woman (or clan section woman, as the case may be) are considered incestuous, punishable by a swelling of the genitals and eventual death. This supernatural sanction applies only to men, as women are considered passive in sexual initiative.

Turning to the patrilineal clans (the word for patrilineal also means “chain”), there are nine named clans (one on the verge of extinction with no fertile males to continue it), all but three having two or more named exogamous sections—the largest with five sections—making a total of 19 exogamous units (ignoring the dying clan). Again, it is not as yet possible to semantically specify the clan names, but the section names are identifiable—some referring to the important public statuses inherited in the section—for example, “clan X, section of the rain ritual specialist.” Sexual intercourse within the patrilineal clan is considered “wrong,” but no specific sanction against such action has come to my attention.

In every case where it can be effected, residence after marriage is patrilocal. That is, a man brings his wife specifically to his father’s house—the father normally moving out to another hut nearby. Occasionally, of course, this is impossible (as in situations where a boy’s father has died or an older brother has already taken the father’s hut), and thus clans are sometimes dispersed. Only clan *sections* ever manage to maintain much residential integrity. As noted above with matrilineal sections, not all patrilineal sections occur in all three villages. Patrilineal (especially clan sections) are localized, and a large clan or clan section in one village may be

barely represented in one of the other two villages. With matriclans the distribution in each village is naturally more uniform, though even here concentrations of patrikinsmen occur because of a type of preferential cousin marriage. There are as well indications of a marital exchange system. The general picture to emerge is that of groups of patrikinsmen living together—men of the same clan section—with at least adjacent generations of these kinsmen belonging to different matriclan sections.

The remainder of this paper will discuss what these kinship groups *do* in Kao/Niaro/Fungor society—not in a causal, but in a descriptive sense. I shall look at the rules surrounding the actions of these kinship groups, and it may be seen what a remarkably logical and successful system it is in terms of the situations facing the society. The rules and prescriptions documented are based on carefully-elicited statements, and may not always reflect what actually happens; but I consider it methodologically critical to keep separate the two kinds of data—that is, the rules and the behavioural norms. It is my view that in ethnography the discovery of the former (the rules) should be logically prior to the determination of the norms.

Inheritance

Inheritance here may be viewed as a series of rules designed to assure the transmission of goods and privileges between holders and heirs. It should be mentioned initially that inheritance in Kao/Niaro/Fungor is (or can in all cases be) *lateral* before *lineal*—that is, a younger brother may inherit before a sister's son with property passed in the matriline, and a younger brother before a son with property passed in the patriline. Each situation is considered individually, and depending on a host of circumstances, such as relative wealth, age, reputation, health, etc., inheritance may be either lateral or lineal. This also means that divisible property is rarely split among heirs, but is passed as an entire estate to the single most appropriate heir. Besides this universal alternative, there are a number of dimensions relevant to local people to consider in describing inheritance rules. These are: 1, *Classes of property*. Class here is simply a generic term for the *local categories* of property transmitted. Farm lands, for example, are not a single class, but three. Water resources are not one class but two. 2, *Types of rights*. Type of right here refers to the kind and degree of command over property. Rights of disposal is the prerogative of the heir with some classes of property, whereas only rights to usufruct or use are transmitted with other categories. 3, *Sex of property and sex of heir*. Most property is specific to certain sexes—there is “male” and “female” property. Some property can be transmitted to members of the opposite sex, some cannot. When these dimensions are plotted together, combined with the patterned alternatives which obtain in some cases, the resulting matrices are a representation of Kao/Niaro/Fungor inheritance—parsimoniously specified.

With regard to land resources, the most distant farms, or “far farms” as the term may be translated, are inherited by the deceased's (or infirmed's) closest patrikinsman—a younger brother or an eldest son. Rights of disposal remain forever the prerogative of the clan (or clan section), and individual heirs acquire only rights of access and use. Far farm land is not in short supply, however, so a man needing more than his inheritance can usually acquire use of another cleared plot belonging to a patrikinsman (field size and the amount farmed is determined

by tradition, and, within reason, a man's ambitions), or clear a new plot. Far farm land newly-cleared passes in the patriline on the retirement or death of the clearer and rights of disposal rest with the clearer's clan.

As mentioned above, a man brings his bride to his father's house on marriage, and can thence acquire access to some of the small bits of fertile land adjacent to the compound. It is usually, however, some time before he claims this access, for young men, no matter what their marital status, do not cultivate on their own to any large extent (except in bride-service) until after they cease the tribal bracelet and stick fighting, sometime around 28–30 years of age (while they choose their first wife 8–10 years before this). These "hillside farms," as they may be translated, are small plots made by carrying earth up on the lower slopes of the mountain (next to the dwellings and immediately above them) to form small cultivable surfaces and crude terraces for garden crops and quick-ripening grains. In the usual course of events, a man's wife actually does most of the cultivating, but she only works the land because it is her husband's, and the land "title" rests with her husband's local clan section.

The third class of agricultural land, the valley or "near farms", is adjacent to the hillside farms and on the fertile low plain next to the mountains—the land composed of alluvium and well watered by run-off. These are matri-group farms—that is, a large area of demarcated land belongs exclusively to a matriclan section, all of whose farming members (male or female) have access to a plot if they wish. Any particular plot is inherited by one's closest lateral matriclansman (male or female), or if such persons are not available or have plots of their own, a sister's son. Women are here also the chief cultivators, whether they hold the land on their own or use it because it belongs to their husband's matriclan section—unlike the hillside farms where they may use it, but can never inherit. The near farm land is sexually "neutral", in contrast to the sexually "male" patrilineally-inherited hillside farms and far farms, and may be inherited by either a male or a female matriclansman. A sister's daughter, then, has claim over a sister's son should they both need land and she is the older of the two. As with other land classes, rights are usufruct, and land cannot be disposed of outside the matriclan section. With all classes of land, however, a man not of the owners' clan or clan section can petition the elders of the owning clan for an unused plot should it be available and the petitioner in need. I did not encounter these situations frequently, but they do occur. In such cases the petitioner could not pass the land on to his heirs, and he could be evicted whenever a member of the owning clan needed a plot.

Any uncultivated resources on either matriclan or patriclan land is considered clan property—not the property of the individual using the land at any particular time. Rights for use (i.e., for collecting bark from trees on the land or wild plants to be used for ritual or medicine) must be negotiated each time with clan elders by individual clansmen, regardless of the particular clansman's land the resource happens to be on. Rights to cultivated resources and seeded crops are transferred quite differently, as may be seen below.

Access to water resources are heritable. Supplies are of two types—the large, open pond in which rights are either community-wide or rest with a single patriclan or patriclan section; or the small wells dug into the sides of the mountain or at the bottom of a dried pond, access the prerogative of a single matriclan or matriclan section. There is one large open pond in Kao which illustrates this most clearly. When full, after the rains, it is public and all the persons of the

village may use it. But when it dries up and wells are dug to capture the sinking water, access rests with a single matriclan section (who admittedly do the digging, but who are the only group with rights of access). Water resources, unlike land, are quite limited, so it is the fortunate clan section with a good well. Non-clan (or clan section) individuals may acquire limited access (never any further rights) if the supply is plentiful and if the matriclan owners agree.

Traditionally, except for those used in funeral ceremonies and (with cattle and goats) a token given to the deceased's son, all animals pass in the matriline. A man then inherits the cattle of his mother's brother or of an elder brother. In herding, a group of adult brothers may run their individually-acquired cattle jointly. Rights of *disposal* are acknowledged if these matrilineally-inherited livestock are converted to money or if in payment of court fines, but a man is severely criticised if he attempts to give cattle to his son—and those having done so are constantly forced to defend their actions. These "gifts", however, are rarely extravagant, and matrilineal inheritance rules normally prevail. It should be mentioned that Arab inheritance patterns are being discussed by the current generation of animal owners, and the Omda of Kao, Niaro and Fungor—a convert to Islam—may uphold patrilineal transmission of animals in future. Goats are inherited in exactly the same way as cattle, and the Kao/Niaro/Fungor Nuba do not keep sheep or camels.

Most animals are regarded as "male" property, and cattle or goats in possession of a female holder pass to male matrikinsmen. Women can inherit these animals only if there are no appropriate male heirs. Females in possession of cattle or goats enjoy full rights, however, including the option to dispose of the cattle through sale and in other appropriate ways.

Pigs are slightly different—they are "female" property. That is, if they are inherited by a male matrikinsman, it is because there was not an eligible female heir. Pigs in the possession of males pass to female matrikinsmen.

There are other animals, such as a few donkeys (donkeys do not do well in this region because of a type of hair disease), dogs and chickens. These are all, by expressed rule, matrilineally-transmitted property, but it is rare they are ever actually inherited, and a man's sons usually enjoy the use of the animals. I have heard a man complain when his mother's brother bought an expensive donkey, for he knew his cousin (his mother's brother's son) would derive the most benefit from the purchase. Dogs and chickens are similarly treated, but again inheritance is rarely relevant and acquisition and disposal frequent. Sale of animals can be to any person.

There are other items that might be called "personal property" which roughly corresponds to a Kao/Niaro/Fungor property class—a man's gun and agricultural tools; a woman's large pots, large gourd containers, grinding tools and special baskets. These are, respectively, male and female property which both pass in the matriline—a woman's female property to her daughters or sisters, a man's male property to his brother's or his sister's sons. Some items, such as beds, remain in the house of the deceased to be used by the survivors and during funeral ceremonies. Most other everyday articles of both men and women are buried with them or destroyed at the funeral.

Grain in granaries is inherited by sister's sons or by brothers—though if the latter, the brothers also accept at least one season's responsibility for the widow and children of the deceased (who in time come to depend more and more on their

own matrilineal men). This inheritance applies to all grain, even that grown on patrilineal land. Because of theft, vermin and water damage, grain can rarely be kept more than one year.

Any money the deceased has left—if the location and sum is public—is inherited by the single closest matrikinsman. This is why the sale of matrilineally-transmitted property, such as cattle, is supported by a person's matrilineal heirs, and why the giving of cattle to sons is discouraged.

One property class is in many ways a unique class—houses. "House" is the word I use to translate the term given to the traditional group of huts linked together around an inner court (having but one outside entrance—the entry to the other huts from doors off the inner court), and ideally occupied by a single elementary family group. Houses rarely last a generation, and the facts of plural (polygynous) marriage mean houses can rarely be inherited in the quantity or at the time needed. A house with four hut "rooms" would normally be divided: two for sleeping, one for kitchen and one for storage. But pressures on the family may mean that a young man and his wife may have only one room, using part of the inner court for cooking. While it is true sons bring their first wives to their father's house, they may take a second wife to the house of their mother's brother, and in terms of use, a house or one room may be allocated to any kinsman of whatever description. The "title," however, rests with the patriline, and if the need presses, a matrikinsman of the owner using the house for one of his wives may be forced out should a junior patrikinsman of the owner need a room or a dwelling. The necessity for these types of alternatives make residence patterns far from purely patrilocal, but do not affect the inheritance rules pertaining to houses.

Rights in Persons

In Kao/Niaro/Fungor there are significant aspects in the types of clan rights and obligations over persons and statuses which distinguish these societies from societies with unilineal kinship groups (those based on reckoning descent in one line only). There is no bridewealth—men spend a number of years (up to 8) in bride-service to the girl's father (consisting of minimal agricultural and house building aid). The marriage is sealed simply when a girl becomes pregnant or at least sufficiently mature that she *could* become pregnant. There are no shifts in descent group status, and after having conceived in her parent's house, she comes to live and bear her child with her husband in his parent's house.

A child—who of course takes the matriline of its mother and the patriline of its father—is reared by its patriline and the wives of patrikinsmen. That is, if the marriage of a child's parents is terminated by separation, theft of the wife, or the death of its mother; a child, of either sex, remains with its father, and is fed and maintained by its father's mother or father's sister, or even another of its father's wives. Only if a father dies when his children are nursing infants does a widow keep her children with her should she marry elsewhere. Even then, children, especially males, return to their patrikin on maturity. If a mother dies while the child is an infant, it is given to an appropriate patrikinwoman or patrikinsman's wife (one who can nurse it) *of its father*, never its mother. In terms of nursing and rearing, a mother's matriline is considered dangerous, and a child nursed by its mother's sister or mother's mother is considered subject to ritual danger from its own matriline. It is, however, only on the death of its mother that a nursing child is left, for a nursing woman is sexually taboo, sanctions being the health of both the mother and the child, and thus such a woman is not likely to be abducted (thus

leaving her child) at this time, intercourse being impossible. After weaning, should a child's mother be stolen, the child remains with its father's mother or father's sister (i.e., its father's patrikinswomen or wives of his patrikin).

Negotiations to marry first begin when a young man is about to enter or has entered the age grade of tribal fighting—at an age of about 17 to 20. He talks to his senior patrikin residence mates—his father and father's brothers—about the girl he wishes to marry, and if there is no past event or exogamous restrictions marring the relationships between the patrikin of the boy and that of his prospective wife, he is given permission to proceed. This all begins when the girl is approximately 8 or 9 years old, for the betrothal period prior to marriage is the time during which the girl's husband-to-be is doing bride-service for the girl's father (or father's patrikinsmen). A young man, having secured the permission of his own patrikinsmen, then consults the girl's parents. The chief figure in these negotiations is the girl's father, who, with his brothers, decides on the suitability of the young man and his patrikin, after again examining closely any exogamic or historical factors which might prohibit the marriage. It is important to keep these negotiations in mind, for this marks the last time a girl's patrikin have jural authority in her marital career. If a man wishes to abduct a woman (a woman already married—one cannot "steal" unmarried girls), he must negotiate with the girl's mother's brother—her *matrikin*. Thus, a girl's patriline has rights only to initial disposal and receipt of services in bride-service; all further negotiations involving changes in the marital status of the girl are with the girl's matrikinsmen.

Kao/Niara/Fungor men express a preference for marriage with a matrilateral cross cousin—a girl who falls in the same kinship category as a mother's brother's daughter. Although a census of all three villages is not yet completed, only in Kao does it appear that this preference is realized for the majority of initial marriages. This means that a man negotiating with a girl's father and her father's brothers may be in fact negotiating with his own matrikinsmen, who are in most circumstances concerned about his welfare. So even though it is the patrilines of the participants who are chiefly concerned in an initial marriage, the fact that a girl's father may be also a boy's matriclansman is certainly to his advantage.

The theft of a wife today may mean the payment of cattle to the former husband. This happens when the former husband brings the case to court, and payment is from one to five cows, depending on the number of offspring the ex-wife is leaving behind—the fewer the offspring, the more cattle may be claimed. Of a maximum of five cattle (for a woman abducted having left no offspring) a man may actually receive only three—two going to the court which hears the case. People in Kao (the residence of the Omda of the entire area) say traditionally this arrangement was not present and is a Government introduction to stabilize marriage (or, as it appeared during my initial visit, to encourage seduction in order to fill the coffers of the Native Administration). Most men whose wives have been abducted do not press the case, in spite of appeals from the court, for the theft is an obvious injury to a man's pride and something they are hesitant to have publicized. Men express a court claim as prostitution—that is, it is the receipt of cattle for women—the way they regard Shilluk and Arab marriage payments. Custody of children, as seen above, remains with the father. On discovery of a theft, a man and his patrikinsmen *may* (though they do not always do so) go to the ex-wife's mother's brother and challenge him, for this is the man who had to give permission for the theft, and should the case be taken to court, the new husband (the thief) may ask the girl's matriclan for cattle with which to pay the fine. The injured

husband has no claim at all on the girl's patriline for return of any of the gifts he might have given them or compensation for his labour during the long period of bride-service.

Adultery is considered sin, not crime, and is not compensatable, though a husband may fight his wife's lover if he catches him. Occasionally a case may be brought to court, but the injured husband gets nothing—the Omda gleans a fine.

Desertion on the part of the wife is treated somewhat like abduction—any claims are on the girl's matriline, particularly if she deserts her husband and goes to her brother's house or mother's brother's house. This act is considered a potential prelude to abduction, for here suitors have easier access. Husbands rarely leave wives—if they do not care to have a wife around, she is simply ignored or otherwise made to feel unwanted until she finally leaves on her own. Should a case come to court over an abduction, the girl's matriline attempt to argue that the former husband ignored their sister (or sister's daughter) and made her feel unwanted, and thus should not be paid compensation.

There are, of course, symbolic aspects to the change in the status of a woman stolen—she has a period of seclusion, withdrawal from normal social intercourse, and a coming out—much as if it were a first marriage. The rights, however, of a matriline over its married kinsmen are clear, and should a man attempt to steal a girl without first getting the permission of her matriline, her brothers and matrilineal kinsmen will stop the theft or go and bring back the woman by force. To ignore the permission of a girl's matriline prior to an abduction may also result in supernatural punishments, such as barrenness or malformed children.

Divorce is impossible, except as understood by abduction, and involves no ceremony. Separation occurs, as mentioned, though any children born to a woman while she is separated from her husband (either living with her mother's brother or her father) are considered his and take his patriline regardless of their genitor. Illegitimacy is impossible.

Widows capable of still bearing children are quickly remarried. A widow without children may be avoided, for the coincidence of barrenness (or dead children) and a dead husband makes them quite suspect. There is not a levirate (a rule requiring women to marry a deceased husband's brother) in operation as marriage of a woman to men of the same matriline is prohibited, but it is considered proper and desirable if a widow marries another of her deceased husband's patrilineal kinsmen who are not also his matrilineal kinsmen. Rights to women and their potential offspring cease on a husband's death, however, so anyone (not of prohibited matrilineal clans or patrilineal clans) can take the widow—with no payment and very little ceremony—though here, as with any marriage after the first, the woman's matrilineal kinsmen must be consulted and agree to the marriage.

A man cannot beat his wife without risking retaliation by her brothers, so it is impossible to speak of the transfer of rights over a wife's non-sexual physical person in marriage. The actual rights transferred are then minimal, marriage is fragile, and consequently every man has had several wives, both serially and at the same time (in 1967 no man had more than three wives at once, although theoretically the number is unlimited), and each woman has had several husbands before she finishes her marital career (after a woman's child-bearing years are over, she usually remains with whatever husband she had at menopause). It appears marriage acts chiefly to fix the kinship addresses of children, for as we have seen, not even exclusive sexual access is guaranteed in marriage. Marriage, in summary,

is essentially the establishment of patriclan rights over, and access to, reproductive issue during the time any given marriage is in force—that is, before a man dies or before his wife is stolen—upon which time such rights cease. The matriclan of the girl has the crucial right to decide when and to whom such rights in marriage may be transferred.

These minimal rights in marriage with local women may be contrasted with the marriage by local men to Shilluk women. The Kao/Niario/Fungor Nuba occasionally “purchase” young Shilluk girls brought to the villages to be “sold.” The payments for such girls are usually more than 10 cattle, an equal number of goats, and £10 to £15 in cash for each—a very large amount by local standards. These girls are not, of course, slaves—nor had any evidence come to my attention that the Kao/Niario/Fungor people ever kept slaves—but the “purchaser” does acquire for himself (or herself—women can also purchase Shilluk girls in their own right) and his matriclan exclusive rights over this girl in marriage. These girls are reared as Nuba culturally, the only difference being that their marital fate is sealed, exogamy notwithstanding. They take the matriclan of their purchaser and may, if it is a man, become his wife. If not, they are given in marriage to another matriclansman, and even though they may change husbands (through dissatisfaction with a previous husband or his death), each new husband is of the same matriclan as the Shilluk girl herself and all her previous husbands.

The patriclan of such females often poses a problem. Some of these women with whom I talked insisted their patriclan was that of their biological father (whom they never, of course, see again—most of these women cannot even speak Shilluk, though several local Nuba can); but the local people usually insisted the girls took the patriclan of the elephant ritual specialist. This man had many Shilluk friends and was acknowledged as one of the villages’ Shilluk hosts when Shilluk came to the villages. He controlled the movement of elephants in Shilluk territory (adjacent) as well as Kao/Niario/Fungor territory—a fact acknowledged by the Shilluk men with whom I spoke. The important point here, however, is that the patriclan membership of these women mattered little, and the critical group membership was their matriclan—the group membership they gave their offspring. The chief reason they are “bought” originally, in fact, appears to be that it enables a man to produce sons that are not only his patrikinsmen but also his matriclansmen, and thus may enjoy all his inheritance. No one ever considered (*considered* here may be the wrong word—some of the Shilluk wives were quite lovely and had many lovers) abducting them, for the purchaser might claim back the entire purchase amount—far more than it would ever cost to steal a local wife, and far more than a wife was thought to be worth.

Though not transferred in marriage, non-sexual physical rights over persons do exist, in fact, and the illegal spilling of blood calls for adjustments and compensations. I say illegal, for the spilling of blood in the tribal sports is considered legitimate. Deaths and injuries resulting from the dangerous stick and bracelet fighting are not subject to any claims or compensations.

Homicide is unknown, and no one is clear about what would happen in such case—the usual response is simply that the Government would take away the killer. Nadel documented exactly the same response 30 years ago, which at least testifies to the success of the peace-keeping mechanisms of the duolineal south-eastern Nuba.

Fights, though rare, do occur, however, and the matriclan and patriclan rights and obligations again neatly mesh to give Kao/Niario/Fungor society wider

alternatives and more success in settlements than usually found in societies with but single unilineal descent systems. When two people of either sex fight, and if the case is brought to court (or before the moot composed of the elders of each village section), and providing it is between two individuals with no common clanship (or with common matrilineal clanship), the patrilineal clans of those involved negotiate the payment required (or submit to the decision of the court), usually a fine of money or cattle, to the injured party. But if the incident happened to be between persons who belong to sections of the same patrilineal clan or to the same patrilineal section, the issue of settlement is referred to the *matrilineal clans* of the parties concerned. So where patrilineal blood responsibility ceases to be effective within the group, responsibility is shifted to the matrilineal clans of the parties concerned.¹

Rights in Statuses

To introduce the various statuses and their transmission within clans and clan sections, it is necessary to examine briefly internal clan structure. Clans are essentially acephalous—there is no well-articulated leadership, they are without a head. The elders of the clan or clan section (either patrilineal or matrilineal) take the role of co-ordinating collective decisions and establishing consensus. In the smaller clans, this may only be a few individuals.

But there are specialized statuses peculiar to each clan, though their incumbents are not necessarily those elders in clan authority positions. On the contrary, these statuses, though inherited within the clan, are village-wide, or even wider in scope. These include such positions as the rain ritual specialist and the grain ritual specialist—singular statuses inherited in a particular patriline whose incumbents act with regard to the entire community. Nadel has called this type of situation *symbiotic*—that is, a situation in which clans have statuses peculiar to only certain of their members, inherited within the clan, yet statuses necessary for the welfare of the wider community. Indeed, one of his criteria for the classification of Nuba Mountain peoples is the presence or absence of a “symbiotic clan organization.”² It appears, however, that Nadel may have misunderstood the *clan's* role in this, for each status is more properly a *community* status occupied by individuals who simply have certain clan addresses so to speak, and the rules of succession dictate that these be kept within a given patriline. Even though, as noted above, clan sections may derive their name from the peculiar status inherited within the section, it seems erroneous to speak of symbiotic clans when it is in fact the peculiar status which is involved, hardly the clan.

Almost all special offices and statuses are heritable in the patriline only. These include a host of various specialists—for rain, grain, fertility, new year rituals, elephant control, lion control, monkey control, hunting success (for both animals and honey), oaths, peace, major sickness and barrenness, and planting, among others. Ritual, knowledge and paraphernalia associated with each specialist is not common to the entire clan or clan section, but only to individual incumbents. Any action taken against one of the specialists is directed to him (or her—women can theoretically fill certain of these positions should male incumbents be unavailable) only—there is no clan responsibility. Action against such

¹ What happens if the parties involved are of the same matrilineal *and* patrilineal? At this point I do not know, although certainly such situations would not arise frequently. I hope to get more data on this in later research.

² S. F. Nadel, *The Nuba*, pp. 9–11.

specialists is, in fact, not uncommon, for if the specialist fails to fulfil his function, he may be punished and even killed. The important point is that the patriline or section is not corporately responsible—it is a community function—a contract with an individual who, as all individuals, is a member of a particular patriline. And lineal succession is simply the local means of ensuring the perpetuity of the status.

Although Nadel appears to have been wrong in the case of the ritual specialists, there are other precisely symbiotic types of behaviour peculiar to clans (or clan sections) as a whole which are regarded as benefiting the entire community. This is chiefly a curious type of penitential behaviour, for the south-eastern Nuba appear to regard suffering as necessary to purity or success. In one case, two exogamous sections of the same clan, at the death commemoration ceremonies of one of their members (held long after the funeral of the deceased), divide and beat each other, individually, with stout whips—an action said to be necessary for the welfare, long life and health of the entire community. Two sections of another patriline beat each other when the wives of one section's clansmen conceive for the first time—said to be for the welfare of the entire community in that this ensures the conception and successful delivery of other of the community's women. These examples are more properly symbiotic *clan* situations, not the specialist statuses discussed above. There are other specific taboos, totems, ritual observances and burial directions peculiar to each clan and clan section (both matriline and patriline) which may have something to do with the rest of the community in a functional sense, although this would be part of a wider symbolic system which I have not as yet systematically investigated.

There is one other situation in which the interworking of matriline and patriline can be seen most clearly. This involves behaviour at the death commemoration ceremonies—complex lengthy rituals involving several days and involving kinsmen of the deceased from all three villages. Kao/Niaro/Fungor people regard the deceased as having a malevolent (or at least mischievous) spirit which lingers around after his or her death waiting for a death commemoration ritual that finally settles the spirit in an after-life. The living tend to ignore this spirit (as the ceremonies are protracted and expensive) as long as they can, until it begins to acknowledge this lack of attention with crop failures, unsuccessful hunts and persistent disease. The living kinsmen of the deceased then fulfil their obligation to rest or settle the spirit, thereby getting rid of it. It is the closest living matrilineal kinsmen of the deceased who must provide the death commemoration, aided by others of the matriline. A brother or a sister's son (in the case of a male deceased), a brother or a son (in the case of a female deceased) must provide the bulk of the food and grain for beer (an immense amount of beer is consumed in these long rituals, for one aspect involves a ten hour dance for which the drummers and singers must be well paid, and the audience fed). The audience, however, those who come to partake of the feast—who enjoy the privileges of the ritual, as it were—are the deceased's *patrikinsmen*. Thus, the deceased's matriline feed the deceased's patrikin, thereby settling the dissatisfied spirit.

To round out this preliminary sketch, mention should be briefly made of the nature of relationships between clans apart from the specific rights over and responsibilities toward individual clansmen and community statuses. Certain patriline (or sections) are linked in a type of fictive brotherhood by virtue of residence in the same village section—as a result, in other words, of historical circumstances. The relationship between these clans (the term for which may be

translated "between whom there is food") is marked by occupation of the same village section men's hut and a prohibition on combat with one another in the tribal sport of stick and bracelet fighting. The term for the relationship between clans (and sections) of other village sections (save those of your own and "linked" clans who may be living elsewhere—it should be remembered that there may be some dispersion of clan sections of the same clan) may be translated "between whom there is fire", and with these clans one must not eat, and may combat in the tribal sports. One fights the patrilineal descendants of those one's father fought, regardless of any mis-match of size or strength of the individuals involved. Outside one's own clan section, and other things being acceptable, a person can marry from either the "food" category or the "fire" category.

Certain matriclans (or sections) are linked as well—not by common residence, but by historical traditions, such as aid to one another in times of food shortages. Tribal sport is prohibited as well between "linked" matriclans, but the "fire"/"food" distinction is only relevant to patriclans.

The above sketch is all based on very limited research—research still in progress. I have asked questions bearing on topics S. F. Nadel had considered previously—questions which were oriented, however, toward eliciting only the local view of clanship and the rules and prescriptions for action articulated by the people themselves. Readers of Nadel's essay in *African Systems of Kinship and Marriage* should note this corrective paper in conjunction.

HABABIN VILLAGE ECONOMY¹

by

L. G. HILL

Introduction

The purpose of this paper is to give some account of the village economy of the Hababin. The Hababin are one of the small Arab tribes that make up the Dar Hamid confederation of North Kordofan. They number some 10,000 people² and form one *'omodiya* of 58 sheikhs and at least 63 village-settlements. They occupy perhaps 750 square miles of mainly *qoz* country in the north of western Dar Hamid, which for convenience I shall refer to as Dar Hababin. In Dar Hababin the *qoz* is represented by gently undulating sands with thin acacia woodland in the lower and flatter sections, with grass and *merikh* (*leptadenia pyrotechnica*) in the higher parts. These sands give way in the northwest to the *seisa*, a vast silty plain with short grasses, broken only by acacia bushes along the water-courses and occasional rocky outcrops. Four seasons are recognised; *kharif*, the rainy season, from late June to mid-September, followed by *darat*, warm and humid until November, followed by *shita*, cool and dry, until March when *saif*, hot and dry, begins. The rains of *kharif* average about 250 mm. per annum, but rainfall varies considerably in incidence and intensity from year to year. The area is, in fact, a sandy semi-desert, hospitable to men and animals for only half the year.

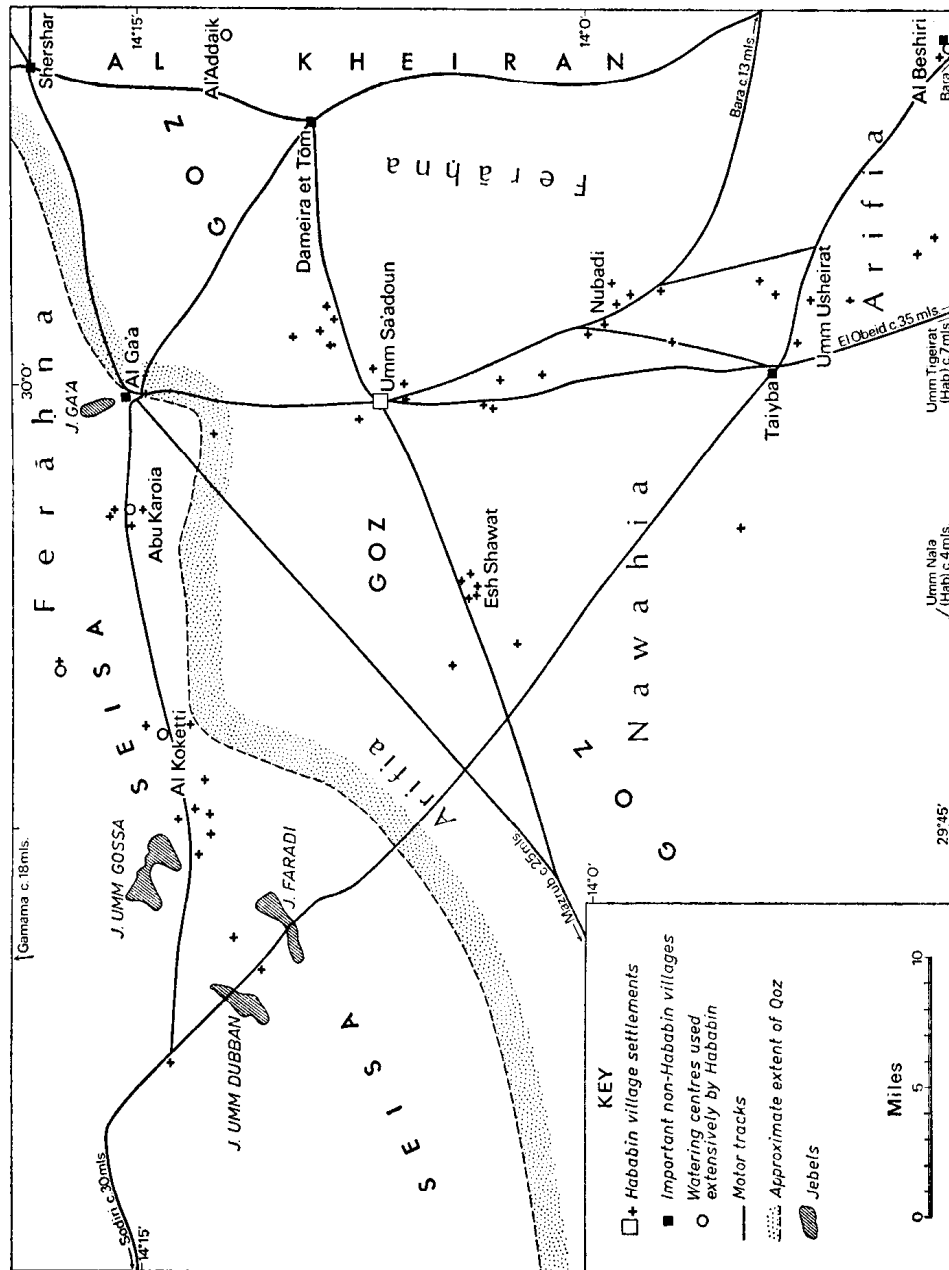
The Resources

In theory, all Dar Hababin is the property of the state, which grants rights of use to the tribe. In practice, the tribe sees itself as owning the territory, and wherever possible follows its own custom in matters relating to land. The tribe recognises five resources in Dar Hababin: water, cultivable land, forest products, grazing and salt.

Water is the vital resource on which the exploitation of all the other resources depends. Supplies are unevenly distributed on the ground and through the year, and must be considered generally inadequate for the present human and animal population. Rainfall provides short-lived pools in clayey bottoms during *kharif*, and a large supply at only one place, Koketti, where a *khôr* collects and holds surface water for most of the year. Even at the end of *saif*, water at Koketti is near to the surface, which makes it the watering centre for herds in northern Dar Hababin. Elsewhere, the people rely on deep wells. A few of these wells are concrete-lined and permanent. They were dug by the Council with village labour, and are owned and maintained by the village. The remainder are wood-lined, liable to run dry in *saif* and collapse in the rains. Many villages have no permanent water-supply. They transport water on donkey-back from other villages.

¹ A shorter version of this paper was read to the Philosophical Society of the Sudan on 5th September, 1966. It is based on material gathered during a nine-month sociological study of the Hababin in 1965, made possible by the generosity of the University of Khartoum and the Ford Foundation. The transliteration of Arabic terms is from the dialect, *not* from written Arabic, using the *SNR* system.

² The 1st Population Census of the Sudan 1955/56, 6th Interim Report (Ministry of Social Affairs, Khartoum), p. 11 gives the Hababin *Omodiya* population as 9,640.



Sketch map to show approximate locations of Hababin villages

Usable cultivable land in Dar Hababin is already a scarce resource, despite the low population density, because land far from water-supplies cannot be exploited. Already people spend a great deal of their time travelling backwards and forwards to and from their fields. Disputes over cultivable land are frequent and bitter. Cultivable land is distributed between villages by the Omda and between villagers by their sheikh. In tribal custom, village land once distributed is the property of the individual villagers. An individual's land cannot be bought and sold, but can be rented or inherited. When a man leaves the village permanently, or dies without heirs, his land reverts to the village and is re-distributed by the sheikh to those in need. Equally, anyone wishing to have land can approach his village sheikh.

All land not under cultivation is either grazing land or waste. Grazing is theoretically open to all, and many herds from other tribes (e.g. Kababish, Beni Gerar, Shanabla and other sections of Dar Ḥamid) pass through Dar Hababin each year. In practice, each village attempts to preserve nearby grazing by allowing as few animals as possible to water at its wells throughout the year. This grazing is then used in the dry season by its own herds operating from large watering places and the village itself. Despite this precaution, the area around many villages clearly is overgrazed at present.

The main forest product of Dar Hababin is wood, particularly of *acacia tortilis*, for building and fuel. It can be taken at will and is far from abundant. The southern part of the territory is just on the northern fringe of the *hashab* (*acacia senegal*) zone, so that gum arabic *within* the area is unimportant. There is a salt field at Al Ga'a, which is shared with the neighbouring Feraḥna tribe. It offers a local source of salt for men and animals, and full-time employment for the women of Al Ga'a. It is considered to belong to the villagers of Al Ga'a as a corporation, and forms the only important source of tax revenue for the central government from the territory, as it is exported over a wide area. As only one part-Hababin village is involved, it is excluded from the present account.¹

To exploit these meagre resources the Hababin villagers have an economy based on animal husbandry, horticulture and cash incomes. Let us consider each of these in turn.

The Basic Economic Systems

1. *Animal Husbandry.* The Hababin keep camels, cattle, sheep, goats, donkeys, chickens and dogs. Only tax estimates of numbers are available.² Camels are kept for transport, meat, milk, hair and hides; cattle for meat, milk and hides; sheep for meat, hair and hides; goats for milk, meat, hair and hides. These animals are used to provide a cash income, though camels are also kept for reasons of social status (see below). Camels, cattle and sheep are sold for their meat, and are transported on the hoof by Hababin and others to the markets of El Obeid, Omdurman and Egypt, direct or via the markets of Bara and El Shigeig. They are also slaughtered for their meat locally, along with goats which do not command a high enough price for "export." Clarified butter (*samin*) is made during *kharif* and *darat* for the "export" markets. Otherwise animal products are for local consumption, i.e. milk, milk products and meat for food; hair for the manufacture of

¹ A separate study is intended.

² 1965 Animal Tax lists give (for the tribe, not the territorial Omodiya): Camels 1,424; Horses 0; Cattle 3,301; Donkeys 1,418; Sheep 17,343; Goats 6,077.

wall-mats (*kifil*), harnesses, rope and tents; hides for leather containers, shoes, beds and harness. Most households have a donkey for transport and a dog as scavenger and guard. Few chickens are kept.

Livestock can be considered in two groups; those animals kept in and around the village, and those animals kept away from it. In the village are kept donkeys and a few camels for transport, goats for meat and milk, a few cows for milk and the odd sheep of small owners. These present a fair demand for water and grazing close to the village. To preserve these resources the major part of the livestock is kept away from the village throughout the year. Even so, in late *saif* both grazing and water are short in the village. Fodder saved from *darat* is used if available, otherwise the animals have a hard time. The wells are kept working twenty-four hours in the day.

The animals kept away from the village are herds of sheep, cattle and camels. There are two main watering places for these herds at which the Hababin spend the *saif*, their own *damar* of Koketti, and Al 'Addaik, a Feraḥna *damar* in the northern Kheiran. They also *damar* to a lesser extent at Al Beshiri and Umm Dubban where they have wells. Besides these, they use Gamama in good years and any place to the south with sufficient water in bad years, even going as far south as the Nuba Hills. Al 'Addaik and Koketti are especially favoured, as apart from their water supplies being reliable and close to home, they also have water very close to the surface which much reduces the labour involved in watering herds. From each *damar* there is a seasonal movement of herds to exploit more distant grazing and water supplies. Each kind of animal has a different pattern of movement related to its feeding and watering requirements and therefore must be considered separately.¹

Most of the Hababin camels water in the *saif* at Al 'Addaik. With the first rains the camel herds move out from this watering point on their *shogara* to wherever there is surface water and grazing (usually to the south). When good fresh grazing becomes plentiful the herds move back to Al 'Addaik to join up with other Hababin and Feraḥna herds. Then they move southwestwards on their *nushugh*. Their route depends on grazing and takes them through Dar Maganin to Dar Ḥamar where they turn northwards with the rains and move on into northern Darfur and Kordofan. They begin to return near the end of *kharif* travelling through Dar Kababish. In a poor year the route will be curtailed to exclude Darfur, the herds remaining in the vicinity of Jebel Katul and Soderi. In December the herds are brought to the villages to feed on the melons and stover in the fields. They then graze around the villages until it becomes necessary to water the camels when they fall back on their *damar* of Al 'Addaik for the *saif*.

Both sheep and cattle use Koketti as their main watering place in *saif*. In *kharif*, large herds of sheep follow a similar pattern of movement to the camels, but they go only as far as Dar Ḥamar on their *shogara*. Cattle stay fairly close to their *damar* in *kharif*. Some go north to Gamama where a lake usually forms, but mostly they move out into the *seisa* to exploit the small pools and succulent grasses. At this time the herders' families can join them for short periods to enjoy the plentiful supply of milk and make clarified butter. At other seasons, few women travel with the herds. When the surface water is finished, the herds are forced to move back close to Koketti until the next rainy season.

¹ The 1965 Animal Tax lists indicate that the eastern villages invest approximately 1/3 less in animals per taxpayer than the western villages.

Each year then sees a scattering of herds in all directions in the attempt to use distant grazing for as long as possible so as to preserve tribal resources for the hard times of *saif*. In *saif* all the herds concentrate on the few major watering points in or close to Dar Hababin, and it is at this season the labour requirements of the herds are highest, when animals must be watered frequently with sub-surface water. For the rest of the year labour requirements are low, two men, for example, being sufficient for a herd of 100–150 camels.

The vast majority of the villagers look after their animals themselves. The animals attached to the household are mainly looked after by women and children, while the herds are looked after by the men and bigger boys. The co-operating unit for animal husbandry is the patrilineal extended family based on a man and his sons. The sons, each in turn, look after the herds belonging to their father and brothers until their parents are dead and the brothers decide to divide the herds and begin the cycle again with their own sons.

Men with large herds, but without sufficient family labour, and men with insufficient animals to herd themselves must employ herders. These are usually young unmarried men and boys trying to acquire the cash and animals necessary for marriage and their own herds. There are no fixed wage-rates for herding, each contract being negotiated individually according to the type and size of herd. Thus an adult herder of camels might get about two to three pounds cash and a young male camel, e.g. a *wad labūn* (a three-year-old) for a year, while his boy assistant gets one pound and a younger camel. If a man with a small number of camels attaches them to a larger herd, the herders will get two or three young sheep or goats in payment besides. A cowherd might get a one- to three-year-old cow and one to three pounds per annum for his work. An adult shepherd will get a young ewe, and eight to twelve young rams spread over the year, while boys herding sheep or goats will get four or five lambs or kids for a year. Small numbers of cows, sheep or goats added to herds are usually paid for in cash at a few piastres per month. All herders get besides the use of a riding animal (camel or donkey), their food and clothing. The clarified butter produced from the herds goes to the owner.

2. *Cultivation.* The crops grown at present are two varieties of sesame (*simsim hāleri* and *simsim aswad*), bulrush millet (*dukhn*), two varieties of sorghum (*marēg ahmar* and *marēg abiad*), beans (*luba tayyib*), okra (*bamia*), several varieties of water melons and *kirkadi*. The main subsistence crops are *dukhn* and *marēg*, while sesame is grown as a cash crop. An attempt to introduce *kirkadi* as a staple cash crop in 1964 failed because of low market prices. Water melons are grown as a supplement to water supplies in the cultivation season, as animal fodder and as a source of seed for sale.

There is no system of crop rotation with a fallow period. Each farmer attempts to grow his own supplies and whatever crop he thinks will bring him the highest income in any year. When yields begin to fall off on a plot of ground it is considered time to leave it fallow and clear new ground. Informants differed considerably in their estimates of time cultivated to time fallow. They suggested four to seven years under crops, seven to ten years, or even longer, fallow. New land is referred to as *sukhna* (hot), old or abandoned fields as *barda* (cold) or *maiyyita* (dead). Land is also divided into *qoz* (sand) and *tin* (meaning here sand with a little clay). A villager expects to get a return of 3 to 4 sacks of sesame or 4 sacks of *dukhn* or 3 sacks of *marēg* from one *mekhammas* of *qoz* in a good year

while his land is *sukhna*, and half as much again from *tin*. Crop yields in a year of average rainfall are about half those in a good year; poor rains mean almost total failure of the crop. Yields are also reduced by the depredations of numerous pests, such as birds, locusts, millipedes, small animals, insects and untended livestock.

The horticultural year begins any time after the previous harvest (i.e. from December onwards), when the villagers opening new fields start clearing the land. The trees are cut down to chest-height and their branches heaped to make rough thorn fences. Clumps of grass are chopped out with hoes and the grass and undergrowth is burnt off. The cleaning of old fields begins in April and proceeds slowly because of the heat and the scarcity of male labour early in the *saif*. First trees are pruned and fences rebuilt, then the ground is cleared of weeds and stubble, and finally the soil is hoed to prepare it for rain and sowing.

The first sowing (*al tarmil*) begins at the very end of the *saif*, a few days before rain is anticipated. Because of the loss of grain to birds should the rain be late, some villagers prefer to wait until after the first rain (*rushash*) to make their first sowing. In both cases, there is a further sowing (*al tergi'a*) after the first shoots appear, new seed being put in to replace seed which has failed to germinate.

There is one weeding when the plants are small (*hash* or *mogh*), and another when they are half-grown (*jenkab*). In old fields, the first weeding is lighter than in new, and need not be commenced until the crops are almost a foot in height. Even so, the weeding, done with a small hoe (*hashasha*), are the hardest work of the cultivation season, there being only about a month available for each. Weeding is the crucial process in cultivation, because the amount planted depends on how much can be effectively weeded, rather than on how much can be cleared, hoed, sown or harvested, all of which have a comparatively longer time available for them.

The growth of crops is seen as proceeding through a number of named stages to maturity. The time taken varies; *simsim hāleri* is ripe in fifty days, *dukhn* and *marēg* in about three months and *simsim aswad* in four months. As the crops ripen so the best heads of grain are cut individually with a small knife (*umm tigda*). Secondary heads which grow later are cut when ripe but the grain is of poorer quality. In the case of sesame the plants are cut entire with a large serrated-edged knife (*mongal*) a few inches above the roots. After the cutting, the crops are stacked and left to dry for about three weeks, the sesame on the ground, the *dukhn* and *marēg* on low platforms to protect them from white ants. The dry sesame plants are shaken to release their seed, while the *dukhn* and *marēg* heads are threshed with a flail (*mudagaga*). The grain is winnowed by tipping it from one tray to another in the wind, picking out the larger pieces of chaff by hand. The dirtiest grain is sieved. The grain is then either stored in pits (*matmura*) in the fields or taken in sacks and leather bags to the house or market.

The fields are usually emptied by the end of December. The large water melons are put aside for later use, and some of the *marēg* and *dukhn* stalks are removed for housebuilding and dry-season fodder. When the last stragglers have removed their crops, the period of *talaiq* is declared, and the fences are opened for camels and cattle to graze on the stover and small melons.

During the horticultural season many people move out of their villages into small huts and shelters in the fields. Their supplies are brought to them by members of their family; alternatively they come into the markets occasionally and

collect their needs. As the season progresses they can cut down on the frequency of these journeys by relying on water from small rain pools, and later, water melons. Other families move out to seasonally-occupied villages such as Rigeiba. These villages are situated too far from permanent water supplies to be inhabited throughout the year, yet possess fertile soils and rain pools which can be exploited in *kharif*. The families stay there until the crops are harvested and the water exhausted. Staying in the cultivations like this reduces the time wasted in travelling enormously, and has the advantage that there is always someone present to reduce the depredations of pests.

There is no marked sexual division or specialisation in cultivation. The heavy work of clearing is predominantly a male occupation; winnowing is confined to women by the custom of *musuk*. The remaining tasks are performed by either sex, children or adults. Labour is differentiated by the system in which it is employed. On the one hand there is a basic peasant system in which each elementary family works its own fields, occasionally drawing in group labour for the heavier tasks. On the other hand, the more wealthy villagers operate a proprietor system, in which they rely mainly on hired labour for all cultivation tasks. Between these types there are many possibilities depending on a family's ability to employ labour or its own need to be employed. In the largest village, Umm Sa'adun, many villagers work partly as labourers and partly in their own fields. Elsewhere, there are few men capable of being employers, and the villages adhere more closely to the basic peasant system. Labour derived from outside the society is minimal.

Group labour is used in both systems, and a working party in the fields is called a *nafir*. When a man holds a working party, the invited workers labour for a morning, after which he provides them with *'asida* (millet porridge) and tea, and perhaps a pot or two of millet beer (*marisa*). In the peasant system the groups used are small, for participation involves reciprocal obligations. A man usually invites relatives, close friends and neighbours. In the proprietor system, the tribal officials—Nazir, Omda and Court President—have the right to call for workers from any village in the tribe for one working party a year, though these privileges are not fully exercised, probably because of the expense: for working parties of this kind are something of a holiday for the workers, in that besides the usual porridge and tea, a sheep is provided for a feast. Also if the previous harvest was a poor one (i.e. most years), they open their granaries on this day and allow those in need to borrow grain until it can be returned after the harvest. Others in this system such as sheikhs and rich men have only the right to call on their own villagers on one day in any year. They too must be generous in their hospitality unless they wish to incur reciprocal labour obligations.

In the cultivation season the villagers see themselves as working a seven-day week unless Muslim calendar holidays intervene. Even so they usually manage to find time to visit one or more of the local markets on market days even if only for the afternoon. They divide the day into two working periods: *dahawah* from about 7 a.m. to midday, and *serba*, from about 3 p.m. to 6 p.m. Labour for cultivation can be hired on a time basis, the labourer being paid for the *dahawah*, plus half again if he works the *serba*. Alternatively, it can be hired on a piece-work basis, the labourers being paid for clearing, sowing, weeding or harvesting per *mekhammas* and for threshing per sack. Rates for hiring are negotiated individually, and depend on the task and on the amount of labour available. Thus in June, when labour is abundant, rates for clearing are low, whereas in *kharif*,

when labour becomes scarce, the rates rise, especially for weeding. Table 1 gives approximate figures for 1965, a fairly good year for crops, grazing and gum-collecting. In 1966 when the rains were very bad, all rates were lower after July and remained so until the following July, when the very good rains of 1967 brought the rates to a higher level than 1965.

TABLE 1
WAGE-RATES FOR CULTIVATION, DAR HABABIN, 1965

Operation	Time-Rates per approx. 8 hour day (men)	Piece-Rates per mekhammas	Notes rates in piastres
1. CLEARING new land ..	15-25	100-150	
2. CLEANING old land ..	10-15	50-70	
3. SOWING sesame ..	15-25	40-50	
dukhn/marēg...		30-40	
4. WEEDING 1. heavy ..	15-25	100-150	
other ..		50-70	
2.	15-20	50-70	
3.	12	25-40	usually unnecessary
5. CUTTING sesame ..	15-20	30-40	
dukhn/marēg			
6. WINNOWING	15-25	1/15 of grain	women only

Notes: 1. Women's time-rates vary from half to full male rate.

2. Wage for *dahawah* only is 2/3 daily rate; for *serba* 1/3.

3. For daily labour meals are provided for operations 1 to 4; for piece-work, operations 1 to 4 are paid part cash, part food.

The third base of the Hababin village economy is the earning of cash incomes both inside and outside Dar Hababin. Traditionally, cash incomes are derived mainly from gum-collecting, even though almost all Dar Hababin lies north of the acacia senegal (*hashab*) zone. Only the villages of the southeast fringe near Tayiba have a few thin "gardens". These villages, Nubaḍi, Umm Usheirat, and Krānik are mainly composed of members of the Abu 'Ammar tribal section. The gardens are individually owned and worked by the villagers themselves. In the north, an attempt is being made by the Nazir and Omda to introduce a rotation system of four years crops and twelve years *hashab*, but the experiment is still in its early stages. The vast majority of gum-collectors go outside Dar Hababin. In the past southern Dar Hamid, especially Dar Maganin, was the most popular area. Today, despite the closeness of these gardens, few Hababin go to them. Apart from the problems of water-supply, they dislike the system employed there of the harvest being shared equally between the owner and the collector. They go

instead to the gardens around Jebel Abu Garūd near Roseires in Blue Nile Province.

The system is as follows. First, an entrepreneur goes from the village in September and purchases rights over a gum garden for a year. He can choose between an unburnt garden (*rabasha*) at £40 to £60 for immediate use, and a garden in which the undergrowth has been burnt off (*hurga*) for use from January at about £100. Alternatively, he can purchase a share in a large garden for £20 or so. He then returns home, collects workers and sells them shares in his garden for one to two pounds, or if they have no money, for a kantar of gum for every pound borrowed, plus one day's labour in his own share of the garden. Work in a *rabasha* begins with cutting in October, and the season lasts about three-and-a-half months. Work in a *hurga* is more popular, as the gum is of better quality and the January-to-June season fits nicely into the cultivation cycle of Dar Hababin. The *rabasha* and *hurga* seasons overlap, so the gum-collector can combine the two, using the slack period, between the later pickings in the *rabasha*, to do the cutting in the *hurga*.

Some of the collectors go to Abu Garūd by camel. This takes them about sixteen days. The majority go by lorry and train, taking four to five days. Their equipment consists of strong clothes, leather bags and an axe. They work in twos and threes sharing a camel which is used to carry water, food and gum. In the division of cash from the sale of gum, the camel is counted as a man for the work it has done during the season. Thus if there are two collectors, each collector gets one third of the profits, the final third going to the camel owner as the "camel's share." In a good year the entrepreneur who rents the garden can make a considerable profit provided he has a few camels to hire for the camel's share. The collectors make perhaps £60 per head profit in a good year if they work in both *rabasha* and *hurga*, more if they have their own camel. In poorer years, the profit is about £40, but much depends on the price of gum. Most of the collectors bring home much less than they earn, having spent a fair amount on food, travel, entertainment and presents before they arrive.

Gum-collecting is then the main source of cash income. Of the other sources, not previously described, a small amount of cash comes home from villagers permanently employed outside Dar Hababin. A few villagers receive government salaries, particularly in Umm Sa'adun which is administrative centre for the area. These salaries are small and the work necessarily part-time. The sheikhs and Omda get a percentage of the taxes they collect. Outsiders living in the area such as school teachers, dispensers and merchants offer some work for servants. Other ways of supplementing income are few. Many of the women earn a little cash every week by making the local *marisa* beer, weaving mats and rugs and tanning skins for sale in the local market. For men there is the possibility of carrying wood and water to Al Ga'a, and work butchering in the markets, neither very remunerative.

There are other opportunities for the entrepreneur with capital as merchant or shopkeeper and as animal tax collector for the Council in the market (*zariba*). The capital needed for these enterprises is considerable, and few Hababin have shown themselves capable of competing in them with the Jallaba. There is only one well-established Hababin merchant, though a few Hababin act as small-scale retailers for large merchants, and Hababin have on occasion held the *zariba* in Umm Sa'adun.

The distribution of economic systems

The economic activities outlined above have a fairly straightforward geographical distribution. In the northwestern villages around Koketti, animal husbandry, concentrating on sheep, cattle and camels is the dominant activity. The flat, gravelly *seisa* provides good grazing in most years, and allows some cultivation on sandier soils near to wells. Only one village (Umm Debeiba) cultivates cash crops as a main source of income; the rest have sufficient animals to be able to cultivate entirely or mainly for subsistence. Very few men go gum-collecting, and even fewer villagers earn supplementary cash incomes by work in Koketti market or by carrying wood and water to Al Ga'a. These western villages are occupied mainly during the cultivation season, the remainder of the year being spent in shelters or tents often quite close to the permanent village site.

The eastern villages on the *qoz* are more permanently occupied, and concentrate on cultivation of both subsistence and cash crops. Villagers with herds spend some of their year in the *seisa*, but the village investment in animals is lower,¹ with more emphasis on goats, sheep and cattle. Some men from almost all these villages go gum-collecting, mostly to Abu Garūd.

The largest village, Umm Sa'adun (pop. c. 750), lies near the junction of the *seisa* with the *qoz*. As the administrative centre and main market it offers more opportunities for a cash income than elsewhere.

Within villages economic strata can be distinguished. These are most marked in Umm Sa'adun, least in the western villages around Koketti. The few rich men have large herds of sheep, cattle and camels. They sell off the increase to provide cash when necessary. Most cultivate extensively—over twelve *mekhammas*—using hired labour drawn partly from their clients dependent on them. They do not collect gum, though some draw dues from gum gardens owned elsewhere. A few of them have government salaries.

The stratum below is composed of the vast majority of villagers, and is rather more varied in its activities. In the west they have herds of cattle, sheep and camels. They cultivate two to four *mekhammas* mainly for subsistence, hire their labour for herding, but not for gum-collecting or cultivation. Elsewhere they have fewer animals, mainly sheep and goats, and cultivate rather more (four to eight *mekhammas*) with their own labour. They hire their labour part-time for cultivation and go gum-collecting. A prolonged series of bad years can lose them their animals and throw them heavily into debt; a series of good years enables them to increase their herds, and the more ambitious to attempt minor entrepreneurship in gum-collecting and the market.

Below these are the poor. They have very few animals, usually goats. As they are poor they have difficulty in getting agricultural credit. They cultivate little on their own behalf, averaging perhaps two *mekhammas*, and spend most of the cultivation season as hired labourers. During the rest of the year a few collect gum, but the majority stay in occupied permanent villages (particularly Umm Sa'adun) as servants, water-carriers, beer-makers and odd-job men. The very poor are the old and infirm people without families to support them, incapable of work and dependent on the generosity of other villagers.

¹ See note on p. 61.

The Combination of Economic Systems

The above gives only a generalised pattern for the Hababin. The individual villager's exploitation of the economic systems, after allowing for the cultural and environmental limitations described above, is governed by his ability to perform his duties and to achieve his desired consumption pattern. His foremost duty is to feed, house and clothe his dependants. These are at any one time mainly his wife, or wives, and children, but he will be responsible besides, at one time or another, for unmarried, divorced or widowed sisters, his widowed or infirm mother or father, his divorced or widowed daughters and their children, and possibly other relatives and their children. Thus the ties of kinship and the uncertainties of demography make his subsistence needs very variable over his lifetime. Of these needs, housing costs him nothing beyond his labour and the obligation to help others who helped him. Equally most household and nomadic equipment he and his family can make themselves, as well as producing their staple food—grain, milk and meat. Clothing, and tools (axes, knives and hoes) though simple and of the cheapest quality, must be bought. So also must other subsistence foods such as onions, salt, yeast, chillies, sesame oil, tea, sugar, limes and tomatoes. He also needs cash for other market items which are now considered necessities—matches, lamps, paraffin, blankets, torches, batteries, metal cooking-pots and bowls, glasses, tin boxes, padlocks, dyes, soap, perfume, jewellery, extra clothes, tobacco and cigarettes.

Secondly, each villager should maintain a series of socio-economic obligations to fellow villagers and relatives close at hand. At every birth, circumcision, marriage and funeral, gifts of cash, gold or animals are necessary for relatives and special friends. When the celebration of these occasions are his own personal concern, he must provide food and drink for his guests. (Marriage is particularly costly for the principals, and though I am unable to go into the details here, the bridegroom alone will need forty to one hundred pounds and both his and the bride's parents are involved in heavy expense which is only partly offset by the gifts received). Both gifts and hospitality are obligatory if he wishes to maintain his status. Size of gift is related to ability to pay, so there is no need for him to continuously give better gifts than he receives—but high status can be acquired in this manner, for it rests on the size of the group with which he is able to maintain reciprocal gift-giving relationships.

Other socio-economic obligations are to give one's labour to those who participated in one's working parties, to give one-tenth of one's harvest to the village poor as *zakāh* and a gift to the Feki and Imam at the end of Ramadan (*futāra*). There is also an annual village feast (*karama*) after the first heavy rain of the year in which a bull is sacrificed, to the cost of which everyone is expected to contribute according to his wealth.

Lastly, a man must meet the demands of taxation. Direct taxes are collected on livestock, and on animal and produce sales in the market.

The fulfilment of these obligations depends on far more than the number, health and strength of the labour force the villager can command. It depends mainly on the capital he can command for investment and the savings he can accumulate, savings which must be sufficient to cover his needs in good years and bad. In the poor environment of Dar Hababin it is generally accepted that only three years in ten can be considered as good. In a ten-year cycle then, he must put aside enough in the three good years to cover the seven poor years. What he does in fact is to put part of his savings into gold and silver ornaments for his wife,

where it can be traded back into cash (at a loss) or used as security for a loan, should he be in need. The remainder he treats as capital and invests in the economic opportunities available. The risks are obvious, but skilful management of his capital can enable him to manipulate the three basic economic systems of cultivation, animal husbandry and gum-collecting in such a way that in good years he acquires a surplus for saving and further investment and in bad years he minimises his losses.

The sons of rich men acquire their capital by gift and inheritance, the rest get their 'inheritance' as assistance at marriage and build their capital by gift and their own initiative. All must consider the capital which they can draw from the rich men and merchants. The rich men tend to invest their capital in their own enterprises and it is only by hiring his labour to them that a villager can acquire some of the cash or animals he needs for his own enterprises. The alternative is to get credit from the merchants. These offer assistance in accordance with the risks they have to take and the profits they desire. The villager who is a regular customer (*zabōn*) and a good risk, having jewellery or animals as security, can always get credit from the merchant. No direct interest is paid, but the prices paid for goods "in the book" are higher than cash prices and are increased as the account lengthens. This is the most used form of credit in the area. For the villager who is a poorer risk, the shopkeeper will provide seed, food, clothing and some cash from June until October. After the harvest the crop must be sold to the merchant, who, after retrieving his outlay from the proceeds of the sale, shares the remainder half and half with the farmer. This system is referred to as *dain* (debt)¹ and few villagers have recourse to it. For the bad risk there is no credit available and he is forced to rely on the cash he can accumulate from working as a hired labourer.

The more capital the villager has available, the more possibilities he has in choice of combination of economic systems. It is in this connection that small regular salaries are significant, for the villager drawing them can command higher credit and ensure his subsistence throughout the year. But as at present these salaries are few and mainly confined to Umm Sa'adun, they have small effect on the overall Hababin system. The vast majority of villagers can take into consideration only cultivation, gum-collecting and animal husbandry.

Cultivation requires only a small cash investment for tools and seed, plus five to six months' labour. It is seen as a necessary activity, particularly by the villager with little capital, but also as a risky and undependable one. For he knows that the growing season is short, the soils poor, the rainfall fickle, the techniques primitive, the yields low and the market variable. Even in a good year he is limited by the cash and labour he can provide. Gum-collecting is seen as a safer occupation, for the main requirement is labour, and even in bad years a man can expect to come home with some cash in his purse. On the other hand, the profits from gum-collecting are never large (unless one invests cash as an entrepreneur), and by themselves are insufficient to stave off the losses resulting from a bad cultivation year.

¹ cf. *sheil* elsewhere, e.g. in Shaw, D. J. (Ed.) "Agriculture in the Sudan," 1966, Vol. II pp. 56-59. We might note here that the well-established merchant has many *zabōn* who are good risks; it is the small or new merchant who must take the greater risks and therefore charge higher rates on credit. This factor makes it difficult for small merchants (especially Hababin) to get established and for the poorer villager to get credit.

It is the insecurity of cultivation and the insufficiency of gum-collecting, along with the inadequacy or infeasibility of other alternatives, that directs the majority of villagers into making animals their main channel of investment. Provided a man herds with skill, animal husbandry offers security against want and employment throughout the year. The main risks lie in disease and theft rather than in the vagaries of climate, for a bad *kharif* in Dar Hababin can be avoided by moving to a more favoured area. The animals provide cash, gifts, food, hair hides and transport. The capital invested in them increases both by natural reproduction and rising market prices.

In the combination of economic systems then, the Hababin villager tends to look to animal husbandry as the most desirable of the main alternatives available to him, particularly as it is favoured by other non-economic factors which I cannot go into here.¹ His investment outside of animals is very small. Success is still seen in terms of animals owned, and the more successful a villager is, the more pastoral he tends to become. Ideally the Hababin would prefer to return their pre-Mahdiya system of animal husbandry with cultivation mainly by slaves. In practice, after the loss of animals during the Mahdiya and slaves in the Condominium, they have been forced to develop their economy in other directions. Their attempts to build up large herds again appear to have been thwarted by human population increasing proportionally faster than the animal population and by taxation favouring cultivation rather than animal husbandry.

In conclusion, this study of Dar Hababin has dealt briefly with one aspect of the Kordofan Arab economic complex of animals, crops and gum. I have attempted here to record the main systems of production and to relate them to each other as part of a tribal whole. I have also suggested that there are good economic reasons for the Hababin preference for nomadic animal husbandry over settled cultivation, even if they as a tribe would appear to have been unsuccessful in achieving their desires. It is hoped that this will be of some value in the problem of deciding what weight to put on animal husbandry in the proposed new agri-cultural settlements in the *qoz* zone of Arab Kordofan.

¹ e.g., Most of the social factors described by Cunnison for the Humr and Asad for the Kababish which would equally well apply here. See Cunnison, I. "The Social Role of Cattle," *Sudan J. of Vet. Sci. and Animal Husb.*, 1, No. 1, 1960 and Asad, T. "Seasonal Movements of the Kababish Arabs of Northern Kordofan," *SNR* xlv, 1964.

SOME DEVELOPMENTS IN RAIN-FED AGRICULTURE IN CENTRAL SUDAN

by

K. A. AGABAWI

Introduction

"The Granary of the Sudan", the name given to the most productive rainlands region of the country, is that belt of land stretching from the Abyssinian border in the east to Darfur Province in the west, roughly occupying the area between isohyets 450 and 800 mm. This vast expanse of nearly 100 million feddans¹ is made up of two distinct types of soil, viz: the Goz Sand soils and the clay soils of the Central Clay Plain. About 60 million feddans of the clays, mainly in the centre and east of the country, are potentially suitable for agricultural production. Unfortunately, apart from three relatively small foci of advanced agriculture in the Gedaref, Singa District² and Nuba Mountains, the rest of the clay plain is, so far, very inefficiently used for crop and animal production. The wasteful system of shifting agriculture and the unreliable practice of "hariq"³ cultivation are the main systems of plant-crop culture; while the use of uncontrolled natural pastures by nomadic herds constitutes the only means of animal raising. Water supplies during the rainy season are adequate but they become seriously short during the dry season. Low standards of husbandry and shortage of water are the most important limiting factors to efficient land use in the whole area.

The Nuba Mountains region has been developed since 1924 as a short-staple cotton producing area by superimposing this crop over the system of shifting cultivation. No attempt was made to improve or change the method of farming, which has remained essentially the same as it was in 1924, although the area under cotton has been substantially increased. In contrast to the Nuba Mountains, development in the Gedaref region⁴ was started in the early forties and has, since that time, received great attention as a mechanised crop producing area. Today, the Gedaref area has the most advanced system of non-irrigated farming in the Sudan and provides many pointers for future rainland development in this country. Farming in the Gedaref region is, however, faced with many obstacles which must be surmounted to improve present day production, and which need to be firmly borne in mind in planning future projects. It is for these reasons that the Gedaref area has been chosen for a critical study, of the development of rainlands resources for agricultural production.

General Characteristics of the Gedaref Region

Location. This region lies south-east of Khartoum between latitudes 12° 45' N and 14° 45' N and is bounded by the Atbara River on the east and the Rahad River on the west and south-west. Gedaref town itself is about 245 miles from

¹ One feddan = 1.038 acres = .42 hectares.

² Dali and Mazmoum mechanised crop production areas.

³ "Hariq" cultivation is a form of shifting agriculture, unique to the Sudan, in which fire set on the old dry grass burns the young green grass which is the potential weed crop of the season. The dura crop is then sown and no further weeding is needed.

⁴ Singa area has been developed along the same lines as the Gedaref.

Khartoum,¹ the capital and main consuming centre of the country, and 480 miles from Port Sudan,² the only sea port. Thus the region is reasonably favourably situated with respect to internal and external trade.

Soils. The soils in this area are deep, dark coloured, heavy, extensively cracking clays, often called "Tropical Dark Clays, Black Cotton Soils or Grumusols" (Knibbe, 1964). The clay fraction varies from 61% to 73% (Laing, 1953). Occasional calcium carbonate concretions are to be found in the top horizons.

These soils are generally alkaline in reaction and the soluble salt content is uniform and always below .1% which is the critical limit for crop growth. Both potassium and phosphorous supplies are adequate but nitrogen may become deficient when continuous cropping of exhaustive crops is practised.

The top soil is self-mulching and thus develops into a very good friable condition during the rainy season, a characteristic which makes it well suited for working with light machinery. The mulch, which may be up to 8 cms thick, absorbs rainwater readily but there is a danger of water-logging late in the rainy season, particularly in the low-lying areas. When the rains cease these soils harden as they dry and develop cracks 2–6 cms wide and 40–120 cms deep (Knibbe, 1964).

These soils are amongst the most fertile in Africa and are capable of producing high yields of a wide range of crops. However, the implication of a clay soil subject to water-logging is that it may develop sticky conditions unsuitable for the work of wheeled machinery causing delays in critical cultural operations. The hardening of the clay at the end of the rainy season, moreover, interferes with the harvest of crops which fruit below the surface of the soil—e.g. groundnuts.

Around the hills and on the higher ground there are reddish-brown, often coarse-textured, soils, locally known as *gardud*. These soils do not absorb water readily and are, therefore, liable to suffer from drought. Gardud soils are unsuitable for mechanical cultivation, but they constitute only a small percentage of the total area.

Topography. The Gedaref area is usually assumed to be a flat plain, at an altitude of approximately 600 m. above sea level. A gentle slope of .5% to 1% is common, giving the impression that the area is well suited for large-scale mechanization. It must be noted, however, that this gradient is determined by survey grids two kilometers apart which could not be expected to give the sharp picture of actual variations in levels affecting mechanised agriculture. Changes in level within the two-kilometer grid lines do exist and play an important role in the interaction between cultural practices and rainfall and have resulted in soil erosion and loss of soil productivity in many parts of the region. Eroded soils have been noticed by Laing (1953) and by the author in many parts of the area including the Government Mechanized Demonstration Farm at Gabob.

Isolated hills and rocky outcrops exist throughout the area alternating with small khors which are the main drainage channels of the area.

Climate. Precipitation is the most important climatic factor influencing production in the area because it determines the type and variety of crops to be grown, and the cultural techniques which should be used for optimum production. Rainfall occurs during summer, from May to October, but the effective rainy

¹ By road.

² By rail.

season is generally limited to four months, June to September. Total annual precipitation increases from north (Ghadambaliya) to south (Doka) and follows the same trend throughout the belt (Table 1). It may appear from the monthly averages that the pattern of rainfall is ideally suited for crop production, with four months of effective rainfall beginning comparatively lightly in June to give a chance for pre-sowing operations such as weed control and seed-bed preparation. The rains then increase in July and allow for crop establishment, reaches a maximum in August which coincides with maximum crop-growth rate, and decreases as the crop reaches maturity. In November the rains cease, and so provide ideal harvest conditions for most crops. Actually the picture is not always as rosy

TABLE 1
AVERAGE MONTHLY AND YEARLY RAINFALL FOR SELECTED TOWNS (in millimetres)

Locality	Years of record	Month									Total
		Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	
Ghadambaliya	16	0	2	16	75	135	173	104	21	2	528
Gal el Nahal	21	0	1	33	107	181	190	90	25	0	627
Gedaref	30	1	4	31	84	161	193	113	22	5	614
Sugura	11	0	4	41	131	151	195	100	20	3	645
Doka	16	0	4	36	139	195	215	118	27	3	737

Source: Sudan Meteorological Department, Pamphlet No. 1, January, 1967.

because variation in rainfall is very great both between and within seasons. This is a common feature throughout the Central Rainlands of the Sudan. In the Ghadambaliya area (310 sq. miles) which has 9 stations, Swinson (1953) reported an annual rainfall variation of 25% and an inter-station variation of $\pm 100\%$ for a two weeks record period. Thus rainfall is not only variable but also patchy. Analysis of the Doka annual rainfall figures reveals a variation of 20%. The implication of the variation is that quick-maturing crops, such as light dura and light sesame, may suffer serious water stress in one year out of four in the north, while crops requiring 600 mm of rain, such as cotton, are subjected to water shortage one year in five even in the south.

The distribution of the individual rain showers within the rainy season is very important because it is related to the time of sowing, the feasibility of post-sowing operations, the regular supply of water to the crops and the time and feasibility of harvest. Experiments in this area have shown that early sowing gives the highest yields;¹ therefore, early rains are conducive to high yields because they allow crops to be established early. Late rains would help late-sown crops to mature, and loosen the soil for the harvest of groundnuts. A succession of heavy rain-showers in the middle of the rainy season is likely to cause waterlogging and prevent

¹ Clouston (1948); Laing (1953); Senior Inspector of Agriculture 1963/64; Report on MCPS for 1963/64 Crop Season.

the use of machinery while long intervals between showers bring about varying degrees of drought. An unfavourable distribution of rain may occur at any stage of the crop growth and cause unpredictable loss of yield.

The significance of this rainfall pattern covering a vast area is that all the operations connected with sowing and establishment of crops need to be carried out during a short period of time early in the rainy season, as early in July as possible, thus calling for a great amount of power to carry out the work expeditiously. Subsequently, the crops are less demanding until they are ripe when they, again, need to be harvested withing a relatively short period of time. Then a long idle period of four or five months follows when the land carries no crop. Such extremes of power demands can only be effectively met when all cultural and harvesting operations are mechanised.

Since the rainfall occurs during the hot summer months when the average daily maxima are above 30°C, and the daily minima rarely fall below 20°C,¹ the range of possible crops is limited to those tolerant of warm weather to the total exclusion of cool weather crops.

Vegetation. A considerable part of the region has been cleared for the purpose of crop production. The natural vegetation belongs to the low-rainfall woodland savannah of the *Acacia seyal-Balanites* group. In the southern undeveloped areas the tree population is very variable, ranging from a few to several hundreds per feddan. Much of the area now under crops was originally lightly wooded and consequently easily cleared. The thickly wooded areas have been left uncleared because of the high cost of removing the trees.

560,000 feddans (Badi, 1963) have been declared forest reserves, of which there are 15 in number. These reserves are within the agricultural area and are intended for the supply of firewood, charcoal and building material. However these forests harbour a great number of birds, insect pests and diseases which constitute a potential danger to crop production.

Water supply. The whole of the agricultural area, including Gedaref town itself, suffers serious shortage of domestic water supply during the dry season. Haffirs and shallow wells are the main source of water but a few deep bores ranging from 540–1000 feet deep have been established in a few isolated areas.² Haffirs are by far the most important source of water particularly during and just after the rainy season. But haffir water—especially that of unprotected haffirs—is unsuitable for human consumption, even though the local population uses it for lack of anything better. However, government officials, quite rightly, reject it and insist on having a clean hygienic water supply. Government units, therefore, arrange for a good water supply for their staff regardless of cost, and two examples of such arrangements will illustrate the seriousness of the water situation in the area:—

(a) In December, 1966, the Demonstration Farm run by the Department of Agriculture at Gabob—23 miles east of Gedaref town—was being supplied with domestic water from wells in Wad El Huri 38 miles away. It took the tanker four hours to cover the round trip during the dry season because of the bad condition of the roads.

¹ Swinson (1953).

² The whole of Northern Gedaref Rural Council area had 6 deep bores in 1965.

(b) In December, 1964 the survey team at Seinat were obtaining their daily water supply from Wad El Huri—57 miles away.

These are glaring illustrations of how poorly the area is supplied with clean water. Dirty haffir water is available at short distances and is used by the local farming communities who, in consequence, suffer from diseases which reduce their production efficiency.

It is ironical that the total rainfall in any part of the Gedaref area is more than sufficient to cope with domestic water needs throughout the year if it is properly conserved. It is the means of conserving rainwater in a clean form that is lacking and not the supply of water itself.

Historical Background of Development

Clouston (1948) and Laing (1953) have previously covered the history of the development of this area, but it is convenient to mention again, briefly, the relevant historical stages for the benefit of the discussion which follows.

Attention was first drawn to this area by Sir Alexander McIntyre in 1928 as a possible sesame producing area to be run by the Sudan Plantation Syndicate, but the Sudan Government refused to lease land for this purpose at that time. The area was then forgotten until World War II, when grain supplies in the world became short. In 1943 it was decided to make use of the Gedaref area by recruiting "idle non-productive labour" from the Three Towns to grow dura by hand: a plausible idea—in theory—but the cost of production proved to be too high and in any case the labourers produced little more grain than they consumed in the form of food and drink during the period of production. Subsequently the grain situation became even more serious, and in 1944 it was decided to try mechanised production by bringing in one wheeled tractor and one crawler tractor and some old equipment. This at least, showed the feasibility of mechanised agriculture on those clays, and thus the later development of the area may be said to have originated from a tentative measure adopted under extreme circumstances during World War II. Subsequently, more equipment was introduced and tried, and after a stage when the system of participating tenants¹ was tried, the government decided to pass these lands to private enterprise in 1956.

Experiments carried out in the area during these years have shown that production is feasible by the use of tractors and seeder-boxes mounted on wide level discs as the minimum equipment required to prepare the land and sow the seeds of the dura and sesame crops and that such a unit was able to work one thousand feddans in a season. Research has also shown that post-sowing operations may be carried out by machinery but the results were not at that stage complete.

Present Pattern of Land Use

Land Tenure. Land tenure arrangements are governed by the "Land Settlement and Registration Ordinance 1925," and the Ministry of Interior's "Scheme for Disposal of Rainlands (1959)" in the manner and conditions specified in

¹ In this system the Government undertakes to disc the land, sow the dura seed and thresh the crop. Tenants are obliged to hand weed the cropped land, and cut and collect dura heads. The grain is then shared equally by both parties.

"Land Form 48." All unregistered agricultural land is assumed to be government owned, but it falls into three distinct categories:—

1. Government land subject to no rights (unsettled and unregistered);
2. Government land—unsettled and unregistered—subject to rights vested in a community, such as a tribe, section, or village or sometimes in individuals;
3. Government land—settled and registered—but leased for the purpose of cultivation to government mechanised crop production units or to individuals or co-operatives.

Although land in categories 1 and 2 is unregistered, according to the 1925 Land Settlement and Registration Ordinance, "all unregistered land is deemed to be the property of the government until the contrary is proved" (Bolton 1948). Customarily, when the government intends to develop organized agriculture in such areas, the land is first demarcated and mapped and the intention of the government to register the demarcated area is made public. Right holders, e.g. people claiming the right of use of the land for any purpose, are invited to prove 'beyond doubt' their claimed rights. Subsequently these rights may be acknowledged by the Government who would settle them, after providing the necessary compensation, and register the land under the Government's name. It is only after the settlement and registration of land is effected that agricultural land is disposed of to new holders. This procedure is necessary to guard against conflict over land between traditional users—individuals or communities—and new lessees who are allotted the land for use under organized schemes.

According to the 1959 'Scheme,' a "Land Allotment Board" which includes the Chairman of the Province Authority or his deputy, as Chairman, the Inspector of Agriculture, as secretary and Executive agent, the Director of Agriculture or his representative, as well as two representatives elected by the council concerned and two members from the armed forces, is responsible for the allotment of land for the purpose and in the manner authorised by the 'Scheme.' The constitution of this Board was revised on 21st December, 1964 and later on 1st May, 1965 to include:— (1) the Chairman of the Province Authority or his deputy—as Chairman, (2) Director of the Department of Agriculture or his representative; (3) the Senior Inspector of Agriculture; (4) Two members appointed by the Chairman; (5) two members elected by the Rural Council concerned; and (6) Province Inspector of Lands.

The increase of membership of the Board to include the Province Inspector of Lands as well as the Senior Inspector of Agriculture is very important because both members are very much concerned with land registration and land cultivation. The addition of two members to be appointed by the Chairman is helpful in introducing elements who may either be concerned with land allotment or helpful in advising the Board in land settlement and other related matters.

The Board may allot land for the following purposes:—(1) Government mechanised crop production; (2) cultivation by private tractor owners; (3) planned non-mechanised cultivation; and (4) cultivation by "hariq."

1. *Government mechanised crop production.* On the application of the Ministry of Agriculture the Board may allot land for mechanised crop production. This is a direct allotment from the government to a government department and does not involve any difficulty. The Ministry of Agriculture may enter into

annual agreements with participating cultivators. This seems to be a good arrangement by which the government keeps control over land and can maintain close supervision of actual production. This system was in practice until 1956 when the government decided to abandon it and give way to private enterprise to take over production in the whole area.

2. *Cultivation by private tractor owners.* Allotment of land in units of 1000 feddans is made to tractor owners by the Board in accordance with the regulations and conditions laid down in Part III and annex 2 (Clause 16) of the 'Scheme.' National Co-operative Societies may be allotted up to 5,000 feddans for cropping. Private enterprise and registered companies may be allotted 5,000 feddans or more on the recommendation of the Director of Agriculture and the consent of the Commissioner of Lands. These area limits are very generous, and pave the way for large-scale farming by individuals and organisations. Up to December 1966 only 11,000 feddans had been allotted to Co-operative Societies while 1,297,000 feddans were under individual management.

An area of not more than 1,000 feddans may be allotted on annual tenancy to firms or individuals engaged in manufacturing or importing agricultural machinery for the purpose of machine testing and/or demonstration. This is an extremely useful provision to encourage the introduction and testing of new machinery in the area, and to give machine dealers the chance to show farmers the best way to use machinery. Such allotments were made in the early days of development, but since 1957 firms have not shown interest and no land has been allotted for this purpose since that time.

A nominal rent of 1 PT per feddan per annum is paid in advance to the government. This rate is very low and does not bear any relationship to the economic rent of the land. The purpose of this low rent is to stop land users from claiming any rights over the land. It may be mentioned, here, that farmers pay taxes¹ on their crops at specified rates when crops are taken to markets.

The term of the lease is one year renewable for all allotments of 1,000 feddans. Larger holdings are leased for 8 years renewable on the recommendation of the Land Allotment Board. One year leases are most unsatisfactory because they do not offer sufficient security for efficient farming. Many disadvantages arise from this short-term lease. These are:—(i) productive investment—in machinery or implements—is discouraged; farmers are content with the absolute minimum of machinery specified in the lease. The pattern and efficiency of production, consequently, tend to remain at the same low level with little chance of improvement. (ii) An annual lease does not offer sufficient security for credit suppliers, a factor which has discouraged the flow of capital to this area. Even the Government Agricultural Bank does not finance any cultural operations except the harvest of dura, and then, only on condition that the crop has reached the secure milk stage. (iii) The short term lease does not encourage settlement in the area. Farmers, therefore, consider their stay on the farms as a temporary period of hardship necessary for extracting wealth from that particular piece of land. (iv) Long term measures for maintaining soil fertility, such as green manuring, soil conservation measures, etc., are not introduced because their value is not realized in one season. (v) Animal rearing is not possible because of the shortness of time. All these factors tend towards an extractive agriculture and loss of national wealth.

¹ Locally known as *Ushur* and *Gibana*.

The greatest proportion of cultivated land in the area is held by private tractor owners. In 1966/67 there were 1,297,000 feddans leased to private tractor owners. The salient features of the regulations governing these leases are discussed below.

A. *Eligibility¹ and Land Allotment.* The applicant must satisfy the Board that:—(i) he is a Sudanese. (ii) He has or can obtain the necessary agricultural machinery. (iii) He has sufficient capital to finance the scheme. (iv) He has sufficient agricultural knowledge and experience and has the managerial ability and time to run the scheme.

Thus the allotment of land is restricted to Sudanese nationals who can obtain agricultural machinery (the minimum is one tractor, one wide level disc and a seeder-box, worth more than £S.2,000) and are also capable of raising enough capital to finance the cropping of 1,000 feddans. These restrictions limit the eligibility to a small class of Sudanese; true farmers and rural communities are not amongst them. Those who could fulfil the financial requirements are mainly the merchant and contractor classes, and it is they who constitute the majority of leaseholders today. Ironically, these are the very people who, in most cases, do not satisfy condition (iv) of eligibility. Although these classes may have the necessary capital to obtain machinery and finance agricultural operations, they have no knowledge of agriculture and, in most cases, they do not have the time nor the inclination to remain on their farms since agriculture is usually only a side line to their main business. Lack of capital and suitable credit facilities mitigate against those who are full-time farmers or those who otherwise satisfy condition (iv) of the eligibility such as agricultural graduates of universities or other institutes. However, it appears from allotments made to date that the Board has assumed that the financial qualification is more important than 'agricultural knowledge and experience, managerial ability and time to run the scheme.' The result is that merchants and townsmen take on leases and appoint "*wakils*"² to manage their farms, thus creating a large number of absentee lessees. Moreover, two illegal arrangements have evolved. Leaseholders, unwilling to farm, sub-let their one thousand feddan allotments, usually to other lessees, at an annual rate ranging from two to four hundred pounds depending on the location of the farm with respect to rainfall, water points and markets. Alternatively, lessees, mainly from the merchant class, may pass over the whole farm to tenants who would undertake to bring in machinery and establish all crops to the ripe seed stage. In return the original leaseholder is allowed to select 200 feddans of the mature unharvested dura crop. These irregularities are so common that some farmers³ have accumulated up to 20 farms each which they sub-let annually. Naturally, these farms are scattered all over the M.C.P.S.⁴ demarcated area and consequently could not be run by one man. The sub-tenant appoints one local representative to manage each acquired farm. Officially the sub-tenant or his representative pose as *wakils* for the original lessee. Such irregularities are encouraged by poor living conditions within the farming area and are perpetuated by the failure of government to apply regulations. Farming has consequently sunk to the level of extractive agriculture which is carried out at a very low standard of crop husbandry.

¹ Part III Clause 13 of the Scheme.

² Wakil = representative of the lessee.

³ There are about 10 well-known names in Gedaref who perpetuate these irregularities.

⁴ Mechanised Crop Production Schemes.

No serious problems were encountered by the Board in the early stages of development, since the proper procedure of Land Settlement, Registration and Disposal had been strictly followed. In 1959, however, the 'Land Allotment Board' decided that no further allotment of land should be made. At this time a need arose for rotational land¹ for private tractor owners who were allotted only 1,000 feddans, because their original allotments had already been cropped for four years (in some cases more), and yields had fallen to unremunerative levels. The demarcated area of 450,000 feddans in Gabob was thought by the 'Land Allotment Board' to be suitable as rotational land for Ghadambaliya—55 miles away. Thus the Gabob area was allotted as a rotational area to tractor owners who had been cropping land in Ghadambaliya, and they had to move their equipment all this distance. Later the 'Land Allotment Board' realized that the demarcated land in Gabob was unsettled and consequently unregistered in the Government's name. By 1963 friction between traditional users—nomads and pastoralists—and the tractor owners reached a serious level. It is worthy of mention that in a meeting of the "Land Allotment Board" on 20th April, 1963 it was decided that it was not part of the functions of the Board to effect land settlement, and that the competent authority was the Province Council. The Chairman of the Province Council accepted responsibility; but later he reported that the Ministry of Finance did not approve the sum of £S.30,000 required for effecting settlement of the 450,000 feddans. The Gabob area is now one of the most productive lands for troubles but not for crops, in spite of fertile soils and adequate rains. This is only one example of lack of co-ordination between government agencies which have different responsibilities in the same agricultural area. These divided administrative responsibilities are apt to have an adverse influence on land and resource use. On the other hand it must be said that the actions of the Board regarding land allotment had not followed the rules of the 'Scheme,' i.e. they had allotted land in the Gabob before settlement and registration had been carried out. Maps showing how land had been allotted, and what was still available for allotment, were not kept (until December, 1964), although Part I Clause (a) of the 'Scheme' demands their availability for inspection by the public.

B. *Conditions of the Agricultural Lease*². Conditions of the lease were laid down in such a way as to allow the Sudan Government to retain full control over the land, as well as over the type and methods of agricultural production to be pursued on the land. Under the conditions prevailing in the central rainlands—i.e. undeveloped natural resources far in excess of the present needs of the population—the policy of the Government was intended to guard against the accumulation of large tracts of land under the ownership of a few people, with the consequent creation of a landless class. On the agricultural side, government control over the land is tacitly assumed to facilitate development according to national policy, and in a manner which maintains soil fertility and makes the most efficient use of available resources. Even if the pattern of agricultural production has been directed along certain lines, if the need for a change arose—as a result of further experimentation or the introduction of new innovations—this could be easily and quickly effected.

¹ It was assumed that an eight-course rotation of 4 years crop followed by 4 years rest should be followed. The two farming units need to be allotted close to each other.

² Lands form 48; Annex 2 (Clause 16).

Leaseholders must undertake (a) 'to obey, observe and comply with all Acts, Ordinances, Orders, Rules and Regulations made by the Government *now or hereafter* in force governing the conduct, managing and control of agricultural land'; (b) 'not to underlet, assign, charge or part with the possession of the land or any part thereof except with the previous consent of the Board'; (c) 'to deliver up possession of the land to the Government, on the expiration or *sooner*, or termination of this lease in good heart and condition.' All these conditions are meant to tighten the control of the Government over the land, and remind lessees of the fact that the land does not belong to them. On the technical side, the Government maintains control over production methods by the following conditions.

The lessee should agree: (i) 'To cultivate the land . . . in a good and husband-like manner in accordance with approved agricultural practice and using such machinery as may be necessary . . . and to accept as binding the decision of the Director, Ministry of Agriculture as to what is the approved agricultural practice and good and husbandlike manner at any time and place and in respect of any crop, rotation of crops or method of cultivation or machinery required,'¹ and (ii) 'To permit agents of the Government to enter upon the land and inspect the cultivation and the buildings thereon and the machinery used in cultivation.'²

It may be noted that all these conditions give considerable powers for the 'policing' of production and, that they lay great stress on the obligations of the lessee and the rights of the government. There are no comparable provisions setting out the obligations of the government and the rights of the lessee, a fact which puts the latter in a disadvantageous position. The situation of the lessee is made worse by the following clauses: (a) the lessee is 'not to erect any building in permanent material . . . without the written approval of the Board';³ (b) ' . . . if there shall be any breach by the lessee(s) of any of the conditions in clause 3 hereof the Government may cancel the lease and retake possession of the land and all buildings thereon shall become the property of the Government without any obligation to pay any compensation of the same . . . '⁴ No provision is made to help lessee to fulfil his obligations as stated in clause 3; (c) 'At the expiration of the term hereby granted the Government may retake possession of the land and the lessee(s) shall be entitled to remove any building materials . . . '⁵

These conditions, together with the fact that land was usually allotted on an annual basis, made the private tractor owner an extremely unsettled farmer. The uncertainty of crop production, characteristic of rainfed agriculture, has been accentuated by the uncertainty of continuity of the lease. The obstacles to the erection of permanent buildings forces lessees to be content with grass huts as the only dwellings in the scheme—a factor which adds to the hardships of living close to the cultivated land. All these circumstances interact with the merchants' attitude towards investment and profit to favour an extractive type of agriculture, in which the emphasis is upon maximum returns from the minimum input in the shortest possible time. It is obvious that these lease conditions do not offer the security nor the incentive for a high standard of crop and soil husbandry. Land tenure arrangements need, therefore, to be altered with a view to encouraging better crop husbandry in a more settled and continuous form of agriculture. The following suggestions are made for improving the lease conditions: 1. The duration

¹ Clause (3) No. 6.

² Clause (3) No. 10.

³ Clause (3) No. 4.

⁴ Clause (5) of annex 2 (Clause 16).

⁵ Clause (7) of annex 2 (Clause 16).

of the lease should be longer, at least 8 years renewable for all schemes. 2. Lessees should be encouraged to erect permanent buildings as a prerequisite for demanding their presence on the farm, at least during land preparation, sowing and weeding, as a step towards abolishing absentee farming. 3. Lessees should be allowed greater flexibility in choosing their rotation from a number of alternatives to be offered by the Ministry of Agriculture. 4. Rotational and cropped land should be allotted as one piece of land, i.e. land should be leased in units of 2,000 feddans.

3. *Planned Manual Cultivation.* To cater for small cultivators, the Board may allot land for manual cultivation in accordance with Part IV of the 'Scheme.' In the Gedaref area, land outside the demarcated area was allotted to local tribesmen, as well as to cultivators from outside the locality, for the purpose of manual cultivation with or without permanent village settlements. In accordance with clause 20 of the 'Scheme' the allotment of land for the purpose of manual cultivation does not confer any freehold right, but it does confer on the village community a right of occupation and cultivation for so long as they occupy it and cultivate it properly; and this right can be extinguished by agreement (or expropriation) on *payment of compensation*. The local people, realizing that the whole area is subject to development, have established rights of cultivation on large tracts of land, hoping that compensation will be paid by the Government whenever their land is expropriated.

The Board has allotted units of 100 feddans and 200 feddans (locally known as the hundreds) assuming that they could be cropped by hand labour. No provision was made to settle the land, register it or even carry out a soil survey or land demarcation. Such land was also outside the technical supervision of the Department of Agriculture, because it is outside the demarcated area of M.C.P.S. In the 1964/65 season, the Senior Inspector of Agriculture at Gedaref reported that the total area cropped outside the M.C.P.S. was 500,000 feddans. Not all this land has been allotted by the Board, but because there are no maps or records the Board has no control over areas actually allotted, and has even less control over what happens in unallotted parts. Because land is 'unsettled' and unregistered conflict has arisen between new cultivators and nomadic herdsmen. The size of plot—100 or 200 feddans—is not easily cropped by hand by one man, and in view of the scarcity of labour, it was necessary to resort to the use of machinery. At first machinery was hired from tractor owners after they had carried out the sowing of their own land, but later machinery was imported into the area to work these holdings in an extractive manner which has resulted in serious erosion and loss of soil fertility. It must be emphasised that these vast areas¹ constitute an important part of the national wealth and must be guarded against misuse. A reconsideration of the conditions of their allotment must be made with a view of organizing their use in accordance with the general policy of the country. The following steps are suggested for immediate action: (i) Plain surveying to map the whole area and demarcate it for organized cropping. (ii) The appropriate holding size must be studied so that allotments can be made in accordance with whether they are to be cultivated by hand or machinery. Not more than 20 feddans should be allotted to individuals who will practise manual cultivation, while the

¹ According to S.I.A. report on 3.9.1964 such areas existed west of Ghadambaliya, north of Um Sharaba, Elaraish, Elmaganis, Elganana, Um Niheid, West of Matna extension, Um Targeen, east and south of Gabob, Al Kireisha, Tabarak Alla, east of Doka, Kakum and Saraf Saeed.

unit for mechanised agriculture should not exceed 100 feddans. (iii) All land should be under the technical supervision of the Ministry of Agriculture, to ensure a high standard of husbandry and the proper maintenance of soil fertility. (iv) Encouragement of co-operatives for the provision of agricultural machinery to work the small holdings.

4. '*Hariq*' cultivation need not be discussed here because it has now almost disappeared from the area.

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THE ECONOMICS OF PUMP IRRIGATION FROM THE NILE IN THE SUDAN*

by

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Traditionally, crops have been watered from the Nile either by the natural flooding of banks and past courses of the river, by the water wheel (*saqiya*) or by the more primitive counterpoised bucket (*shaduf*). Only a modest land area can be commanded by the last two devices while considerable expenditure of either animal- or man-power is necessary. A large part of such artificially irrigated agriculture has therefore to be geared to providing a self-sufficiency in food and animal feedstuffs. The introduction of mechanical pumps thus facilitates both an increase in irrigated area and a move toward a more highly commercialised riverain agriculture.

TABLE 1

COMPARATIVE NUMBERS OF PUMPS, SAQIYAS AND SHADUFS IN THE SUDAN, 1927-1953*
AND NUMBERS OF PUMPS, 1963†

	1927			1937			1953			1963
	<i>Pumps</i>	<i>Saqiya</i>	<i>Shaduf</i>	<i>Pumps</i>	<i>Saqiya</i>	<i>Shaduf</i>	<i>Pumps</i>	<i>Saqiya</i>	<i>Shaduf</i>	<i>Pumps</i>
<i>Province:</i> Northern	65	9880	240	112	6859	128	608	5692	84	1249
Khartoum	31	150	130	39	321	317	202	350	239	297
<i>B. Nile</i> <i>Province:</i> White Nile	—	38	1562	25	35	631	284	1091	635	1441
Blue Nile	8	167	98	18	200	188				
Upper Nile	3	1	50	5	—	80	37	—	94	82
TOTAL:	107	10236	2080	199	7415	1344	1131	7133	1052	3069

SOURCE: *Annual Reports of the Department of Agriculture and Forests, Sudan Government.

†Report of the Census of Pump Schemes, 1963 (1).

The rapid growth of pump irrigation in the Sudan, especially after the Second World War, can be judged from Table 1. By 1963 the gross area covered by pump irrigation schemes was 1.29 million feddans of which 537,000 feddans were

*The writer acknowledges the help given by many interests, both government and private, in the preparation of this paper. Special note must be made of the help received in making an economic survey of 36 pump schemes during the summer of 1966. This survey was made possible by the generous co-operation of those scheme licensees, managers, field staff, and cultivators interviewed, by the enthusiasm and diligence of the eight students of the University of Khartoum who conducted the survey and by the valuable assistance received from officials of the Department of Agriculture in the preparation and execution of the survey. The research was supported financially by the Research Committee of the University of Khartoum.

A list of references is given at the end of the paper; numbers in parentheses refer to these references.

cropped. This cropped area then accounted for 43 per cent of the total cropped irrigated area which in turn was 17 per cent of the total cropped area of the Sudan. Nearly a quarter of the total cotton or about a third of the irrigated cotton area, is at present pump irrigated.¹ It is therefore clear that pump irrigation is of considerable economic significance both as a source of foreign exchange earnings and government revenues and as a major source of livelihood and employment in the agricultural sector. Moreover it has provided an opportunity for the economy's private sector to invest in the expansion of irrigation agriculture. In the past few years, however, poor economic performance, especially in the case of cotton schemes, has reduced the rate at which new schemes are being established. There has, therefore, been increasing discussion of how this performance might be improved and of the future role of pump irrigation in the utilisation of the Sudan's share of Nile waters. This paper is a contribution to this discussion.² The development that has taken place to date is first reviewed and this is followed by an analysis of the economic performance of the existing agriculture in order to suggest lines along which further development might be directed.

The Physical Background

Pump irrigation schemes border the Niles northward from Malakal on the White Nile and from Roseires on the Blue Nile. This agriculture is therefore strung out over a line some 1,500 miles long most of which is orientated north-south over the 750 miles between latitude 10°N and 22°N. The most important

TABLE 2
APPROXIMATELY MONTHLY IRRIGATION REQUIREMENTS (cu. metres per feddan)
FOR DISTRICTS SOUTH OF KHARTOUM

District:	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Wad Medani ..	700	800	800	800	800	800	600	500	500	800	700	600
Singa	700	700	800	800	800	800	600	300	300	600	600	600
Roseires	600	800	800	800	800	800	300	200	200	400	600	600
Kosti	800	800	800	800	800	800	600	400	400	700	800	800
Melut	800	800	800	800	800	700	200	200	300	600	700	800

SOURCE: Reference 7.

climatic variation found over this distance, so far as irrigation is concerned, is *rainfall*. In the extreme south of the area, annual rainfall exceeds 700 mm. (28 inches). This rainfall is concentrated in the months July, August and September so although 350 mm. is enough for a summer crop of sesame or *dura*

¹ The rapid post-Second World War expansion in pump irrigation consisted of a large increase in private cotton schemes along the White and Blue Nile. From 1950/51 to 1962/63 the area of cotton in these schemes rose from 24,000 feddans to 213,000 feddans (1). This expansion received its principal stimulus from the high cotton prices of the Korean crisis, 1950/52. No further schemes are being established, however, following the break in cotton prices in 1958.

² Other recent contributions may be seen under references 3, 4, 5 and 6.

(*sorghum vulgaris*), irrigation is necessary for crops grown outside this season. Moving northwards, even this summer rainfall gradually diminishes to practically nothing in the desert of the Northern Province and irrigation becomes necessary throughout the year. The approximate¹ seasonal field-crop water requirements that are given in Table 2 for districts south of Khartoum, reflect the seasonal rainfall variation. Vegetables generally require a higher soil moisture content and therefore more frequent waterings are necessary. As a rough estimate they may be considered as needing half as much water again as field-crops. Waterings are usually applied at fortnightly intervals for field-crops and at weekly intervals for vegetables, or more frequently in the early and late summer months.

Soils,² for the most part, fall into two broad categories; silts and clays. Along the Blue Nile and the Nile north of Khartoum the best soils are those composed almost entirely of silt deposited from the flood waters of the Blue Nile and its tributaries and the Atbara.³ These deposits form a border of varying width up to about 200 metres. North of Khartoum the river traverses a desert of thin sand soils and only these alluvial silts and the clay basins in old courses of the rivers can be used. The latter suffer from patchy variations in salt content and thereby quality. They are still subject to flooding of varying extent and duration depending on their level and the size of the August-September flood.

The White Nile borders the Gezira clay plain which stretches away eastwards to the Blue Nile and beyond. The westward border is formed by the sands of Kordofan which come down to the White Nile in places. This plain was originally laid down under permanent fresh water, which probably once formed a lake of the Blue Nile, and varies in quality according to salt concentration. Wide variations may occur in short distances but the soils are, for the most part, of good quality. Their structure deteriorates under continuous irrigation and they need drying to cause cracking and aeration. Fallows are therefore usually included in crop rotations on them for this purpose as well as a means of controlling perennial weed growth.

There is generally only very slight local variation in the level of this clay plain. It has a general slope downwards from the Blue Nile north-westwards to the White Nile. Between Roseires and the confluence at Khartoum, the Blue Nile falls 66 metres, while from Renk to Khartoum the White Nile falls only 7 metres. This slope therefore facilitates gravity irrigation from the Blue Nile and has meant that the White Nile has been left to pump irrigation.⁴

¹ Irrigation requirements are determined by climate, soil type, stage of plant growth and, to some extent, crop. The climatic factors other than rainfall are temperature, humidity and wind velocity but rainfall is the most important cause of variation in irrigation requirements within the region. Most of the schemes are established on soils of high clay content and the requirements quoted are for this soil type; silt and sand soils require slightly more water. There is little variation in water requirements between field-crops at any one stage in plant growth. Requirements increase slightly with plant growth.

² See Reference 9.

³ Silt deposits (of high clay content) also border the White Nile as far north as Renk from the Riber Sobat which, like the Blue Nile and Atbara rivers, rises in the Ethiopian Highlands and is subject to the same flood regime.

⁴ Any barrage on the White Nile to command the surrounding land would result in considerable loss of land by inundation behind the barrage. This is demonstrated by the Jebel Aulia Egyptian water store on the White Nile which floods land as far south as Kosti.

Recent soil survey work, for further irrigation under the terms of the 1959 Nile Waters Agreement with Egypt, has identified about 400,000 feddans of land suitable for development by pump irrigation on the White and Blue Niles, together with the possibility of some expansion (up to a maximum of 60,000 feddans) along the Main Nile. These areas are dwarfed, however, by the four million feddans or more of land both sides of the Blue Nile from the White Nile to, and beyond, the River Rahad which are commanded by the new Roseires dam on the Blue Nile.

The annual yields of the rivers of the Nile basin can be subject to large variation from one year to another while the rivers of the basin rising in the Ethiopian Highlands display a marked seasonal flow variation, peaking to a flood over the months July to October. The White Nile is not as seasonally variable but does have some variation under the influence of the Sobat.¹ These river regimes of course influence *river levels* although the relationship is complicated by storage and diversion works on the rivers. Pump lifts, derived from Sudan Survey Department maps and from long-term monthly river level and flow recordings (10), are shown in Tables 3 and 4, median and 90 per cent reliable years, respectively, for present day river control and extraction.²

TABLE 3
NILE PUMP LIFTS (in metres to one decimal place) FOR PRESENT RIVER REGULATION
AND EXTRACTIONS, MEDIAN YEAR

	<i>Jan.</i>	<i>Feb.</i>	<i>Mar.</i>	<i>Apr.</i>	<i>May</i>	<i>June</i>	<i>July</i>	<i>Aug.</i>	<i>Sept.</i>	<i>Oct.</i>	<i>Nov.</i>	<i>Dec.</i>
Renk	3.9	4.3	4.8	4.9	4.9	4.5	4.0	3.6	3.4	3.5	3.2	3.1
J. Aulia* Reservoir	4.5	5.4	7.8	9.9	10.5	10.5	8.7	5.5	5.0	4.5	4.5	4.5
Singa	18.8	12.1	13.5	17.1	19.2	18.8	14.9	9.9	10.1	13.2	13.0	12.0
Sennar* Reservoir	5.3	5.7	7.5	10.3	13.5	9.3	12.0	8.8	8.8	8.8	6.7	5.3
W. Medani ..	17.3	8.2	18.3	18.4	17.3	16.4	13.1	9.9	10.0	12.7	15.4	17.2
Shendi†	4.9	5.4	5.7	5.9	5.9	4.9	3.5	0.2	0.1	1.2	3.2	3.6
Merowe	11.0	11.4	12.1	12.5	12.5	11.7	10.0	5.8	7.0	7.0	9.2	9.8

*Large areas of pump irrigation are watered from the Jebel Aulia and Sennar reservoirs which influence river levels as far south as Kosti and Singa, respectively.

†Example of a Northern Province low-lying basin.

¹ The White Nile seasonal flow is smoothed and reduced by losses in the Sudd swamps south of Malakal. These losses mean that 84 per cent of the annual Nile basin yield north of the Atbara confluence comes from the Ethiopian Highlands and only 16 per cent from the Equatorial Lakes Plateau. During the non-flood season November to June, however, the White Nile contributes 66 per cent of the river flow. The Blue Nile and its tributaries and the Atbara contribute 84 per cent of the flow July to October.

² Except that the Sennar reservoir dead store below the level of the Gezira and Managil Canal outlets is retained to firm hydro-electric power output rather than released to Egypt in April and May as at present.

TABLE 4
NILE PUMP LIFTS (in metres to one decimal place), FOR PRESENT RIVER REGULATION
AND EXTRACTIONS, 90 per cent RELIABLE YEAR

		<i>Jan.</i>	<i>Feb.</i>	<i>Mar.</i>	<i>Apr.</i>	<i>May</i>	<i>June</i>	<i>July</i>	<i>Aug.</i>	<i>Sept.</i>	<i>Oct.</i>	<i>Nov.</i>	<i>Dec.</i>
Renk		4.2	5.0	5.0	5.1	5.1	4.6	3.8	3.8	3.6	3.4	3.6	3.7
Singa		19.1	12.3	20.1	20.4	19.3	16.9	15.7	11.1	11.8	13.6	17.3	18.0
W. Medani	..	17.8	18.2	18.2	18.0	18.1	17.4	14.7	10.1	11.2	14.6	16.1	17.1
Shendi		5.5	5.4	5.9	5.9	6.1	5.5	4.0	0.8	0.7	2.3	3.9	4.6
Merowe		11.2	11.9	12.6	12.7	12.9	12.1	10.5	6.6	6.4	8.3	10.1	11.0

These lifts will change in future with increasing extraction of water upstream via the recently completed Blue Nile and Atbara dams at Roseires and Khashm el Girba. In general, lifts will be increased on the Main Nile and on the Blue Nile north of Sennar in the winter months November to April. This increase will be larger on the Blue Nile as further water is extracted for the large expansion in irrigated land from the Roseires dam. The Main Nile, however, will continue to receive much the same amount of water from the White Nile. Somewhat lower lifts will probably occur in the winter and early summer months between Roseires and Sennar on the Blue Nile as stored water is passed from the Roseires reservoir for use in the Gezira-Managil area.

The fuel costs of pumping are proportional to the lift if slight variation in pump efficiency with changing head is ignored.¹ Thus the fuel costs for a cotton scheme on the Jebel Aulia reservoir of the White Nile are about a third of those for a similar scheme on the Blue Nile at Singa for 90 per cent reliable year lifts. (See Table 9 and compare with Tables 3 and 4.) The locational and seasonal variation in irrigation costs arising out of locational and seasonal variation in river level is not a large proportion of total crop costs, however. The cost of a one-feddan watering of 400 cubic metres raised through one metre with a pump efficiency of 60 per cent is about 1.2 piastres (£S.0.012).² Thus even if lifts change as much as from 5 to 15 metres between different locations or between seasons, the cost of four month's (i.e., eight) full waterings for one feddan of a crop only changes from £S.0.48 to £S.1.44. This must be compared with total non-labour crop costs of the order of £S.24 for cotton and £S.8 for groundnuts. (See Table 8.)

¹ The cost of engines is also influenced by lift, of course; see later section on establishment costs for pump schemes.

² If the work is, say, done in one hour, the rate of delivery is 400 cu. metres per hour or 3.93 cubic feet per second. The B.H.P. required is therefore:

$$3.93 \times 62.5 \times 3.28 \times \frac{1}{550} \times \frac{1}{0.60} = 2.44 \text{ B.H.P.}$$

where one cubic foot of water weighs 62.5 lbs.; one metre is 3.28 feet; and one horse power is 550 ft. lbs. per second.

One B.H.P. delivered over one hour consumes about one-fifth of a litre of fuel oil. This costs about 10 piastres per gallon or 2.2 pt. per litre. The cost of the watering is therefore 1.07 pt. in fuel oil or about 1.2 pt. with lubricating oil included.

The Pattern of Existing Development

(a) *General Features.* The distribution of schemes and gross area under pump irrigation in 1963 is shown in Table 5. The concentration of development on the Blue and White Niles is clear. These two rivers support 50 and 30 per cent respectively of the gross area under pump irrigation and 92 per cent of this area is in schemes principally concerned with cotton production. One eighth of the Northern Province gross area is in the one large cotton scheme of the Province (at Zeidab), and without this scheme the average size of scheme in the Northern Province drops to 197 feddans.

TABLE 5
DISTRIBUTION OF SCHEMES AND AREAS BY REGION AND AVERAGE SIZE OF SCHEMES
BY REGION*

Location	Schemes		Gross Area		Average Size (Fds.)
	No.	%	Area (Fds.)†	%	
White Nile ..	704	31	630,000	49	900
Blue Nile ..	329	14	393,000	30	1200
Northern Prov.	1014	45	229,000	18	230
Khartoum Prov.	220	10	37,000	3	170
Kassala Prov.§	16	—	3,000	—	170
Total	2283	100	1,292,000	100	570

*These data are drawn from the 1963 Pump Scheme Census and are presented on a river basis for Blue Nile and Upper Nile Provinces. Only a relatively few schemes on the White and Blue Niles are in Khartoum Province and these are of the type mainly orientated toward supplying the local markets of the three towns, Khartoum, Omdurman and Khartoum North.

†Figures rounded to nearest 1,000 feddans.

§Most of the few schemes on the Atbara and Rahad rivers are included under Kassala Province.

The distribution of schemes among size categories is shown in Table 6. The predominance of small enterprises of less than 50 feddans in all but the White Nile area (which has, however, more schemes in proportion in the category 50–100 feddans) is shown together with the concentration of schemes of over 1,000 feddans on the Blue and White Niles. The Blue Nile has two size types: (i) the smaller fruit and vegetable schemes between Khartoum and Sennar providing for the sizeable urban population along that reach of river; and (ii) the large cotton estates rivalling those of the White Nile in size.¹

¹ Only two schemes under 50 feddans in Blue Nile and Upper Nile Provinces grow cotton while over 90 per cent of those over 50 feddans grow cotton. Seventy per cent of these smaller schemes are on the Blue Nile between Khartoum and Sennar which has several towns of over 5,000 feddans as well as being close to the three towns area of Khartoum, Omdurman and Khartoum North. Just over 50 per cent of the vegetables grown in Blue Nile Province are grown in this area and 70 per cent of the Province's fruit trees are there.

TABLE 6
PERCENTAGE SIZE DISTRIBUTION OF SCHEMES BY REGION*

<i>Size Category (feddans) gross</i>	0-50	50- 100	100- 500	500- 1000	1000- 5000	5000- 10000	10000	Total
White Nile ..	4.3	46.7	25.3	7.9	12.1	1.6	2.1	100
Blue Nile ..	65.9	6.1	7.3	3.0	11.6	2.7	3.4	100
Northern Prov. ..	38.7	24.3	27.5	6.7	2.5	0.2	0.1	100
Khartoum Prov. ..	67.7	14.6	10.5	2.7	4.5	—	—	100

*See Note 1 of Table 5.

As far as holding sizes within schemes are concerned, the 1963 census records average sizes of 23.1, 4.5 and 13.2 feddans for Blue Nile, Northern and Khartoum Provinces, respectively. These figures slightly over-estimate holding sizes as no allowance is made for schemes without either owner-occupier or tenant cultivators or for scheme areas worked by direct labour, e.g., fruit areas are usually owned, and worked, separately by the pump licensee. The figures are also of gross area rather than cultivable area. Despite these qualifications, however, the figures serve as a rough comparison of holding sizes between provinces and are an indication of the extent of pressure of population on a limited land area in the Northern Province.

In general, intensity of land use under pump irrigation is low. The usual level of intensity is about 50 per cent of total scheme area for all but the smallest schemes, i.e., those under 50 feddans. The cotton schemes of the White and Blue Niles are mostly under the six-course rotation cotton-fallow-fallow-cotton-*dura*-fallow. Land use patterns in Northern and Khartoum Provinces also include large areas of temporary fallows, over 40 per cent of total area in both instances. In schemes of less than 50 feddans, cultivator holdings are usually smaller so there is greater pressure to intensify. These schemes are also usually sited on the better silt land immediately bordering the river so there is not the same problem of deterioration of soil structure with uninterrupted irrigation as there is with the clays. However, because of a widespread preference among cultivators for the security of having their own supplies of food and animal feedstuffs, even these smaller schemes still tend to produce sufficient crops for subsistence combined with intensive vegetable production for cash income.

Lastly among these general observations, it is noted that the present uncertain economic performance of pump irrigation is reflected in the large numbers of registered schemes no longer functioning. These failures are not closely associated with any particular size category of scheme and amount to as much as 45 per cent of the area at present in working schemes on the White Nile and in Khartoum Province. The census records the same percentage comparison as 24 and 11 per cent, respectively, in the case of Blue Nile schemes and Northern Province schemes. Poor site selection, especially in terms of soils, may account for some of these failures but the official processes necessary for the establishment of a scheme rule this out as a common reason for failure. No close study has been made of the reasons why these schemes have ceased to operate, but the principal immediate

reason is tenant-licensee disputes following poor management or low yields. As mentioned previously, the low level of cotton prices since 1958 has been a major cause of closure on the White and Blue Niles.

(b) *Regional Land Use Patterns.*¹ Three broad types may be distinguished among pump irrigation schemes in the Sudan: (i) the cotton schemes of the White and Blue Niles; (ii) schemes geared to supplying the food and livestock fodder markets of urban populations; and (iii) the schemes of the Northern Province in which commercial crops are largely secondary to subsistence crops. The developments which have taken place up to now within these three categories are briefly described in this section.

(i) Pump irrigated cotton (268,000 feddans) is almost exclusively concentrated on the White and Blue Niles, the only notable exception being the Zeidab scheme's 6,570 feddans of acala cotton near Ed Damer in the Northern Province. Of all the crops commonly grown in pump schemes, cotton receives the greatest attention and its cultivation is closely regulated by government and supervised by scheme management. Land preparations (in the form of water channel clearance and dry- and split-ridging) together with green-ridging are mechanised. Despite this assistance at the start of the season, however, cotton remains a crop with a high labour requirement for weeding and picking and finally clean-up when the cotton plants are pulled, swept and burnt to control blackarm and leaf-curl diseases. Fertiliser is applied at the rate of about 100 kg. of ammonium sulphate per feddan and the crop is sprayed three or four times against insects.

In contrast, the cultivator's subsistence crop in these schemes, dura receives far less attention. It is grown on the ridges of the preceding cotton crop, receives no fertiliser usually (although it is very responsive to fertiliser) and only receives what water is available after meeting the cotton crop's requirements which in years of poor summer rainfall may mean that it receives insufficient water. Groundnuts are being encouraged as a substitute to dura in view of their value both as a cash crop and as a leguminous crop. In general, however, tenants have proved reluctant to give up the security of having their own supplies of their subsistence crop.

The usual holding size in these schemes is 15 feddans with 5 feddans of cotton and 2½ feddans of dura set in a six-course rotation having at least one fallow before each cotton serial. Peak labour demands for such a rotation occur from mid-August until towards the end of September (cotton and dura weeding), over January, February, and March (cotton picking) and at the beginning of May (cotton clean-up). The substitution of groundnuts for cotton extends the first peak to the whole of August with the need to sow cotton and weed groundnuts at the same time. The substitution also creates a new peak at the end of October and early November with the groundnut harvest. Assuming a six-day working week, a family of two adults and two children under 18 would need some assistance with weeding, groundnut harvest and cotton clean-up if the children were equivalent to a third of a man and the cultivator's wife helped only with cotton picking. The cotton-dura holding might require that something like nine man-days extra labour be hired. The cotton-groundnut holding would require 19 man-days extra.

¹ As in section (a), information of a general nature in this section has been drawn from the 1963 Pump Scheme Census.

These additions would cost about £S.3 and £S.7, respectively. If only the cultivator works, the respective man-day requirements become 51 and 76 and the cost rises to £S.18 and £S.27.

(ii) Large towns, especially the three towns of the capital area which together have a population of about half a million people, greatly influence cropping in neighbouring pump schemes in view of the poor connections to more distant parts and the severely limited scope for nearby rainland agriculture. Thus the majority of schemes in Khartoum Province is devoted to vegetable and fruit production for the high-income three towns' market. There are even larger areas of cereals and fodders, concentrated in larger schemes. The use of machinery in these schemes, as in the Northern Province, is less common than in the cotton schemes. It is more or less restricted to larger schemes in the Northern Province although there is widespread use of contracted machine services in Khartoum Province.¹ Bulls are still widely used for ploughing and, where practised, ridging. Most crops are grown in borders which are made up by hand.

Cropping is more intensive and general fertiliser use is more widespread in these schemes than any other type. A wide range of fruit and vegetable crops is grown. In Khartoum Province fruits range in importance from citrus (80 per cent of which are lemons) to mangoes, bananas and guavas in that order. In assessing incomes from pump irrigated agriculture in the last section of this paper, a 3½ feddan holding has been used for this scheme type with one feddan of late (i.e., winter) tomato, half a feddan of okra (lady's fingers) and a quarter of a feddan each of early tomato, *mulukhia* (Jew's mallow) and egg plant (aubergine). Such a vegetable holding should be within the capacity of one man's labour. These labour-intensive crops are, however, only just within the capacity of a man for this size of holding and an increase in the size makes large differences to the amount of assistance required. If, for example, the holding size were doubled, one man's labour would have to be supplemented with 36 man-day's hired labour costing about £S.13.

(iii) Lastly, brief review is made of the pump irrigated agriculture of the Northern Province. The 230,000 feddans gross area of this agriculture is mainly geared to providing the subsistence of the largely rural population of 1,170,000² of the area. Thus although the Northern Province is noted for its extensive area of tree crops (68 per cent of the total area of Nile pump irrigated fruits) and for its large areas of horse and haricot beans, cereals predominate. As in the case of Khartoum Province this cereal area is roughly half dura and half wheat in contrast to the Blue Nile Province cereal crop which is 94 per cent dura. Of the fruit trees, three-quarters are date palms and the others citrus, bananas and mangoes in that order.

As with the more commercial schemes of Khartoum Province, Northern Province schemes in general do not follow rigid rotations. A land use pattern commonly used in the Shendi district is to combine enough late summer dura for subsistence together with *ful masri* (horse bean) or *fasulia* (haricot bean) followed by a feddan or so of November transplanted onion for cash income. A further

¹ The 1963 census showed that all the cotton schemes use tractors and that 88 per cent of Khartoum Province schemes had the use of a tractor, 73 per cent of them hired. Only 20 per cent of Northern Province schemes used tractors.

² Estimated population a decade since the 1956 Census of Population which put the Northern Province population at 870,000 with an estimated annual increase of 3 per cent.

crop of dura undersown with *lubia* (the bean *dolichos lablab*) may be grown in May for grain and animal feed in late summer. Late summer groundnuts or winter vegetables may substitute the bean cash crop in the above rotations as an alternative cash crop.

In the later estimation of cultivator cash income for typical schemes, the Northern Province example is taken to be a holding of 4 feddans cropped, made up of 2 feddans of *fasulia*, one feddan of late summer dura, and half a feddan each of onion and early summer dura. If this holding were worked by one man with the assistance of another equivalent family member at periods of peak labour demand, no hired labour would be necessary. If the cultivator works alone then some 8 man-days hired labour are required which should cost not more than £S.3.

In general, although crop husbandry standards in pump irrigated agriculture vary considerably, they are often far from good. The use of undressed and unselected seeds, late sowings, inadequate weed control, inappropriate, if not absence of, crop rotation, and insufficient use of manure and inorganic fertiliser all tend to result in yields which are generally poor. Many cultivators barely cover their costs, some even if their labour is not changed, because yields are so poor. The yields adopted in Table 8 in assessing the economic performance of these schemes are therefore above average. They are by no means outstanding, however, and could well be obtained by most cultivators with better standards of husbandry than are commonly found at present.

(c) *Organisation.* Pump schemes are established and operated under a variety of different forms of organisation.¹ Present day schemes may be grouped under five headings according to responsibility for, and consequent interest in, irrigation facilities, labour, entrepreneurship, management and land: (i) individual small group, or company ownership of irrigation works with the land worked in small units by cultivators, with crop-sharing between cultivator and pump owner (the licensee) and with, usually, cultivator or government ownership of the land; (ii) co-operative ownership of irrigation works by independent cultivators; (iii) ownership of irrigation facilities in a partnership arrangement between several families; (iv) individual ownership of irrigation works with the land worked by a management using a hired labour force; (v) government schemes.

Category (iv) is the least common and there are very few large land areas in the hands of a single owner or family worked as a unit without tenant cultivators.² Considerable areas in Northern and Khartoum Provinces and on the White Nile are registered in private ownership,³ most of it small-scale ownership, but this area is not increasing for it is no longer government policy to register private rights in land and all lands which are not already registered are regarded as government lands which can be hired for a nominal rent.

There are only 55 government schemes, of which 20 are over 1,000 feddans gross area. The large majority of schemes are therefore private. Their establishment is closely regulated by Government, however. Development plans, in the

¹ For a more comprehensive account of the organisation of production in the irrigated areas of the Sudan see Reference 6.

² The proportions of privately owned land in the total pump irrigated land areas of Northern and Khartoum Provinces and of the White Nile districts of Blue Nile Province are 52, 65 and 83 per cent, respectively.

³ New schemes having more than the irrigation capacity corresponding to two 5-inch pumps (capable of watering about 100 cropped feddans) must be organised to include tenant cultivators. Hence only a few new schemes come under category (iv) above.

form of cropping, canal layout, pump siting, etc., have to be approved by local officers of the Department of Agriculture and government departments are responsible for land settlement and contour survey. The Nile Pumps Control Board approves and issues licences to pump¹ and debits the extraction approved against the Sudan's water accounted as regulated by the terms of the Nile Waters Agreement with Egypt.

Individual licensees predominate for all scheme types both in terms of number of schemes and in terms of area. Company organisation is mostly confined to larger schemes, especially the larger private cotton schemes. Partnerships account for about a quarter of both schemes and area on the Blue and White Nile but co-operatives are more common than partnerships in Khartoum and Northern Provinces where co-operatives account for one-sixth and one-fifth, respectively, of the total area.

The private cotton estates of the White and Blue Niles nearly all belong to category (i) above.² They are organised along Gezira lines with uniform cropping and close supervision of crop husbandry. They also have similar crop sharing arrangements to the Gezira, derived from the traditional crop-sharing system of the Sudan's riverain agriculture whereby each interest has a share of the crops: landowner, cultivator, *sagiya* owner, *sagiya* operator and owner of the bulls used to drive it. Here it is the cotton crop which is shared with the same advantages of spreading risk and the administrative ease of levying payment for resources used. The cultivators (commonly referred to as 'tenants') have their *dura* without specific charge.

The individual, group or company which arranges the establishment of the scheme provides the irrigation facilities and holds the pump licence, takes a 52 per cent share of the cotton crop after certain so-called 'joint account' costs³ have been paid from the total proceeds of the crop. From this share must be paid the cost of the water, the administration of the scheme and the agricultural management.

From the tenant's share is paid most of the labour charges plus machine weeding operations. Tenants invariably employ hired labour to do some or even most of the work on the holdings, especially cotton-picking. They receive interest-free advances with which to meet the expenses of hired labour. Most of

¹ The term of a pump licence is 10 years for up to 10-inch pumps and 15 years for larger pumps. There are two main kinds of licence, perennial and flood, although there are a few so-called restricted licences which are valid from about May/July to sometime from the end of December to the end of April according to district. A flood licence permits pumping for the period mid-July to December but extensions are now commonly granted to March with the new water available under the terms of the 1959 Nile Waters Agreement with Egypt. Perennial licences are, of course, required for fruit and vegetable production and 90 per cent of the schemes in Khartoum Province have perennial licences, 50 per cent of schemes under 50 feddans in Blue Nile Prov. and 45 per cent of Northern Prov. schemes.

² Much financial support initially came from commercial banks, from private financiers in the form of cotton exporting agencies or from local interests unable to secure more licences. Other important sources were established commercial companies (such as trading concerns) and private family wealth. (See Reference 11). Since the 1958 crisis, the current expenses of most of these schemes are supported by loans from the government's Agricultural Bank and the commercial banks only finance a small part of this business now. In taking over this role the Agricultural Bank inherited outstanding debts amounting to £5.2 millions.

³ These costs include the costs of fertiliser, sprays, seed, dry-ridging, clean-up, sacks, transport to ginnery, ginning, transport to Port Sudan and marketing charges. Following on Gezira precedence, it is likely that picking costs will also be added to the 'joint account' in the near future.

these loans are deducted from their share of the crop at the end of the season. Loans for cotton clean-up, and perhaps picking in the near future, are, however, deducted from proceeds before they are shared.

Tenancies are allocated in uniform holdings of usually 15 feddans. The larger schemes are run by a full-time managerial staff and have a substantial administration principally devoted to handling tenant accounts and payments. Three-quarters of the schemes over 500 feddans have hired managers.

The larger private schemes of Northern and Khartoum Provinces are run on similar lines, but all the crops are shared and there is considerable variation in land use. Also there is not the same uniformity of cultivator holding as pump irrigation has generally been established on previously settled land, much of which is in private ownership, usually in the name of the present cultivators.¹ Finance is mostly provided by local merchants or out of private family wealth, especially (in the case of the Northern Province) the private fortunes of local leaders and officials and the contributions of relatives in secure employment living away from the area.

Despite government encouragement, co-operative pump schemes have met with little success. The principal reasons for this in the Northern Province have been noted as the "strong family structure, the land shortage (and therefore dearth of scope for cash crop development), and bad marketing opportunities."² Partnership schemes are either the result of local initiative from a group of families who subsequently share in the operation and management of the irrigation facilities or they are share-holding arrangements where the cultivators have been encouraged by a licensee to invest in, and thereby increase their interest in, the business of providing water and improving the scheme. It is increasing and has been seen as a means of securing greater tenant participation and responsibility in this kind of agriculture.

The main³ government schemes are the eight 'alternative livelihood' schemes on the White Nile and the ten large government schemes of the Northern Province. The former were established to compensate those displaced in 1937 by the inundation of their lands by the Egyptian water store at Jebel Aulia, while the first of the latter schemes were established during the First World War to relieve local food shortages. They are all substantial enterprises, ranging between 1,000 and 12,000 feddans gross area. The White Nile Schemes are run on the same lines as the Gezira scheme and the surrounding private cotton estates. The Northern Province schemes, however, present a new departure for here "the Government acts as a true landlord renting land and selling water at a fixed rate per crop to cultivators, though keeping a close control over the cropping pattern."⁴ Difficulties are met, however, in collecting these water charges and most of the schemes are persistently run at a loss to the government. It is perhaps a poignant reminder of one major advantage of crop-sharing especially for a largely subsistence agriculture.

¹ Land very rarely changes hands in the Northern Province, as it is regarded as being held in family trust.

² Reference 6.

³ In addition, there is the Guneid Sugar Scheme on the Blue Nile and the new extensive Melut cotton scheme on the White Nile, and several smaller government ventures.

⁴ Reference 6.

Economic Performance¹

The estimates of economic performance presented in this section are related to three scheme examples which are representative² of their type in size and cropping: (i) a cotton scheme of 1,000 feddans of cotton which would correspond to a total cropped area of 1,500 feddans, a cultivable area of 3,000 feddans and a gross area of about 3,250 feddans; (ii) an 85-feddan vegetable scheme (50 feddans cropped) following the early and late tomato, okra, mulukhia and egg-plant rotation noted on page 91; (iii) a 500-feddan scheme (typical of the schemes of over 50 feddans in the Northern Province) following a rotation typical of the Shendi area of the Province: *fasulia*, *dura* and onion combined in the proportions noted on page 92 to give a total cropped area of 240 feddans.

(a) *Development Costs.* Table 7 shows the pump, engine, canalisation and other development costs for the above three scheme sizes and rotations. The per-unit area capital costs for pump and engines depends on the number of hours a day for which the pumps are worked and the maximum amount of work to be done in a day. A 10-hour day with peak working to 14 hours and emergency working to 18 hours seems to be usual. The maximum power required is determined by the intensity of cropping and the water requirements of crops, both of which are subject to seasonal variation. Generally speaking, the peak power demand occurs sometime between January and April when river levels are low and when most rotations have a large part of the area cropped. Crop water requirements are also high in these months.

The capital cost of the cotton scheme per cropped feddan corresponds closely to the £S.40 per cultivable feddan commonly quoted for this investment. This figure is reduced by about 20 per cent for the largest schemes of say 10,000 feddans of cotton. The small vegetable scheme is made considerably cheaper without the expenses of buildings, pump and engine housing, civil engineering works and special canalisation and land clearance. It is interesting to note that greater pump lifts do not add seriously to the total initial investment, i.e., about 12 and 2 per cent, respectively, in the two examples showing such comparison.

(b) *Administration and Management Costs.* In general, the cotton schemes have a more elaborate administration and management than other schemes. High administration expenses arise from the need to keep accounts for individual tenants recording advances, crop yields and share payments. Management costs are also higher as these schemes are essentially commercial ventures centred on the cotton crop for which numerous services are provided, i.e., provision of seed, fertilisers and sprays, recruitment of pickers, and the organisation of transport and marketing. The day-to-day management is usually the responsibility of a hired manager assisted by locally recruited field supervisors (*samads*) who are commonly scheme cultivators who have proved to be successful farmers. This system is not

¹ The data used in this section are drawn principally from an economic survey of pump irrigation conducted in the summer of 1966. The survey covered 18 private cotton schemes on the Blue and White Niles and 18 Khartoum Province and Northern Province Schemes. These data have been supplemented by reference to other recent studies (3, 4, 5, 6 and 7) and by information from private and government interests in pump irrigated agriculture, especially the government's Agricultural Bank.

² They are representative in the sense that they are model, i.e. most commonly found. That this is so in respect of size may be seen from reference to Table 6.

TABLE 7
DEVELOPMENT SPECIFICATIONS AND COSTS FOR THREE EXAMPLES OF PUMP
IRRIGATION SCHEMES

1. A scheme of 1,000 feddans of cotton (1,500 feddans cropped) located on (a) the White Nile, (b) the Blue Nile at Singa, and (c) the Blue Nile at Sennar.
2. An 85-feddan vegetable scheme (50 feddans cropped) located at Wad Medani; and,
3. A 500-feddan Northern Province scheme located at (a) Shendi, and (b) Merowe.

	Scheme type:		
	1	2	3
A. Limiting factors to pump/engine specification:			
(i) Critical month	March	March	January
(ii) Lift, for 90 per cent reliable year (metres)	(a) 7.8 (b) 20.1 (c) 7.5	18.2	(a) 5.5 (b) 11.2
(iii) Crop intensity for critical month	1/3	7/8	7/8
B. Pump/engine specifications:			
(i) Total B.H.P. required	(a) 150 (b) 350 (c) 164	20	(a) 32 (b) 60
(ii) Number and size of pumps (dia. of suction pipe in inches)	(a) 3, 12" (b) 3, 16" (c) 3, 12"	1, 6"	(a) 2, 6" (b) 2, 8"
C. Costs (£S.):			
(i) Pumps and engines	(a) 11,000 (b) 25,000 (c) 11,000	850	(a) 1,600 (b) 2,000
(ii) Canal and drain earthworks ..	40,000	100	3,750
(iii) Engine housing and foundation, canal regulators and bridges, discharge basin, pipes and fittings ..	23,000*	—	5,720†
(iv) Design and land settlement, survey and clearance	9,500§	50	450**
(v) Housing, offices and stores ..	28,000††	—	5,000§§
TOTAL COSTS	(a) 111,500 (b) 125,500 (c) 111,500	1,000	(a) 16,550 (b) 16,950
D. Development costs:			
(£S.) per cropped feddan	(a) 74.3 (b) 83.7 (c) 74.3	20.0	(a) 68.9 (b) 70.6

*Engine installation and civil works (£S.8,000), regulators and bridges (£S.7,000), field outlet pipes (£S.5,000) discharge basin (£S.1,000), pipes and fittings (£S.2,000).

†Installation and civil works (£S.3,000), regulators and field outlet pipes (£S.2,000), pipes and fittings (£S.500), discharge basin (£S.250).

§Land clearance (£S.6,000), soil test and land settlement (£S.1,500), design, contour survey, etc. (£S.2,000).

**Land clearance (£S.200), survey and settlement, etc. (£S.250).

††Housing for: manager (£S.3,000), two accountants (£S.3,000), two clerks (£S.2,500), three field inspectors (£S.4,500), engineer (£S.2,000), ten other workers (£S.10,000), offices and stores (£S.3,000).

§§Housing for: manager (£S.3,000), offices and store (£S.2,000).

TABLE 8
CROP LABOUR USE (Man-days/feddan) AND CROP COST AND RETURN (£S. per feddan): SUMMARY FOR SELECTED CASH CROPS (to 3 significant figures)

	<i>Cotton</i>	<i>G/Nuts</i>	<i>Fasulia</i>	<i>Onion</i>	<i>Early Tomato</i>	<i>Late Tomato</i>	<i>Okra</i>	<i>Egg-plant</i>	<i>Mulukhia</i>
Labour input (M-days)	54	31	23	83	27	41	56	31	50
<i>Costs:</i>									
(a) Labour	15.9	11.2	7.6	22.6	9.7	13.7	17.5	12.5	18.4
(b) Seed, fertiliser, transport, sacks, etc.	21.0	6.7	3.9	28.9	13.1	25.1	20.4	11.7	39.0
(c) Machine costs	1.75	1.0	2.9	3.0	3.5	3.5	3.0	3.0	3.0
(d) Working capital*	1.23	0.27	0.54	1.90	0.36	0.36	0.36	0.25	0.38
Import duty element in costs†	3.83	0.85	0.70	3.83	1.87	4.27	3.52	1.89	6.60
Yield/Fd. §	5 ktr.	1.0 m.t.	4 ard	40 ard	200 cans	600 cans	500 guffa	300 guffa	1000 guffa
Sale value (£S./Fd.)**	70.0	30.0	40.0	60.0	160	75.0	100	90.0	200
Gross margin 'A'††	49.8	26.9	37.8	36.6	135	36.6	62.2	64.4	146
Gross margin 'B'§§	35.5	22.3	33.2	28.1	127	38.9	66.6	65.3	138

*Working capital is reckoned as a 10 per cent p.a. charge on cumulative expenditures between land preparation and crop sale.

†Estimated as a 15 per cent charge on machinery services (tractors, agricultural implements, spares and diesel oil all pay 15 per cent import duty and other vehicles such as lorries pay 50 per cent. Labour is only a small part of these machinery charges); fertiliser 5 per cent, transport 20 per cent; and sacks 12 per cent.

§A seed kantar (ktr.) of cotton weighs 312 lbs.; a metric ton (m.t.) is 1000 kgs.; an ardeb (ard.) of *fasulia* weighs about 100 kg.; there are 5 ardebs of onions to the m.t.; a can of tomatoes weighs 10 kg.; a guffa (hand basket) weighs 15 kg. approximately.

**The sale value of cotton and vegetables includes export duty or taxation (roughly £S.1 per kantar in the case of cotton and 10 per cent of value land tax in the case of vegetables). All other prices are scheme returns after payment of taxes (again assumed at 10 per cent of value). Tax on groundnuts: £S.4/m.ton.

††Gross margin 'A' is a measure of the value of the crop to the economy, so returns include taxation, costs exclude import duties and only costs of items having alternative employment have been deducted (this includes cost of labour only for the five end vegetable crops).

§§Gross margin 'B' is returns after taxation less cost items (b) and (c), i.e., it is the margin for distribution between licensee and cultivator after shared costs have been extracted.

***Cotton is shared in a special way—shared costs include some machinery and labour charges; see p. 101.

widely used outside the cotton area where schemes are smaller and tenants have some freedom to choose their own crop and practices.

Salaries and wages are by far the largest item of expense in the provision of administration and management (see Table 9). Some economies are achieved in this item with increasing size of scheme. These economies are principally derived from a reduction of the expenses of senior staff per feddan with larger areas. For

TABLE 9
ANNUAL AND CAPITAL EXPENDITURE (£S.) ON MANAGEMENT, ADMINISTRATION
AND WATER (import duty element bracketed)

Item	1000 fd. Cotton Scheme		85-Feddan (gross) Vegetable Scheme	500-Feddan (gross) N. Prov. Scheme
	W. Nile (J. Aulia res.)	B. Nile (Singa)		
(a) <i>Annual Costs:</i>				
Salaries	5,400		360	900
Fuel and oil for pump- ing†	1,100 (165)	3,250 (490)	211 (32)	212** (32)
Maintenance of canals, buildings, etc. ..	1,500 (75)	2,000† (100)	40 (2)	150 (8)
Light and water ..	100 (5)		—	—
Transport (depreciation, fuel and maintenance)	850 (170)		—	—
Misc. (telephones, office expenses, insurance, etc.)	500 (25)		—	50 50
Total social costs: ..	9,010	11,310	577	1,269
Total cost to licensee:	9,450	12,100	611	1,312
(b) <i>Capital Costs: §§</i>				
Social	103,000	116,000	870	15,500
To licensee	111,500	125,500	1,000	16,950

*Costs of engines, pumps and fuel bear a 15 per cent duty. All other costs are charged a 5 per cent duty.

†The fuel bill is for 90 per cent reliable year lifts of Table 4.

§Lift as for Wad Medani from Table 4.

**Lift as for Merowe from Table 4.

††More expensive than the White Nile because of greater silt deposits in canals from the high silt content of Blue Nile flood water.

§§From Table 7.

example, a cotton scheme of 400 feddans of cotton has perhaps a full-time manager at about £S.70 a month with two samads at £S.15 a month. On the other hand, a scheme of 10,000 feddans of cotton may have a manager at £S.250 a month plus two assistant managers each at £S.120 a month and 15 samads. The expenses of co-ordinating management and field supervision therefore fall from about £S.3 per feddan of cotton per annum to a third of this amount.

Similar economies are to be found in administration and in the operation and maintenance of pumps and engines. The total annual salaries and wages bill for cotton schemes (excluding labour costs for machine services) falls from about £S.7 per feddan of cotton for schemes of 500 feddans of cotton to a minimum of £S.3 for the largest schemes. However, no such trend was observed for Northern and Khartoum Province schemes visited. Staff bills of about £S.7 per cropped feddan (including tree crops) for schemes of about 50 feddans cropped were recorded but showed little variation with increasing size of scheme up to the largest scheme visited of 3,000 feddans gross, 900 feddans cropped.¹

(c) *Cultivator Income and Return on Capital.* Costs and returns for the three selected scheme size, holding size, and rotation examples are summarised in Tables 8 and 9. For the yields used, vegetables clearly yield the highest returns but have, of course, a limited market. The pre-eminence of cotton as a field crop over alternatives such as groundnuts is confirmed. However, *fasulia* also ranks as a valuable cash crop, particularly to the cultivator in view of its more modest labour requirements.

Some assessment of the value of pump irrigation to the economy as a whole is made in calculating the social return to capital, ignoring taxes and export/import duties and labour charges in the cotton and Northern Province schemes (in view of the low opportunity cost of such labour).² The result is summarised in Table 10 where cultivator and licensee returns are also noted. Licensee costs are summarised in Table 9. These together with capital costs, repayment and interest, are paid out of the licensee's share of the value of the crop after deducting items which are commonly³ shared between licensee and cultivator, namely, crop taxes, machinery services, seed, fertiliser, transport, etc. From the cultivator's share is paid the cost of the manual labour input which of course varies in cash terms according to the amount of labour contributed by the tenant and his family.

It can be seen (Table 10) that although both the cotton scheme and the Northern Province scheme yield a sound return on capital in terms of social costs and returns, neither is a very rewarding investment for a licensee. Net annual social returns are about 40 per cent and 30 per cent, respectively, of social capital investment for these investments. Net annual returns to the licensee of £S.8.52 per feddan of cotton and £S.6.35 per cultivated feddan, respectively, however represent an inadequate return on the licensee's capital. If buildings and civil engineering works are amortised at 6 per cent over 50 years and pumps and engines are written off at 6 per cent in the term of the licence,⁴ the annual capital repayment and interest charges amount to about £S.8 per cotton feddan and £S.6 per cultivated feddan, respectively. The conclusion is that these two investments are

¹ This may be compared with an average annual salaries and wages bill of £S.1.32 per gross feddan for nine of the government Northern Province schemes (reference 4, Tables III, 4.2 and III, 4.5). The bill per cropped feddan would be about twice this figure.

² Without the pump scheme the activities of cultivators and hired labour would be essentially subsistence activities such as *saqia*, rainland and floodland cultivation and livestock rearing. The value of these have been crudely offset by leaving the value of the pump-irrigated *dura* out of the income of the cotton and Northern Province schemes. As most of this crop is not marketed, it also avoids crop taxation, which is levied at point of sale.

³ There is no rigid division of such costs between cultivator and licensee in practice, e.g., a licensee may pay taxes out of his share of returns, cultivators often provide their own seed and may pay for machine services separately.

⁴ 15 years and 10 years respectively.

TABLE 10

SUMMARY OF CULTIVATOR, LICENSEE AND SOCIAL COSTS AND RETURNS, AND RETURNS TO GOVERNMENT FOR THREE EXAMPLES OF SCHEME SIZE/HOLDING SIZE/ROTATION

	1000-feddan Cotton Scheme	Vegetable Scheme	N. Prov. Scheme
A. Cultivator returns and expenses (per holding):	£S.	£S.	£S.
1. Share of the crop ..	78*	78	40
2. Total cultivator expenses	45†	33	27
3. Returns (a) with no labour from himself or his family (b) cultivator alone assists§ (c) regular assistance from family*	33 100 115	45 78 78	13 37 40
B. Licensee returns and costs (per scheme):			
1. Share of crops sold ..	19,200	1,950	3,000††
2. Annual expenses	9,450 (White Nile)	611	1,312
3. Interest on working capital financing agricultural operations**	1,230	18	120
4. Net Annual Returns ..	8,520	1,320	1,568
C. Net annual social returns per scheme (Gross margin 'A' less annual costs)	40,800	3,270	4,590
D. Tax and excise returns per cultivated (or cotton) feddan to government§§	8.8	14.4	3.9***

*44 per cent after deduction of joint account expenses—£S.9.50 per feddan plus £S.4.0 per seed kantar (see p. 101).

†Includes £S.5.250 machinery charges in addition to labour costs other than picking and clean-up. (The last, £S.40, are an advance which the cultivator keeps if he employs no labour for these two operations).

§See sections on labour resource use in text.

**It is usual for the licensee to bear the interest on most of the working capital through the system of advances to cultivators through the season and through meeting expenses for fertiliser, machinery, etc.

††Including £S.10 per holding as the licensee's share of the *dura* crop.

§§Excluding land tax for cotton and any profits tax that the licensee may pay on his business for the year and government land rent and licence fees (last two are only nominal charges). Land tax varies with locality and is paid on the estimated season's yield (about £S.0.70 per seed kantar for cotton). This tax is deducted from any business profits tax that the scheme may be liable to at a later date.

***More if the *fasulia* is exported and therefore incurs export duty.

worth while if it is accepted that the manual labour input has no alternative occupation. They must, however, seem unattractive to private investment even though they may be of value to the economy as a whole (especially if the cash crop is exported). On the other hand, the very high returns to the licensee of the vegetable scheme are a clear demonstration of the unsuitability of crop-sharing where high-value cash crops are grown.

As is to be expected, cultivator returns are closely related to the level of labour input from the cultivator and his family. They are very modest returns if all labour is hired.

It must be emphasized that these results are sensitive to yields, crop intensities and prices. The yields and crop intensities adopted are above average. It is certain that many pump schemes barely cover their annual costs offering no replacement of, or interest on, capital and only a subsistence living for the cultivator. The average yield of the private cotton schemes is less than 5 kantars per feddan in most years. Many schemes consistently yield 3 kantars per feddan or less. The picture is made even more gloomy by the possibility that cotton prices may weaken still further from the £S.14 per seed kantar adopted here. As there is little scope for economies in costs, improvement must essentially be sought in improved yields and greater intensity of cropping. Groundnuts, for example, yielding a ton of unshelled nuts per feddan offer a valuable substitute for the *dura* of present rotations.¹

The crucial importance of achieving high yields can be illustrated well by reference to the cotton crop. Joint account costs that vary with yield² amount to about £S.4 per seed kantar if picking costs are included as seems likely (following on Gezira precedence) in the near future. Joint account costs independent of yield amount to about £S.9.50³. These costs are first deducted from gross receipts (less about £S.1 per seed kantar for export duties and royalties on lint and seed) which are then shared between licensee (56 per cent) and cultivator (44 per cent). Licensee annual expenses amount to about £S.12 per feddan of cotton for Blue Nile schemes and cultivator expenses are about £S.9⁴ per feddan. It can be calculated therefore that the licensee does not even cover his annual expenses (Blue Nile schemes) with a yield of less than 3.4 seed kantars per feddan while the cultivator does not cover his costs (if he provides no labour himself) for a yield of less than 3.3 kantars.

Prospects for Improvement

Clearly, present crop yields and market prices discourage further investment in pump irrigation and there seems to be considerable scope for improving the existing development. In general, there is perhaps little room for major cost economies and attention must be directed at improving the value of output.

¹ Groundnuts (at 1 m. ton per feddan) have a margin of £S.22 per feddan over labour, water and management costs while *dura* (at 0.66 m. tons per feddan) has a margin of £S.11. Labour inputs are estimated at 31 and 24 man-days respectively and water requirements are similar.

² Includes picking costs, sacking, transport to ginnery, ginning, transport to Port Sudan, sales commission, portage and insurance.

³ Seed, fertiliser, sprays, dry-ridging, ploughing and clean-up.

⁴ Of this, £S.1.050 is for split-, cross- and green-ridging and ditching; £S.8.100 is for labour charges other than picking and clean-up (picking costs are roughly covered by advances charged against the joint-account; clean-up receives an advance of £S.1.800 per feddan).

Further substitution could be made of high value cash crops in the place of subsistence crops which can be grown more cheaply further south in the rainlands and further intensification of cropping might take place where soils permit. The crucial need, however, is to improve yield performance and concluding comment is directed at two broad issues which seem to be of paramount importance in this respect.

In the first place, *government support services* seem to be inadequate, especially advisory services. A small start has been made in advisory work but the number of staff is as yet small and the section (of the Ministry of Agriculture) lacks the prestige and favour that other departments have. The service is mainly directed at individual cultivators which perhaps overlooks the value of the existing management structure as a means of relaying information and advice. This management is financially interested in improvement and is sited on the scheme. The latter is an important advantage in a country of poor communications, especially during the rains when many crops are sown and when roads can become impassable for days.

That the existing cultural practices are often inadequate is an illustration of how the addition of new physical resources such as land and water to a traditional agriculture should not be regarded an end in itself but rather as a starting point for further improvement. The key to this further improvement lies in the individual cultivator. It is he who must have the skill, resources and incentive to mould new crops and cultural practices into a better farming system. A whole complex of changes in the services provided to the agricultural industry is required to promote this improvement at farm level: research, development and sales outlets are necessary to make better materials and methods available; advisory services should demonstrate their value; education, credit and health services are required for the individual farmer to be able to execute the change; modified land tenure, cost payment, reward distribution and marketing arrangements may be necessary to give incentive to change. That the ability and interest of farmers can be promoted to achieve better farming systems is already demonstrated by the many high-yielding, intensely cropped schemes of today.

The second broad issue pursued further here relates to the question of *incentive*. Solutions to the present poor technical and economic performance of pump irrigation are widely discussed in terms of broad organisational changes in the schemes. In particular, there is the opinion that either the schemes should become the direct responsibility of government or they should be run as co-operatives. Neither change is perhaps a practical solution, at least in the near future, in view of the grave shortage of skilled personnel in the government service to execute the change. Furthermore, neither alternative seems to offer an encouraging prospect for improvement judging from past experience. Government schemes do not achieve markedly better output than private schemes and in fact the highest yielding schemes are private ones. On the other hand, as noted before, co-operatives have not proved outstandingly successful up to now despite official encouragement. Again, they have no record of achieving yields which are generally better than those achieved under other forms of organisation.

Both alternatives tend perhaps to overlook the vital importance of the individual farmer. As noted above, it is he who must be induced to recognise the value of higher yields. Perhaps the most important single issue from this point is the unsuitability of present crop sharing arrangements in an increasingly commercial agriculture. In a subsistence agriculture these arrangements ensure some return

to all interests even in a poor year, while payments for services and resources are made easier. However, the application of this system to high-value cash crops can form a serious disincentive to growing these crops, to improving yield and even to accepting pump irrigation at all. The motivation to improve would be better served if a cultivator paid fixed rates for inputs provided by the scheme and so became conscious of the true costs and returns relating to the alternatives facing him. In particular, he would have every incentive to achieve at least the yield level which covered the cost of the inputs, beyond which returns accrue to him alone. Some modification would be necessary in the private schemes for management would also have to be given some interest in higher yields. This could no doubt be accommodated by a bonus related to crop proceeds. In comparison with the present situation, however, scheme owners would perhaps find sufficient reward in a higher and more certain return on their investment.

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THE VITAL STATISTICS OF HAG YOUSIF RURAL COMMUNITY

by

MAMOUN YOUSIF

Introduction

Efforts to improve the collection of vital statistics in the Sudan could only start properly in towns where some kind of administrative machinery is available. But as the majority of the people in the country live in rural areas this effort must be supplemented by special studies among different rural areas of the country where little or no information is to hand.

At the present little is known about the vital and population statistics of the Sudan other than the facts revealed by the first population census carried out on 17th January, 1956, and the sample survey covering 1,883,380 persons comprising 10% of the rural nomadic population and 100% of that in 68 towns.

The World Health Organisation Expert Committee on Health Statistics (1957) recommends "the fact that in a number of areas a complete and adequate registration system cannot be established for the time being should not deter the establishment whenever possible, and even on a modest scale, of a simple registration system which could at least give information of the natural growth of the indigenous population."

This paper, which describes the Vital Statistics, is part of a comprehensive public health and social study carried out in Hag Yousif rural community.

HAG YOUSIF VILLAGE

Hag Yousif village lies about six miles east of Khartoum North town. Its history dates back for about 500 years to the Fung Kingdom. An interesting legend was told of a man known as Musa Elganger who came a long time ago from Atbara on a horse which, while drinking from the Nile, was attacked by a huge crocodile. The horse pulled the latter from the water and took it one mile east of the river where it was killed. Musa settled there and started the village. His tribe was Awaida. This legend is believed today by most of the people of the village.

About 200 years ago, a religious man known as Hag Yousif settled in the village. He came from Gebel Aulia. He found that the village was inhabited by three tribes: Awaida, Batahin and Messelemya. Later, a fourth tribe, the Magarba, came to settle also. Many other people of different tribes came to settle and live in Hag Yousif village. The religious man, Hag Yousif, started a Khalwa to teach the Koran. This was one of the early causes of the increase in the size of the village. When Hag Yousif died the village was named after him. Most of the inhabitants were nomadic or semi-nomadic tribes who came to settle in the village. They worked mostly as milkmen, labourers and farm-workers.

Ten years ago a co-operative society for dairy farming was started near the village. The people were encouraged to bring their cattle and to enlist in the

society. They were given free land and water to grow fodder for the cattle. The milking and selling of the milk was carried out by the Ministry of Animal Resources on behalf of the Society. The milk is pasteurised and sold mainly to Khartoum dwellers. This scheme attracted more Batahin people, who are originally nomads, to come and settle in Hag Yousif. Within a few years the village extended in area and increased in population. The village is about two miles in length and $1\frac{1}{2}$ miles in breadth at its widest part. The houses are scattered haphazardly. They are crowded together in some areas and sparse in others; a house site is usually decided by the presence of a shady tree to act as a playing yard for the children and meeting place for the adults.

All the population of the village are Muslims. There are two mosques. The health services are provided by a local dispensary run by a medical assistant and an unqualified nurse. The dispensary service is mainly curative and is provided through an out-patient clinic. The environmental health service is provided by Khartoum North Rural Council. The midwives practising in the village are untrained. The maternity and health visitor services of Kober and Hillat Kuku centres are not extended to this rural community. There is one elementary school for boys, but no school is provided for girls. The dispensary and the boys' schools are the only governmental institutions functioning in the village. There are three public Khalwas. There is a local bus service between the village and Khartoum North town. The service is irregular in time and interrupted during heavy rains.

PURPOSES OF THE STUDY

I *Study of the Vital Statistics:*

1. To enumerate the population according to their age and sex.
2. To find the infant mortality rate and to study its causes.
3. To find the following other rates: birth; death; stillbirth; perinatal mortality; maternal mortality; fertility; abortion and marriage; and to study the possible factors affecting these rates.

II Study of the nutritional status and the general health of the children.

III Study of the social, educational and economic conditions of the people, together with the study of their marriage customs and beliefs.

IV Study of the public health conditions of housing, water supply and environmental sanitation.

V To draw conclusions on the best public health methods to develop community health services of this and similar Sudanese rural communities.

This article reports the results of the vital statistics.

The vital statistics to be found in Hag Yousif will reflect the health of this rural community which is similar to many other rural communities in the country. The vital indices will show the standard of health and health services present in rural

areas and will give us figures to use for comparison with other rural communities, whether in the Sudan or other parts of the developing countries. At present we have no information at all about the vital statistics of such communities where there is no registration system.

The census of the village will show the *de facto* population present, and its sex and age distribution. The percentage of children will show us the number at school age and what educational provisions are available for such a number.

PLANNING AND METHODS

I *Notification and Registration of Births, Deaths and Stillbirths*

1. From the 1st September, 1964, notification and registration of births, deaths and stillbirths were started in Hag Yousif rural community. Special forms for registration were supplied to the Medical Assistant in charge of the dispensary. The Medical Assistant was briefed how to record the registration on the forms. These forms were checked with him and collected weekly.

2. The chief of the village (the Sheikh) and his local assistants were all shown the purposes of the study and how it would prove help towards the betterment of their community. After all their doubts were satisfied and they were ascertained that the personal information they gave was not going to be used for any local rates collection or rationing purposes in the future, they were glad to co-operate. Every local Sheikh was asked to tell the people in his area of the purposes of the survey and to seek their co-operation. This they did and finally not a single family in the whole village refused to give information.

3. All the traditional midwives (*habl dia*, or 'rope') were interviewed. They were asked to notify the births or stillbirths they attended.

4. A series of talks was given to groups of people in different areas of the village about the purposes of the survey and their co-operation was sought. The figures for notification and registration for the two years ending 31st August were analysed for this study.

II *The Family Survey*

1. All the houses in the village were numbered consecutively with white paint.

2. A schedule was used for collecting the information required. Every family in the village was visited at home. The interviewing was carried out by the fifth (penultimate) year medical students of the Faculty of Medicine, University of Khartoum, and three social workers from the Ministry of Health. For the purpose of the survey the students camped for 10 days near an old court building, 7 miles away, near Hatab rural community. The interviews started at 7 a.m. and the work continued till 2 p.m. The schedules were collected and checked by the author during the afternoon and any schedules which were not complete were

taken again to the family. After the second week, the students left the camp and further work was completed with the help of three social workers; it took another four weeks to cover the whole village. The family survey started on the 8th October and ended on the 6th November, 1964.

III *Two Test Surveys*

These were carried out during the last week of September, 1964, on 20 families and 15 families respectively, to try out the questions, to make necessary amendments and to train the interviewers.

Various other procedures were carried out for different purposes not reported in this article.

RESULTS

1. *The Population Structure*

The total population of Hag Yousif as enumerated at the beginning of the survey during the first week of October, 1964, was 4,683. These were the people actually present in the village at the time of enumeration (the *de-facto* population).

TABLE 1
POPULATION OF HAG YOUSIF VILLAGE BY AGE
AND SEX, OCTOBER, 1964

<i>Age</i>	<i>Total</i>		
	<i>Male</i>	<i>Female</i>	<i>Persons</i>
0-4	529	494	1,023
5-9	423	385	808
10-14	248	205	453
15-19	128	135	263
20-29	286	406	692
30-39	272	275	547
40-49	150	140	290
50-59	102	103	205
60+	78	60	138
N.K.	193	71	264
<i>Total</i>	2,409	2,274	4,683

Of the total population 2,409 were males and 2,274 were females. The age groups are shown in Table 1. The population structure is shown in Fig. 1. It was compared with those of Akufo, a Yoruba village in Nigeria, as reported by Gilles (1965), and rural Devonshire in England (Registrar General's Review 1951).

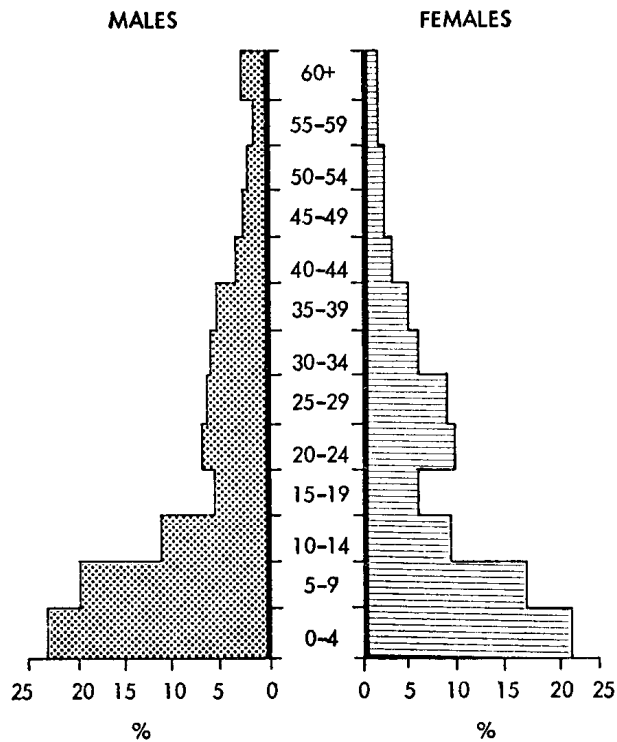


FIGURE 1
Sex and age pyramid
in Hag Yousif rural
community (Sudan).

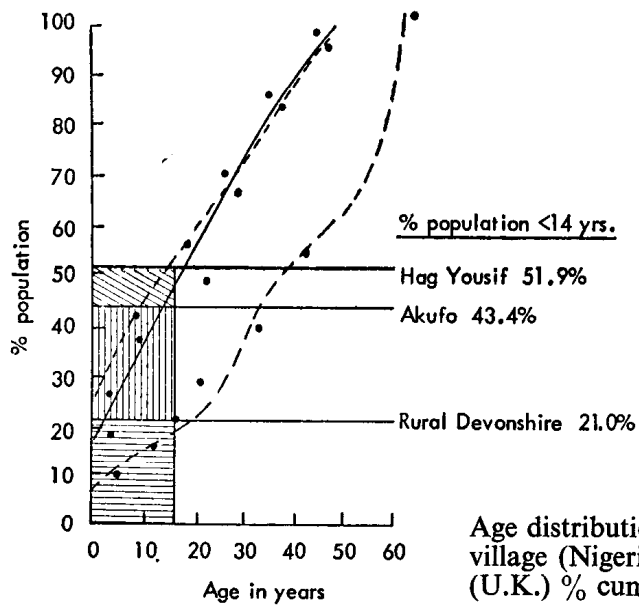


FIGURE 2
Age distribution in Hag Yousif, Akufo
village (Nigeria) and rural Devonshire
(U.K.) % cumulative frequency.

Discussion. While persons under 14 years of age form 43.4% in Akufo, they form 51.9% in Hag Yousif rural community. In Devonshire, England, rural community, the under-14 persons form only 21%. These population structures in both African rural communities give a broad base to the population pyramid and this reflects the high fertility and high child mortality under 5 years of age. Both the African communities agree in having a common demographic pattern for the under-15 years of age. Both communities contrasted with the demographic pattern of the developed rural community of Devonshire in England.

The population pyramid shrinks above the age of 15 to show a lower percentage of survivals to maturity who will reflect the net reproduction rate.

The pyramid structure of the male population rate of Hag Yousif becomes narrower than the female population at the age group 20–29. This may be explained by the fact that many of the males of this age group have moved to an area 30 miles east of the village to grow dura. While in the past most of the people cultivated farms during the rains as a supplement to the income of the family, nowadays only a few of the young and fit men will go and grow dura. This withdrawal from the rain-cultivation is increasing in many of the rural communities in the Northern Sudan. This may be due to the risk of bad years with little rain—people are not ready to run such risks nowadays and prefer to have jobs in the near towns with low and constant incomes.

This attitude may be one of the causes of famines reported in many areas of the country where the people depend on the dura sent to them from areas where it is grown as a cash crop and not as a food crop.

The habit of polygamy will also account for the preponderance of females aged 20–29 over males. The age 20–29 is considered the reasonable age for a second wife. This second cause also accounted for the increase of this age group in the Akufo community in Nigeria.

Only 3.5% of males and 2.7% of females at Hag Yousif are over the age of sixty. Hence the preponderance of the population of this community are children and young adults. In this respect this community also contrast with that of rural Devonshire.

The two African rural communities are very similar in their population structure in spite of the difference in their geographical and climatic conditions; Akufo is in the tropical zone of Africa and Hag Yousif is in the semi-arid zone. As more than 3 million of the Sudan population live in climatic conditions similar to Akufo, the population structure of Hag Yousif may be similar to these rural areas. As such a population structure in developing communities is decided mainly by the fertility and mortality, these indices may be considered as also similar in these two communities.

The population structure of the developed community which contrasts with the two African communities is the result of better health services, better economic and agricultural systems and the establishment of law, order, good government and migration.

2. *House Census*

The population of Hag Yousif lives in 1,016 independent households. Sixty households were found vacant due to the migration of the owners to grow dura in an area 30 miles east of the village. Sixteen houses are used as guest houses, which cater for most of the visitors to the village. The rest of the buildings are 11 shops, 3 Khalwas, 1 elementary school, 2 mosques and the dispensary building. This covers all the houses and buildings present in the village.

Discussion. It is interesting to note that there are 16 houses used for guests. They are known also as Khalwas. As the majority of the population lives in one-roomed houses, the only solution to the problem of guests is to find such a communal house built by one of the families who can afford it and used also by their neighbours, who are mostly relatives. Such houses are usually kept closed unless there is a visitor in one of them.

3. *Family Size*

Table 2 and Fig. 3 show the distribution of the population of Hag Yousif by family size and number of houses.

TABLE 2
DISTRIBUTION OF HAG YOUSIF POPULATION BY FAMILY SIZE
AND NUMBER OF HOUSES

<i>Family Size</i>	<i>Number of Houses</i>	<i>Persons</i>
1	53	53
2	138	276
3	167	501
4	168	672
5	156	780
6	137	822
7	89	623
8	56	448
9	32	288
10	12	120
11	4	44
12	1	12
13	—	—
14	1	14
15	2	30
<i>Total</i>	1,016	4,683

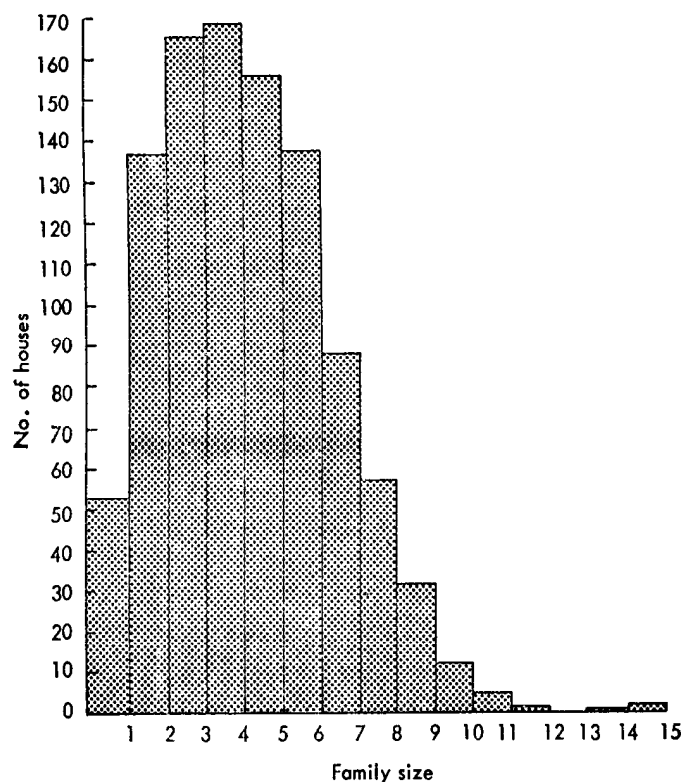


FIGURE 3

Hag Yousif population according to family size and number of houses.

Discussion. Of the 53 individuals who are living alone, 36 are bachelors, 7 are elderly widows living usually near to the house of a married son or daughter. 138 houses are occupied by 2 individuals, mostly married couples without children. There are only two families with 15 members each, one family of 14 and one of 12. Families with 4 members occupy 168 houses and this is the family size with the highest frequency distribution. The average family size is 4.8. This gives an approximate number of about 3 children per family. This is slightly better than the picture described by Macdonald (1936) of a primitive community where half the children survive and half die, so that every woman is replaced by one daughter giving rise to a static population.

4. *Tribes*

Table 3 shows the main tribes in the village.

TABLE 3
THE MAIN TRIBES OF THE MARRIED POPULATION
OF HAG YOUSIF VILLAGE (1964)

Tribe	Married Population	
	Males	Females
Batahin	678	733
Magarba	73	76
Messelemya	39	37
Kababish	33	31
Galiyin	16	18
Awaida	18	22
Mahas	20	17
Other	59	56
N.K.	4	11
<i>Total</i>	940	1,001

Discussion. The Batahin tribe constitutes the majority of the population. 72.1% of the total married males and 73.2% of the married females are Batahin. The other tribes are the Magarba, Messelemya, Kababish, Awaida, Mahas, Galiyin and many other smaller tribes. It is interesting to note that the Awaida tribe, which was the first to settle, is overwhelmed by the Batahin and Magarba tribes. In spite of this multiplicity of the tribes in this village they live in peace without disputes. This is, in a way, remarkable compared with most of the other neighbouring villages in which, though they do not have this multiplicity of tribes, the population are always in internal conflicts and disputes with each other. The probable cause for these disputes is that the other villages were more involved and committed to the different political parties. Causes of disputes because of common pastoral lands or water supplies, which occur in other parts of the country among nomadic tribes, do not exist here. As the majority of the people of Hag Yousif are mostly recent settlers and mostly illiterate, they are not involved much in political upheavals.

The Batahin tribe like the Shukriya is a camel-rearing tribe. The majority of the tribe are nomadic. They move during the rainy season to the north-east towards the River Atbara. During the dry season they move to the south-west trying to avoid the Shukriya tribe, so as not to become involved in tribal disputes. Those who rear cattle came to settle in many villages not far from Hag Yousif in order to sell the milk to the town dwellers. The milk is brought to town by lorries very early in the morning. After the selling of milk, they wash the milk cans and fill them with tap water to take back with them. How much of this water they use for drinking purposes and how much is used for adulteration of milk is a question which is difficult to answer. From time to time milk inspection, which should be performed more regularly than it is now, reveals cases of adulteration.

With the establishment of the Co-operative Dairy Scheme, many of the Batahin people who own cattle came to settle in Hag Yousif. This explains why the Batahin now constitutes the largest tribe in the village. Being a nomadic tribe, their experience in village life, household hygiene and town occupation is much less than the other neighbouring villages. It is a community which needs more help from public health and social workers if they have to compete and develop like the other neighbouring rural communities in the suburbs of Khartoum.

5. *The Birth Rate*

This rate is defined as "The births occurring in the calendar year divided by the estimated total population of the area at the middle of the year"—usually expressed per 1,000 (Hill, 1966). Notification and registration of births was started from the beginning of September, 1964. For the two years starting 1st September, 1964 and ending 31st August, 1966 there were 312 notified cases of live births. During the first year 148 births were notified; during the second year 164 births were notified. During the same two years there were 88 and 76 notified cases of deaths respectively. The increase in the population during the first year was 60 (148-88); during the second year the increase was 88 (164-76). This increase was added to the total population to work out the birth rates for the two years.

The birth rate for the first year of the study (1964/65) was 31.1 per 1,000 total population. The rate for the second year (1965/66) was 33.9 per 1,000 total population. The average birth rate for the two years was 32.5 per 1,000 total population.

TABLE 4

BIRTH AND MORTALITY RATES IN THE 'THREE TOWNS' AND KHARTOUM RURAL AREAS AS REPORTED BY THE MEDICAL OFFICER OF HEALTH FOR THE YEAR 1961/2

<i>Place</i>	<i>Rate Per 1,000 Population</i>		<i>Rate Per 1,000 Live Births</i>	<i>Rate Per 1,000 Total Births</i>
	<i>Birth Rate</i>	<i>Death Rate</i>	<i>Infant Mortality Rate</i>	<i>Still Birth Rate</i>
Khartoum	41.4	17.1	70.6	24.7
Khartoum North ..	37.0	5.8	6.1	30.1
Omdurman	38.2	11.8	50.8	9.2
Rural Areas	14.8	0.8	3.5	10.9

Discussion. This birth rate found in Hag Yousif will give an idea about the true birth rate in the Sudan compared with any other rate given in the country, as all the births conducted by the traditional midwife have been notified and registered.

A look at the rate given by the Medical Officer of Health for Khartoum Province (1961) will confirm the validity of this fact. The Medical Officer of Health gave in his report a birth rate of 14.8 per 1,000 total population for Khartoum rural areas, which includes Hag Yousif. The difference between the two rates is due to lack of registration of the births conducted by the traditional midwife, who still practises in the rural areas of Khartoum. In Khartoum town, where the traditional midwife does not practice and all births are registered, the rate was reported as 41.4 per 1,000 total population for the year 1961. This appears a more reasonable rate than the one given for the rural areas. Table 4 shows the births and deaths for Khartoum, Omdurman and Khartoum North for the year 1961.

When the birth rate of Hag Yousif or Khartoum town is compared with rates for England (Registrar General, 1962-1965), it will be noticed that the birth rate of the Sudan is still high. The rates for England were given as 18.0, 18.2, 18.5, 19.1, for the years 1962-1965 respectively. The rate for the Sudan is also higher than the rates reported (United Nations Demographic Book, 1965) in areas of registration in India, Iraq, Angola, United States and Argentine. But the Sudan rate is lower than three other countries: United Arab Republic, Mauritius and Gambia (see Table 5). One should beware of drawing conclusions from the rates reported from the developing countries where lack of registration may still be operative in them. The degree of accuracy of these figures depends on completeness of registration.

Had it not been for the inaccuracy which one gets in reporting the actual ages of mothers in developing countries, the figures for births would have been related to the different ages of mothers.

TABLE 5
BIRTH AND DEATH RATES FOR VARIOUS COUNTRIES COMPARED WITH SUDAN
(HAG YOUSIF)

Country	Birth Rates per 1,000 Population					Death Rates per 1,000 Population				
	Year 1960-64					Year 1960-64				
	1960	1961	1962	1963	1964	1960	1961	1962	1963	1964
India	21.1	21.0	20.9	—	—	9.2	9.3	8.8	—	—
Japan	17.2	16.9	17.1	17.3	17.7	7.6	7.4	7.5	7.0	6.9
Iraq	29.8	20.4	20.5	20.5	21.7	4.5	4.3	4.3	3.9	—
Angola	20.2	19.7	20.6	19.6	—	5.4	4.1	2.8	2.1	—
Mauritius	40.6	51.7	48.8	47.0	—	11.3	9.8	9.3	9.0	8.6
Gambia	44.0	43.2	47.9	46.7	44.9	12.1	14.5	15.0	15.7	13.2
United Arab Republic	42.9	43.9	41.3	42.1	—	16.9	15.8	17.9	15.3	—
Argentina	22.8	22.4	22.2	21.8	21.5	8.7	8.3	8.3	8.1	8.0
U.S.A.	23.7	23.3	22.4	21.7	21.2	9.5	9.3	9.5	9.6	9.4
England & Wales ..	17.2	17.6	18.0	18.2	18.4	11.5	12.0	11.9	12.2	11.3
Sudan (Hag Yousif)	—	—	—	—	33.9	—	—	—	—	15.7
Sudan (Khartoum) ..	—	41.4	—	—	—	—	17.1	—	—	—

N.B. Figures are for areas of registration.

6. *Crude Death Rate*

This rate is defined as "The total deaths occurring in the calendar year" divided by the estimated total population of the area at the middle of the year—usually expressed per 1,000. For the two years of the study the number of deaths notified and reported were 88 and 76 respectively. The death rate for the first year (1964/65) was 18.5 per 1,000 population. The death rate for the second year (1965/66) was 15.7 per 1,000 population. The average death rate is 17.1 per 1,000 total population.

Discussion. The death rate is one of the health indicators which shows the overall intensity of mortality in a certain community. This rate is affected by the characteristics of the community under study to as great an extent as their general health conditions. So one cannot use it for comparative purposes between different areas of the world unless adjustment is made for the persons exposed. The rate may also be affected by many factors such as differences in climate, standard of living, economic conditions, housing, over-crowding, food hygiene, environmental sanitation and the age distribution of the population. Other factors include infectious and endemic diseases which are very important in communities living in the developing countries. For all these reasons, the rate for Hag Yousif is only reported and future studies in other areas of the Sudan may make comparison more easy. In spite of these factors affecting the death rate, it is an important index of mortality of a population. As this study revealed a low standard of hygiene and public health in Hag Yousif this rate will come down with better health services in the near future.

The death rate reported by the Medical Officer of Health of Khartoum (1961) for Khartoum rural areas was 0.8 per 1,000 population (Table 4). This rate reflects the lack of registration of deaths in the area. The 1956 Sudan census gave the rate as 14.3 per 1,000 total population which is closer to the average rate of 17.1 per 1,000 population found during this study.

Table 5 shows the death rates of different countries compared with Hag Yousif. The Sudan death rate is higher than all the rates of the countries shown on Table 5, except the rate of the United Arab Republic for the year 1962, which was 17.9 per 1,000 total population.

One important factor affecting the death rate among the Hag Yousif population is that 51.7% of the population are under 15. Of these 23.1% are under the age of four years. This high percentage of the population in this vulnerable age group, together with the bad environmental sanitation, overcrowding and the high prevalence of infectious diseases accounts for the high death rate found among this community. 24 out of the 76 deaths over one year of age (1965) are due to diarrhoea and gastro-enteritis, and were deaths under 6 years of age. Pneumonia accounts for 14 deaths and measles for 9 deaths. Hence the infectious diseases together with poor sanitation, as reflected by the diarrhoeas, are important causes of deaths among the children of this community.

Tuberculosis and infective hepatitis seem to be important causes of death among the adult population. There were 5 cases of deaths due to fever of unknown cause and the most probable cause of deaths is typhoid due to the bad sanitation and the polluted water supplies. There were 3 deaths caused by meningitis; epidemics of meningitis which visit Khartoum every 3–4 years account for high mortality during the years of the epidemics. This may be explained by the delay in taking the patients to the hospitals and the inability of the local dispensaries to deal with epidemics without help from the hospitals which cannot cater for all the cases.

7. *The Natural Increase in the Population*

This rate is calculated by subtracting the death rate from the birth rate: $32.5 - 17.1 = 1.5\%$.

Discussion. Following the 1956 Sudan census the natural increase in population for the whole country was worked out as 3.2%. The annual rate of increase for the period 1958-63 was reported as 2.8% (United Nations, 1964).

The natural increase of most of the developing countries is about 3%. The developing countries are contributing every year with a higher percentage to the world population. While in 1900 they contributed about 67% of the world total, in 1960 they comprised 70% (Harrar, 1965).

The rate of natural increase is affected by the infant and child mortality. Hence this rate given for Hag Yousif points to the high infant and child loss. But this rate does not conform with the rapid growth in size of Hag Yousif village. The explanation to this increase is found in the high influx mostly of the Batahin tribe, who came to live near the town. The Co-operative Dairy Scheme and the red-brick factories in the neighbouring village "Hillat Kuku" attracted many young people to come and live in Hag Yousif. Migration towards the capital and other main towns in the country, which this survey points to, is worthy of special study due to the many social and public health problems which are usually associated with it.

8. *Sex Ratio by Birth*

Of the 164 total live births during the second year of the study 1965/66, 88 were males and 79 were females giving a ratio of 1.07 (i.e. 107 males per 100 females). This trend of more males than females in the Sudan conforms with the 1956 census when there were 5,186,126 males and 5,076,410 females in the whole country.

9. *Maternal Mortality Rate*

This rate is defined as "The deaths ascribed to puerperal causes divided by the total live births and still-births per 1,000." During the interval of two years of this study two cases of maternal death were reported. One mother died due to post-partum haemorrhage and the other due to puerperal sepsis. This give a rate of 6.04 for two years.

The rate for one year will be equal to 3.0 per 1,000 total births. If, for international comparison, this rate is worked out per 100,000 population then it will be 21.3 per 1,000 population.

Discussion. Investigation of the two cases of maternal deaths showed that both cases could have been saved if the delivery had been conducted by a trained midwife, or if the traditional midwife had referred the cases to hospital earlier. The case who died due to the post-partum haemorrhage was not referred to the hospital, but died at home. The other case was suffering from puerperal fever for four days before she was taken to the hospital to die there.

If the maternal mortality rate for Hag Yousif is taken as a representative of the rural Sudan (it is the only rate we have yet in the country) and is compared with other countries, we may get some idea of our rate bearing in mind that we may not be comparing similar communities (see Table 6).

TABLE 6
MATERNAL MORTALITY RATE FOR VARIOUS COUNTRIES COMPARED WITH
HAG YOUSIF (SUDAN)

<i>Country</i>	<i>Maternal Mortality per 100,000 population 1962</i>
Nigeria	17.8
United Arab Republic ..	6.4
Ceylon	9.3
Cuba	3.3
England & Wales ..	0.5
Sudan (Hag Yousif, 1965)	21.3

This maternal mortality rate for a community living a few miles from Khartoum with the best maternity services in the country, is very high. The maternal mortality rate is one of the most valuable indices to measure the overall health status of a community.

In Hag Yousif the services of trained midwives are still not established. All the deliveries were conducted by the traditional midwives. These midwives conduct the delivery while the mother is standing holding a rope coming down from the ceiling. There are many dangers to the mother and the infant from such a delivery. While performing an anterior episiotomy by a razor blade the midwife may inflict an incised wound on the presenting part of the foetus. The umbilical cord will be cut by the unsterilized razor blade with the danger of the foetus of umbilical sepsis, which may lead to fatal septicaemia with organisms like staphylococci, streptococci or *Pseudo-monas pyocyanea*. Puerperal sepsis is not an infrequent happening following this way of delivery and is the case of one of the two deaths during the study. There is much to deprecate about the deliveries conducted by the traditional midwife.

As this maternal mortality rate is calculated from a small figure it must be interpreted with caution and should not be taken as a rate for the whole country. This will not prevent us from emphasizing the danger to the mother from pregnancy without antenatal care and delivery without a trained midwife.

10. *Infant Mortality*

The infant mortality rate is defined as: "The deaths under one year of age occurring in the calendar year divided by the total live births occurring in calendar year" (usually expressed per 1,000). It is a kind of specific mortality rate. During the 12 months period starting on 1st September, 1964 to 31st August, 1965 there were 12 infant deaths and 148 infants born, giving an infant mortality rate of 80.1 per 1,000 live births. The following year, September 1965 to August, 1966,

there were 10 deaths and 164 infants born giving an infant mortality rate of 60.9 per 1,000 live births. The average infant mortality for the 2 years was 70.5 per 1,000 live births.

This rate is further studied during the first 28 days of life and after the first 28 days of life, i.e. *neonatal mortality rate* is similar to the infant mortality rate except that the numerator is restricted to the first 28 days of life; *postnatal mortality rate*—the numerator is restricted to the period after the first 28 days of life.

For the period September, 1964 to August, 1965 the neonatal mortality for Hag Yousif was found at 47.3 per 1,000 live births. The postnatal mortality for the same period was equal to 32.8 per 1,000 live births. The neonatal mortality for the second year, September, 1965 to August, 1966, was equal to 41.4 per 1,000 live births. The postnatal mortality for the same period was equal to 19.5 per 1,000 live births. The average neonatal mortality for the two years of the study was 44.4 per 1,000 live births, the average postnatal mortality is equal to 26.1 per 1,000 live births.

The infant mortality for Hag Yousif was also studied retrospectively to see the figure before the start of the survey, which may have influenced the prospective rate found. This was worked out by asking about the deaths of infants (under one year), which occurred from the 1st September, 1963 to the 31st August, 1964 (one year before starting the study). There were 15 infant deaths during this interval. If the average number of births for the two years which followed is taken as the average number of children born for the period September, 1963 to August, 1964, then the infant mortality for the period is equal to 96.7 per 1,000 live births. Hence if we want to get a more accurate figure for the infant mortality in Hag Yousif, we can further take the average for three years. This gives an average infant mortality of 79.2 per 1,000 live births.

Table 7 compares the infant mortality found in Hag Yousif with other African countries and England and Wales.

TABLE 7
INFANT MORTALITY RATES IN DIFFERENT COUNTRIES (AREAS OF REGISTRATION)
COMPARED WITH HAG YOUSIF

Country	Infant Mortality Rate per 1,000 Live Births			
	1961	1962	1963	1964
French Somaliland	62.9	37.6	50.9	—
Gambia	64.6	68.1	68.1	79.4
Ghana	96.7	86.5	82.3	—
Kenya	—	53.2	56.3	36.9
Nigeria	81.0	62.2	67.8	—
United Arab Republic	108.0	133.8	118.6	—
Ceylon	52.1	52.8	—	—
England & Wales	21.4	21.7	21.1	19.9
Sudan (Hag Yousif village)	—	—	80.1	70.5

Table 8 shows the causes of infant mortality in Hag Yousif before the start of the study as reported from the history taken during the family survey.

TABLE 8
CAUSES OF DEATHS AMONG INFANTS UNDER ONE YEAR IN HAG YOUSIF FOR THE TWO-YEAR PERIOD SEPTEMBER, 1964—AUGUST, 1966

<i>Cause of Death</i>	<i>Number</i>	<i>Per Cent</i>
Diarrhoea and gastro-enteritis	9	40.9
Pneumonia and other respiratory infections	5	22.8
Whooping cough	2	9.1
Measles	1	4.5
Diseases of early infancy (pre-maternity, etc.)	3	13.6
Infective hepatitis	1	4.5
Meningitis	1	4.5
<i>Total</i>	22	99.9

Table 9 shows the average rates of all mortalities under 5 years of age for the two years of the study.

TABLE 9
MORTALITY IN THE VILLAGE OF HAG YOUSIF

<i>Mortality</i>	1964		1965		<i>Average Rate</i>
	<i>Total</i>	<i>Rate/1,000</i>	<i>Total</i>	<i>Rate/1,000</i>	
1. Stillbirths	11	69.1	8	46.5	57.8
2. Neonatal	7	47.3	6	41.4	44.4
3. Postnatal	5	32.8	4	19.5	26.1
4. First year	12	80.1	10	60.9	70.5
5. 1-4 years	51	64.2	48	59.1	61.6

1. = Rate/1,000 total births.

2, 3, 4. = Rate/1,000 live births.

5. = Rate/1,000 population aged 1-4 years.

Discussion. The infant mortality rate is one of the important rates which reflect the health standards and social conditions in a country especially in the developing ones. Unfortunately in many of the developing countries the rate

reported does not reflect the actual infant mortality of the rural population, who constitute the vast majority of the population, as the reported rates are mostly for towns and areas of registration. Only through special surveys of rural areas could the gap, present in this lack of information, be bridged.

The retrospective infant mortality rate found in Hag Yousif is higher than the prospective rates. Getting the past history from illiterate mothers was one of the difficulties which was met in this survey. In spite of this the rate found appears to be a reasonable one. The prospective infant mortality, no doubt, has been influenced by our presence in the village. Although a direct responsibility for the health services of the village was not assumed, infants dying or suffering had to be offered the best possible medical care. In spite of this interference the average rate found for Hag Yousif for the two years of the study was 70.5 per 1,000 live births. This rate is higher than the rates given for French Somaliland, Gambia, Kenya, Nigeria and Ceylon (Table 7). The only higher rate is the one of the United Arab Republic. Lack of registration may explain why the rates in the aforementioned countries are lower than Hag Yousif. The United Arab Republic may indicate a better registration system than the other African countries.

After the Sudan census, the corrected infant mortality for the Sudan was given as 140 per 1,000 live births (Krotki, 1958). He thinks that the figure may be more than that—in the order of 200, i.e. every 5th baby dies within a year of being born. If Hag Yousif could be considered as one of the rural areas with an average health service available as indicated by the presence of a dispensary, then the infant mortality for the whole country is more than halved since 1956. But the rate found in Hag Yousif could not be applied to the whole of a country like the Sudan, with varying endemic and epidemic diseases and different social and economic conditions which could affect the infant mortality in various areas. In the Sudan, where registration of births and deaths is a very difficult and expensive task, other, similar demographic studies in various areas are required so that an average infant mortality for the whole country could be worked out more accurately.

The infant mortality rate of 70.5 per 1,000 live births found in Hag Yousif is still a high rate compared with the developed countries where the rate has been lowered to less than 20 per 1,000 live births. In England and Wales the rate for the years 1961–1965 was 21.4, 21.7, 21.1, 19.9 and 19.0 respectively.

The diarrhoeas and gastro-enteritis, together with pneumonia, account for 40.9 and 22.8% respectively of the causes of deaths. Diseases of early infancy account for 13.6% of deaths of infants. Measles and whooping cough cause 9.1 and 4.5% of deaths. The diarrhoeas and gastro-enteritis are a reflection of the poor sanitation and household hygiene in the village. The pneumonias and upper respiratory infections are also influenced by the overcrowded conditions in which the children live. With the traditional midwife and home delivery of cases which should be delivered in hospital, little could be done for deaths during early infancy where prematurity, anoxia and congenital malformation are fatal in the district.

11. *The Stillbirth Rate*

A stillbirth applies to any child "which has issued forth from its mother after the twenty-eighth week of pregnancy and which did not at any time after being completely expelled from its mother breathe or show other signs of life."

The rate is the number of stillbirths occurring or registered divided by the number of births occurring or registered—normally expressed per 1,000.

For the first year of the study 1964/65 the rate was 69.1 per 1,000 total births. For the second year 1965/66 the rate was 46.5. The average rate for the two years was 57.8.

The stillbirth rate is also studied with the perinatal mortality rate since the causes of stillbirths may also be responsible for death during the first week of life.

TABLE 10

HISTORY OF ABORTION AMONG MARRIED WOMEN IN HAG YOUSIF VILLAGE (1964)

<i>Number of Abortions</i>	<i>Married Women</i>	
	<i>Number</i>	<i>Per Cent</i>
0	855	86.5
1	88	8.9
2	35	3.5
3 or more	10	1.0
<i>Total</i>	988	99.9

N.B. History of abortion of 13 women was not known.

TABLE 11

HISTORY OF ABORTION AMONG MARRIED WOMEN IN HAG YOUSIF ACCORDING TO AGE (1964)

<i>Age</i>	<i>Total No.</i>	<i>History of Abortion</i>	
		<i>No.</i>	<i>Per Cent</i>
Under 19 years	133	14	10.5
20-29 years ..	396	50	12.6
30-39 years ..	225	37	16.4
40 years and over	208	29	13.9

N.B. The age of 39 mothers was not known.

TABLE 12
HISTORY OF STILLBIRTHS AMONG MARRIED WOMEN IN HAG YOUSIF VILLAGE

<i>Number of Stillbirths</i>	<i>Married Women</i>	
	<i>Number</i>	<i>Per Cent</i>
0	893	90.4
1	74	7.5
2	16	1.6
3 or more	5	0.5
<i>Total</i>	988	100.0

N.B. History of stillbirths of 13 women was not known.

TABLE 13
HISTORY OF STILLBIRTHS AMONG MARRIED WOMEN IN HAG YOUSIF ACCORDING TO AGE (1964)

<i>Age</i>	<i>Total No.</i>	<i>History of Stillbirths</i>	
		<i>Number</i>	<i>Per Cent</i>
Under 19 years	133	9	6.8
20-29 years ..	396	30	7.6
30-39 years ..	225	29	12.9
40 years and over	208	26	14.4

N.B. The age of 39 mothers was not known.

12. *The Perinatal Mortality Rate*

This is defined as "the number of stillbirths plus deaths under one week per 1,000 total number of live and stillbirths." The rate for the year 1964/65 was 88.1; and for the year 1965/66 was 52.1. The average rate for the two years was 70.2 per 1,000 total births.

13. *History of Abortion and Stillbirths*

The stillbirths are studied further retrospectively with abortion Tables 10, 11, 12 and 13 show the past history of abortion and stillbirths in the married women in Hag Yousif.

Discussion. The study of infant and child deaths will be more complete when foetal loss due to abortion and stillbirths is also studied. 8.9% of the married women gave the history of one abortion and 7.5% of one stillbirth. While 3.5% gave the history of two abortions, only 1.6% gave the history of a second stillbirth. Hence, while the occurrence of one stillbirth is nearly as frequent as one abortion, the chance of occurrence of a second or more stillbirth is less than half of the abortions. At younger age groups of married mothers, the incidence of abortion is higher than stillbirths, while at the age 40 and over, the incidence of abortion falls and stillbirths rises. While the abortion rate in this latter age group is 13.9% the stillbirth rate is 14.4%.

The average stillbirth rate of 57.8 per 1,000 total births is a high rate compared with the infant mortality of 70.5 per 1,000 live births in Hag Yousif. Could the practising untrained midwife be the cause of this high ratio? It was noticed that the traditional midwife is reluctant to refer cases of difficult labour to the hospital. This is due to the lack of proper assessment of the cases which require reference and to her fear of escorting cases of difficult labour to hospital. At the hospital in such cases the midwife is supposed to give a history to the doctor-in-charge and as such cases may sometimes result in deaths of the foetus or the mother she is afraid of being held responsible legally. In such cases the people are not worried so much about the foetus as its mother; they may be relieved to see the delivery end safely for the mother even if the infant is sacrificed.

14. *The Fertility Rate*

This rate is defined as "the live births occurring divided by the female population at child-bearing ages (usually taken as 15-44 years)." In Hag Yousif this rate for the year 1964/65 was equal to 167.8 per 1,000 women aged 15-44.

TABLE 14
PERCENTAGE OF DEAD CHILDREN AMONG MARRIED MOTHERS WITH CHILDREN IN
HAG YOUSIF

<i>No. of Dead Children</i>	<i>Mothers Affected</i>	
	<i>Number</i>	<i>Per Cent</i>
0	488	57.7
1	245	28.9
2	85	10.1
3 or more	27	3.2
	845	99.9

N.B. The number of dead children of 66 mothers was not known.

"Fertility to be adequately understood must be studied as a cumulative process that occurs from marriage to the menopause" (Campbell, 1963). The total number of children born by the married women gives a better idea than the fertility rate. It is also more informative to know the number of children who survived and those who died. For this reason the mortality of children in Hag Yousif is studied and is related to the number of mothers affected. Table 14 shows the number and percentage of mothers and the number of children they have lost. The number and percentage of live children among mothers is also shown in Table 15.

TABLE 15
PERCENTAGE OF MOTHERS ACCORDING TO NUMBER OF LIVE CHILDREN IN
HAG YOUSIF

<i>No. of Live Children</i>	<i>Mothers</i>	
	<i>Number</i>	<i>Per Cent</i>
0	112	11.7
1	153	15.9
2	174	18.2
3	149	15.6
4	149	15.6
5	88	9.2
6	67	7.0
7 or more	65	6.8
	957	100.0

N.B. The actual number of children of 44 mothers was not known.

The mortality during the first four years of life is the main factor which affects the net reproduction rate. 28.9% of the married mothers lost one child, 10.1% lost two children and 3.2% lost three or more children.

The mortality rate during the first four years of life was 71.5% of all mortality among children under 20 years of age. The mortality rate drops sharply to 11.8% and 7.0% in the age group 5-9 and 10-14 years of age. It is interesting to note that there is then a rise to 9.6% in the age group 15-19 years. This is accounted for by the hazards of maternal mortality among girls. While in this age group only 10 boys were reported dead, 24 girls have been reported dead (see figs. 4 and 5).

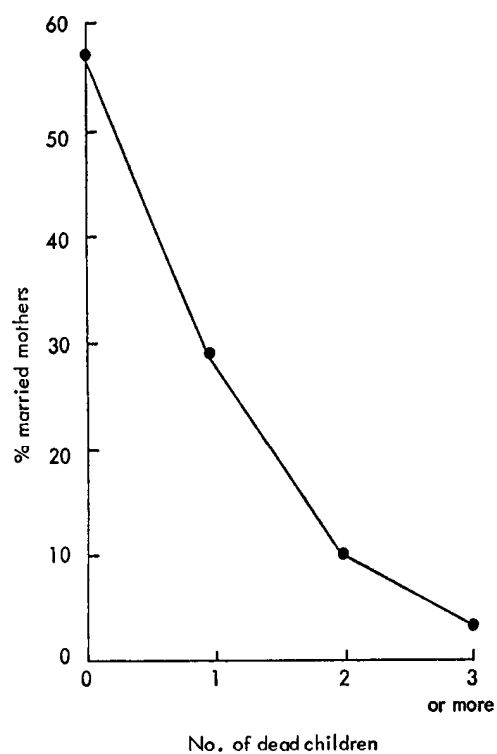


FIGURE 4
Curve to show the death
of children among married
women of Hag Yousif.

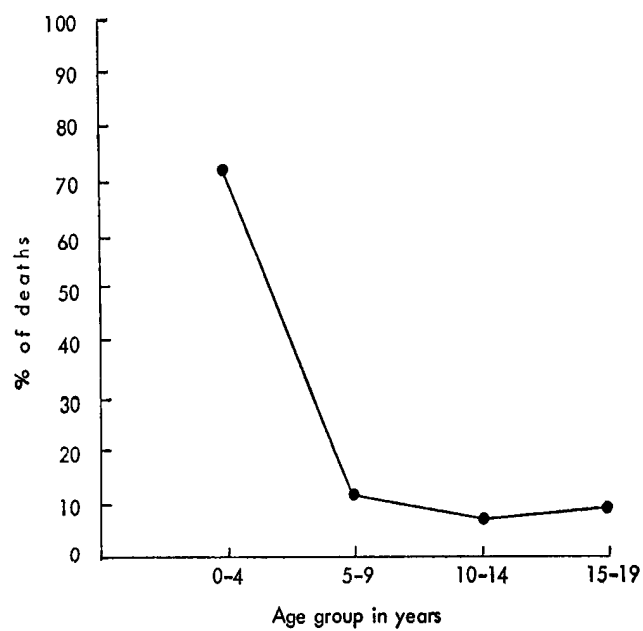


FIGURE 5
Curve to show the mor-
tality among the Hag
Yousif children according
to their age group.

15. *The Vital Statistics Coverage Compared with 1956 Sudan Census*

Discussion. Krotki (1958), speaking about ethics of census reporting, said "More research, further evidence, subsequent surveys, a later census may furnish additional grounds for accepting or rejecting in a more definitive way some of the earlier, perforce tentative, conclusions. The history of research knows many examples of how the zeal of the primary reporters, limited or even destroyed altogether any useful work which secondary researchers could carry out." He believed that results of field work are sacred. The original figures should therefore be published in the first instance, as a point of professional ethics, unamended and unadjusted. With these ethics in mind, Hag Yousif was studied. Krotki (1958) also gave a warning about the results analysed from the 1956 census by showing the difficulties and snags which face a population census on limited resources: inexperienced enumerators and supervisors working with limited pay simply for the prospect of temporary employment.

In spite of all these limitations the only data we have about the infant mortality in the Sudan to compare with Hag Yousif are those drawn from the first 1956 census.

The infant mortality rate as reported by the census has to be corrected before subjection to any comparability. The reason is that the infant mortality rate used for the purpose of the 1956 census was the number of children who died during the twelve months prior to the enumeration, while aged less than one year at the time of enumeration, per each 1,000 babies born during the same period. It will be noticed as Krotki (1958) suggested, that the two kinds of infants do not quite come from the same period and hence some correction was necessary. Hag Yousif infant mortality will be considered more reliable as it is the result of a prospective study.

Another point is that in Hag Yousif the average of two successive years was taken while the census figure is a one year figure which may be influenced by an epidemic disease in an area or any mishap.

Another important difference is that most of the census figures were the result of a sample, which subjected them to sampling error, while the Hag Yousif study is a study of the whole population in the village and is not influenced by any sampling error.

The infant mortality (corrected) of Khartoum Rural East, where Hag Yousif lies, was given in 1956 census as 115 per 1,000 live births. In the Hag Yousif survey the average infant mortality for the two years was 70.5 per 1,000 live births. Could the 10 years lapse of interval with improved health services explain this new rate compared with the 1956 rate? More surveys in the same area and other parts of the country are needed before one can reach such a conclusion.

The vital statistics reported in this study were derived from the registration records. The processes of notification and registration were closely supervised to get a complete coverage. This was very essential as registration of births and deaths were not compulsory among this community. No death certificate is needed for burial or for legal inheritance. The low level of social development and illiteracy make it impossible to administer at the present a compulsory registration system to cover all the rural areas of the country. This could only be achieved accurately in such studies of a localized community. The persistent follow-up and the weekly investigation was essential to get a complete registration

of the vital events. The existence of under-registration, even in Khartoum Province, is reflected by the figures presented in the annual reports of the Medical Officer of Health.

In spite of the high level of illiteracy (75.3 %) among this population, which is one of the main causes of incomplete registration in the Sudan, Hag Yousif people co-operated very much in the notification and registration of the vital indices. Health education in this field to remove the lack of appreciation of the vital happenings among the illiterate population is going to be the main tool for the Sudan before registration becomes compulsory in all parts of the country.

The inaccuracy in age reporting will continue to introduce sizeable errors into the vital statistics based on age data. This fact is more noticeable among the ages of the adult females than among the males or children. A high percentage of the adult illiterate males in this community under study were able to tell their ages with a good degree of accuracy to put them safely in the appropriate age group. They always correlated their time of birth to a certain incident which happened either in their village or in the country at large. The female adults were more able to give the ages of their children than their own ages. This is due not so much to the world-wide desire of females to give a younger age than their actual age, than to mere ignorance and illiteracy. Because of this possible error in adult ages, no attempt is made to enter into extensive comparisons depending on age, between this community and other communities. Hence the study is directed towards the investigation of the children who are the vulnerable group and constitute more than 50 % of the population. This will be published in another article.

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THE JEBEL DUMBEIR EARTHQUAKE OF 1966

by

I. R. QURESHI

Introduction

This paper gives an account of the field study of the Jebel Dumbeir Earthquake which was the strongest of a series of earthquakes that started in central Kordofan on October 9th, 1966 and continued for at least six months. The field study was made during the second week of the seismic activity by a group of the Geology Department, University of Khartoum. The group consisted of Dr. S. M. El Rabaa, Messrs. A. A. Sadig, Y. A. Salam, B. D. Khalil and A. S. Dawoud, and the author.

Jebel Dumbeir lies about 9 km. north-east of Jebel Ed Dair, a prominent and well-known jebel in Kordofan. The earthquake named after Jebel Dumbeir was associated with faulting (see Map 1) and caused damage to property in the region of the jebel. Its epicentre lay close to the jebel.

The Jebel Dumbeir Earthquake was widely felt in the central Sudan and the time of its occurrence on October 9th, 1966 was noted precisely in many towns. The earthquake was recorded at distant seismological observatories. Its parameters according to U.S.C.G.S. Preliminary Determination of Epicentres were as follows:—

Time of origin—06: 48: 40.3 UT,¹
Epicentral co-ordinates—12.6°N., 30.8°E.,
Depth of hypocentre—11 km.,
Magnitude (M)—5.1.

Qureshi and Sadig (1967) have given an account of the ground relief and geology of the area. They have also discussed the geophysical significance of the earthquake with reference to known seismic activity in eastern Africa (Sykes & Landisman, 1964; Sutton & Berg, 1958; Gorshkov, 1963) and suggested an investigation of its possible relationship with the Western Rift System.

Foreshock and Aftershock Activity

The Jebel Dumbeir Earthquake was preceded by one foreshock and followed by many aftershocks. Four principal shocks of the series were recorded on the first day at the Addis Ababa seismological observatory (see Table 1).

TABLE 1*

<i>Time at Addis Ababa</i>	<i>Estimated Distance</i>	<i>Estimated M</i>
06: 06: 22 UT	1010 km.	5.0
06: 50: 47	1000 km.	5.7
07: 19: (35)	1000 km.	4.8
10: 30: 30	1075 km. ?	5.3

*Data from Professor P. Gouin, Director, Geophysical Observatory, Addis Ababa.

¹ UT (Universal Time) is 2 hours ahead of the SST (Sudan Standard time).

Since the Addis Ababa observatory was the nearest recording station its estimate of the magnitude of the Jebel Dumbeir Earthquake (second shock in Table 1) is probably better than that of the U.S.C.G.S.

There is a general agreement in the earthquake-stricken area that only one shock preceded the Jebel Dumbeir Earthquake. Times for this shock as given by the residents in the region of Jebel Dumbeir, including Er Rahad and Semeih, are in close agreement with the time for the first principal shock recorded at Addis Ababa. There are, however, some conflicting reports from El Obeid where some persons are reported to have felt the first shock at 4.00 SST and others at 7.30 SST; these reports do not appear to be reliable.

The local doctor at Semeih (14 km. from Jebel Dumbeir) recorded the times of 20 shocks felt in the township during the greater part of the first 24 hours. According to this record the Jebel Dumbeir Earthquake was followed by four shocks in the first 72 minutes, one of which was registered at the Addis Ababa Observatory with a magnitude of 4.8. The following quiet period of about an hour and a half was terminated by a widely felt shock, registered at the Observatory with a magnitude of 5.3. Another shock followed within 5 minutes. Many shocks continued to be felt in Semeih on subsequent days. Four shocks were felt by us on the afternoon of October 21st and the following morning; one of these had an intensity of IV.

The frequency of shocks felt at Jebel Dumbeir was probably greater than at Semeih. During our visit to the Jebel Dumbeir area on October 19th, five shocks in as many hours were felt with intensity varying from IV to V. On the following day six shocks were felt in a little over six hours.

The aftershocks were also felt in Er Rahad (22 km. from Jebel Dumbeir) but their frequency was not as great as in Semeih. Some of the shocks were felt by us during the three nights we spent there; one of these awakened us from sleep and had an intensity of V.

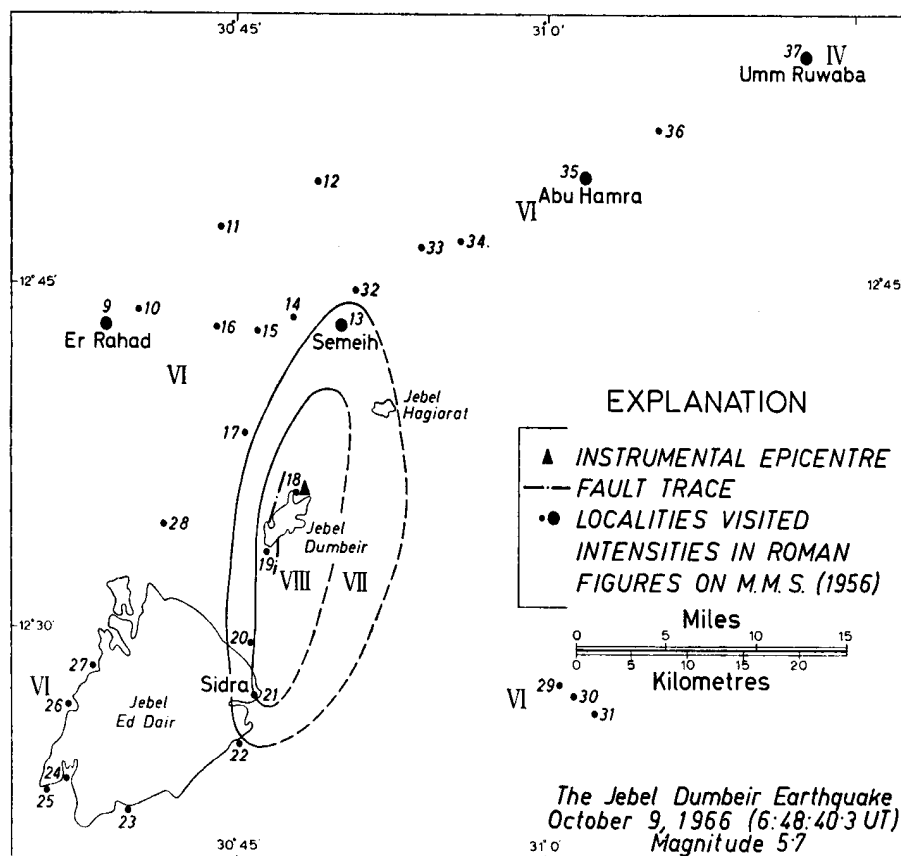
The aftershocks, apart from the principal shocks, were felt mainly at Jebel Dumbeir, Semeih, Er Rahad and Sidra—in the descending order of frequency. The frequency at Jebel Dumbeir is estimated at over twenty per day during the second week of activity. It was reported to have fallen to two to six shocks per day at the end of December, 1966. The activity appears to have much subsided since; some newspapers reported sporadic shocks in April, 1967.

Intensity Distribution

The Jebel Dumbeir Earthquake had a radius of perceptibility of about 400 km. Its intensity at various places in the Sudan was estimated from the statements of the inhabitants and from an assessment of the damage to property. The estimates are based on the Modified Mercalli Scale—1956 version (Richter, 1958, p.137). Field notes of this data are presented in Table 2 at the end of the article, and their summary illustrated in Maps I and II. The column headed recorder(s) registers the initials of the members of the group.

The interpretation of the expression 'felt by few' in Table 2 is made in terms of the proportion of the population that felt the earthquake and not in terms of the actual number that did so. Thus, in Khartoum (including Omdurman and Khartoum North), which has a population of over half a million, although thousands of persons felt the earthquake their proportion is not considered to exceed 1% of the total population: hence the note in Table 2. A tremor of equal intensity may not be noted at all in places where population is only a few hundred or less.

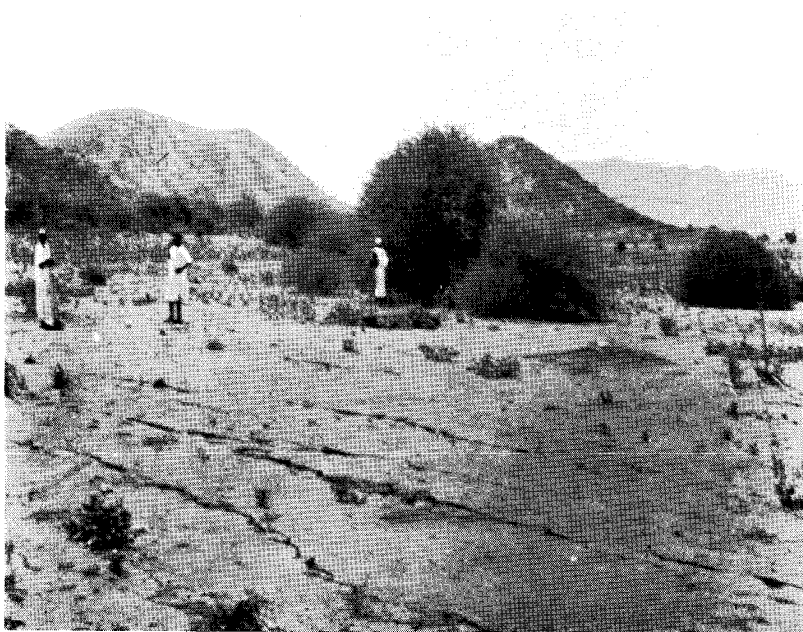
Booming of corrugated-iron roofs is considered to be equivalent to the creaking of wooden walls and frames and is interpreted to indicate by itself an intensity in the upper range of IV. Tumbling down hill-slopes of rock boulders is considered to be equivalent to the fall of objects off shelves and is thus assumed to indicate a minimum intensity of VI.



MAP I

Intensities and 'isoseismals' (on Modified Mercalli Scale—1956 version) and the fault trace associated with the earthquake, in the region of Jebel Dumbeir. Localities shown are numbered as in Table 2. Modified after Qureshi and Sadig (1967) with the kind permission of the publishers of *Nature*.

There is a fair thickness of loose superficial deposits in all the places recorded in Table 2 except at Sidra which is built on rocky ground; this may explain smaller damage in this township as compared with Semeih (see Richter, 1958, p. 146). Higher intensity at Sidra is based on reports of appearance of water in dry wells. In general intensity is found to be higher over Basement Complex rocks than over a considerable thickness of bedded sedimentary rocks; an example has been given elsewhere (Qureshi & Sadig, 1967, p. 264).



(a)

Photo by Y.A.S.



(b)

Photo by Y.A.S.



(c)

Photo by Y.A.S.

PLATE I

- (a) Tension gashes *en échelon* north of J. Dumbeir (left). The hill in the right background is Jebel Ed Dair.
- (b) Boulder hurled down the N. slope of J. Dumbeir by the strongest shock. Lighter patches show its freshly chipped parts.
- (c) Slumping of a bank of Khor Abu Habil in the course of the gash belt, S. of J. Dumbeir.

facing p. 130



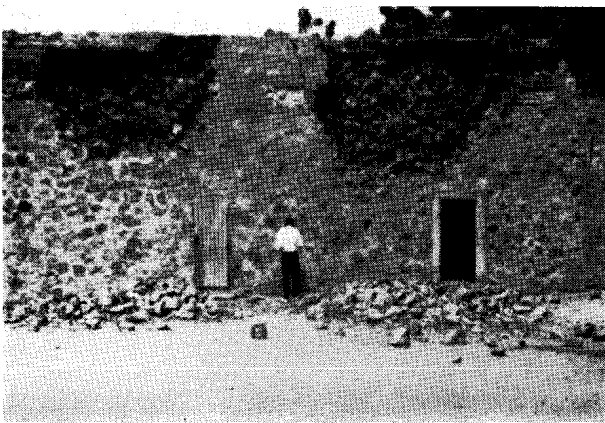
(a)

Photo by S.M.R.



(b)

Photo by A.A.S.



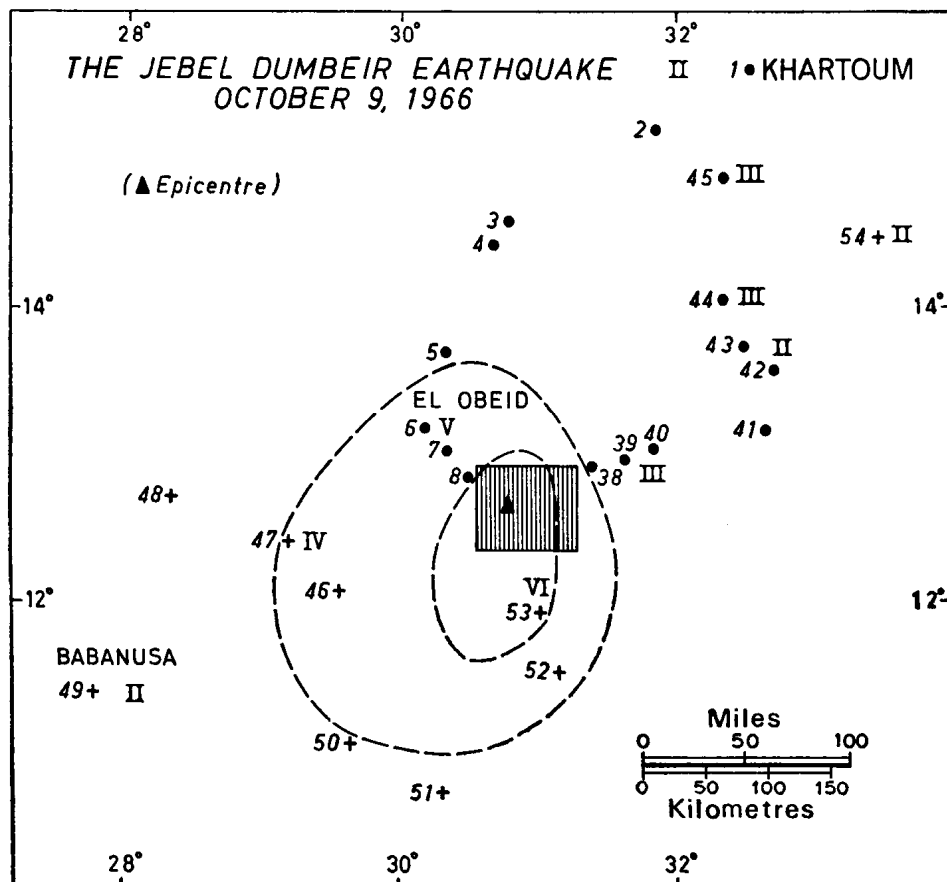
(c)

Photo by Y.A.S.

PLATE II

- (a) Reappearance of outline of old and forgotten grave near Hagar el Ezariq South.
- (b) Badly damaged hut and broken pitcher in Hagar el Ezariq North.
- (c) Damage to stone building in Semeih.

A large number of boulders of various sizes were hurled down the slopes of Jebel Dumbeir and Jebel Ed Dair. They could be distinguished from the old boulders by their freshly chipped corners. Among the boulders that came down Jebel Dumbeir there were two, each of which measured about 2 m. $\times$ 2 m. $\times$ 2 m.



MAP II

Intensity distribution of the Jebel Dumbeir Earthquake in the Sudan. Localities visited are shown by dots and numbered as in Table 2. Localities reported by newspapers are shown by plus signs and numbered as in the text. The shaded square encloses the area of Map I. Approximate positions of two regional 'isoseismals' are shown: the outer contour encloses the area of intensity greater than III and the inner of intensity greater than V. Locality No. 39 which lies outside the outer contour probably experienced an intensity of IV and this indicates a local variation of intensity.

Other ground effects noted near Jebel Dumbeir were (1) the slumping of a bank of Khor Abu Habi (Plate 1 (c)) in the gash-belt, and (2) the re-appearance of the outline of the old and forgotten graves which had been levelled in flush with

the ground surface (Plate 2 (a))—this resulting from a considerable shaking of the ground.

The localities visited by the group in the region of Jebel Dumbeir are shown in Map I along with two 'isoseismals', i.e., lines separating zones of equal intensity. The localities numbered 1–8 and 38–45 are outside this area and are shown in Map II. Other localities which were not visited by the group and where minimum intensities are assessed from newspaper reports are also shown in Map II. These are numbered as follows: Dilling, 46; Abu Zabad, 47; En Nahud, 48; Babanusa, 49; Kadugli, 50; Talodi, 51; Abu Gubeiha, 52; Rashad, 53; and Wad Medani, 54. Reports of boulders hurled down the slopes of jebels near Rashad put the minimum intensity there at VI. Reports from Dilling suggesting that a small boy was buried alive while collecting sand from a nearby khor could not be confirmed and the exact cause of the accident remained undetermined. Possibility of an earthslide could not be ruled out. The earthquake was however widely felt in the town but no damage was reported; its intensity is thus guessed at not more than V. A broken window was reported from Abu Zabad where the intensity is estimated in the upper range of IV.

TABLE 2
INTENSITY DISTRIBUTION OF THE JEBEL DUMBEIR EARTHQUAKE

<i>Locality Number, Name</i>	<i>Field Notes</i>	<i>Recorder(s)</i>	<i>Estimated Intensity</i>
1. Khartoum ..	Felt by few seated persons	I.R.Q.	II
2. Umm Inderaba	Not felt	Y.A.S.	—
3. Gabra esh Sheikh ..	Not felt	Y.A.S.	—
4. Halasa (Umm Qirfa)	Felt by few seated persons	Y.A.S.	II
5. Bara	Felt by few persons as vibration of a light truck	Y.A.S.	III
6. El Obeid ..	Most persons felt and were frightened. Weak plaster fell off the ceiling and wall of a build- ing. Booming of corrugated-iron roofs. Rattling of doors and windows. Cracks in walls of some old buildings	A.S.D. I.R.Q. & Y.A.S.	V
7. El Ein ..	Felt by all. Duration estimated	I.R.Q.	V
8. Nawa ..	Felt by all. Duration estimated. Swinging of doors. A stationary wagon slid down the railway track	I.R.Q.	V
9. Er Rahad ..	Felt by all. Duration estimated. Small articles fell off shelves. Booming of the cor- rugated-iron roof. Cracks in masonry D. ..	A.S.D. & I.R.Q.	VI
10. Umm Ufeina	Felt by all. Trees shaken	I.R.Q.	VI
11. Abu Tuleih	Felt by all	I.R.Q.	VI
12. Idd en Nabag	Felt by all. Furniture moved	I.R.Q.	VI
13. Semeih ..	All persons felt and were frightened. Books fell off shelves. Crockery broken. Trees shaken. Widespread damage to masonry D. ..	A.A.S., I.R.Q. & Y.A.S.	VII
14. Dagak ..	Felt by all. Trees shaken	Y.A.S.	VI
15. Tebeldiya ..	Felt by all. Trees shaken	Y.A.S.	VI
16. Shaqq El Windi	Felt by all. Trees shaken	Y.A.S.	VI
17. Qoz Bishara ..	Felt by all. Trees shaken	A.A.S.	VI

<i>Locality Number, Name</i>	<i>Field Notes</i>	<i>Recorder(s)</i>	<i>Estimated Intensity</i>
18. Hagar el Ezariq North	The shock frightened all persons and animals. Glass and earthen utensils broken. Trees violently shaken. Small cracks in ground. All-mud structures completely collapsed, others (mud and straw) badly cracked. One donkey and two goats were killed	A.A.S. & A.S.D.	VIII
19. Hagar el Ezariq South	The shock frightened all persons. Many all-mud structures were completely destroyed. Others received wide cracks. Earthenware broken. Old graves shaken loose	A.A.S. & I.R.Q.	VIII
20. Gondukur ..	Felt strongly by all. Direction estimated. Objects fell off shelves.	B.D.K.	VII
21. Sidra ..	All persons frightened. Direction estimated. Violent shaking of trees. Objects fell off shelves. Cracks in mud structures and stone walls. One wall collapsed. Rock boulders tumbled down the eastern slope of Jebel Ed Dair. Water appeared in dry wells	B.D.K. B.D.K.	VIII VI
22. Farla ..	Felt by all. Cracks in one mud cottage	B.D.K.	VI
23. Kimla ..	Felt by all. Some boulders tumbled down Jebel Ed Dair	B.D.K.	VI
24. Mundur ..	Felt by all. Boulders came down the slope of Jebel Ed Dair	B.D.K.	VI
25. El Ein ..	Felt by all. Direction estimated. Cracks in mud cottages.	B.D.K.	VI
26. Dar el Kebir	Felt by all. One mud cottage cracked. Boulders came down the slope of Jebel Ed Dair. Trees shaken	B.D.K. B.D.K.	VI VI
27. Iggera ..	Felt by all. One mud cottage collapsed	I.R.Q.	VI
28. Tebeldiya ..	Felt by all. Grass huts shaken	A.A.S.	VI
29. Qardud North	Felt by all. Grass huts and trees shaken	A.A.S. & Y.A.S.	VI
30. Qardud Abu Zida ..	Felt by all. Grass huts and trees shaken. Cracks in mud structures	A.A.S., A.S.D. & Y.A.S.	VI
31. Qardud Nyama (market) ..	Felt by all. Objects fell off shelves. Booming of corrugated-iron roof. Cracks in mud structures. One wall collapsed	I.R.Q.	VI
32. Allah Karim	Felt by all. Grass huts shaken	I.R.Q.	VI
33. Qoz esh Shau	Felt by all. Grass huts shaken. Objects fell off tables	I.R.Q.	VI
34. El Eddaiyat ..	Felt by all. Grass huts shaken	I.R.Q. A.A.S. A.S.D.	VI
35. Abu Hamra	Felt by all. Doors swung. An old wooden beam collapsed	I.R.Q.	VI
36. Koanamusa ..	Felt by all. Grass huts shaken	I.R.Q.	VI
37. Umm Ruwaba	Felt by many. Duration estimated. Sensation of a jolt	A.S.D.	IV
38. El Ghabsha ..	Felt by seated persons	I.R.Q.	III
39. Wad Ashana	Felt by seated persons. Vibration of corrugated-iron roof. Duration estimated	I.R.Q.	IV
40. Tendelti ..	Felt by few	I.R.Q.	II
41. Kosti ..	Felt by few	I.R.Q.	II
42. Esh Shawal ..	Felt by few	I.R.Q.	II
43. Kawa ..	Felt by few	I.R.Q.	II
44. Abu Hibeira	Felt by many. Some cracks in a mud structure	I.R.Q.	III
45. El Geteina ..	Felt by many	I.R.Q.	III

Damage to Life and Property

Fortunately the area around Jebel Dumbeir was thinly populated and the foreshock had been a sufficient warning to the people to leave their huts and cottages. Consequently there was no loss of human life in this region. One donkey and two goats were however reported killed after having been buried under collapsed structures. Most of the housing structures in the region consisted either of all-straw huts or cottages made of mud walls and thatched roofs. The former were only severely shaken by the earthquakes but the latter were badly damaged. The most affected area lay within a radius of about 22 km. from Jebel Dumbeir and this included the two villages of Hagar el Ezariq, at the foot of the jebel, and the small townships of Semeih, Er Rahad and Sidra.

Most mud huts and grain stores either collapsed or were badly cracked in Hagar el Ezariq North (see Plate 2 (b)) but in Hagar el Ezariq South only half of such structures were so affected. A large amount of earthenware, glassware and china was also broken.

Among the townships, Semeih was the worst hit probably because it lay close to the epicentre and in alignment with the zone of faulting and also because it is built on a sand dune which lies directly over granitic rocks. Here many of the twenty-year old brick and stone buildings were badly damaged (Plate 2 (c)). In the younger buildings plaster showed widespread cracks and some of the parapets partly collapsed. Older buildings in Er Rahad and Sidra showed only cracks except one building in Er Rahad whose parapet fell down.

Richter (1958, pp. 136–137) classifies buildings into four types, A to D, according to the quality of materials used, the design and the workmanship. The quality of masonry of the badly damaged buildings in Semeih and elsewhere was quite poor—mostly mud plaster having been used; it is thus considered that they were generally of type D.

A very old brick building collapsed in El Obeid (Map II) on the morning of 11th October. In addition to the principal shocks of the series (Table 1), El Obeid also experienced some of the stronger aftershocks. The collapse of the building may therefore be attributed to the aggregate effect of these shocks.

Faulting

Most shallow shocks usually originate as a result of subsurface fracturing or from volcanic activity. Earthquakes associated with vulcanicity generally increase in number before an eruption takes place. In the tectonic earthquakes on the other hand the strongest shock may or may not be preceded by a few foreshocks but it is followed by a large number of aftershocks which decrease in frequency and magnitude. Apart from the fact that there is no evidence of recent vulcanicity in Kordofan, the series of earthquakes described above followed the general pattern of tectonic earthquakes.

Surface evidence of faulting is reported in a relatively few tectonic earthquakes (Richter, 1958, pp. 168–184) and is rare in earthquakes of magnitude less than 6. By providing the evidence for faulting at surface, the Jebel Dumbeir Earthquake proved itself to be a tectonic earthquake. An explanation for this unusual behaviour may lie in the rather shallow depth (11 km.) of its hypocentre.

The evidence for faulting was found in the characteristic tension gashes that develop in clayey deposits as a result of strike-slip fault movement in the underlying bedrock (Hills 1963, pp. 99, 171–4). The gashes were arranged *en échelon*

and were best developed in the silty soil in the region of Jebel Dumbeir (Plate 1 (a)). They were spaced 2 to 5 m. apart and were 14 to 15 m. long. Their width increased towards the middle reaching a maximum value of 3 to 5 cm. In softer ground, possibly because of slumping, some of the gashes were 25 to 45 cm. wide.

North of Jebel Dumbeir the gashes lay in a linear belt trending about 020° and the gashes themselves trended at 340° ; this indicated a sinistral strike-slip fault movement in the bedrock.

The gash-belt was followed for a distance of 4 km. north of Jebel Dumbeir where it terminated in muddy ground (see Map I). Southwards the gashes became finer and shorter on the northern slope of the jebel and were eventually lost in bushes and loose rocks and the belt could not be followed right across the jebel. It reappeared however south of the jebel where it swung along a curve for a distance of about $\frac{1}{2}$ km. from an initial trend of 343° to a trend of 012° . It maintained the latter trend for a further distance of $1\frac{1}{2}$ km. but was not followed for its full length. Attempts to locate a possible northward continuation of the belt in Semeih and a possible southward continuation in Sidra were unsuccessful.

Conclusions

The Jebel Dumbeir Earthquake was the strongest of the series of earthquakes that occurred in central Kordofan beginning October 9th, 1966. The earthquake had a radius of perceptibility of about 400 km. and was accompanied by damage to property in the region of Jebel Dumbeir. The earthquakes were of tectonic origin and resulted from a fault movement which began at a depth of 11 km. and continued right up to surface.

A detailed geological study of the region of Jebel Dumbeir is recommended in order to determine the extent of faulting at surface and to discover whether the fault was a new fracture or a rejuvenation of an old fracture.

A network of local seismograph stations in the Sudan would help in making local crustal studies and in delimiting the regions prone to seismic activity.

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RECENT DISCOVERIES IN THE CALDERA OF JEBEL MARRA

by

D. HAMMERTON

Introduction

Jebel Marra is the highest point of the isolated mountain massif comprising the Marra Mountains which constitute an area of relatively high rainfall, permanent streams and dense vegetation entirely surrounded by the desert and semi-desert of Darfur Province. In the summit area of this volcanic complex is an impressive caldera, commonly referred to as a crater, which is about five kilometres in diameter at a height of over 2,000 metres and whose encircling basalt cliffs rise from 500–1,000 metres above the floor attaining a maximum height of 3,024 metres in the west. Within the caldera is a central cone containing a deep crater lake which occupies a former vent of the volcano while to the east the lowest part of the sloping floor contained a shallow lake nearly 2.5 kilometres in length.

Since the first visit by Hobbs and Gillan in 1918 (Gillan 1918, Hobbs 1918) Jebel Marra has been visited by a number of geologists, botanists and zoologists while more recently it has been intensively studied by a United Nations FAO team with a view to developing the agricultural and forest resources of the area. However, prior to 1964 no collections or studies of the aquatic floor and fauna had been made. This was, in the hydrobiological sense, virgin territory.

In November, 1964 a joint expedition from Sir John Cass College, University of London and the Hydrobiological Research Unit, University of Khartoum, carried out the first biological survey to be made of the streams and the two lakes, locally known as the Dariba lakes. From a hydrobiological point of view Jebel Marra was of particular interest to us because of the almost complete isolation of these waters near to the geographical centre of the African continent and because we knew that there were striking chemical differences between the various streams and between the two lakes (Hunting Technical Services, 1958).

The team was jointly led by Miss L. McGowan (Sir John Cass College), and the writer (Hydrobiological Research Unit); the former was responsible for zooplankton and bottom fauna and the latter for water chemistry and the collection of algae. The four remaining members of the team, all from Sir John Cass College, together with their special interests were as follows: Mr. A. E. Bailey-Watts (fish), Miss A. Fullick (small reptiles and mammals), Mr. J. Greenwood (marginal and attached fauna), and Mr. J. Rogers (fish).

During the five weeks we spent in the area several hundred samples, comprising a much larger number of specimens, were collected from many different sites including streams, waterfalls, pools, moist rocks and the two saline crater lakes. A large number of chemical analyses were made in the field and other determinations were carried out on samples taken back to Khartoum University. We also carried out the first bathymetric survey of the two lakes.

In December, 1965 and January, 1966 a second visit to Jebel Marra was made by the writer in order to carry out limnological studies in the two lakes and to add further to the collections already made.

The detailed scientific results of these two expeditions will be published in the appropriate journals in due course; the purpose of this article is merely to describe some of the more interesting immediate discoveries.

Bathymetric Survey of the Dariba Lakes

In order to carry out biological and chemical studies of the lakes it was considered essential first to make a map of their bottom contours and for this purpose the Hydrobiological Research Unit had purchased a lightweight, transistorised echo sounder which was calibrated in two scales, 0–60 feet and 0–60 fathoms. An Avon "Redseal," 5–6 man, inflatable rubber dinghy was used for making a series

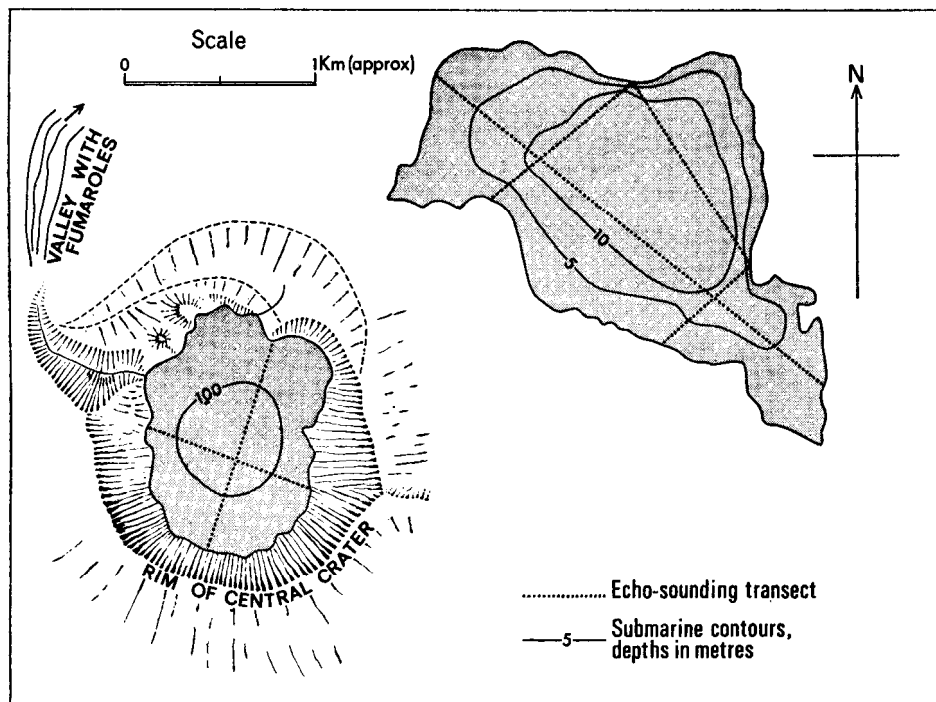


FIGURE 1

Map of the Dariba Lakes, Jebel Marra.

of transects, this being the first time that a boat had been used on these waters. Three persons were required in the boat for each transect, one rowing, the second reading the echo sounder at 15 or 30 second intervals and the third recording the data. As far as possible the boat was rowed at a constant rate in a straight line from a prominent landmark on one side of the lake to a similar feature on the opposite shore. These landmarks are all clearly defined on aerial photographs of the crater and thus it was possible to draw a reasonably accurate map of the two lakes. The positions of the transects and the interpolated submarine contours are shown on this map (Fig. 1).

As we had anticipated, the large lake, which occupies the lowest part of the floor of the caldera, proved to be a shallow, flat-bottomed body of water; its maximum depth was 11.6 metres. The smaller lake was in striking contrast to this and on our first transect no response could be obtained on the echo sounder. Further investigation showed this to be due to the steep slope of the lake bed, which is in the form of a conical funnel, so that the echo was not reflected back to the surface until we reached a flat circular area in the centre of the lake which gave a very clear signal at depths ranging from 102 metres to a maximum of 108 metres. The maximum depths of both lakes were subsequently checked when samples of the bottom deposits were taken by means of a dredge on a calibrated rope. On the writer's second visit in 1965/66 the depths were further checked by means of a Ruttner sampler lowered on a steel cable from a Friedinger winch, calibrated in metres and tenths of a metre. The maximum depths thus obtained in January, 1966 were 11.6 metres for the large, and 108.8 metres for the small lake.

Both lakes show evidence of marked rises in level in relatively recent times. The water of the small lake is very clear and during our 1964 survey we noted a number of dead trees, still in their growing positions, at various depths below the surface, indicating that the water level had risen considerably. Subsequently, in January 1966, I found evidence of at least two former beach levels. With the use of underwater face mask and snorkel the underwater margins of the lake were explored and, at two points on opposite shores, I found two clearly defined beds of plant remains at depths of approximately 3 metres and 5–7 metres. Partly decayed material from these beds appeared to be very similar to the sedge *Cyperus laevigatus* and its variety *C. laevigatus var distachyos*¹ which today form a dense marginal growth round the periphery of both lakes.

The evidence of these former beach levels indicates that the water level has probably risen abruptly on at least two occasions in relatively recent times. Such sudden changes could hardly be accounted for by changes in rainfall and the most probable explanation is that on each occasion major landslips occurred on the unstable inner walls of the crater, resulting in large upward displacements of the water. There is plenty of evidence that such landslips have occurred in the past on all sides of this crater. Evidence was also found in 1964 for a rise in level of the large lake by the discovery of a number of dead trees standing in 2–3 metres of water near the east bank.

Further evidence for the rise in level of this lake can be obtained by comparing Hobbs' map (1918, p. 362) with present-day aerial photographs: today the large lake occupies a considerably greater area of the caldera. Moreover Hobbs states that the lengths of the two lakes in 1918 were 1,950 yards and 1,550 yards, a ratio of about 1.3 to 1.0. Today the large lake is more than twice the length of the small lake. There is however, no evidence of former beach levels and it is suggested that here a steady rise in level is taking place due to the inflow of sediment following the annual rains—a process which should within a relatively short time result in the disappearance of the large lake. However, if Hobbs' map is correct, the increase to more than twice its 1918 area seems too much to be accounted for in this way alone and there must also have been a big increase in the total volume of the lake. Supporting evidence for such an increase can be found by comparing

¹ Specimens were collected by the Botany Department, University of Khartoum, expedition in December 1966 and were determined by V. Tackholm of Cairo University.

recent analyses of the lake waters with those of R. G. Archibald of the Wellcome Research Laboratories, Khartoum, who analysed two samples collected by Lynes in 1920 as shown in the following table:—

<i>Date of Sample</i>	<i>Analyst</i>	<i>Large Lake</i>		<i>Small Lake</i>	
		<i>Chloride mg/L.</i>	<i>Alkalinity meq/L.</i>	<i>Chloride mg/L.</i>	<i>Alkalinity meq/L.</i>
10/4/20	Archibald ¹	9,700	640	1,030	57
20/12/57	Anon. ²	2,580	169	780	51
29/11/64	Hammerton	2,540	145	775	44
12/1/66	Hammerton	2,580	147	778	48

The marked decrease in salinity of the large lake between 1920 and 1957 can only be accounted for by an approximately fourfold increase in the volume of the lake (assuming that the inflows contain some chloride). The decrease in salinity of the small lake is much less, corresponding to an increase of just over 30% in the volume of the lake. No further change in salinity has taken place between 1957 and 1966.

In the absence of any climatic data for the caldera between 1920 and 1957 one can only speculate as to the possible causes for the increase in volume of the two lakes. These include climatic changes such as an increase in rainfall or a decrease in evaporation, physico-chemical changes in the lake basins such as deposition of algae and silt or chemical action all of which would tend to seal off porous strata, and finally earth movements which might affect the pattern of drainage within the caldera.

One further factor must be considered here and that is the remarkably small seasonal variation in lake level during any one year. This was first noticed by Hobbs and Gillan (Gillan, 1918), confirmed by Lynes (1921) and more recently by the United Nations FAO team who carried out monthly observations on the level of both lakes during 1965–66 and found a maximum variation of not more than half a metre (verbal communication). Lynes put forward the theory “that each lake has its own basin equally as independent of the other as the original formation of the two lakes certainly was: that the water is in both senses derived directly from subterranean sources, that the basins are porous in a high degree at about one foot above dry season water level and that the small rise and fall undoubtedly existing is due to the excess of water, both surface and subterranean, which for a comparatively brief period only viz. during and just after the annual rains slightly raises the respective heights of the overflow.”

Lynes goes on to say: “there is much evidence in the form of extensive water courses . . . that immense quantities of rainwater must feed the salt lake during the rains and yet it is no better off in the end than the fresh lake whose abruptly sloped containing structure can only supply it with a comparative teaspoonful of rain water at the same period. No—the surface water supply can be but a passing incident in the life of both these lakes.”

¹ Lynes 1921.

² Hunting Technical Services 1958.

Our own investigations in 1964 and 1966 revealed the presence of water not far below the surface of several of the dry watercourses in the vicinity of the large lake. This water was fresh (chloride content ranging from 12 to 72 mg./L.) and there was usually a detectable flow towards the lake. This confirms Lynes suggestion of subterranean sources of supply but one cannot agree with him "that enormous quantities of rainwater must feed the salt lake during the rains." If this were true the lake would soon lose its saline character and, in any case the observed rise in level at this time is very small. Thus, little of the fairly heavy annual rainfall (800–1,200 mms.) reaches the lake via the surface drainage and most of the water reaching the lake from whatever source must be lost by evaporation.

With regard to the small lake, Gillan (1918) thought that the small variation in annual level could be fairly easily explained: "The precipitous sides of the crater form a comparatively small drainage area while the depth of water presumably minimises evaporation. The absence of salt may possibly point to a subterranean outflow and the sulphurous nature of the water pre-supposes the likelihood of perennial springs both of which would tend to keep the level fairly constant."

The depth of water does not actually affect the evaporation rate but Gillan was remarkably far sighted in suggesting the presence of perennial sulphurous springs. In fact I discovered a series of hot sulphurous springs in January, 1966 (see page 142) and the flow of these, though not great, could be sufficient to counter-balance the loss by evaporation. The presence of a permanent subterranean outlet seems less likely but there is a possibility that the basin is porous just above lake level on the north side where the rim is much lower. In accordance with Lynes any excess water would then drain by seepage into the lower floor of the caldera.

The presence of the hot springs poses another problem: from where is their water supply obtained? The small size of the available catchment within the central crater makes it extremely unlikely that the water is derived from the annual rains. If it is merely water re-cycled from the lake then the problem of evaporation loss is less easily explained. Two other possibilities remain, i.e. that the water is derived deep down from the subterranean water of the caldera or that it is "juvenile" water derived from even greater depths.

In conclusion, to summarise briefly the foregoing arguments, the remarkable constancy of level of both lakes in closed basins where the climatic conditions would lead one to expect big fluctuations points to the conclusion first proposed by Lynes (1921) that there is a self-regulatory mechanism in each lake tending to keep the level constant within very narrow limits during the course of each season. Any excess water following the rains must drain away through permeable strata only a little above normal lake level while any losses in dry weather due to evaporation must be nearly balanced by the inflow from springs or subsurface water.

This in turn suggests that the increase in lake volumes between 1920 and 1957 was probably not solely due to increased inflow from rain (which would merely drain away) but to the deposition of impermeable material such as algae and fine silt around the lake margins so that a greater part of the inflow was retained. This theory still requires an increased inflow of fresh water during this period to fit the known facts unless the rate of evaporation in some way decreased. Thus, if the

inflow remained constant while evaporation increased (by virtue of the greater surface area of the rising lake) then the salinity would increase—exactly the opposite of what has happened. However, only a detailed geological survey together with records of rainfall, run-off, evaporation and lake levels will provide a final answer to this question.

Evidence of Residual Volcanic Activity

During the 1964 expedition to the Dariba lakes, John Greenwood and I noticed pronounced acrid, sulphurous fumes while exploring the N.W. rim of the central cone. Despite a search of the immediate area we were unable to locate the source of these fumes. Later we reported this observation to members of the United Nations FAO Jebel Marra Project team in Zalingei. They told us that such fumes had been noticed on a number of occasions in the past but no one had located their source. Indeed Lynes (1921) recorded sulphurous fumes within the crater which were then interpreted as arising from the decay of organic matter in the saline lake.

One of the subsidiary aims of my second visit to the Jebel was to try to locate the source of the fumes. Before embarking on the search I made some enquiries among the Fur men of the village of Taura Tonga which lies at a height of 2,600 metres, only three hours by foot from the Dariba lakes. These men had lived all their lives on the mountain and were frequent visitors to the caldera. Indeed some of the women from this village came regularly to the lake side to collect salt for sale in the local markets. All of the men, with one exception, said that they had no knowledge of bad smells or hot gases within the crater. However one man by the name of Abdel Rahman told me the following story.

About thirty years ago, when he was a small boy in the village of Kallokitting (further down the same valley) an old and very wise man from the village had gone up into the crater one day with a younger companion and they had entered a deep valley which contained hot evil smelling air and where they saw many dead birds. Eventually they came to a place where hot air was rushing out of the ground with a roaring sound like that of a pressure lamp. The old man told his companion to wait while he went forward and with the aid of a stick collected material near the vent. Later they took this substance back to Kallokitting and Abdel Rahman remembered seeing this “kabrit” (sulphur) which was yellow and burned with a blue flame. No one as far as he knew had ever been near the place again as it was reputed to be haunted by ‘sheitans’ and ‘djinnns’ and one would die from breathing the bad air. Abdel Rahman said he did not know where this valley was, except that he thought it might be the deep valley on the N.W. side of the small crater lake.

Since it was near the upper rim of this valley that we had first noticed the sulphurous fumes in 1964, I decided to start my search here and spent several hours exploring the valley from top to bottom but with no success. Later I realised that this could not have been the correct valley because it is only accessible by boat from across the lake and no boats had ever before been seen on these lakes. On returning in the rubber dinghy from this excursion I decided to explore the N.W. margin of the lake and, while doing so, suddenly realised that the surface of the water was distinctly hot. Steam was rising from the lake margin and there was a faint sulphurous smell, though not the acrid smell of sulphur dioxide.

Further exploration of this corner of the lake revealed that the hot water was coming from a series of hot springs at the margin, as indicated in the sketch map (Fig. 2). At a beach about 15 metres long I found numerous springs at a temperature of 65°C . flowing out of the sand just below and just above lake level. The ground for a distance of several metres inshore was hot—in fact a thermometer pushed 10 centimetres into the ground about one metre from the water registered $70\text{--}75^{\circ}\text{C}$. About 30 metres N.E. of this beach there was a bigger hot spring emerging from a vertical rock at lake level and at a temperature of 73°C . Further along still, at a second beach I found numerous springs at temperatures ranging from $65\text{--}73^{\circ}\text{C}$. In the S.W. corner of the beach a strong flow of water at a temperature of 85°C . was seen emerging from a hole three inches in diameter in the rock face.

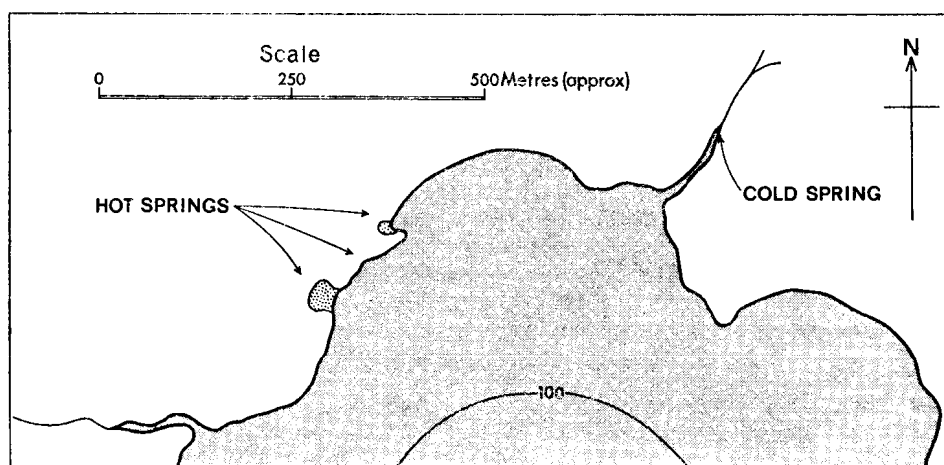


FIGURE 2

Position of hot springs.

Hot water from these springs could be detected spreading in a thin layer over an area up to 50–100 metres from the shore. The thermometer indicated surface temperatures of $30\text{--}50^{\circ}\text{C}$. while often only 5–10 cms. below the surface the temperature dropped abruptly to the normal lake temperature of 18°C . All the hot springs seemed to be at about the level of the water surface but there was a very small stream of water at $65\text{--}70^{\circ}\text{C}$. flowing down the centre of the second beach. Underwater exploration failed to reveal any submarine hot springs. Chemical analyses show that the water from these springs is more saline than that of the lake (chloride content 955 to 1,350 mg/L. compared with 778 for the lake), indicating that they must form a relatively small part of the lake inflow.

One cold, freshwater spring was also found on the north side of this lake in a deep fissure which could only be entered by boat (Fig. 2). The flow was very small at a temperature of 15°C . and with a chloride content of 19 mg/L. This spring must be derived from the rainwater of the central crater but, as I have suggested earlier, the hot springs must either be supplied from deep subterranean water of the caldera or from “juvenile” water at even greater depths.

Two days after the discovery of the hot springs I made a careful search of the outer N.W. slopes of the inner crater and eventually located a deep gulley (see Fig. 1) in which there were a large number of fumaroles along a distance of 100–150 metres. At each vent gases smelling strongly of sulphur dioxide were discharging under pressure with a sound remarkably like the pressure lamp as described by Abdel Rahman. Around each vent there were crystalline deposits of sulphur and other minerals and also a number of dead birds, small rodents and insects. These had evidently come to seek warmth during the very cold nights and had been suffocated by the fumes. The whole valley in the vicinity of the fumaroles was completely devoid of any living plant—clear evidence of the highly poisonous nature of the gases. The ground was warm, even hot in places and sounded dangerously hollow near some of the fumaroles. But for a gale force wind blowing up the valley that day it would have been impossible to venture within because of the choking fumes. Moreover, access from either end of the valley was not feasible because of high cliffs and the only way in that I could find, down the steep side of the gulley, was decidedly difficult, the cliffs being loose and crumbling. In future anyone wishing to enter this valley would be well advised to take a good quality alpine rope for safety. There was not enough time to make a detailed study of the area but at least three of the adjacent valleys to the west were similarly devoid of vegetation and appeared to contain fumaroles.

The discovery of hot springs and fumaroles was recorded in *Nature* (Hammer-ton, 1966) together with the comment that the volcano of Jebel Marra must now be regarded as dormant and not extinct. Subsequently Burton and Wickens (1966) pointed out that fumaroles had not previously been seen in the crater although the mountain had been traversed by a number of observers, and they suggested the possibility that “the fumaroles reported by Hammerton have formed during the last few years and that there has been a rise in the geoisotherms below Jebel Marra cannot be entirely discounted. Workers in the area should be on the watch for any further signs of increasing activity.”

Certainly it is true that previous recorded observations have not mentioned these phenomena and that they are unknown to the present day inhabitants of the mountain. However, as I have already pointed out, the hot springs are only accessible by boat and considerable searching was required to find the fumaroles even when their presence was suspected. Moreover, there is the story, which to me seems highly convincing, that the fumaroles were seen some thirty years earlier by a man from Kallokitting. Deposits of travertine around the outlets of some of the hot springs also suggest that these are not of very recent origin.

One further piece of evidence that the volcano is not extinct was discovered by our 1964 expedition. Samples from the large lake revealed that there was a layer of warm, saline water, some two metres thick, at the bottom. This layer had a temperature of 18°C. and a chloride content of 2,840 mg/L. compared with 16–17° and 2,540 mg/L. chloride in the upper layers. On my second visit in January, 1966, this saline layer had completely disappeared, the chloride content then being a uniform 2,580 mg.L. at all depths. These results suggest the presence of intermittent, hot saline springs at the bottom of this lake. The opacity of the water here (Secchi disc visibility 25–30 cms.) rules out any possibility that the higher temperature of the saline layer could be due to solar heating, such as occurs in certain brine lakes at times when these are covered with an overlying sheet of clear freshwater.

Flora and Fauna in Relation to Water Chemistry

Some of the more important physical and chemical characteristics of the Dariba lakes are shown in the following table:—

	<i>Small Dariba Lake</i> (surface sample)	<i>Large Dariba Lake</i> (surface sample)
Date	11/1/66	13/1/66
Temperature °C. . .	17.9	18.05
pH	9.4	9.8
Alkalinity (HCO ₃ +CO ₃) (meq/L. . .)	47.5	147
Na (mg/L.)	1,600	6,200
K "	95	585
NH ₃ (as N.) "	Nil	Trace
NO ₃ (as N.) "	Nil	Nil
NO ₂ (as N.) "	Trace	Trace
SiO ₂ "	10	24
P ₂ O ₅ "	0.02	5.2
Cl "	778	2,580
Dissolved O ₂ "	6.2	8.2

Both lakes are highly saline, being rich in sodium, potassium and chloride and are also highly alkaline due to the predominance of carbonate and bicarbonate among the anions. The concentration of dissolved salts is approximately three times greater in the large lake, this being almost certainly due to proportionally higher evaporation losses.

It is not proposed to comment in detail here on stratification in these lakes. However, results from the two expeditions suggest that the small lake is permanently stratified chemically with no dissolved oxygen below 50 metres and a marked increase in such constituents as ammonia, phosphate and silicate together with large amounts of sulphuretted hydrogen in the bottom water. Diurnal variations in temperature and dissolved oxygen were remarkably small in the surface water of this lake, rarely exceeding 1°C. and 1 mg/L. respectively. The large lake was in marked contrast again; here the surface temperature was sometimes observed to rise from about 15°C. to over 19°C. between sunrise and mid-afternoon, while the oxygen content rose from about 6 mg/L. to over 10 mg/L. in the same time. However the tendency toward thermal stratification by day was almost invariably ended by rapid nocturnal cooling and mixing; thus prolonged stratification probably does not occur except in the presence of pronounced salinity differences such as were found in 1964 (see above).

Phytoplankton

As a result of their high salinity and alkalinity the waters of crater lakes and other basins of closed drainage tend to have a very restricted flora and fauna and the Dariba lakes are no exception. Not only is there a very limited range of species present but also there are striking differences between the two lakes which

are associated with the chemical differences. Our plankton net hauls in 1964 and 1966 showed that the small lake contained no planktonic algae, such algae as were found being clearly derived from epiphytic populations on the marginal vegetation. The water of this lake was extremely clear, the white Secchi disc being visible at depths of over five metres.

The large lake contained enormous quantities of the rare blue-green alga *Spirulina* (*Arthrospira*) *platensis* together with trace amounts of the even rarer *Anabaenopsis arnoldii*. The *Spirulina* was often seen to form a dense scum which drifted with the wind to form decomposing masses on the leeward shores. Because of the dense algal population and the resultant organic matter in solution, which imparted a yellowish colour to the water, visibility was so poor that the Secchi disc could rarely be seen at greater depths than 25–30 centimetres.

It is of interest to note here that *Spirulina* (*Arthrospira*) *platensis* has previously been recorded in dense growths in about ten crater lakes in central Africa (Beadle 1932, Baxter et alia 1965, Talling 1965) and from one crater lake in North America (Frey, 1963, p. 402) as well as in a number of closed drainage basins in Africa. The closely related *Spirulina maxima* has been recorded from pools near Lake Chad where it has apparently been used as a food by certain tribes since ancient times (Brandily 1959). All these pools and lakes have certain chemical features in common, e.g. high salinity, high alkalinity and pH values in the region of 9.0 to 11.0.

One puzzling feature is the complete absence of *Spirulina* or indeed any planktonic algae from the small lake. If, as suggested earlier, increasing salinity and alkalinity brings about a restriction of the flora, one would expect to find this lake richer in species than the other. Clearly the answer lies in the water chemistry and some light has been thrown on this problem by Beadle (1932) who studied the chemical composition of similar waters.

Beadle analysed samples from some fifteen lakes in East Africa, including six crater lakes, and studied their composition in relation to the flora and fauna. These lakes had a remarkably wide range of composition—for example the alkalinities ranged from 2 to 710 meq/L. (milliequivalents per litre) and the chloride contents from 10 to 3,450 mg/L. (milligrammes per litre). Lakes with the lowest values had a normal flora and fauna but in the upper region of the alkalinity values nearly all had dense blooms of *Spirulina*. Of particular interest, in connection with the Dariba lakes, were his results from three crater lakes A, B and C on a volcanic island on Lake Rudolf. Lake A, with an alkalinity of 60 meq/L., had no algae while lakes B and C with respective alkalinities of 178 and 113, had dense blooms of *Spirulina platensis*. Beadle suggested that the scarcity of algae in A might be due to the alkalinity being too high for the growth of diatoms, chlorophyceae and all blue-green algae other than *Spirulina* but not high enough for the growth of the latter. In his conclusion Beadle stated that no algae other than *Spirulina* had been found in waters above an alkalinity of 23 meq/L., that no algae were found within the range 23–80 meq/L. and that no *Spirulina* was found in waters below 80 meq/L.

The results from Dariba certainly fit in very well with these values. The small crater lake with no algae had an alkalinity of 43.4, almost exactly midway between Beadle's upper and lower limiting values, while the *Spirulina* rich lake had an alkalinity of 145 meq/L. which is intermediate in value to a whole series of lakes from 80 to 710 meq/L. whose flora comprised only *Spirulina platensis*.

Unfortunately for this theory, however, both *Spirulina platensis* and *Anabaenopsis arnoldii* have recently been found abundant in Lake Rudolf (alkalinity 20–25 meq/L.) together with other algae not typical of alkaline waters (Fish 1955, Ross 1955). *Spirulina* and *Anabaenopsis* were not found in Lake Rudolf at the time of Beadle's work but their presence now suggests that other factors than alkalinity may be involved. *Spirulina platensis* has also been recorded in Lake Aranguadi, an Ethiopian crater lake with an alkalinity of 52–57 meq/L. (Baxter *et alia*, 1965). Talling (1965) suggests that, in this connection, a comparative survey of lakes in the alkalinity range 25–100 meq/L. would be of great interest.

In France studies have recently been carried out by the Institut Français du Pétrole (1967) of the laboratory culture of *Spirulina maxima* from Chad. Their experiments have shown that the main physiological requirements of *Spirulina* are an alkaline bicarbonate medium whose pH ranges from 8.5 to 11.0 and which must contain a certain quantity of sodium ions associated with the carbonate and bicarbonate. The optimum temperature for growth was 35°C. (Clement *et alia* 1967). As far as can be seen, apart from temperature, both the Dariba lakes fulfil these requirements. Why *Spirulina* does not grow in the small lake must, therefore, remain a mystery for the present.

Spirulina as a Source of Food

Spirulina, hitherto a somewhat rare and physiologically unknown alga, suddenly became of considerable interest in 1967 when the Institut Français du Pétrole announced that it was highly promising as a possible major source of protein.

Prompted by the discovery that it had long been a foodstuff of certain tribes in Chad, the Institut carried out analyses which showed that *Spirulina* had one of the highest protein contents of any known food (60–80%) and also a high vitamin content. Moreover, the Institut claims, it is considerably easier to cultivate on an industrial scale than some other algae (such as *Chlorella*) which have been intensively studied for this purpose. When grown experimentally in shallow ponds in the south of France, *Spirulina* has yielded dry algae at the rate of over 14 tons per acre per year. Thus one acre of *Spirulina* can produce approximately 10 tons dry weight of protein per year compared with 0.16 tons from wheat and 0.016 tons from beef. Even higher yields can be expected under tropical conditions (Institut Français du Pétrole, 1967). Thus it may be that this alga, hitherto only known in quantity from saline waters in Chad and crater lakes in Africa, may become an important part of the diet of mankind tomorrow.

Zooplankton

Identification of aquatic African fauna is by no means easy and much of the material from Jebel Marra has had to be sent to specialists in various countries for determination. The zooplankton of the lakes has not yet been fully identified but a considerable population of Copepoda was found in the small lake, while the plankton of the large lake comprised mainly Rotifera (McGowan, 1967). These observations are similar to those of Beadle (1932), who found no zooplankton other than Rotifera in lakes whose alkalinity was above 100 meq/L.

Fish

Because of their complete isolation from any external watercourses, it seemed unlikely that any fish could be present in these lakes, unless they had been introduced by man. It did not surprise us, therefore, to find that the gill nets which were set during the course of our 1964 investigations produced an entirely negative result. It is in any case doubtful if normal freshwater fish could survive in waters of such high alkalinity. Where fish such as *Tilapia* have been recorded from highly alkaline lakes it seems likely that they have become adapted over a period of many generations while the lake has become gradually more alkaline.

Conclusion

The discovery of hot springs and fumaroles within the caldera clearly showed that the volcano of Jebel Marra is dormant and not extinct, though the probability is that these are the final manifestations of much earlier volcanic activity. Nevertheless, the evidence of changes in salinity and lake level within the present century, suggests that conditions within the caldera are by no means static and one cannot be certain that volcanic activity is not increasing. The changes in salinity and lake level themselves require further explanation as also do the small seasonal fluctuations in level of the lakes. The examination of cores from the lake sediments would, no doubt, throw considerable light on these problems and perhaps reveal much of the recent history of the lakes and possibly of the caldera itself.

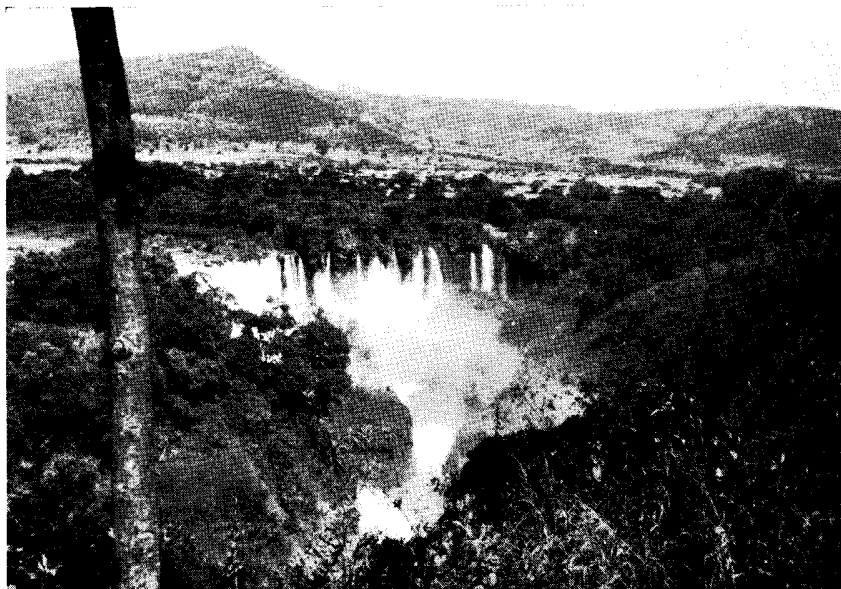
The lakes certainly present a most interesting study in comparative limnology, and one to which relatively little attention has been given in the past, probably largely because of the isolation and difficulty of access of these and similar lakes. Only a detailed biological and chemical survey of a considerable number of similar alkaline lakes (many of which are to be found in Africa) is likely to explain the striking differences in flora and fauna such as we have found in the Dariba lakes. Another aspect of the biology of the lakes has not yet been touched and that is the seasonal cycle of phytoplankton and zooplankton growth; as far as I am aware this has not been studied in any alkaline lakes in Africa.

Many other features worth investigation in the caldera have not been mentioned—for example the height of the lakes above sea level is not exactly known and there is still uncertainty as to which is the higher, though most observers seem to think that the small lake is higher by about 10 metres. The presence of ruins of stone houses on the rim of the small lake has not, as far as I am aware, been recorded, let alone studied by archaeologists. Could these have been built when Jebel Marra was the centre of a very much larger salt trade than it is today? Evidently, Jebel Marra should provide a rich field for investigation for many years to come, especially for geologists, archaeologists and biologists.

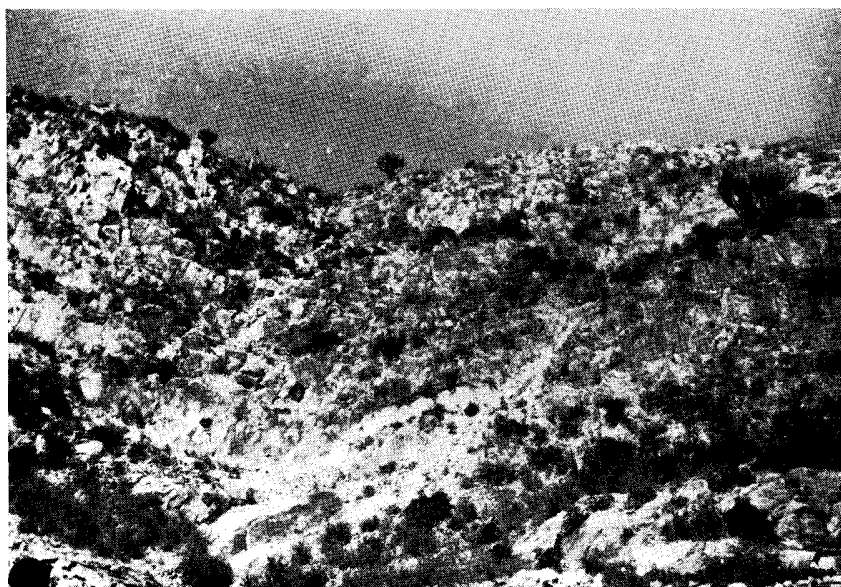
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(a)



(b)

PLATE I

Two of the collecting sites: (a) Tissisat Falls (b) Axum.

ALTITUDE AND FAUNAL DISTRIBUTION IN ETHIOPIA

by

FAYSAL T. ABUSHAMA AND J. L. CLOUDSLEY-THOMPSON

Introduction

In 1960 a bioclimatic and faunistic study was made in the Red Sea hills and coastal plain (Cloudsley-Thompson, 1962, 1963). In 1961 a similar investigation was carried out by us up the Nile valley to Nimuli, Yei and the Imatong Mountains (Cloudsley-Thompson, 1966). In 1962, work was carried out around Wadi Halfa (Pettet, Pettett, Cloudsley-Thompson and Idris, 1964), Kassala and the region south of 13°N (Cloudsley-Thompson and Idris, 1964). Finally in 1964, a study was made of the effect of altitude on faunal distribution on Jebel Marra, Darfur (Cloudsley-Thompson, 1967). The findings there were compared with those already obtained on the Erkowit Plateau of the Red Sea hills (Cloudsley-Thompson, 1962).

Thus, although most of the faunistic regions around Khartoum have been briefly described, a big gap, representing the Ethiopian Highlands, still remained. In order to investigate this we flew to Addis Ababa in December 1965 and made our way by local bus to Asmara *via* Bahar Dar on Lake Tana, Gondar and Axum.

We are indebted to the Research Committee, University of Khartoum, for a grant to defray our expenses. We also owe our gratitude to Drs. Brian Woods and Michael Prosser of the Haile Selassie I University, Addis Ababa, who took us to the crater and rift valley lakes south east of the city and to Mount Menagesha on the west. Without their kindness and hospitality we should have been unable to visit these interesting places and the result of our expedition would have been much the poorer. Mrs. J. Anne Cloudsley-Thompson accompanied us and rendered valuable assistance in making quadrat counts.

Methods

Owing to the fact that we had to depend upon public transport, both time and apparatus were cut to a minimum. A whirling hygrometer was employed for the measurement of air temperature and relative humidity. Microclimatic temperatures were assessed with a small mercury thermometer, and humidities determined by means of cobalt thiocyanate papers that were afterwards matched in a comparator with coloured glass standards. Microclimatic readings were taken at midday. The weather remained remarkably constant and consequently the results obtained in the various localities are fairly comparable.

In order to determine the influence of altitude, climate and vegetation on the numbers and distribution of the fauna, 50 half-metre-square quadrats were selected in four localities—two at Axum and one each at Gondar and Asmara—and all ground-living arthropods in them were counted. This somewhat primitive method was adopted for practical reasons, but nevertheless provided results comparable with those previously obtained in different regions of the Sudan. Although we tried to work each quadrat with equal thoroughness, there must inevitably be a large subjective element in the results which are probably more significant qualitatively than quantitatively.

It may be objected that in many cases specimens were not identified. Precise identification may not be necessary, however, as different species of the same orders often occupy similar ecological niches in different localities and the numerical results are therefore comparable even if different species are being considered.

TABLE I
MICROCLIMATIC READINGS AND FAUNAL ESTIMATIONS AT DIFFERENT LOCALITIES IN ETHIOPIA, AT 12.00
ON DAYS OF FINE WEATHER DURING DECEMBER, 1965.

Locality	Lake Zwe	Just S.E. of Addis Ababa	Mt. Menagesha	Bahar Dar	Gondar	Axum	Asmara
Situation	Grass, scattered trees	Grassy clearing in eucalyptus grove	Clearing in forest of <i>Podocarpus</i> and juniper	Grass beside <i>L. Tana</i>	Clearing in <i>eucalyptus</i> grove	Side of hill	Grass plain (cloudy)
Altitude (m.)	1520	2410	2600	2000	2120	1900	2325
Mean annual rainfall (mm.)	55.4	102.4	—	—	107.6	72.2	53
Temp. of air (°C)	24.0	22.5	23.0	26.0	25.0	24.0	18
RH of air (%)	45	35	30	45	40	45	65
Temp. on surface (°C)	60	55	56	55	52	38	34
RH on surface (%)	5	15	5	20	5	10	40
Temp. under a rock (°C)	32	31	29	30	34	24	21
RH under rock	40	25	65	60	50	60	60
AVERAGE FAUNA PER SQ. M. (COLLEMBOLA, TERMITES AND ANTS RECORDED AS PRESENT PER 1/4 SQ. M.)							
	2 ants 5 Tenebrionidae	1 Lycosidae 6 Blattaria 2 Hemiptera 3 Tenebrionidae	2 woodlice 1 Geophilidae 3 Lycosidae 3 Agriopidae 3 Linyphiidae 1 Theridiidae 3 snails	3 Acari 1 Lycosidae 1 Theridiidae 2 Linyphiidae 4 Collembola 1 Blattaria 1 Orthoptera 2 Hemiptera 4 Lepidoptera larvae 4 ants 3 Tenebrionidae	4 Acari 5 Lycosidae 1 Gnaphosidae 1 Collembola 12 Blattaria 1 Orthoptera 3 Hemiptera 4 ants 2 Lepidoptera larvae	2 Lycosidae 1 Linyphiidae many Collembola 1 Blattaria 1 Hemiptera 1 Staphylinidae 14 Tenebrionidae many ants	1 woodlouse 1 Lycosidae 1 Thysanura 1 cricket 4 Tenebrionidae 6 Lepidoptera larvae many ants

Results

Microclimatic readings were taken and approximate faunal estimations made at seven places in western Ethiopia. The results are presented in Table I. The numbers of snails and arthropods, comprising the macrofauna of the soil in the four localities studied in detail, are given in Table II. From this it may be seen that the largest numbers of snails, woodlice and Blattaria—animals that require

TABLE II
NUMBERS OF DIFFERENT ARTHROPODS IN 100 QUADRATS (25 SQ. M.).

Significantly large numbers of any particular type are *in italic figures*. In the case of springtails and ants, the figures refer to the numbers of quadrats in which the animals were recorded as present.

<i>Altitude Latitude</i>	<i>Gondar</i>	<i>Axum</i>		<i>Asmara</i>
	2120 m. 12° 36'	1900 m. 14° 09'		2325 m. 15° 17'
<i>Habitat</i>	<i>Slope with rocks and scattered trees</i>	<i>Steep rocky slope of jebel</i>	<i>Level grass plain with stones</i>	<i>Level grass plain with scattered rocks</i>
Snails	22	—	4	—
Woodlice	158	10	—	12
Geophilidae	2	—	—	—
Lithobiidae	6	6	—	4
Scorpions	—	12	—	—
Pseudo-scorpions	—	—	—	2
Opiliones	2	—	—	—
Lycosidae	44	52	4	16
Thomisidae	8	10	4	4
Salticidae	4	16	2	—
Other spiders	28	12	10	6
Acari	10	16	6	6
Collembola	4	2	—	—
Thysanura	—	6	—	34
Blattaria	110	—	—	2
Orthoptera	6	12	2	10
Dermaptera	—	—	2	2
Hemiptera	8	40*	6	18
Embioptera	6	—	—	—
Lepidoptera larvae	18	8	2	142
Ants	78	86	28	8
Tenebrionidae	38	40	4	90
Other beetles	28	12	—	14
Diptera larvae	—	4	—	2

*Excluding two large aggregations of small red bugs.

a comparatively moist environment—occurred at Gondar. Neither at Erkowit (Cloudsley-Thompson, 1962) nor on Jebel Marra (Cloudsley-Thompson, 1967) were such large numbers of these creatures obtained. For instance, the greatest density of woodlice recorded was 19 per 25 sq. m. on Jebel Marra and 6 per sq. m. at Erkowit. This compares with 158 per 25 sq. m. at Gondar. On the other hand 117 spiders for 25 sq. m. at Erkowit exceeds any of the densities found on Jebel Marra or in Ethiopia. Most spiders thrive in comparatively dry habitats and this distribution again may be related to differences in precipitation between the three regions. The significance of the other differences recorded must remain obscure until autecological information about the various species has been obtained.

The annual rainfall at Addis Ababa falls in two parts, the small rains during April and May and big rains from the end of June until mid-September. The year 1965 was very dry, however, and the small rains did not come. Consequently the soil was unusually dry and the fauna probably poorer than usual. It was even drier on the shores of Lakes Zwei and Abbiata where we found only Dermaptera, ants and Tenebrionidae.

Both at Gondar and at Axum we noticed that the soil fauna in our quadrats became more sparse as we worked up the slopes. Beside the Tissisat falls, where the ground was wetted with spray, we collected a typical damp-region fauna including millipedes and woodlice, as well as many spiders and beetles. At Gondar, Embioptera, cockroaches, centipedes and woodlice were all found under larger rocks where the relative humidity averaged 95 per cent. *Buthotus minax* (L. Koch), the only scorpions collected, are normally found in damper situations than other species in the Sudan—for example they occur at Nimule under stones and in Khartoum under the bark of sunt trees (*Acacia nilotica*). We found them at Axum at the lowest altitude investigated but not elsewhere. No doubt their distribution is influenced both by temperature and by precipitation.

The fauna of the Gughé Highlands in Southern Ethiopia has been described by Scott (1952) who attributed its poverty compared with that of the mountains of East Africa to the destruction of the ancient fauna and flora by glaciation, desiccation or the fall-out of volcanic ash. The same author later carried out biogeographical research in the High Simien Mountains of Northern Ethiopia (Scott, 1958). He found no slugs, few snails or woodlice and no false-scorpions. Many of the insects were flightless, as in remote islands, and restricted to particular massifs. Carabidae and Staphylinidae predominated at high altitude. In general, Scott was working at higher altitudes than we were.

Thornton (1957) studied faunal succession in umbels of papyrus, *Cyperus papyrus*, on the upper White Nile. For comparison, we collected the fauna of 50 papyrus heads and obtained: ARANEAE, 8 Salticidae, 7 Thomisidae, 2 Argiopidae (all immature, the Thomisidae especially being very young); INSECTA, 1 Thysanoptera, 1 jassid, 1 grasshopper, 1 Ephemeroptera, 11 ants (9 in one head), 12 beetles and 4 flies (1 *Simulium* sp. and 3 Muscidae). Of the total of 17 spiders there was never more than one in each papyrus head, suggesting overdispersal in contrast to the underdispersal of the Formicidae.

Even when studied superficially, the fauna of papyrus in the Sudd is found to be much richer, consisting of small cockroaches, probably *Metabelina abdominalis* (Shelf.), stick-insects, pentatomid and other bugs, tenebrionid beetles and lepidopterous larvae. Spiders are mostly Salticidae, a few Lycosidae, Thomisidae and Argiopidae (Cloudsley-Thompson 1966). Thornton (1967) obtained no less than

8,125 arthropods from 185 papyrus umbels. He also found that Salticidae were the most frequent and abundant spiders, followed by Thomisidae; but they only appeared in umbels of later age groups, whereas those we investigated appeared to be young umbels.

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APPENDIX

FAUNAL LIST

ISOPTERA

Odontotermes anceps (Sjost.) L. Zwei; *Pericapritermes* sp. (workers only) Gondar (det. R. M. C. Williams).

DERMAPTERA

Labidura riparia (Pallas); Labiidae (genus indet.) L. Zwei, L. Abbiata (det. J. Huxley).

ODONATA

Enallagina sp. Tissisat Falls.

EPHEMEROPTERA

Centroptilum sp. Bahar Dar.

TRICHOPTERA

Amphipsyche senegalensis (Brauer), *Cheumatopsyche* sp., *Oecetis* sp. Bahar Dar (det. D. E. Kimmins).

HEMIPTERA

Trigonotyllus pallidicornis Reut., *Dicyphus* sp., *Microvelia gracillima* Reut., *Cicadulina* sp., *Xestocephalus* sp., *Hecalus* sp., *Zyginella* sp., *Exitianus taeniaticeps* (Kbm.), *Exitianus* sp., *Balclutha* sp., *Nephotettix spicalis* Motsch. (numerous), *Cixius* sp., *Toya ceresensis* (Muir), *T. hessei* (Muir), *T. varia* (Hesse), *Nilaparvata nigritarsis* Muir, Bahar Dar. Nabid nymphs, Gondar (det. W. J. Knight). Pentatomidae, Bahar Dar, Gondar, Axum; *Scotinophora* sp. Bahar Dar; Cydnidae, Bahar Dar; Coreidae, Addis Ababa, Tissisat Falls, Axum, Asmara; Pyrrhocoridae Gondar, Axum; *Phyparochrominae* sp., Mt. Menagesha, Gondar, Axum; *Lygaeus* sp., Tissisat Falls; *Cantacaderinae* sp., *Cantacader* sp., Asmara; *Alydidae* sp., Tissisat Falls; Reduviidae, Bahar Dar, Axum; *Platymieris* spp., Addis Ababa; *Piratiniae* spp., Tissisat Falls, Gondar; *Deraeocoris* sp., *Trigonotyles* sp., Phylirae, Orthotylinae, Bahar Dar; Nabidae, Bahar Dar; *Sigora* sp. Bahar Dar (det. P. Štys).

DIPTERA

Culicidae, Chironomidae including *Tanytarsus nigrocinctus* Freeman, *Chironomus* (*Dicrotendipes*) *pilosimanus* Kuffer, Ceratopogonidae, Tipulidae including *Limonia* (*Phipidia*) sp., *Antocha* sp., *Conosia* sp. Bahar Dar; Chironomidae, Gondar (det. A. M. Hutson). *Tabanus insignis velutinus* Surcouf, L. Zwei, L. Abbiata. *Chrysops streptohalia* Speiser, Bahar Dar (det. H. Oldroyd). *Notiphila ignobilis* Loew, Bahar Dar (det. B. H. Cogan).

COLEOPTERA

Stenosis sp. (Not in British Museum, Natural History) Axum; *Pogonobasis raffrayi* Haag. Gondar; *Adesmia abyssinica* Reiche Tissisat Falls, *Zophosis* sp. (Not in B.M., N.H.) Lake Zwei, *Z. abyssinica* Deyr. Axum, *Mesomorphus* sp. (Not in B.M., N.H.) Axum; *Gonocephalum simplex* F. Axum; *Gonocephalum* spp. (5 spp. not in B.M., N.H.) Bahar Dar, Tissisat Falls, Gondar, Axum, Asmara; *Paramarygmus* sp. (Not in B.M., N.H.) Mt. Menagesha; *Lagaria villosa* F. Tissisat Falls, Gondar, Asmara. *Ebaeus* sp. (Not in B.M., N.H.) Gondar. *Cryptobium errerense* Bernh. Tissisat Falls, *Eulissus pilosus* Roth. Lake Zwei. *Cercyon* (s. str.) *luteus* Oreg. Bahar Dar, *Helochares* (*Crephelochares*) sp. Bahar Dar. *Cicindela brevicollis* Wied Lake Zwei. *Agonum shoanum* Alluaud Bahar Dar, *Pogonus minutus* Dej L. Zwei. *Chlaenius dinodoides* Chaud Gondar, *C. episcopalis* Dej. Gondar, *C. dusaulti* Duf. var. *fulvosignatus* Rche. Tissisat Falls, *Adalia signifera* Rche. Gondar, Mt. Menagesha, *Aphodius impurus* Rothk. Lake Zwei, *Phaedonia areata* (F.) Bahar Dar, *Leptaulaca fissicollis* (Thoms.) Bahar Dar, *Chaetocnema* sp. (Not in B.M., N.H.) Bahar Dar, *Laccoptera abyssinica* Boh. Asmara, *Nematocerus nigriclava* (Hust.) Mt. Managesha, *Systates* sp. (Not in B.M., N.H.) Gondar, *Teripelus subpilosus* Hell. Asmara, *Hypera* sp. ? *variabilis* (Hbst.) Asmara, *Trigonobaris* sp. (Not in B.M., N.H.) Bahar Dar (det. R. T. Thompson).

THE ART OF MAKING MANWARAS IN NUBIA¹

by

MUSTAFA IBRAHIM TAHA

Nubia is the home of the richest types of house decoration that can be found within the boundaries of the Sudan. Of these types the *manwaras* stand as proof of the high skill and ability of the Nubian artist, who has certainly produced a work of art. His achievement may be best valued when we realise that his manwaras are not only decorative, but also serve a useful purpose of storing tea-pots, cups, spoons, etc. (see Figure 1, Nos. 3 and 7). This applies almost to every manwara from the sheikhship of Semna, which may be considered as the extreme northern boundary of this distinguished type of art, down to the southern part of the Omodiya of Kosha, where we find a high concentration of manwaras, as both the innovator of decorated manwaras and the artist who raised it to its highest live there. Dal, however, being the home and area of work of Şaliḥ Ḥasan Ṭaffoul, who is, to me, the best carver of manwaras, is the richest sheikhship in the Omodiya of Kosha, and may be in the whole area of old Halfa.

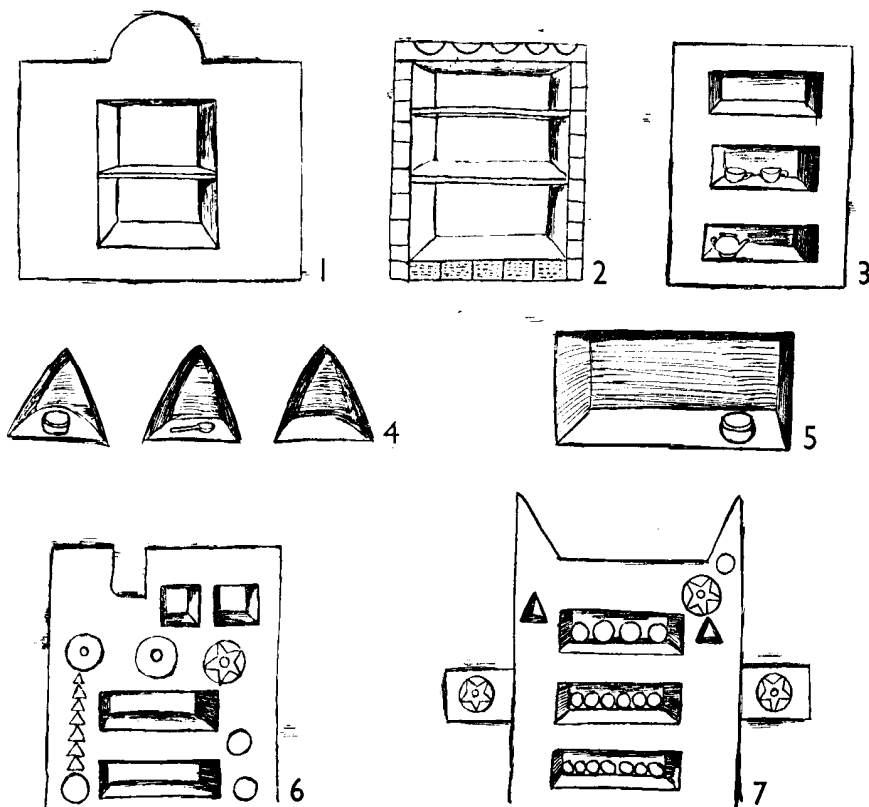


FIGURE 1

¹ Manwara is the Nubian local name for a wall cupboard.

Carvers of manwaras are, as many informants say, indebted to one Osman Aḥmad Khalil (or Osman the Decorator, as his fellow citizens call him) for learning this trade, which he started as early as 1930, the year in which Ṣaliḥ Ḥasan Ṭaffoul was born. No one of the other known makers of manwaras claims to have started at such an early date. In fact some of them admit that they once worked, as assistant builders, with Osman Aḥmad.

As for the way manwaras are made, the artist starts by drawing a sketch with a pencil or a piece of charcoal. Then he carves the shelf or shelves, which can be one, two or three in number, or sometimes more. Then he goes to carve whatever he wants to make on the sides, a process which is usually done on a wet or dry layer of sand. The proportion of sand to mud is frequently 2:1. For the semi-circles, he uses pieces of a string, and for drawing birds, triangles, flowers, and other things, pieces of wood are used.

Finally, I think it useful to end by setting out, in table form, the name of the maker of each manwara, and the name of the village where the drawing was found.

Figures

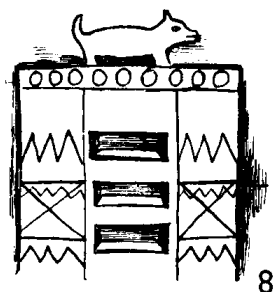
1, 2 & 3

Nos.

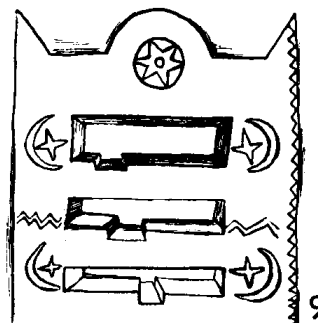
Decorator

Where found

1.	Kasbana Ḥasan Ṭaffoul	..	..	..	..	Bushungai
2.	Dahīyya Farah	..	..	..	..	'Akasha
3.	Faṭna Muḥammad Younis	..	..	..	..	Daka Sab
4.	Muḥammad 'Abd al-Ḥameed	..	..	..	..	Daka Sab
5.	A professional artist called 'Aisha	..	..	..	..	
6.	'Abd al-Salam Ga'afar	..	..	..	..	Absiri
7.	Ṣaliḥ Ḥasan Ṭaffoul	..	..	..	..	Ferkeit Island
8.	Not known	..	..	..	..	'Araseir
9.	'Abd al-'Azim Godah	..	..	..	..	Kofri
10.	Ṣaliḥ Ḥasan Ṭaffoul	..	..	..	..	Guttib
11.	Ṣaliḥ Ḥasan Ṭaffoul	..	..	..	..	Guttib
12.	Ṣaliḥ Ḥasan Ṭaffoul	..	..	..	..	Agri Island
13.	Osman Aḥmad Khalil	..	..	..	..	Sabon
14.	Osman Aḥmad Khalil	..	..	..	..	_____
15.	Osman Aḥmad Khalil	..	..	..	..	_____
16.	Kasbana Ḥasan Ṭaffoul	..	..	..	..	_____
17.	Himmat 'Abd al-Galeel	..	..	..	..	_____



8



9

FIGURE 2

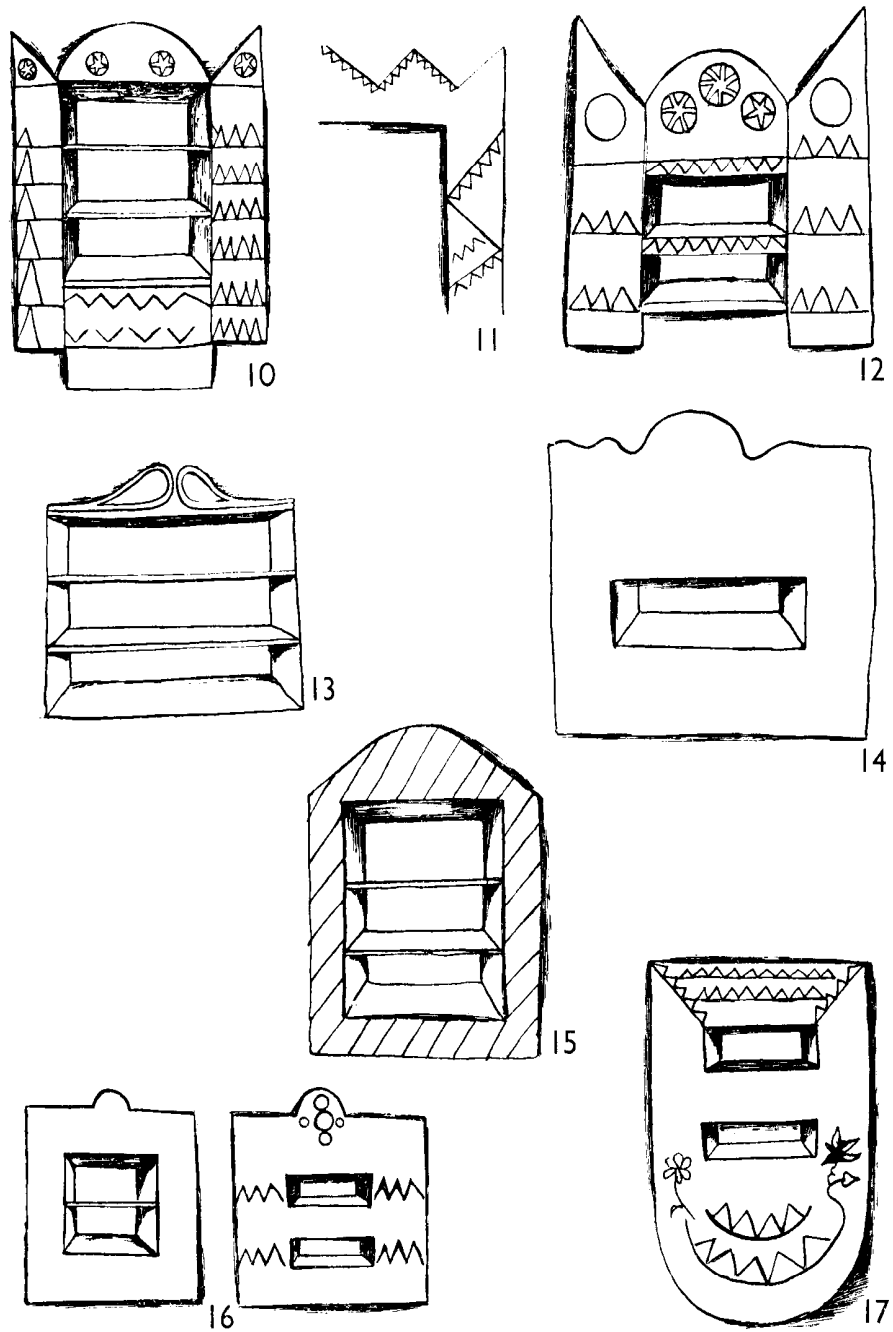


FIGURE 3

CONTROL OF BILHARZIA TRANSMITTERS ON THE GEZIRA IRRIGATION SYSTEM

by

P. J. HUNTER

In this article, the present methods of controlling aquatic snails on the Gezira irrigation system are discussed and are found to be inadequate. Other suitable control methods are discussed and suggestions are made for future lines of research.¹

INTRODUCTION

The extent of bilharziasis in the Sudan has not been fully established, but it is apparent that there is widespread infection in the South and West and on the Gezira irrigation system. Owing to communications and administrative difficulties, there is little likelihood of any immediate large-scale control programme being put into effect in the South and West. Control work on the Gezira has been proceeding for some years, however, and it seems that the Government and local people are prepared to make a serious attempt to deal with the problem.

The Gezira scheme is situated between the Blue and White Niles, south of Khartoum. It has been established for over thirty years and recently been extended (the Manaqil extension) to the South and West. The original scheme covers about 1,000,000 acres and the Manaqil extension a further 800,000 acres. There has been no large-scale survey of the incidence of bilharziasis in this area. Ministry of Health reports show that 16-17,000 new cases are reported annually but these are probably only a few of those present. Local doctors have expressed the opinion that in certain localities the infection rate may be as high as 80-90 per cent of the population. It is certainly much higher now than the 9 per cent reported by Greany in 1952.

The traditional method of snail control on the Gezira is a combination of water treatment with copper sulphate and mechanical and chemical barriers. This showed much promise in the early stages but now appears inadequate. Since recently introduced drugs and molluscicides are now used extensively in other parts of the world, it is apparent that present control methods should be reassessed and possible alternatives considered.

PRINCIPLES OF BILHARZIASIS CONTROL

The approach to bilharziasis control has recently come into line with the successful work on malaria where it has been demonstrated that it is not an economic proposition to eradicate either the intermediate hosts or the parasite; rather, the aim should be to reduce numbers of each to a level where there is little probability of the life cycle being completed.

It has been shown by Hairston (1965) that, as with most other parasites requiring an intermediate host, schistosomes suffer an enormous wastage of

¹ I would like to thank N. O. Crossland for reading the manuscript and giving his helpful comments and advice.

reproductive capacity at various stages of the life cycle. The main principle of control should be to increase this wastage. This can be done most effectively by (a) reducing the probability that miracidia can find an intermediate host snail, and (b) reducing the probability that cercariae can find man. It is clear that treatment of patients with drugs can have an effect on only the former of these probabilities, whereas reducing snail populations has an effect on both. There is, of course, the social consideration that people suffering from the disease should be treated as soon as possible but from the long-term point of view snail control has a greater effect than control of the parasite itself. Other control measures such as improved sanitation, health education, etc. must play an important part in control programmes but these are usually long-term measures that are expensive and socially difficult to put into effect.

DISTRIBUTION OF SNAILS PRESENT

The main intermediate hosts on the Gezira are *Bulinus truncatus* (Audouin) and *Biomphalaria pfeifferi* (Krauss). Both of these species are common throughout the system and there are high populations, particularly in small canals (Williams and Hunter, in preparation). *Biomphalaria alexandrina* (Ehrenberg) is probably present on the West of the Gezira (it was previously known only from Egypt—Hunter and Williams, in press) and *Biomphalaria sudanica* (Martens) is present in the White Nile a few miles to the West of the main irrigated area. There is some danger of these species becoming established in large numbers on the Gezira.

AVAILABLE METHODS OF SNAIL CONTROL

Mechanical Methods

(a) *Periodic Drying of Canals.* Watson (*in lit.*) has shown that some snails can survive lengthy periods (6–12 months) without water by burrowing into the mud at the bottom of canals but it is clear that most snails are killed by moderate desiccation. A sample of ten cubic-foot units of mud from a canal on the Gezira contained no surviving snails (Hunter, unpublished data) although this canal had previously contained high populations of *Bulinus truncatus* and *B. forskalii* and had only been dry for two weeks. It is probable that the rate of drying out and the nature of the substrate determines the proportion of the population able to survive. The drying of canals must primarily be dictated by agricultural requirements, but a large measure of snail control could be achieved by drying canals as often and for as long as possible.

(b) *Mechanical Barriers.* These are at present used in some of the main canals on the Gezira. They consist of screens of galvanised wire netting, 8 meshes to the inch, which extend 75 cms. beneath the surface of the water. Although a large number of snails are found deeper than 75 cms., it may be true that these barriers delay the appearance of snails for a short time in new canals. However, on the Gezira there are much higher populations of snails in the small canals downstream of the traps than in the main canals in front of them. It is clearly of no value to prevent a few snails from being carried down the canal when large populations have already become established behind the barriers.

Biological Control

There are many predators of bilharzia vector snails, e.g. fish, ducks, insect (particularly *Sciomyzid*) larvae, leeches and predator snails. The snail *Marisa cornuarietis* has had some success in controlling the vector in Puerto Rico but, in general, parasites and predators do not seem to give effective control on a large scale. The World Health Organisation manual on snail control (1965) comments that "there is no practical technique for the application of biological control against snail hosts of schistosomes in endemic areas situated on large land masses."

Chemical Control

Copper Sulphate. The standard snail control method on the Gezira consists of a mass treatment of canals with 30 parts per million of Copper Sulphate during July and August of each year. Further treatment consists of chemical barriers in some of the main canals. Bags of Copper Sulphate are hung in the water so that some of the chemical is dissolved as water flows past and it has been calculated that 0.125 ppm. should be achieved.

This method has shown considerable success on small well-administered projects. Abdel-Malek (1961) treated a pump scheme near Khartoum by this method and there are still few bilharzia transmitters in this canal. In spite of this regular treatment on the Gezira, however, there are extremely high populations of snails in many canals. For example, at Abu Usher in the centre of the Gezira single sweeps of a 20 × 20 cm. sampling net were producing over 200 *Biomphalaria pfeifferi* per sweep (unpublished data). There are four possible reasons for the failure of this method: (i) Control is concentrated in the main canals where there are low snail populations due to fast flowing current and low vegetation density. (ii) The chemical combines with elements of mud in the bottom of canals, and therefore has a high settling out rate. (iii) Insufficient chemical is being added so that the desired concentration is not achieved. (iv) The snails are now showing some resistance to Copper Sulphate. This final explanation seems unnecessary since the first three are probably sufficient to explain the failure of the treatment.

Natural Compounds. The fruits and leaves of some indigenous plants have been observed to have molluscicidal properties (Abdel Nabi, 1966). The molluscicidal activity of these plants seems to depend mainly on their saponin content. The only attempt to harness these properties in Sudan has been planting of Heglig (*Balanites*) trees along canal banks but this was found to interfere with dredging practices and therefore discontinued. Since much lower concentrations of synthetic molluscicides have a greater control effect, the value of the natural products must be limited.

New Molluscicides. A number of new chemicals have been developed for the specific purpose of snail control. The longest established of these is Bayer 73 (Bayluscide) which has been extensively used in many parts of the world (e.g. in Tanzania; Crossland, 1963). More recently the compound N-Tritylmorpholine (Frescon) has shown considerable success in large-scale trials (Boyce, Crossland and Shiff, 1966). A small-scale trial on the Gezira (Hunter, in press) shows that this compound is suitable for use in the Sudan. It takes effect at extremely low concentrations, is simple to apply and the concentration can be easily tested.

Other Compounds. Many other compounds are currently in use (W.H.O. Monograph No. 50) in other parts of the world. The most popular of these are Sodium and Copper pentachlorophenate and both have advantages over Copper Sulphate. Lower concentrations are required but they are more difficult to handle.

CONCLUSIONS

The Gezira offers an ideal situation for efficient bilharziasis control. Owing to the large influx of population during the cotton picking season it may be difficult to treat infected people systematically but snail control on this well-established and administered area should present few difficulties. Moreover there is an acute desire on the part of the Government and local people to deal with the problem.

The most pressing requirements for efficient control are twofold:

(1) Comprehensive studies of the biology and ecology of the snails. This would show whether most of the snails are being killed when canals are dry during the summer and if these canals are being reinfected from those that are not drained. If this is the case, a radical re-appraisal of control measures is required. A very large measure of control would be achieved by (a) draining as many canals as possible and (b) intensively treating all canals that are not drained. As a general principle, pests are much more efficiently controlled when populations are low and it is possible that snails on the Gezira could be best controlled by concentrating control measures into the summer months.

(2) Large-scale trials of new molluscicides to assess their potential in relation to traditional methods. For example, a trial of Bayluscide and Frescon would be relatively cheap to carry out and probably give considerable future saving in expense and resources.

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A BIBLIOGRAPHY OF THE SUDAN

1964-1966

Compiled by

ASMA IBRAHIM AND ABDEL RAHMAN EL NASRI

This bibliography is a continuation of the Sudan Bibliography published in *SNR*, xlv, 1965, pp. 130-66. It covers the period 1964-6. The proceedings of three conferences held early in 1967 have been included.

The bibliography is divided into fourteen main sections. Within each section items are numbered consecutively and are arranged alphabetically by author. Material published in Arabic is excluded. The compilers regret that it was not possible to verify fully every item listed or to give the full details for some. Much material would also have escaped attention. It is, therefore, likely that this bibliography is far from being comprehensive. The following numbers have been omitted:—1042, 1219, 1353, 1452, 1456, 1473-4, 1498, 1546, 1831.

LIST OF ABBREVIATIONS

Ag.M.	Agricultural Magazine (University of Khartoum).
A.M.C.	Sixth Arab Medical Conference, Khartoum, 11-15th January, 1967.
A.R.H.B.R.U.	Annual Report of the Hydrobiological Research Unit (University of Khartoum).
C.O.I.I.S.	School of Extra-Mural Studies (University of Khartoum) Conference on Industry in Sudan, Erkowit, 19-24th September, 1966.
E.J.	Economical Journal (University of Khartoum).
FAO. R.C.	Eighth FAO Regional Conference for the Near East, Khartoum, 24th January—2nd February, 1967.
G.M.(U.K.)	Geographical Magazine (University of Khartoum).
J.A.H.	Journal of African History.
J.U.K.E.S.	Journal of the University of Khartoum Engineering Society.
Ph. Soc. S. Proc.	Proceedings of the Philosophical Society of the Sudan.
S.A.J.	Sudan Agricultural Journal.
S.E.	The Sudanese Economist.
S.E.S.J.	The Sudan Engineering Society Journal.
S.J.A.D.	Sudan Journal of Administration and Development.
S.J.V.S.A.H.	The Sudan Journal of Veterinary Science and Animal Husbandry.
S.L.J.R.	Sudan Law Journal and Reports.
S.M.J.	Sudan Medical Journal.
S.N.R.	Sudan Notes and Records.
S.S.	Sudan Society.
Sudan Forests Dept. & U.N.	Forests Department and United Nations Development Programme, Forestry Research and Education Project publications.
U.K. & C.C.F.	University of Khartoum and Congress for Cultural Freedom.

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BOOK REVIEWS

PAUL SANTI: *Mémoire d'un voyage en Haute-Nubie en 1851 d'après un manuscrit anonyme annoté et transcrit*. Beirut (no printer or publisher given), 1965. pp. 213, 2 specimen photographs of the MS, 2 maps. Price not stated.

A little book, born unheralded three years ago, has come to light, a transcription of the manuscript written in a notebook which Mr. Santi picked up on the bookstalls of the Ezbekieh Garden in Cairo, describing game-hunts round Kassala and along the rivers Atbara and Setit in 1851. Mr. Santi establishes with fair probability that the author of the manuscript was the trader Jean-Alexandre Vayssière who made the tour with another Sudan trader, Alphonse de Malzac.

Vayssière was an engaging, imaginative, not over-knowledgeable observer whose journal makes a slight but welcome addition to our sparse information on the state of the province of Taka only eleven years after the Ottoman occupation, when the evil memory of Ahmad Menikli Pasha's cruelties was still vivid. From Vayssière we learn that Ilyas Bey, the deputy governor, was the founder of the town of Kassala. The journal records several Sudanese and othertales told to Vayssière by members of the party which add to the known folklore of the Sudan.

Judging from the photographs of the first and last pages of the manuscript, Vayssière's handwriting must have been in parts difficult to transcribe, and Mr. Santi deserves credit for his pertinacity. But this is no excuse for making so many errors in the transcription of proper names. For instance, Nokram (p. 101) for Muqran, and Kaun (p. 87) for Kawa, where reference to a map would have immediately indicated the correct spellings. The most superficial acquaintance with the Sudanese would have told Mr. Santi that Schoukrich (pp. 95, 111) must be Shukriyyah, and Schaykrich (p. 99) must be Shayqiyyah. Djalich is not an alternative to Djaalin but a mis-transcription for Djalieh, i.e. Ja'liyyah. These are mere samples of a host of mis-transcriptions for which Vayssière is not to blame.

The reason why Mr. Santi has botched his edition is simple. He has worked in isolation—isolation from the geographical and historical background, and from Sudanese scholars of our day who, in the reviewer's unvarying experience, would gladly have helped him solve the many problems which face the editor of such a journal as this. Has Mr. Santi never heard of the Sudan Unit in the University of Khartoum? This defective transcription, and the inadequate notes and bibliography appended to it, are a warning to future editors of Sudan manuscript journals that scholarship of this kind is necessarily co-operative and that no man can afford to turn his back entirely on all the other workers in his field.

RICHARD HILL

BYRON FARWELL: *Prisoners of the Mahdi*. London, Longmans, 1967. pp. xxii, 356, maps and illustrations. Price 50 sh.

Mr. Farwell, an American businessman, has written a book on the Mahdia aimed at the general public. He makes no serious pretensions of its being an academic work and therefore it would be somewhat unfair to criticize it for not being such.

The first part of the work covers the period immediately preceding the coming into power of the Mahdi; the second, by far the longest, deals with the Mahdist era and the last describes briefly the Reconquest and the Condominium period.

For his information on the Mahdia he depends almost entirely on the works by Slatin, Ohrwalder and Neufeld. He states that as there are no written memoirs of Ansar, presumably he means those sympathetic to the movement, he is unable to give the Sudanese point of view of this era. His statement is not correct since Yūsuf Badri's autobiography gives some data on the Mahdia as well as the memoirs of Yūsuf Mikhā'il. At any rate there is a vast storehouse of data available from Mahdist documents which could be used for this purpose and it is not at all clear why Farwell should limit himself to obtaining material from memoirs. Also it is not explained why he has chosen the works of the three prisoners mentioned above and ignored the books by Rosignoli and Cuzzi.¹ He lists Holt's major work on the Mahdia in his bibliography but it has not apparently influenced his thinking to any degree. He uses the limited amount of material that he has selected extremely uncritically. It is a pity that he has not read Holt's paper, *The Source Material of the Sudanese Mahdia*.²

The author writes that he "can lay no claim to original scholarship, and that there is little here that has not been printed in some form, somewhere, before." I agree with this statement and wish only that a more critical use of the material had been made and less prejudiced sources used, so that while remaining popular in character, the book would not propagate false ideas on this vital period of Sudanese history.

F. REHFISCH

ROBERT O. COLLINS and ROBERT L. TIGNOR: *Egypt and the Sudan*. Englewood Cliffs, New Jersey, Modern Nations in Historical Perspective Series, 1967. pp. vi, 180. Price \$1.95 Paper-back.

This short volume is one of a series on the Modern Nations in Historical Perspective which aims at providing reliable historical accounts of individual nations (or closely related groups of nations) in which the essential trends and influences that contributed to the nation's modern character are critically examined. The declared objective of this particular volume is to give "a factual introduction to the modern history of Egypt beginning in the seventh century and of the Sudanese past since the great days of Kush." As the beginning of the modern periods of Egypt and the Sudan begin approximately at 1798 and 1820 respectively the starting point of this survey seems unnecessarily early and the reference to Kush is perhaps out of place. The book as a whole, however, is well organized and nicely produced: it is composed of five chapters, each dealing with a major topic or period that embraces the two countries, and in turn each chapter is divided into two parts of approximately equal length, the first of which covers Egypt and the second deals with the Sudan. However, within the internal division of the chapters, the impact of the common historical factors and cultural trends that radically affected the development of the two nations are insufficiently correlated, nor are similarities emphasized.

In the first chapter, 'Land, People and Livelihood', Dr. Tignor discusses the interaction of the Nile, the people and their social organizations that determined the historical development of Egypt. After demonstrating the importance of the

¹ Rosignoli, P., *I miei dodici anni di prigionia in mezzo ai Dervisci del Sudan* and Cuzzi, G. *Fünfzehn Jahre Gefangener des Falschen Propheten*.

² Middle Eastern Affairs, No. 1. *St. Anthony's Papers*, iv, 1958, pp. 107-18.

Nile to the Sudan and emphasizing the diversity of its ethnic groups and languages, Dr. Collins introduces the impact of western ideas and technology on the traditional Sudanese society. In the second chapter, 'Egypt and the Sudan before the Modern Period', the book proceeds to examine the historical heritage of the two countries. In the case of Egypt, the rise of Islam and Egypt's response to Islamic civilization are admirably expounded. Then, in a lesser space, Dr. Collins summarizes succinctly the Pharaonic influences on the Sudan, the role of Kush, and the spread of Christianity and Islam the coming of the Arabs and finally the emergence of the Funj Sultanate.

As one approaches the present, the discussion becomes more detailed and illuminating. In this connection it is worthy of note that Tignor and Collins have already published important books and articles on nineteenth-century Egypt and the Sudan respectively. Chapter three 'The Beginning of Modernization,' commences with the French invasion of Egypt and Muhammad Ali's enthusiastic efforts to build an efficient modern army capable of accomplishing his territorial ambitions. Here, nearly all aspects of modernization, such as industrialization, perennial irrigation, education and public health are shown to be closely wedded to military reform. The cause of modernization was again taken up by Isma'il, whose reign witnessed the construction of the Suez Canal. However his financial extravagance led to a clash between Egyptian and European interests that paved the way for the British occupation of 1882. A veneer of these modern influences was introduced into the Sudan in the wake of the Turco-Egyptian conquest, whose administration expanded the political boundaries of the country. The Mahdist revolution was in a sense a reaction against innovations introduced from the West. The fourth chapter relates the national challenge to the British activities in the Nile Valley and the emergence of Egyptian and Sudanese nationalism. The final chapter on "Nasser's Egypt and the Independent Sudan" deals with the failure of democratic institutions and the emergence of military regimes in Egypt and the Sudan, though in the latter parliamentary democracy was soon re-established. In their concluding remarks the authors stress the need to check both problems of over-population in Egypt and hostility between the Southern and Northern Sudanese, if the nations are to attain their desired targets of peace and prosperity. The list of suggested reading is very useful.

However, this comprehensive survey is not without its weakness: some of the many stimulating general remarks scattered throughout the book are difficult to accept. To state that "Islam originated in a tribal society" (p. 20) is probably an over-simplification of a complex situation. It was in the commercial city of Mecca that Islam was founded, and it was the mercantile experience of the Meccans in conducting extensive financial activities that enabled them to administer the Muslim Empire. The very use of commercial metaphors in the Quran confirms that the impact of the urban Meccan community which existed well before the birth of Muhammad, was not a trivial one. It is true that "the Tulunid dynasty was a harbinger of the future development of military regimes in Egypt" (p. 30); but the Tulunids also heralded a process to make Egypt financially solvent and to gain a slice of the Eastern Trade that flowed through the Persian Gulf. Though unsuccessful, their idea was followed up by the Fatimids who succeeded in deflecting the Eastern Trade to the Red Sea, 'Aydhab and Egypt. From that time, until the Portuguese captured the sources of the Indian Trade at the beginning of the sixteenth century, the Egyptian revenue was in no small measure dependent on that trade. Again, to point out that the Tulunids urged the troublesome nomadic

Arab tribes to migrate to the Sudan (p. 44) seems to contradict the Ibn Tulun's fear of the rise of an Arab principality in the 'Land of the Mines' or in Nubia, like that of al-'Umari. The treatment of the impact of these Arab tribes and Islam on the Sudan, a factor which drew the Sudan much nearer to Egypt, seems to me surprisingly thin. To speak on page 109 of the "bitterness" evoked by the short-lived Mahdist occupation of Equatoria also seems to me out of proportion: the authors perhaps over-emphasize this and insufficiently stress later developments that aggravated the relations between the Northern and Southern Sudanese.

Collins and Tignor are to be congratulated on having provided in the comparatively few pages at their disposal a balanced and critical account covering essential aspects of Egyptian and Sudanese history. The work is to be recommended as an introductory survey on the subject.

YUSUF FADL HASAN

E. E. EVANS-PRITCHARD (Ed.): *The Zande Trickster*. Oxford Library of African Literature, Clarendon Press, 1967. pp. 240. Price 42s.

With this collection of Zande tales about the trickster-hero Ture, Professor Evans-Pritchard has added a useful volume to the Oxford Library of African Literature. The collection brings together Ture tales taken down in different parts of Zandeland, at different times and by various people. The bulk of the tales included have been published elsewhere, from Mgr. Lagae's 1921 collection onwards, but most of these publications are scattered and inaccessible. The present volume brings together not only original publications, but Evans-Pritchard's own translations of some vernacular texts (for example Mrs. Gore's 1931 collection of fifty tales), which have appeared piecemeal in journals. Of particular interest are the new tales collected recently by two students of the University of Khartoum, Richard Mambia and Angelo Beda. One fairly long tale is included at the end of the volume in the Zande language with interlinear translation.

It is remarkable that in spite of the different times, places and methods of collection, and the resulting different styles of expression, the Ture tales emerge as a unified body of oral literature. The tales consist essentially of the daring, mischievous and deceitful exploits of Ture, the engaging trickster whose name means "spider." There are a few typical plots around which the tales are woven; the volume includes different versions of some tales, to show the way in which the teller's individual imagination plays upon a few central incidents, elaborating or re-arranging them. There are no standard "tales" in the sense of correct word-for-word versions; each tale is an individual composition, designed to suit a particular fireside audience.

Evans-Pritchard's chapters on the social and cultural background, and his introduction to the tales, are particularly welcome as they serve to set in context not only the contents of this volume but all the other Zande texts and tales he has published in various journals. Evans-Pritchard's approach is to treat the tales purely as literature, rather than to use them for linguistic or sociological analysis; and some illuminating parallels are drawn with western literature and popular culture:

"Ture is a monster of depravity: liar, cheat, lecher, murderer; vain, greedy, treacherous, ungrateful, a poltroon, a braggart . . . Yet he is the hero of their stories . . . One is sorry for him when his cocksureness gets him into trouble,

when he over-reaches himself and sheds frustrated tears. Then he is pathetic. We are ourselves acquainted with a similar figure in the folk-tales of our own and other peoples, and he appears in shadow-plays and Punch and Judy. And there is in him a touch of Don Quixote too, of Falstaff, of Charlie Chaplin of the screen, of Mr. Toad of Toad Hall . . . ”

Most of the material in this volume was of course written or dictated long before the days of modern field-work with a small tape recorder. As Ruth Finnegan's volume in the same series shows (on Limba Stories), an extra crispness of style and spontaneity can be captured with a tape-recorded version; and since oral literature obviously loses some of its quality by being written, it is to be hoped that some day this Ture collection can be supplemented by tape-recorded versions.

W. R. JAMES

R. COHEN and J. MIDDLETON (eds.): *Comparative Political Systems, Studies in the Politics of Pre-Industrial Societies*. The Natural History Press, New York, 1967. pp. xiv, 512. Price \$6.95.

This book is one in a series called "American Museum Sourcebooks in Anthropology." It contains twenty essays dealing with a variety of political systems found in a number of so-called "pre-industrial" societies throughout the world. All have been previously published. While one may regret the absence of some personal favourites, the essays have for the most part been well selected. The book will be of great value to teachers and students alike; although a more detailed and theoretically oriented introduction would have added considerably to its usefulness.

The readers of this journal will be pleased to note that Buxton's article, "Clientship among the Mandari of the Southern Sudan," has been included in the collection.

Both the authors and the publishers are to be congratulated on providing us with a very useful book and it is to be hoped that all of the works in this series reach the very high standard of this one.

F. REHFISCH

PHILOSOPHICAL SOCIETY OF THE SUDAN

P.O. BOX 526, KHARTOUM

HON. SECRETARIES' ANNUAL REPORT

For the period 1ST JANUARY, 1967 to 4TH FEBRUARY, 1968

1. *Membership*

Membership as at 30/6/1967 was 166 members against 161 at the end of June, 1966. The first figure does not include 21 members who did not pay their subscriptions.

2. *The 22nd Annual General Meeting*

The 22nd Annual General Meeting was held in Room 1, Faculty of Arts at 6 p.m. on Saturday, 18th February, 1967. The meeting asked the Officers and members of the Council to continue in their offices for another year. But Sayed Hassan Mutwakil, being no longer permanently in Khartoum, was replaced by Dr. Muddathir Abdel Rahim. So members and Officers of the Council for 1967 were:—

President	Sayed Yousif Bedri
Vice-President	Professor F. de la C. Chard
Hon. Treasurer	Sayed Abdel Rahman El Nasri
Joint Hon. Secretaries	Dr. Salih Mohammed Nur Ustadh Mustafa Mohammed Khogali

Members of Council	Dr. Taha Baasher Dr. Kamal A. Agabawi Dr. Yusuf Fadl Hasan Dr. Norman Daniel Sayed Mohammed I. Ahmed Abu Salim Professor F. Rehfish Dr. Muddathir Abdel Rahim
--------------------	---

Past Presidents ex-officio members of the Council:

Sayed Mohammed Ibrahim El Nur, Professor G. N. Sanderson, Miralai Abdel Rahman El Faki, Professor Mekki Shibeika, Capt. G. W. Ogden, Dr. Mohammed Said Bayoumi and Dr. El Hadi El Nagar.

3. *Lack of Enthusiasm*

The 22nd meeting discussed the general lack of enthusiasm among the members to attend the ordinary meetings and to take part in the activities of the Society. Unfortunately lack of enthusiasm continued to show and especially during the 15th Annual Conference.

4. *Council*

The Council met several times during this period. Some of these meetings were attended by Dr. Siddig Ahmed Ismail, the Governor for the 15th Annual Conference from the side of the Sudan Medical Association.

5. *15th Annual Conference*

The 22nd Annual General Meeting decided that the theme for the 15th Annual Conference would be Livestock in the Sudan and it would be held in conjunction with the Sudan Veterinary Association and that the topics for the Conference should be—as usual—of a general nature. Highly specialised topics may be included in the Written Contributions.

It was also decided that in case it became impossible to hold the Conference on Livestock, the alternative should be a combination of the three other suggested themes, namely Management, Administrative Reform and Nation Building in Newly Independent Countries, with special reference to the Sudan.

But the Veterinary Association decided to hold their own Conference separately from that of the Philosophical Society. Again it was impossible to hold the Conference on the other alternatives because the suggested Convenors thought that the time was too short and that they had other engagements.

However, the Sudan Medical Association was ready to collaborate and the theme "Childhood in the Sudan" was accepted by the Councils of both Societies.

The Conference was held on the 1st and 2nd February, 1968 in the Examination Hall and Room 102, Faculty of Arts, University of Khartoum. It was opened by his Excellency Sayed Ismail Al Azhari, President of the Supreme Council of State, and was attended by about 35 participants (last year 180). The Conference consisted of four sessions. In these sessions papers were read by Professor El Tigani El Mahi, Dr. Taha Baasher, Sayed Abdalla Abdel Hadi, Sayda Ihsan Fakhri, Dr. Mahmoud Mohammed Hassan, Dr. Umsur Shadeed and the Conference guest, Miss M. I. Denham. There were no discussion groups, but discussions followed each session.

7. *Ordinary Meetings*

Professor El Tigani El Mahi was supposed to address an ordinary meeting, but the meeting was cancelled because its date coincided with the beginning of Ramadan and because of breakfast time people regretted their non-attendance. Nevertheless, four ordinary meetings were successfully held.

138th Meeting: 15th February, 1967. 20 members and guests present.

Chairman: Dr. Salih Mohammed Nur

Speaker: Dr. B. G. Haycock

Subject: Meroitic Researches

139th Meeting: 21st August, 1967. About 200 members and guests present.

Chairman: Sayed Yousif Bedri

Speaker: Dr. Hassan El Turabi

Subject: The Islamic Constitution—what it means today

140th Meeting: 4th November, 1967. About 30 members and guests present.

Chairman: Dr. Hassan Ibrahim Hassan

Speaker: Sayed Mustafa Baasher

Subject: Misuses of Sudan Natural Resources

141st Meeting: 17th November, 1967. About 40 members and guests present.

Chairman: Dr. Gaafer Mohammed Ali Bakhiet

Speaker: Sayed Galobawi Mohammed Salih

Subject: Administrative Reforms in the Sudan

9. *General*

Attendance for the Annual Conference was very poor, but the level of the discussion was very high.

MUSTAFA MOHAMMED KHOGALI

Joint Hon. Secretary

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| 1st | Impact of Genetics and Agronomy on the Sudan Cotton Crop. (The substance of two of the three lectures has been published in the <i>Emp. J. Expt. Agr.</i> , 1954 and in <i>Empire Cotton Growing Rev.</i> , xxx) | |
| 2nd | Food and Society in the Sudan | 150 Piastres
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| 3rd | Physical Science in Sudan (<i>SNR</i> , xxxvi, 1955) | |
| 4th | Conservation of Natural Resources in Sudan (<i>SNR</i> , xxxvii, 1956) | |
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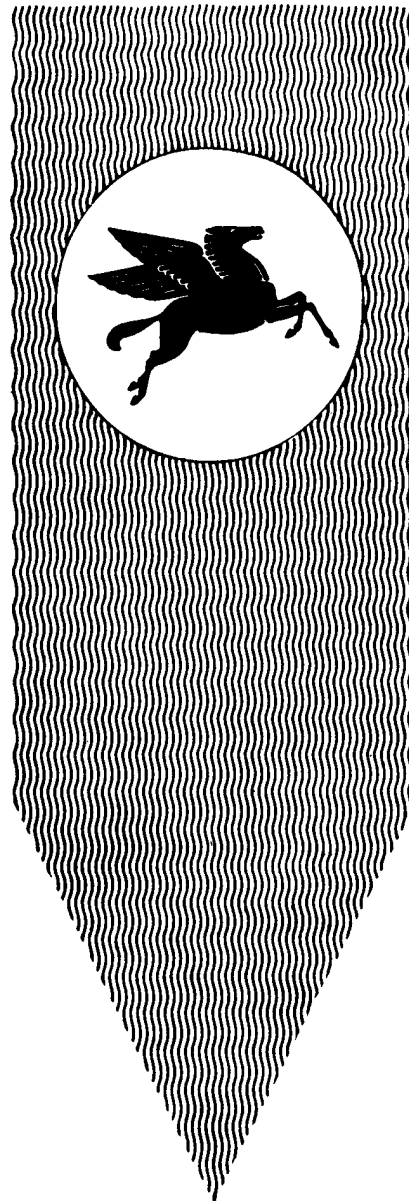
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