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TO carry out the purposes for which it was founded thirty-six years ago, the National Geographic Society publishes this Magazine. All reprints are invested in the magazine itself or expended directly to promote geographic knowledge.

ARTICLES and photographs are desired. For material which the Magazine can use, general remuneration is made. Contributions should be accompanied by an addressed return envelope and postage.

IMMEDIATELY after the terrific eruption of the world's largest crater, Mt. Katmai, in Alaska, a National Geographic Society expedition sent to make observations the remarkable phenomenon. Four expeditions have followed and the extraordinary scientific data resultant given to the world, in addition to an eighth wonder of the world, was discovered and explored—"The Valley of Ten Thousand Smokes," a vast area of steaming fissures. As a result of the Society's expeditions this area has been created a National Monument by proclamation of the President of the United States.

AT an expense of over \$50,000 The Society sent a notable series of expeditions into Peru to investigate the traces of the Inca race. Their discoveries form a large share of our knowledge of a civilization waning when Pizarro first set foot in Peru.

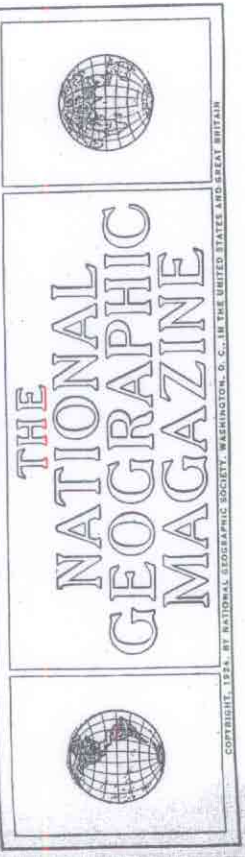
THE Society also, had the honor of subscribing a substantial sum to the expedition of Admiral Peary, who discovered the North Pole.

NOT long ago The Society granted \$25,000 and in addition \$75,000 was given by individual members to the Government when the congressional appropriation for the purpose was insufficient, and the finest of the giant sequoia trees of California were thereby saved for the American people.

THE Society is conducting extensive explorations and excavations in northwestern Mexico, which was one of the most densely populated areas in North America before Columbus came. In this region where primitive peoples lived in vast numbers, the ruins of their cities, their monumental dwellings and whose customs, ceremonies, and name have been engulfed in an oblivion.

THE Society also is maintaining expeditions in the unknown area adjacent to the San Juan River in southeastern Utah, and in Yunnan, Kweichow, and Kansu, China—all regions virgin to scientific study.

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CROSSING THE UNTRAVERSED LIBYAN DESERT

The Record of a 2,200-Mile Journey of Exploration which Resulted in the Discovery of Two Oases of Strategic Importance on the South-western Frontier of Egypt

By A. M. HASSANEIN BEY

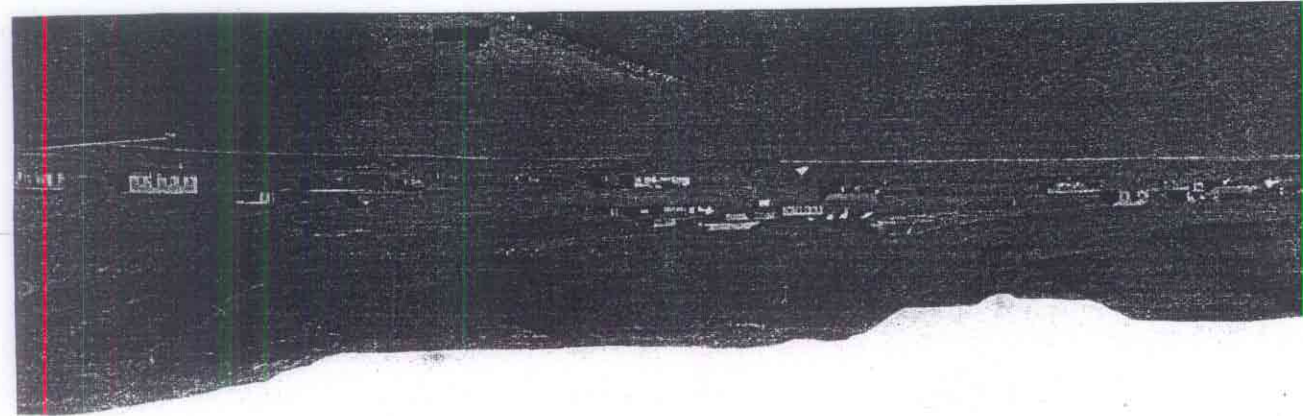
With Illustrations from Photographs by the Author

The journey of Hassanein Bey, graduate of Oxford University and now First Secretary of the Egyptian Legation in Washington, from Sollum, on the shores of the Mediterranean, to El Obeid, in the Anglo-Egyptian Sudan, a distance of 2,200 miles, has been characterized by the Director of Desert Survey, Egypt, as "an almost unique achievement in the annals of geographic exploration."

The expedition was undertaken with the encouragement of His Majesty King Fuad I of Egypt, a member of the National Geographic Society. His support took the form of a grant of leave of absence to Hassanein Bey from the civil administration of Egypt, and the expenses of the expedition were subsequently defrayed by government grant.—THE EDITOR.

TO HIM who has the wanderlust, no other actuating motive for exploration is needed than the knowledge that a region is unknown to civilized man, but for my trip from Sollum to El Obeid, through the hitherto untraversed Libyan Desert, I had the additional incentive of exploring the western frontiers of my native Egypt and of the Sudan. After my desert journey to the Oasis of Kufra in 1921, my sovereign manifested special interest in a proposed undertaking to bridge the gap between Kufra and El Fasher (see map, page 236). Therefore, on December 21, 1922, I landed in Sollum and organized the nucleus of a caravan which was to take me on a trip, occupying more than six months, through the Libyan Desert, that vast expanse of arid land lying to the west of the Nile Valley, from the Mediterranean coast down to the Sudan. The Libyan Desert is inhabited in the north, down to Kufra, by white Bedouin Arabs. The Arabic word "Bedouin" means "dweller of the desert," as opposed to the "dweller of the city." Nowadays, however, it has come to mean any man who goes from one place to another to graze his cattle in the desert. It is used equally for the white Bedouin and the black Bedouin—anybody who lives the

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SOLU, A SMALL MEDITERRANEAN PORT NEAR THE NORTHWESTERN FRONTIER OF EGYPT, FROM WHICH HASSANEIN BEY BEGAN HIS 2,200-MILE CAMEL TREK

In the foreground is the harbor breakwater. The small houses are the quarters of Egyptian officials. In the background is the Egyptian hospital. From the sea rises a precipitous plateau, beyond which lies the desert.

roaming life of those sterile wastes.

In the south, this region is inhabited by tribes of blacks—Tebu, Goran, and Bidiat (see illustrations, pages 268 to 275)—who are rather more refined in features than the central African negroes.

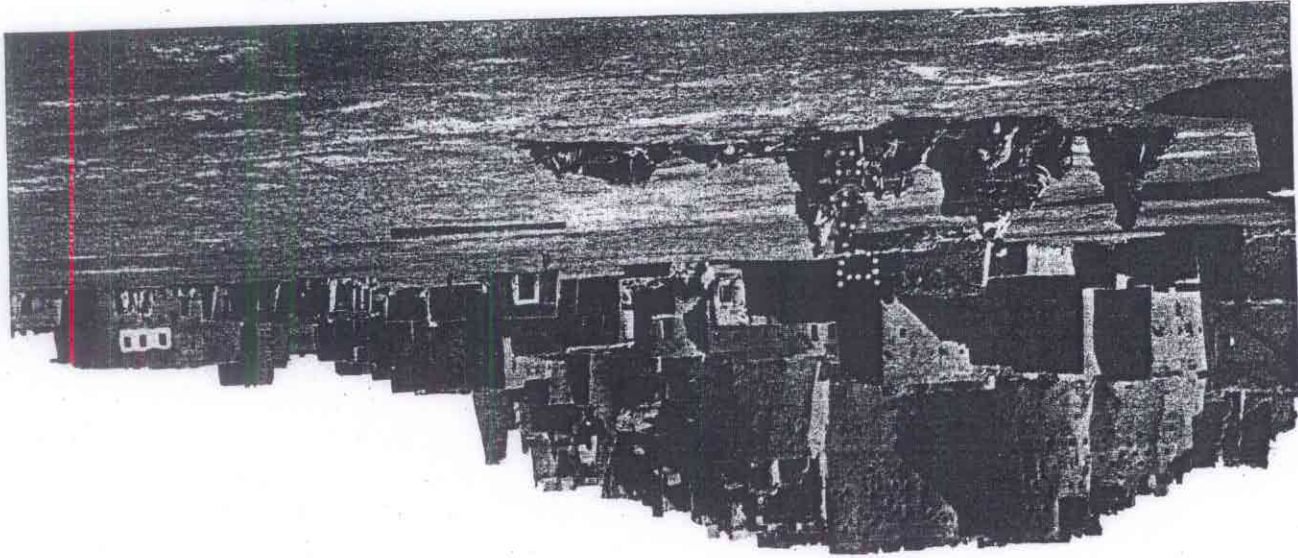
THE SENUSSI, A SECT, NOT A PEOPLE

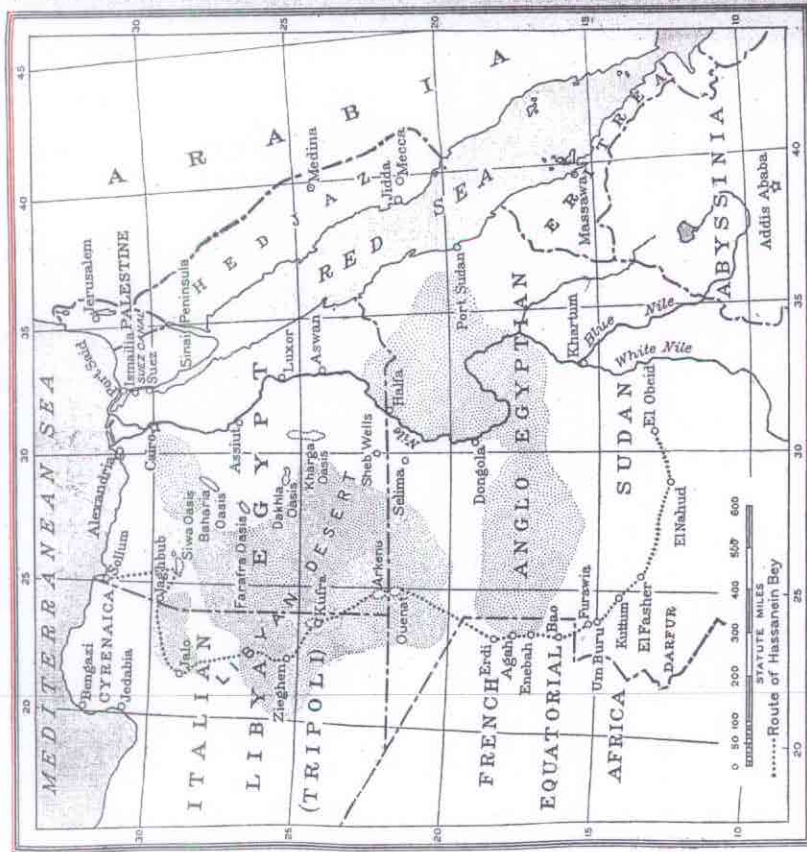
The reader sees always connected with the Libyan Desert the word *Senussi*. Many people think the Senussi are a tribe or a people. In reality, they are a sect of the Moslem religion embracing all the tribes of Cyrenaica and having influence in North Africa and the region south of Kufra. It is a comparatively recent sect, being only about 80 years old.

Its founder, Sidi Mohammed Ibn Ali El Senussi, came from Algeria about 100 years ago. On his long journey to Mecca he saw that there was a fertile field for his teachings in Tripoli and Cyrenaica. He established the famous University of Jaghub (see page 238) and preached a very primitive and pure form of Islam, shorn of all luxuries. The devotees were not even allowed to drink coffee or smoke, and up to ten years ago the man caught smoking was severely punished, sometimes to the extent of having one of his hands cut off.

It has been said by explorers that the tribes of Cyrenaica, who are all under Senussi influence, are actuated by religious fanaticism when they refuse foreigners permission to enter their territory. To my great interest, however, I discovered that not religious, but patriotic fervor is the inspiring principle. Their reasoning is simple. They do not want any aliens to come into

STONE HOUSES OF SIWA, ONE OF THE MOST HISTORIC OASES OF NORTHERN AFRICA





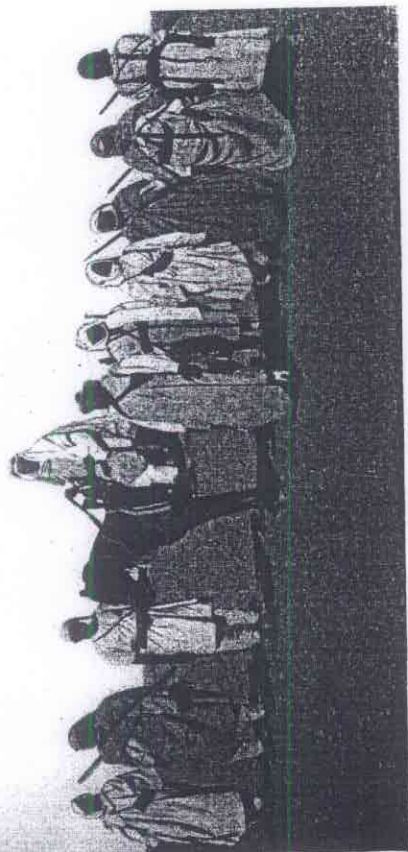
A SKETCH MAP SHOWING THE ROUTE OF HASSANEIN BEY THROUGH THE LIBYAN DESERT
Drawn by A. H. Burnstead

The results of the author's journey include the determination of the exact positions of the wells of Ziegheh and the Oasis of Kufra, resulting in changes of 62 and 24 miles respectively from the positions hitherto assigned to these places on maps of Africa; the discovery of the oases of Arkenu and Ouenat, previously unknown; the discovery of a route from southwestern Egypt across the Erdi Plateau of French Equatorial Africa into Darfur, and the determination of elevations along the entire route.

of the country, for they say foreigners mean domination, domination means paying taxes, and they do not want to pay taxes! Therefore, the best way to avoid taxes is to prevent any stranger from entering the region.

Now, who are the outsiders who come to their country? They are European explorers—Christians. Therefore, no Christians are permitted to enter. Explorers had been forbidden to go into the interior, and with the exception

My first objective from Sollum was



THE ARMED MEN OF THE CARAVAN

Hassanein Bey is mounted upon his Arab horse Baraka (see text, page 245).

Siwa, where I arrived after a nine days' trek. This is one of the oldest oases of the Libyan Desert, and the most prosperous because of its date trees and its numerous springs. Its geographical position has made it a center for Bedouins trading between Egypt and the interior of Cyrenaica.

IN THE OASIS OF SIWA, WHERE THE CARAVAN WAS ORGANIZED

Here one still finds the old houses built on the hilltop to ward off attacks (see illustration, page 235); but now it is a very peaceful place, inside Egyptian territory. The chief occupation of the inhabitants is the cultivation of dates. Olive trees are also grown and olive oil extracted.

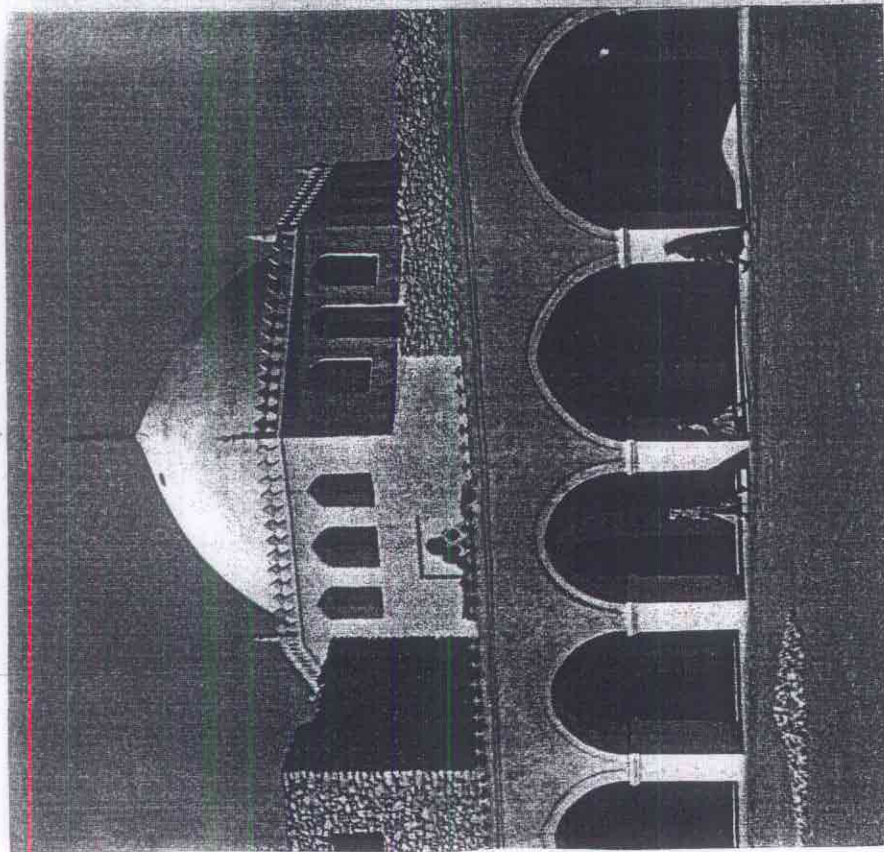
The dates of Siwa are famous all over the world. A visit to the date market reveals a curious communistic custom that prevails here. Everybody, rich and poor, brings all his dates, good and bad, and puts them in heaps, and no one dares touch one date from another man's heap, for it would bring bad luck. On the other hand, they allow any stranger or any poor

man to come in and eat as much as he likes from the best quality, provided he does not take any away with him. Therefore, nobody starves at Siwa.

Some of the women are unusually comely. They dress in very loose garments and adorn themselves with necklaces of silver bangles. Photographs of some of these Siwa girls suggest that they follow the most modern form of coiffure, but the hair is not bobbed, although it has the same effect. It is plaited when the child is young, and the braiding continues as the hair grows. The locks are oiled from time to time, but are never unplaited or combed out (see page 250).

A SHEIK—AMERICAN AND ARAB MEANINGS

After leaving Siwa I put aside my khaki clothes and assumed desert garments, traveling as a Bedouin sheik. I find that in America *sheik* means something very terrible and fascinating; but 90 per cent of the sheiks in the desert are as little likely to run away with a beautiful woman as the same per cent of the sedate bankers of America! The word "sheik,"

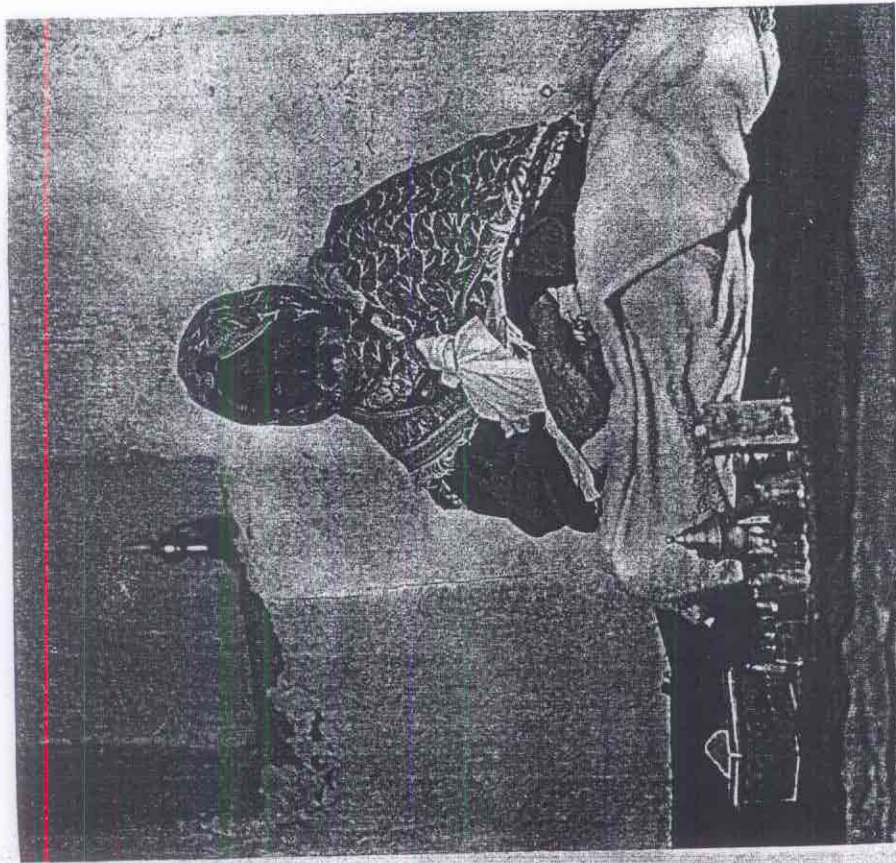


THE DOME OF THE MOSQUE AT JAGHBUB, UNDER WHICH IS THE TOMB OF THE GRAND SENUSSI

in Arabic means "an old man," and it has come in time to mean the oldest man of the tribe—that is, its chief, or the head of the religion, or the head of a caravan. From Siwa my route lay to Jaghbub, the great educational center of the Senussi sect. Near here I encountered Sayed Idris El Senussi, head of the Senussi, who was on his way to Egypt. My longstanding friendship with this powerful leader was, in large measure, responsible for the success of this expedition, as well as for a previous one in 1921, since it was

through his kind solicitude and the letters he gave me that I was able to overcome hostility at many a camp farther south. Jaghbub is a small oasis, having no trade and no industry. Its existence depends solely upon the university. It has a mosque which can accommodate 500 or 600 persons, and within the enclosure is the great dome under which is buried the Grand Senussi, founder of the sect (see text, page 234).

It was necessary to stay in Jaghbub for five weeks, partly because of inability to



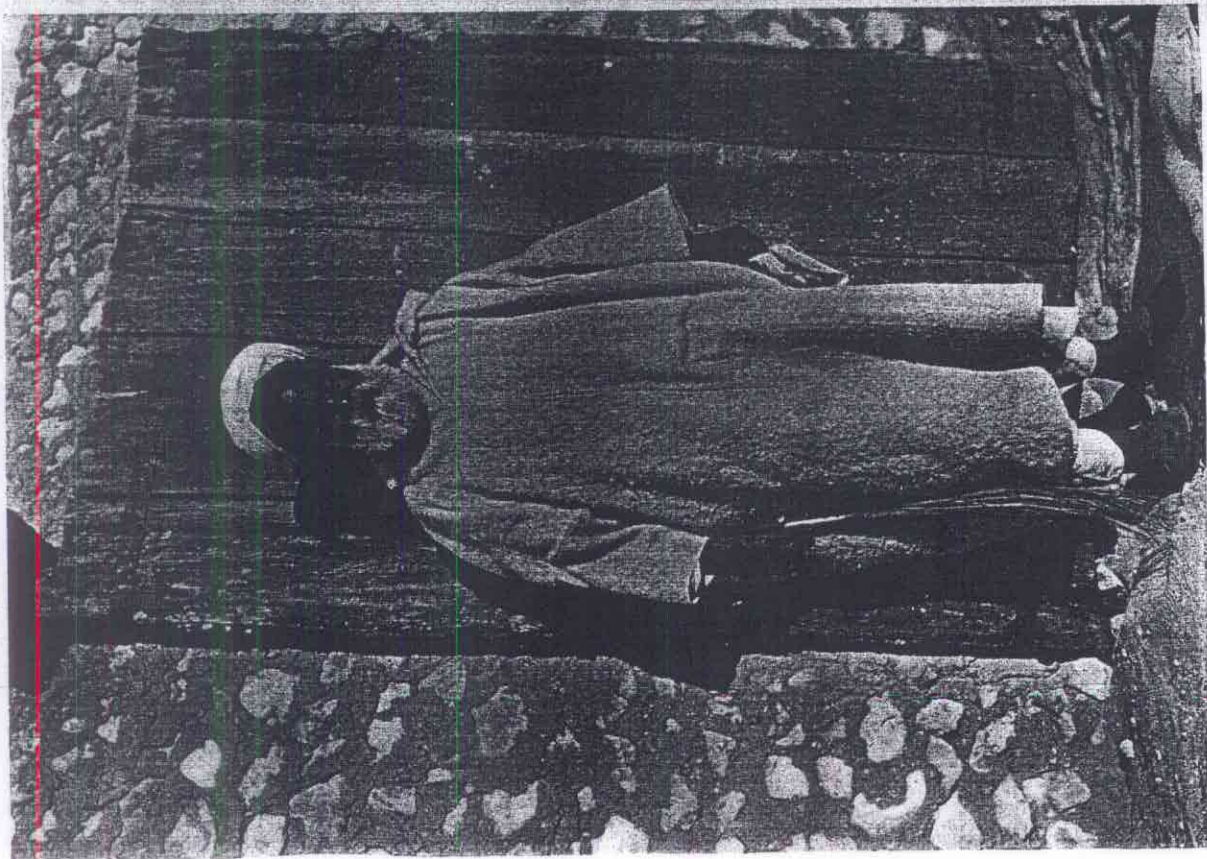
SIDI HUSSEIN WEKIL, A REPRESENTATIVE OF SAYED IDRIS, HEAD OF THE SENUSSI SECT AND A FRIEND OF THE AUTHOR

He is seated before a tea tray. The white rock at his right is a loaf of sugar, from which bits are broken off with a hammer, but if this implement is not at hand the tea drinker is apt to pick up the lump and bite off his share.

obtain camels and partly through the fear of men of other tribes to trespass on the route between Jaghbub and Jalo, the Zwaya and Majabra preserve. However, I eventually secured a Zwaya caravan going westward.

Two days' journey from Jaghbub, on the way to Jalo, we came across a petrified forest. The big bits of petrified trees are still used as landmarks on the way, set up according to an age-old practice of the desert.

It is customary when a caravan finds small pieces of stone lying about along the route to heap them up, to show that some one has passed. Of course, tracks in the sand are obliterated by the wind. It is a wonderful sight sometimes, when one has been trekking for five or six days without seeing any sign of the hand of man, to come across a pile of two or three stones on the ground. It straightway encourages one. The body of a camel or even the skeleton of an unfortunate



THE JUDGE AT JALO, WHO LIVED IN THE TIME OF THE GRAND SENUSSI
He was a very useful source of information to the author in collecting Senussi history. In his right hand is a fly swisher.

traveler, though an awful sight, at least shows that a caravan has passed that way.

IN A DESERT SAND-STORM

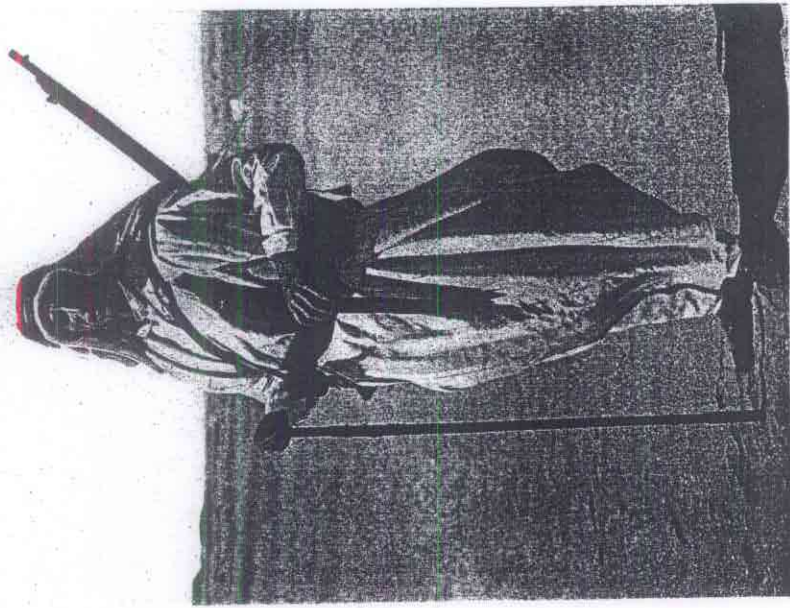
The most interesting feature of the trip to Jalo was eight days of sandstorm.

The desert is usually very calm, with an occasional breeze, which becomes stronger and stronger; then gradually the land looks as if it has been fitted with pipes emitting steam. The fine sand first rises, but as the velocity of the wind increases heavier grains rise. When the sand gets as high as one's head, it becomes distressing, and perhaps dangerous, if the traveler has to face it. Now he is obliged to go very slowly, and if he is not careful and vigilant he may miss the way. But if the wind is blowing from the right or left, it is not so difficult, because the sand can be warded off with the Bedouin clothes.

One day we had to advance in the teeth of the storm, and I saw how it could destroy a caravan. Of course, one has to keep moving slowly. To stop means to be drowned by the sand. The camels instinctively know this and continue to advance in spite of the tormenting blast. On the other hand, the moment the rain comes they stop or even kneel down.

During my previous travels I had collected many of the rules of sandstorms and their behavior, according to Bedouin information, but, to my great regret, they were all broken in those days of trial.

Sometimes, however, toward sunset, when we had been battling for hours against the seemingly interminable bom-



IN THE COSTUME OF THE DESERT

At Siwa the author put aside his khaki uniform and assumed the garb of a Bedouin sheik (see text, page 237).

bardment, the wind would stop dead, as if a master hand had given a signal. For an hour or more the fine sand and dust would settle slowly, like a falling mist. A short while afterward the moon would rise, and under the pale magic of its flooding light the desert would assume a new aspect. Had there been a sand-storm? Who could remember? Could this peaceful expanse of loveliness ever be cruel? Who could believe it?

A CARAVAN OF 15 MEN AND 37 CAMELS

At Jalo the preparations for the big march to the south were completed. My reorganized caravan consisted of 15 men and 37 camels.

The arms for the trip were a motley assortment—9 rifles, 4 revolvers, and 3,000 rounds of ammunition. Three of the rifles were old Egyptian army weapons. The others were Italian, Russian, and German guns smuggled into the Senussi country by the German submarine gun runners during the World War, and used in the Senussi attacks upon the western frontiers of Egypt under the leadership of Sayed Ahmed, cousin of Sayed Idris, who was under the influence of Turkish and German officers.

During the desert journey these guns were seldom used except upon our approach to a Bedouin settlement in an oasis, on which occasions I ordered each man of the caravan to fire three rounds, ostensibly as a salute, but in reality to impress the possibly hostile natives with our armed strength. Sometimes, also, gazelles and other game were shot to provide meat for my men.

Most of the members of the caravan remained with me throughout the journey, going back to Cairo, and, as a tribute to their loyalty and indefatigability, I can only say that, in the event I should ever attempt to repeat the journey, I could wish no better fortune than to have every man of them in the party.

JALO CENTER FOR NORTHBOUND TRADE IN FEATHERS AND IVORY

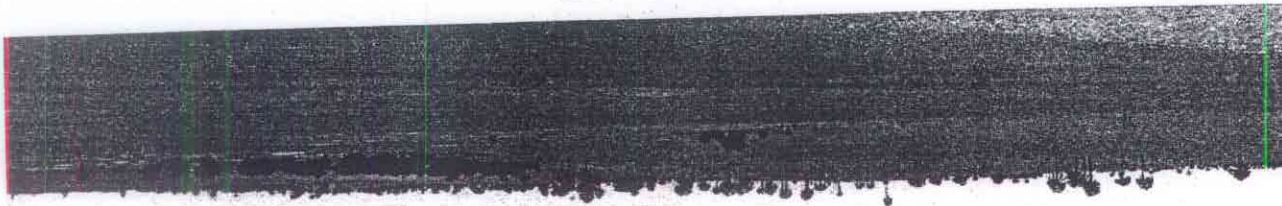
Jalo is one of the most important oases in Cyrenaica, partly because of the dates which it produces, but more especially because it is the destination of the caravans coming north from Kufra. Ivory and ostrich feathers from Wadai and Darfur come to Jalo to be forwarded either eastward to Egypt or northward to Bengazi. This trade is chiefly in the hands of the Majabra tribe, whose head men are the merchant princes of the Libyan Desert. A Majbari (singular of Majabra) boasts that his father died on the *basur* (camel's saddle) in the same way that a soldier boasts that his father died on the field of battle.

From this oasis we moved southward to Buttafal well, a day's journey from Jalo, where water was obtained for the trek across desolate sand flats to the wells of Zieghen.

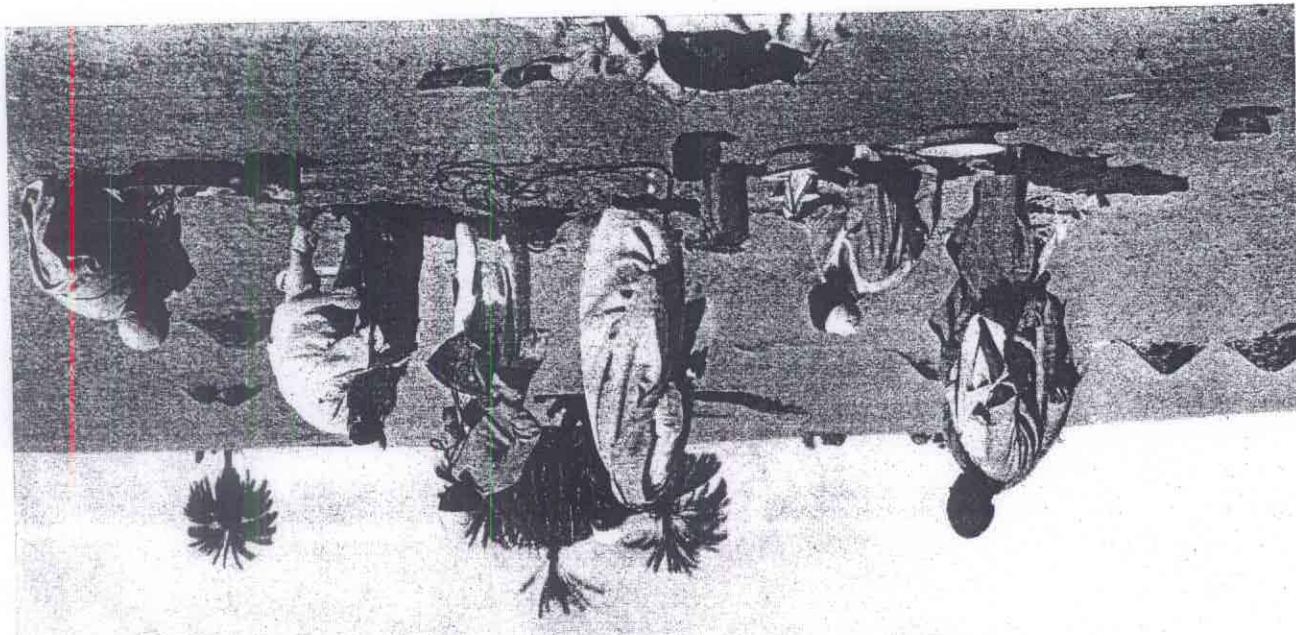
Before setting forth the details of the

This is an important trading center for caravans en route to Bengazi, on the Mediterranean coast, from French Equatorial Africa. It has many wells and date palms, sustaining a population of 2,000.

THE OASIS OF JALO



EL HARASH WELL, IN THE ZIEGHEN DISTRICT
This is the first water in the desert after leaving Buttafal (see text, page 247). Two men are filling girbas (sheepskins) with water. In the foreground is Bibo, the expedition mascot (see text, page 245).



long journey, it may be well to describe the organization of the caravan.

In addition to our 15 men and 37 camels, an important member of the expedition was Baraka, my chestnut Arabian horse, which made the entire journey and endured the hardships astonishingly well. Day after day, in midsummer, he stood tethered near my tent, in the broiling sun, with the temperature sometimes registering 113° F. He is in Cairo now enjoying for life a well-earned rest.

THE MASCOT OF THE CARAVAN

The mascot of the caravan was Bibo, an unimpressive-looking nondescript dog. He was one of the marvels of the expedition. There were days when he must have traveled 60 or 75 miles while we were covering 25 or 30, for he had an insane propensity for chasing birds over the desert.

His vitality was amazing, but he also had a certain canny instinct, for when weary he plainly indicated the fact and appealed, in a manner almost akin to speech, to one of the boys, who would lift him aboard a camel. Here he would perch upon a sheepskin water bag, the coolest spot in the desert. As the day progressed, he would move around to the water bag slung on the other side; so that, like the Kentucky colonel of whom I have heard, who with his mint-julep glass, "followed the shade around the house," Bibo followed his around the hump.

Our shelter equipment consisted of four tents—three bell tents and one A tent. The last frequently was not erected, as it required considerable effort. The bell tents, with their sides raised to admit air, furnished quasi-shelter from the sun, and beneath one of these I usually rotated around the central pole, keeping always just beyond the sunlight, so that my body formed a sort of sundial, as it progressed in circular fashion.

Four cameras and a motion-picture outfit were carried as part of the expedition's equipment, together with an enormous supply of films.

It is the experience of most explorers in tropical regions that, in order to preserve one's films, they must be developed within a few hours of their exposure; but, with very few exceptions, mine were

not developed until after I had returned to civilization—that is to say, after exposure they were kept in tin containers for from one to eight months.

The chance of losing the pictures had to be taken because of the impurity of the water along the route; in fact, from the time we left Sollum until our arrival in El Obeid, we had not one glass of clear water for drinking purposes. In cases where we were using new sheepskin water bags, the water absorbed the tar with which the bags were lined, and where we used old containers the liquid invariably carried in suspension particles of the hair of the hide, as well as other impurities.

On the long treks between water wells, our water camels each carried four sheepskins with an aggregate capacity of 24 gallons.

There is considerable misconception as to the amount of water required by the desert traveler. In winter we found it possible to subsist on an ordinary glassful in the morning and another in the evening. Occasionally, on the daylight marches, a third glass was taken at midday, but this was looked upon as more or less of an effeminate weakness. When it became hot we tried to save water by resting during the day and trekking by night (see text, page 273).

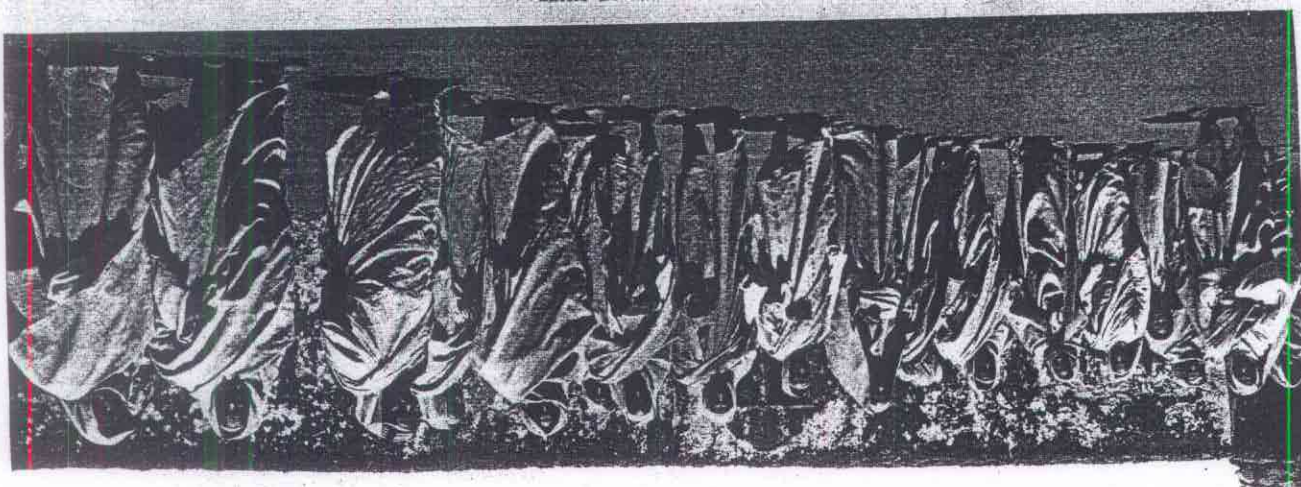
My horse required a third of a sheepskin of water daily, or half a sheepskin every other day, when the supply was scant.

TEA AND RICE ARE STAND-BYS IN THE DESERT

Our food consisted chiefly of rice, flour, dates, and Bedouin butter, the latter almost invariably in liquid form, made from sheep's milk and usually rancid because of its containers—old hide bags.

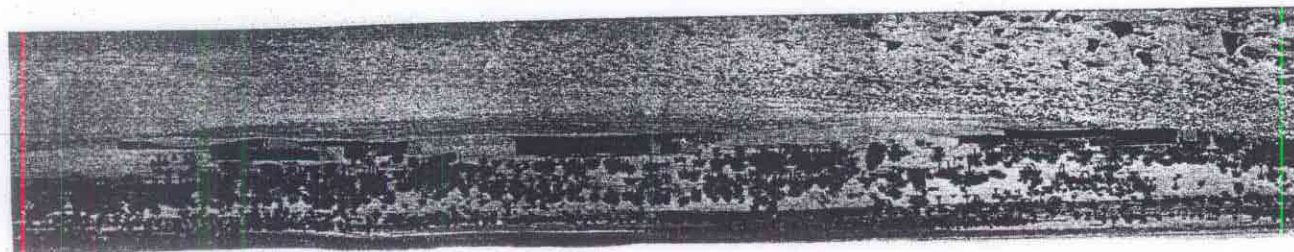
The stand-by of the desert traveler, however, is tea—not the emulsated and emaciated beverage of civilization, but a potent black brew made from one hand-ful of tea and sugar in equal proportions, placed in a small pot having a capacity of perhaps a pint of water. This is boiled and the bitter-sweet liquid is served in tiny glasses holding about two ounces.

Two glasses of this drink will imbue the user with remarkable vitality. He



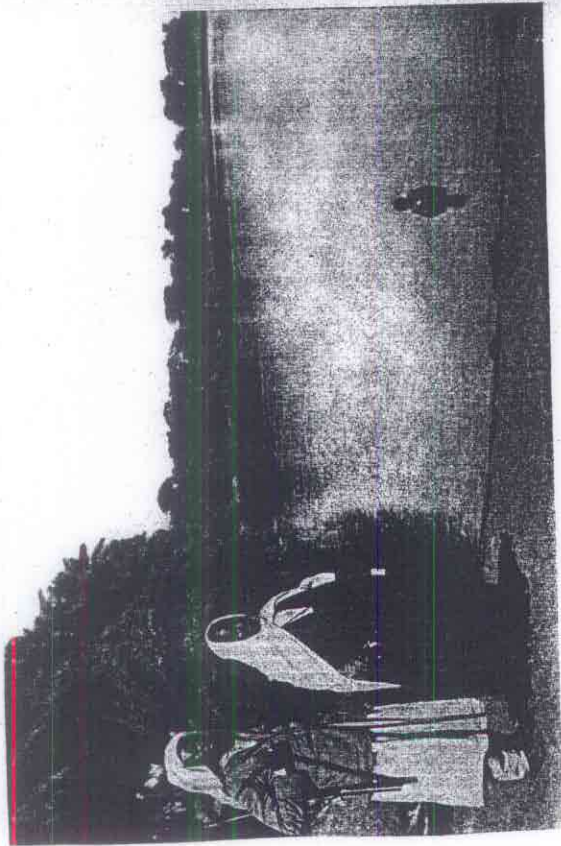
ZWAYA CHIEFS OF KUFRA

The Zwaya are the conquerors of Kufra and the inhabitants of it now. They are the tribesmen who destroyed all the cities and scientific results of the German explorers when he visited them in 1897 (see text, page 296).



DATE PALMS IN THE VALLEY OF KUFRA

In the middle distance the light streak is the Lake of Kufra (see also illustration, page 245). In the foreground are the dwellings of the natives.



THE SALT-WATER LAKE OF KUFRA

This attractive body of water, with an area of two square miles, is very deep in the center. The oasis surrounds the lake. In the foreground is one of the notable Bedouin chiefs of Kufra and one of the Senussi soldiers. When the author asked this chief if there were fish in the lake, he replied: "What is a fish? Does it walk? Does it fly?" It was found to be almost impossible to describe a fish to a person who had never seen one.

becomes wakeful, watchful, and eager for the journey. The effect is exhilarating without being intoxicating. This desert tea is an acquired taste; but once the Bedouin beverage habit is formed, it is very difficult to go back to the pallid tea of civilization.

The staff of life in desert travel is not bread, but rice, which is boiled afresh at each halt. Bread is made without leaven, and is a heavy, unpalatable food, eaten chiefly during the day's march.

LEADER AND MEN MUST FARE ALIKE

I have been asked why biscuits (crackers) were not included as supplies for desert travel. The answer is that an entire caravan devoted to their transport would hardly supply the voracity of one Bedouin's appetite. I am confident that any of my entourage could have consumed a cubic foot of biscuits in the course of a day's march. The Bedouin can travel long and far on a limited amount of food, but when plenty is at

then my responsibility to enter the scientific data in my diary, wind and compare the six watches which I carried (four of which, unfortunately, went out of commission before the end of the journey), label and store the geological specimens collected, and record the films used.

The theodolite was one of my chief cares on the journey, for the Bedouins are extremely suspicious of this instrument. They had had sufficient experience with European nations to deduce the fact that where surveys of their country had been made armed forces generally followed for purposes of conquest. It therefore became necessary for me to practice pardonable deception in order to utilize the instrument.

Readings were taken principally late in the afternoon, and I always made my observations at some distance from native settlements, explaining to the inquisitive Bedouins that the theodolite was in reality a camera, which could be taken out of its box in the twilight or dawn. I had to explain that the camera and the theodolite worked alike, attracting pictures to them.

"How could a camera attract a picture far away from it?" asked a Bedouin of the Nubian head man of my caravan, who was very good at concocting harmless inaccuracies. Abdallah threw his hands in the air: "Ask the magnet how he attracts the iron!" was the simple and, to the Bedouin, convincing reply.

HELPING BIRDS ON THEIR NORTHWARD

FLIGHT

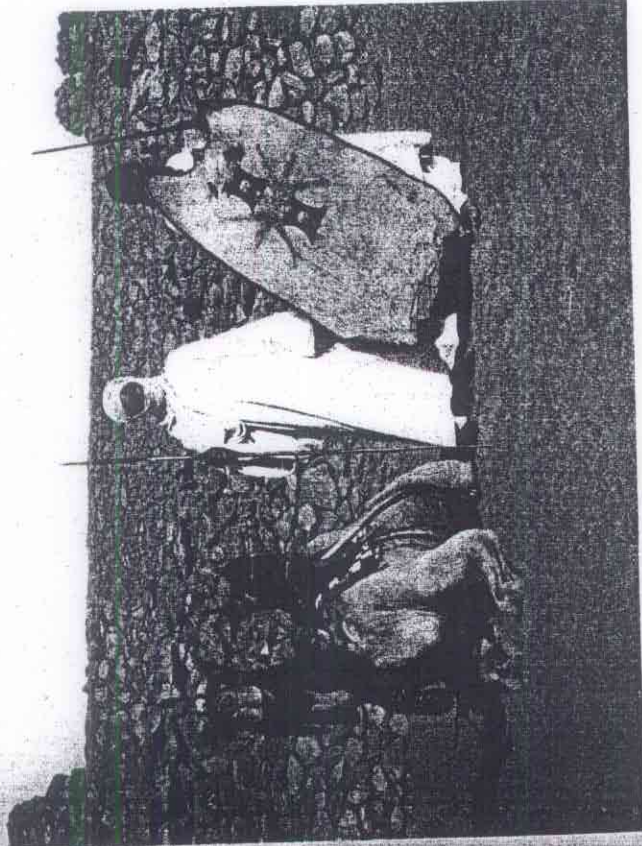
It is a trek of nine days from Buttafal well to Zieghen, across one of the most

SAVED MOHAMMED EL ABED, COUSIN OF THE HEAD OF THE SENUSSI SECT AND THE RULER OF KUFRA

He proved very kind, helpful, and hospitable to the expedition (see text, page 251).

desolate parts of the world. Birds migrating northward to Europe, some of them small robins, fly 250 miles without a drink of water. Sometimes these intrepid travelers, apparently mistaking us for trees, would alight upon our heads or shoulders (see illustration, page 254). We would give them a drink, and off they would fly again. They never made a mistake and started south. As we went along we saw remnants of wings which told their own story.

During this stage of the journey I used to ask the guide in the morning to indicate the line of march for the day. He would trail a line with his stick. I would



TUAREGS IN KUFRA

The men of this tribe, rather than the women, conceal their faces, and even when they eat do not remove their veils. This feat in feeding is accomplished by the use of specially constructed spoons. For an account of this interesting Saharan Berber people, see "Timbuktu, in the Sands of the Sahara," by Captain Cecil D. Priest, in *THE GEOGRAPHIC* for January, 1924.

take bearings on it and check him ten or fifteen times in an hour with my compass, and he would not waver a yard, walking half a mile ahead of the caravan. It was extraordinary to watch him, to see that beautiful straight line.

In daylight trekking, the Bedouin uses his shadow for a compass, and so experienced has he become that his course alters imperceptibly as his shadow moves in sundial fashion.

About midday he would get in trouble, because traveling by his shadow, this would then be between his feet!

I caught him at the end of one day in just one mistake. The stars had not

come out, and he was going absolutely due west when he should have been going south. If I asked him in the daytime, "Are we going in the right direction?" he would wave his hand and say, "God knows best!" Of course, "God knows best," said with an air of assurance, is all right, but if a Bedouin guide tells you "God knows best" in a hazy way, after you have seen him wobble, it means he has gone astray.

We lost three camels on this stretch of desert.

Arriving at Zieghien, I was able to correct its location on the map. Rohlf, the German explorer, who went before me 45



SAYED MOHAMMED EL ABED'S NEPHEW WITH HIS TUTOR, A SENUSSI "IKHWAN" (LEARNED MAN)

The *ikhwans*, in addition to their responsibilities as teachers, play the rôle of peacemakers among the Senussi when a murder is committed. It is they who act as intermediaries in settling the question of blood money (see text, pages 251 and 252).

merely a water hole. Often only a patch of damp sand indicates the presence of water, and the guide will dig a little and find the well (see illustration, page 243).

Three days from Ziegchen there is an old landmark called Garef El Fadeel. In the desert, whenever anything is named for a man it means a bit of tragedy. This man, El Fadeel, was one of the finest guides between Jalo and Kufra. On his final journey he was leading his caravan when a little sandstorm arose. He had trouble with his eyes, so asked a companion to describe all the landmarks. They mistook one, went to the west instead of to the east, and missed their well.

They realized their mistake too late. They tried to go to Kufra, but fell exhausted on the way.

One camel escaped and finally reached Kufra, where it had been accustomed to graze. When it arrived the natives saw a mark on its neck and knew it was El Fadeel's camel. A search was begun for the party, but it was of no avail. The men had died of thirst.

Curiously enough, fifteen years later this party's luggage was found untouched, preserved by the sand.

A TEBU GIRL

The Bedouin style of her apparel and the jewelry which she wears show the influence of Arab civilization on the blacks of the desert. In her ears are silver earrings, her necklace is of amber, and in her nose are bits of amber and coral.

Years ago, had located it 62 miles from where it really is. This was not his fault. He put it down from hearsay, for he had never been there. I suspected the error when I visited the oasis in 1921, but could not be sure until I had accurate instruments.

A TRAGEDY NEAR ZIEGCHEN

Near Ziegchen there have been tragedies, because if the traveler happens to go a little to the right or the left he will miss the well and find no water, for here, as in some other places in the desert, the well is not walled in with masonry, but is

I had letters for Sayed Mohammed El Abed, the cousin of Sayed Idris El Senussi (see text, page 238). He was very helpful and most hospitable.

As a matter of fact, of all the dangers I encountered at Kufra, his hospitality was, I think, one of the greatest! He had to produce about 15 courses for late breakfasts and dinners, and I exhausted all my sodium bicarbonate and indigestion tablets. On one occasion, just after partaking of his bountiful hospitality, I was entertained at dinner successively, the same day, by three Senussi chiefs. Etiquette forbade my declining any of the invitations.

When they dislike a traveler the Bedouins have a very clever way of dealing with him without assuming the blame for "mishaps."

They treat the visitor royally and then wait for him outside the village or oasis and attack his caravan; if they can destroy it, they do so. Then there are many excuses.

If they are questioned they say, "We showed him every hospitality while he was in our midst; outside there are many robbers. One cannot know who committed this crime."

THE BEDOUINS ARE CHIVALROUS AND ROMANTIC

Among the Bedouins of Kufra, as in other oases of northern Africa, one sees only old women or very young girls. The newly married women are generally in the house, because that is the woman's place in the desert.

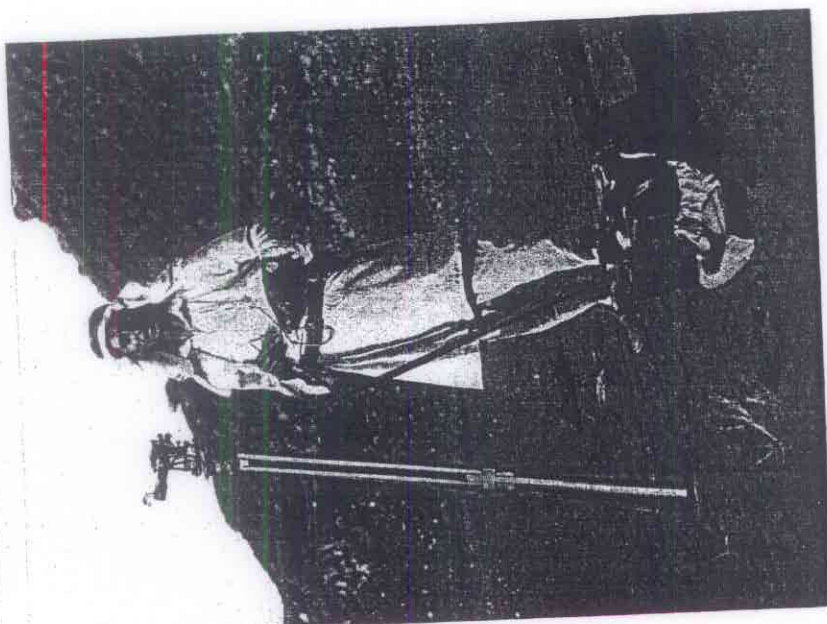
The Bedouins lead very chivalrous and

WITH THE THEODOLITE IN THE DESERT

The Bedouins were extremely suspicious of this surveyor's instrument. They were told it was a type of camera which attracted pictures from a distance (see text, page 247).

romantic lives. When a young man wishes to marry he goes to his sweetheart's camp and sings to her, in many cases his own verses. If the girl likes him, she sings to him in verse tune. Then, if the girl's family approves, there is a marriage.

But occasionally there are elopements, and sometimes vendettas have begun thus. If, in the feud, one man kills another, the family of the deceased generally goes to an *ikhwan*, a learned man of the Senussi sect. The *ikhwan* takes the murderer and goes to the camp of the dead man's tribe and says to his relatives: "This is the man who killed your



relative. You have him here. You can do what you like with him."

Usually the reply is, "May God forgive him, we know it." The blood-money question is then agreed upon—generally \$3,000, or possibly \$2,000 cash and the remainder in camels and slaves. Nearly always blood money is accepted. Sometimes, however, when the feud is strong, this is refused. In such cases the murderer is sure to be slain. He may be allowed to live five, or ten, or fifteen years, but he is bound to be killed, or, if not, then the highest man in his tribe is slain.

The black Bedouins of the south are more reasonable. If a man has killed another, he pays blood money, or he is killed by the slain man's family. But once the murderer dies, no other member of the clan is involved.

The Bedouins marry more than one wife if they can afford it, and in many cases the wives live on good terms with each other. But the eldest, or first, wife remains the mistress of the house. Once, while visiting an old man in Kufra, I was startled, as we entered the courtyard, to hear my companion address one of these wives as "You gray-haired woman!"

"Hush! Don't call her 'gray-haired woman'!" I cautioned. But he assured me that it pleased her, and he was right. She welcomed us, and I found that with these people reference to one's age is a mark of respect.

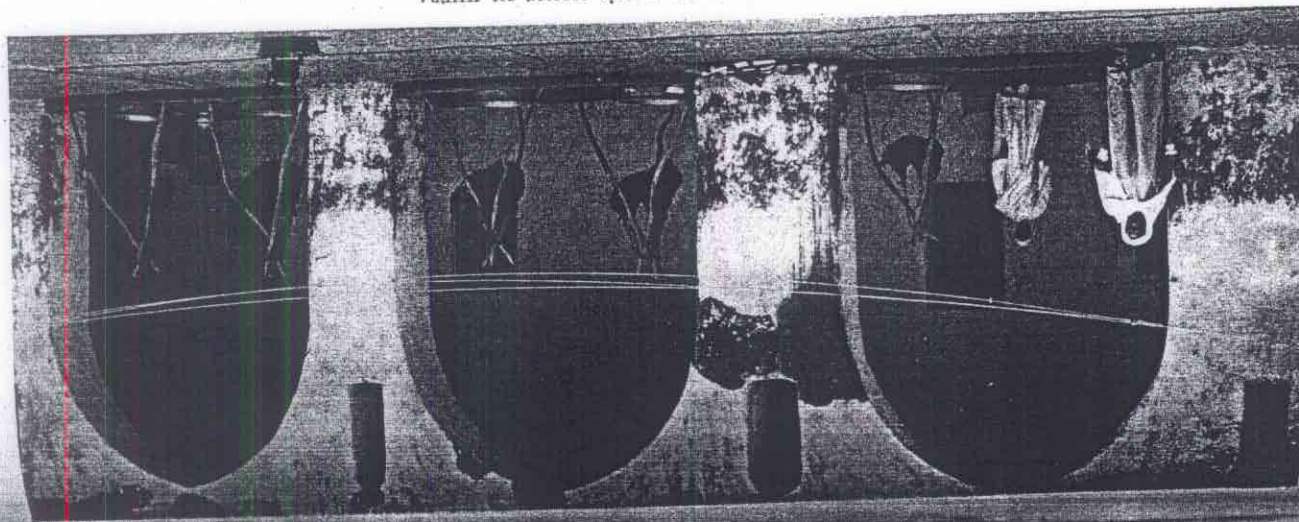
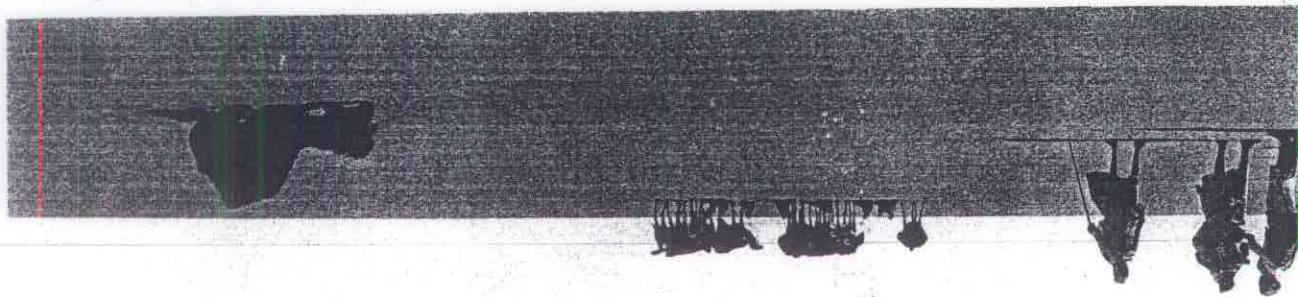
MEN SLAVES AT HALF PRICE

The Bedouins still buy and sell slaves, but the trade is inconsiderable nowadays. When I was in Cyrenaica on my first visit, in 1916, I was offered a slave girl for \$24; now the girl costs \$150. Men are cheaper—about half price!

Only by the use of the letters from Sayed Idris was I permitted to remain in Kufra sufficiently long to rest my men and animals. Despite the intrigues of a faction of Bedouins who were ill-disposed toward me, the stay in this fertile oasis was full of interest. It had been visited previously by only three travelers from the outside world—the German explorer Rohlfs in 1879, and Mrs. McGrath (Rosita Forbes) and myself in 1921.

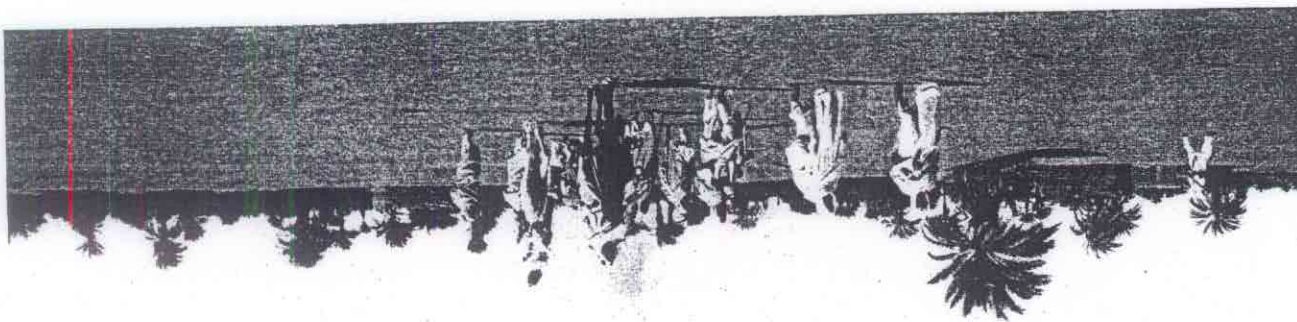
It was during our short halt at Kufra that I learned for the first time of the

A VICTIM OF THE DESERT: ONE OF THE CAMELS LOST ON THE TREK FROM KUFRA TO ARKENU (SEE TEXT, PAGE 270)



SAYED MOHAMMAD EL ARB'D'S HOUSE IN KUFRA

Hanging from the tripods are sheepskins of water left to cool in the shade, and beneath them are shallow copper pans. In the foreground is a teapot.



LEAVING KUFRA FOR THE TREK INTO THE UNKNOWN

The route from this point to Eridi, by way of Arkenau and Ouenat, had never before been traversed by one from the outside world.

recent arrival of a French military, reconnaissance party at Sara well,* which lay on my proposed line of march to Wadai by the beaten trade route.

With the Sara district now among the explored places of the desert, there was only a short strip of untraversed territory lying between it and Kufra.

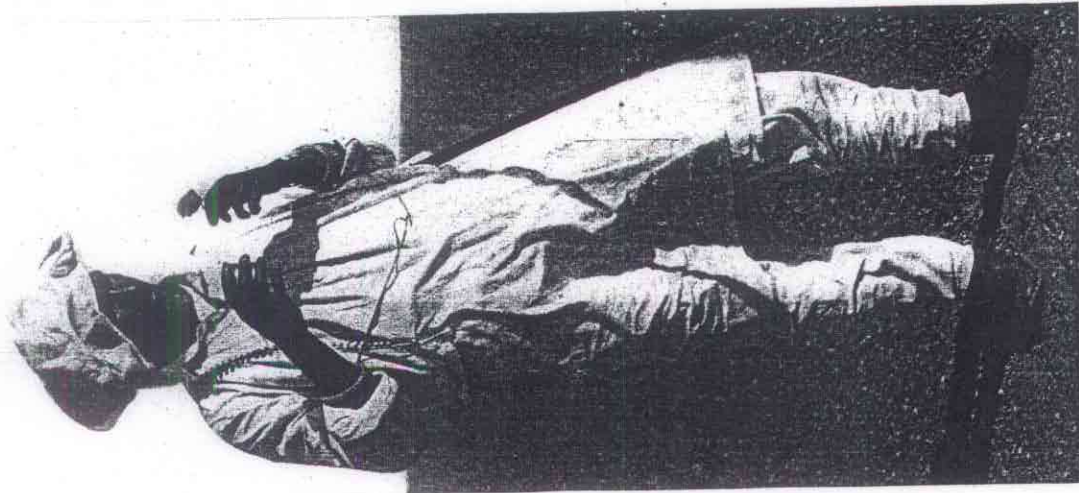
I thereupon determined to cut across from Kufra by an untraversed route which might lead to the lost oases of Arkenu and Ouenat. There had long been a tradition that these oases existed in or near the southwest corner of Egypt. On a map published by Justus Perthes, of Gotha, in 1892, a small unnamed oasis and well were indicated in latitude $21^{\circ} 51'$ and longitude $23^{\circ} 3'$, and another uninhabited oasis, also unnamed, about thirty miles due east.

It is presumed that both these oases had been placed on the map as the result of vague Arab statements; for, according to all available records, they had never been visited by an explorer. Indeed, their very existence was so doubtful that they had not been shown on the maps either of the English or of the French General Staff.

In Mr. W. J. Harding King's paper of 1913, on "The Libyan Desert from Native Information," there is a statement to the effect that he had heard of a place called Owana, or Owanat, halfway along a road from Merga to Kufra, where there was a well and green grass after rain. Mr. King placed the oasis at a distance of more than 80 miles from the nearer of the two oases shown on the German map.

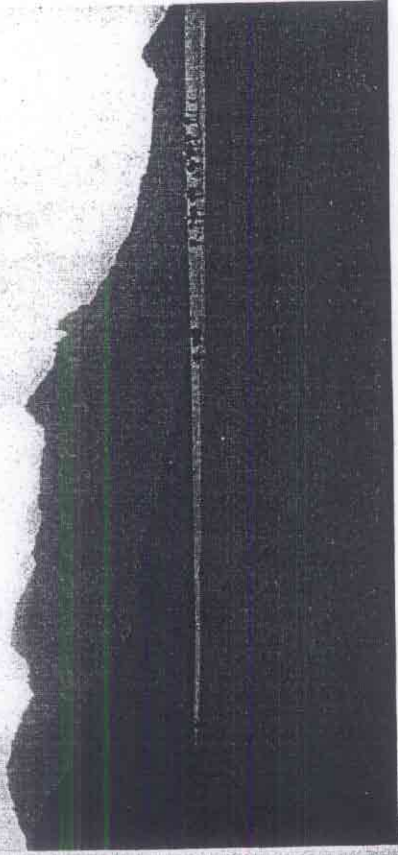
If these oases could be found, I knew that they would prove of

* This apparently was the small party headed by Bruneau de Laborie, which had come from the Gulf of Guinea by way of Lake Chad. From Sara well de Laborie subsequently reached Kufra and thence proceeded, by way of Jalo, to Siwa.—Ebroa.



BEFRIENDING A ROBIN THAT HAD FALLEN EXHAUSTED ON ITS WAY FROM EQUATORIAL AFRICA TO EUROPE TO SPEND THE SUMMER

The walking stick, with a brass ferule and an ivory knob, was mistaken by some of the blacks for a gun. In his right hand the author is holding a glass of water from which the bird has just drunk (see text, page 247).



THE CARAVAN APPROACHING ARKENU EARLY IN THE MORNING

Sunlight piercing a gap in the mountain wall throws a white streak across the sands resembling water.

exceptional value to my country, for they would provide a possible new route of desert travel from Egypt into regions of the Libyan Desert which are still unexplored.

THE START FOR THE UNKNOWN

Having decided upon this new objective, I encountered great difficulty in persuading the man from whom I had hired the camels to let me have my way. The hostile faction at Kufra, however, was anxious to have us take this route because the last caravan of Bedouins to make the journey, eight years previously, had been massacred when just within the boundary of Darfur. If the same fate should overtake us, as seemed to these inimical ones altogether likely, the dwellers in Kufra would be spared the pleasure of a third visit from their unwelcome guest!

After leaving Kufra, the chief adventure of the expedition began. Here at last I was plunging into the untraversed and the unknown.

What lay ahead?

It was not the possible dangers of the

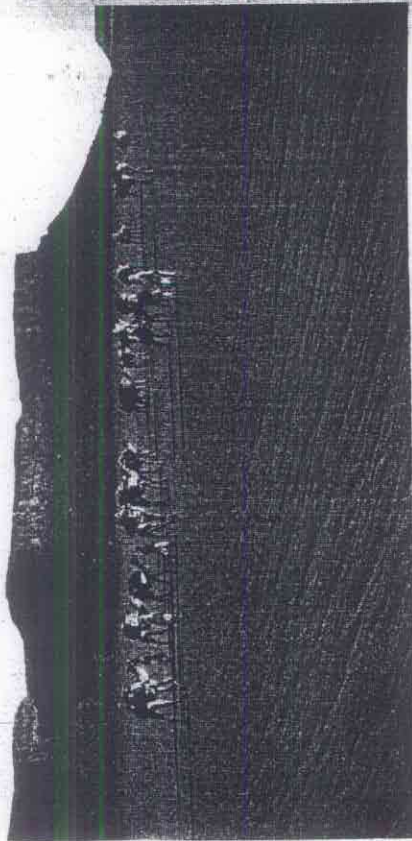
journey which made my nerves tingle and caused my spirits to mount with exhilaration—dangers are merely a part of the day's work in the desert. It was the realization that I was to explore hidden places; that I should go through a region hitherto untraversed by one of my own kind, and make, perhaps, some contribution, small though it might be, to the sum of human knowledge.

Sayed el Abed sent three representatives to see us off at 4:30 in the afternoon of April 18. Our caravan was still making daylight tracks, though the unbearable heat of early summer was soon to end these.

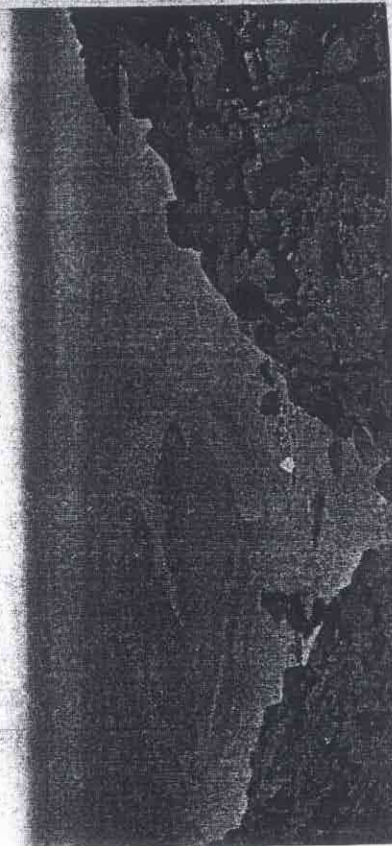
THE BOND BETWEEN CAMEL-DRIVER AND CAMEL

The camel-driver on march is an interesting subject of study. There is between him and his beast of burden a bond of affection hardly less strong than that which exists between the Arab horseman and his steed. The camel is the essential of life in the sands. Travel and trade are dependent upon him.

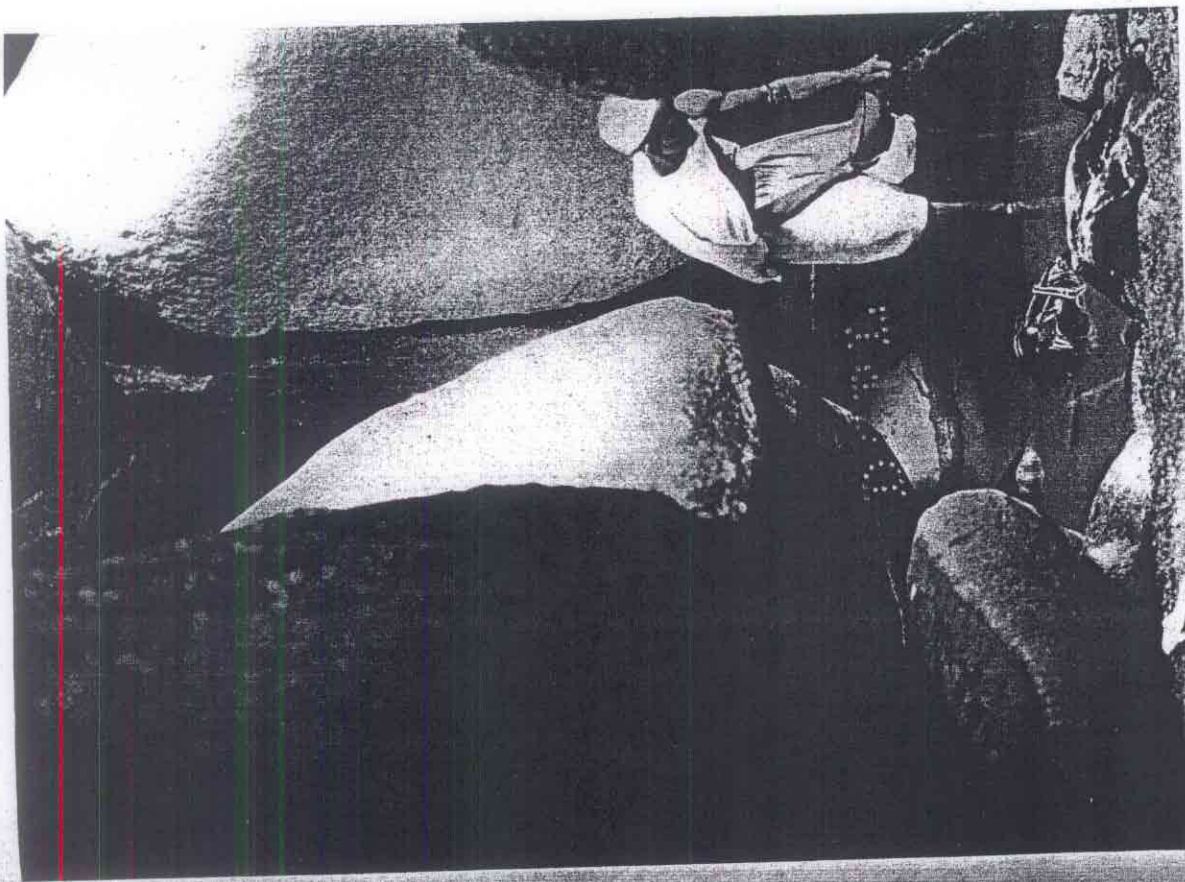
On march the camel goes best when his driver sings. These songs, or chants,



APPROACHING THE HILLS OF OUEENAT
Ouenat was found to be an oasis with 150 part-of-the-year inhabitants (see text, page 275).

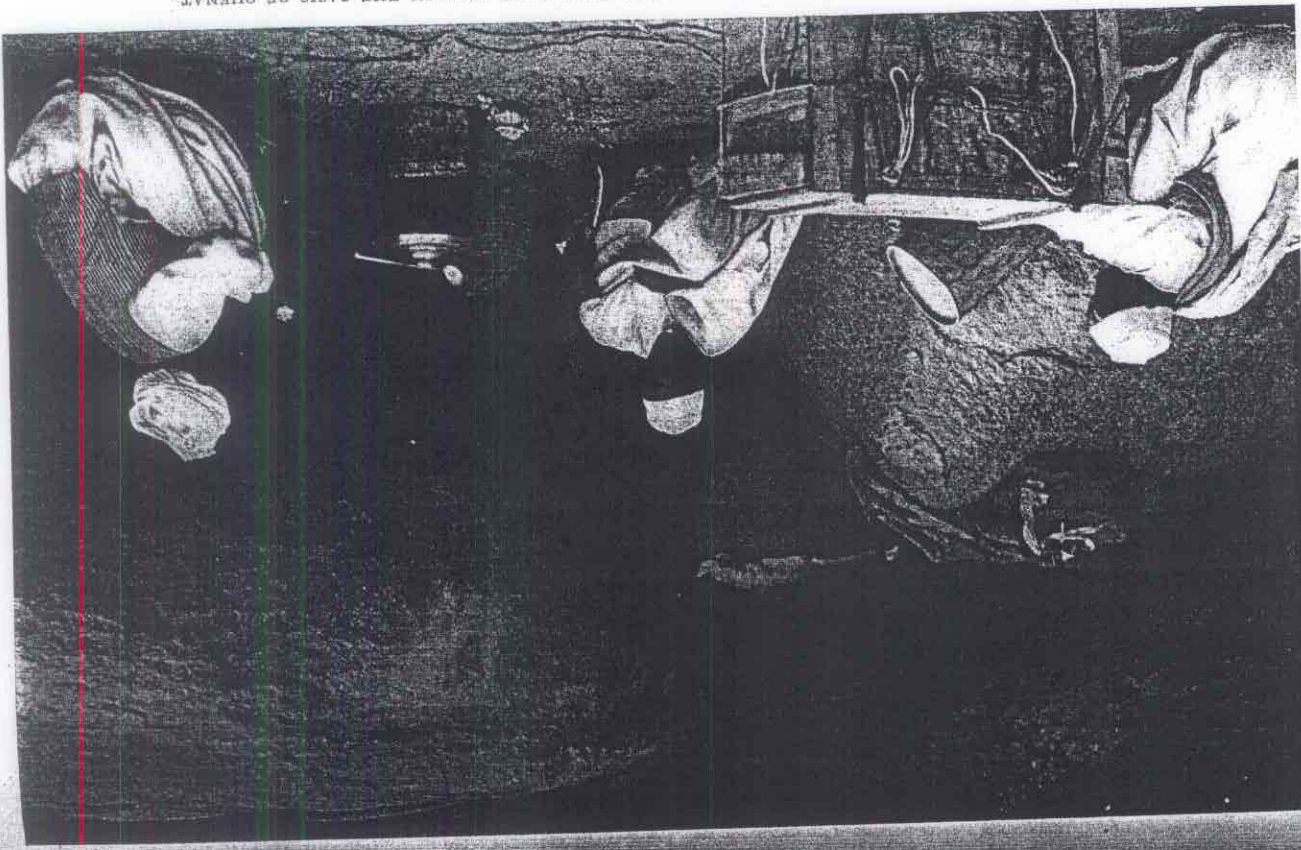


THE DESERT AS SEEN FROM THE HILLS OF OUEENAT
The white spot is the author's tent, which was not often set up, as it was very difficult to raise (see text, page 245).



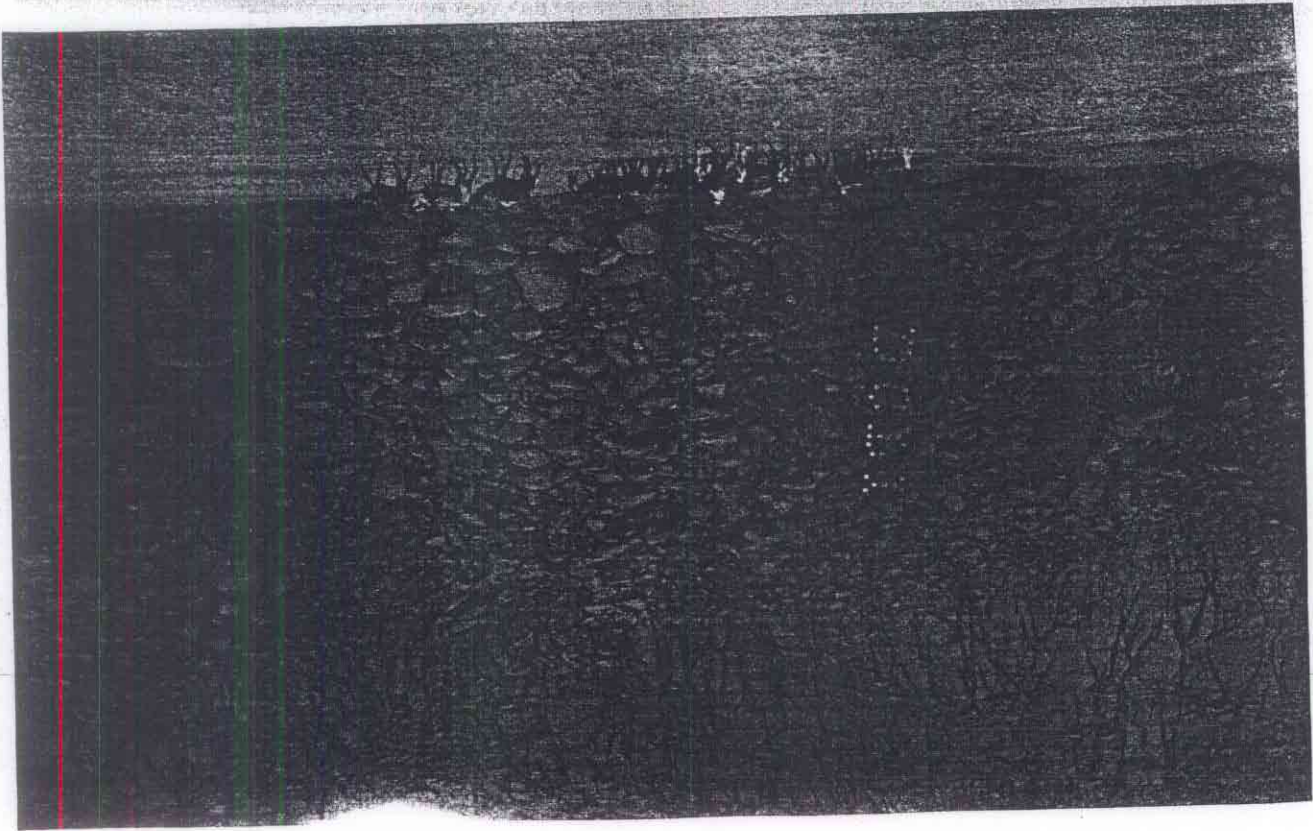
ONE OF THE WELLS AT OUEENAT

There are two types of wells known to the desert—the *ain*, which is a natural spring, and the *bir*, whose existence is usually indicated to the traveler by damp sand, where he may dig and find water. These natural basins of Ouenat, which contain rain water, are not, strictly speaking, of either type, but they are called *ains*.



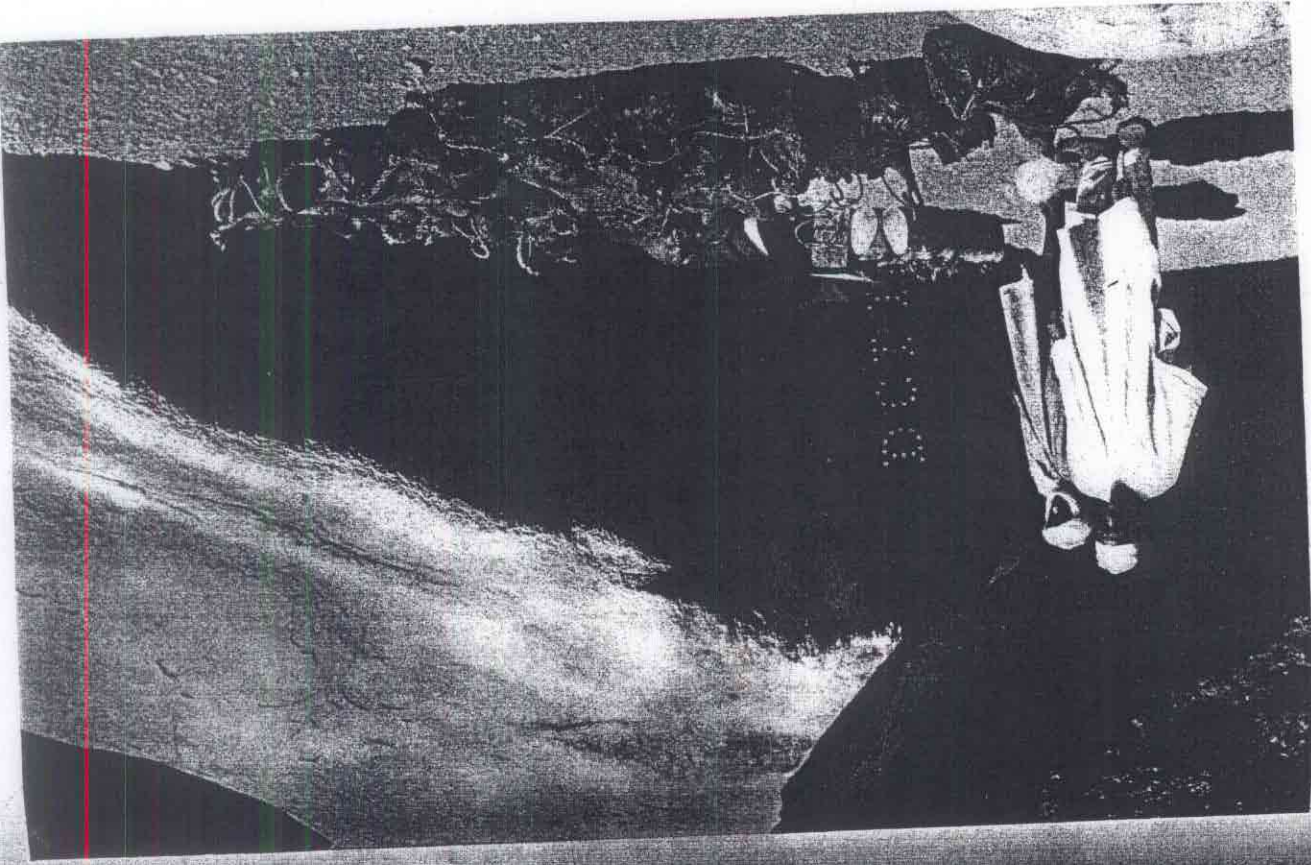
A CAVE UTILIZED AS A KITCHEN FOR THE CARAVAN DURING ITS STAY IN THE OASIS OF OURNAT.
Beneath the shadow of these rocks the members of the caravan found some relief from the blistering heat of the outside world.

THE CARAVAN APPROACHING THE OASIS OF OURNAT
The enormous boulders of the precipitous cliff have been worn smooth by the sand-blast of the desert (see text, page 275).



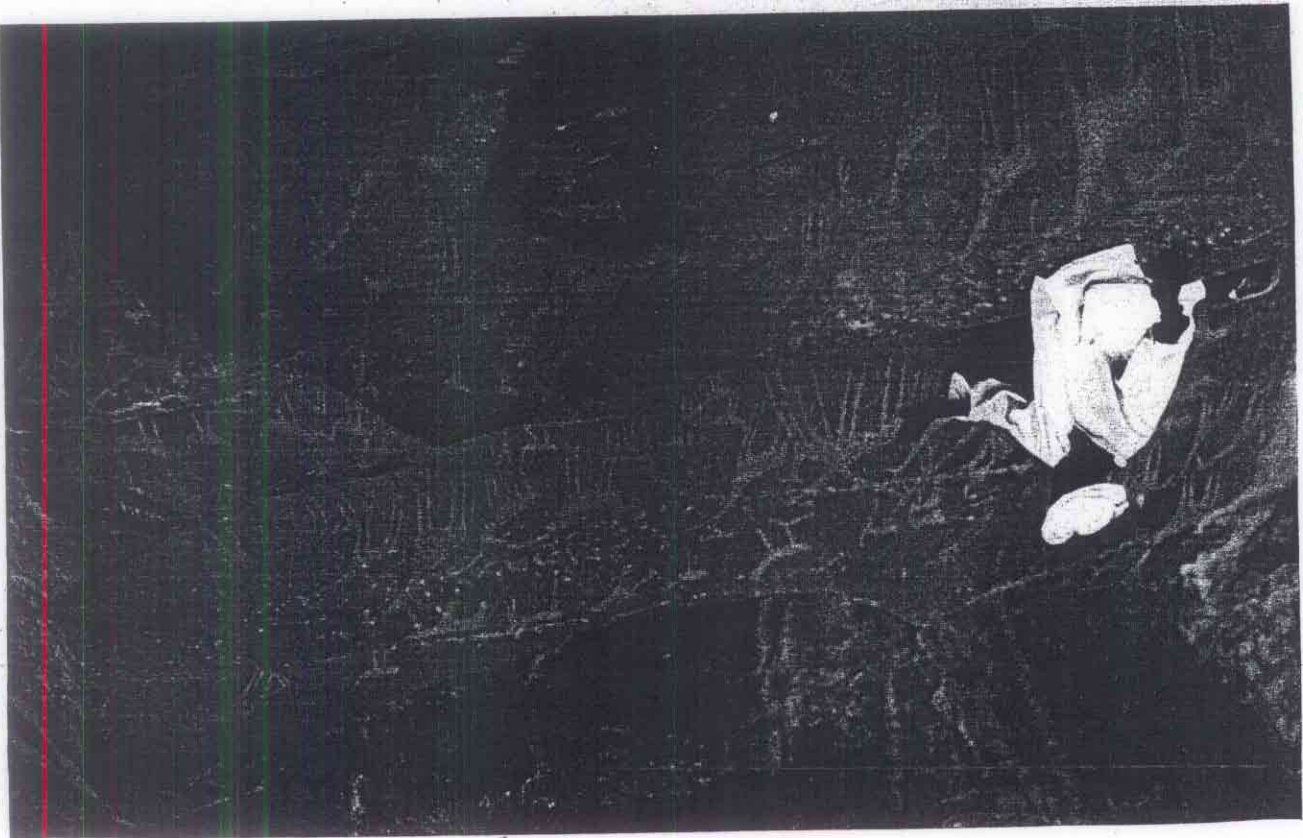
THE WATER SUPPLY FOR THE CARAVAN

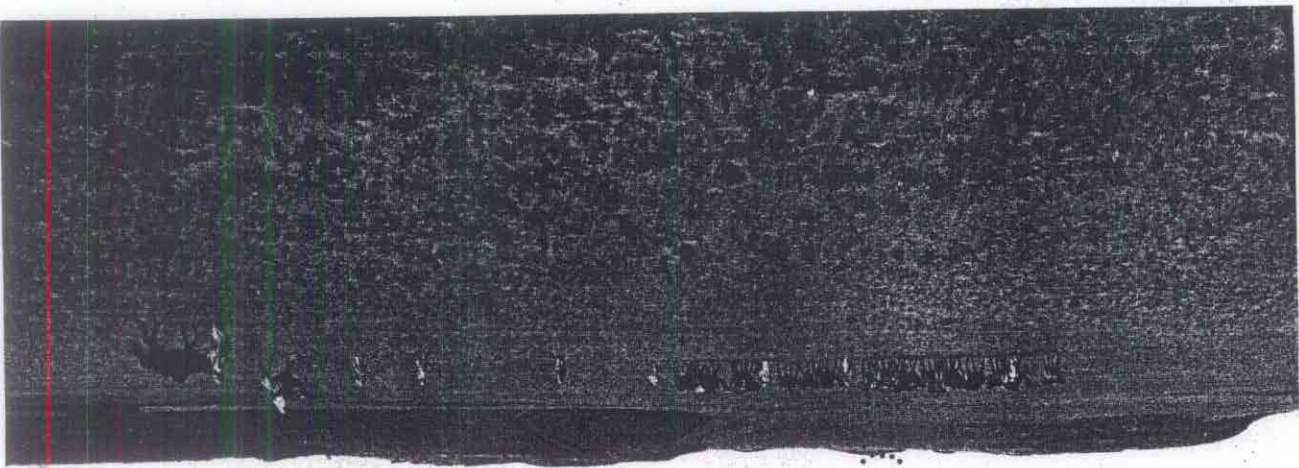
An average water-load for a camel on march is four sheepskins, each containing six gallons.



THE MYSTERIOUS ROCK CARVINGS AT OUNAT

Hidden in the heart of this hitherto-unknown oasis are these strange pictographs. Who carved them and when are questions yet to be answered by science, but there are indications that they may antedate the Christian era (see text, page 270).

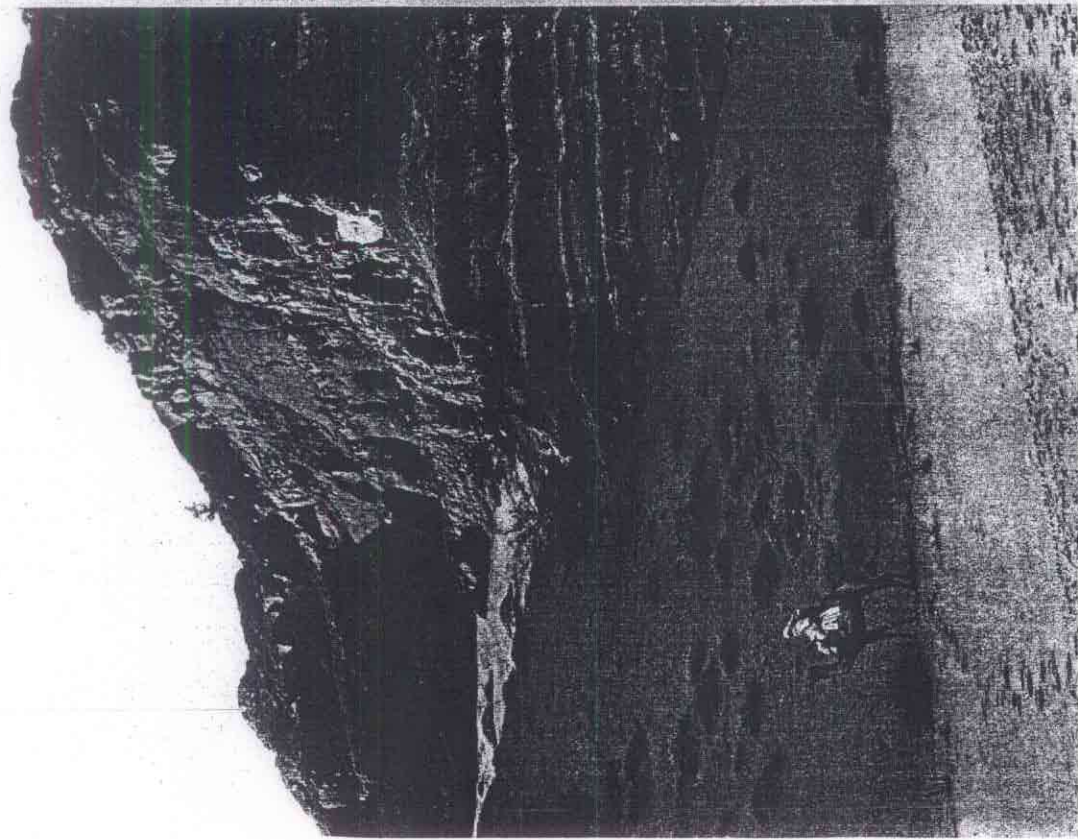




THE CARAVAN APPROACHING ERDI: THE COUNTRY CHANGING FROM ARID DESERT TO A PLATEAU COVERED WITH GRASS. This was the most interesting change encountered in the Libyan Desert. It marks the line between the waterless waste and country with sufficient grass for pasturage. Had the expedition not come across this grass, the entire caravan would have been lost.

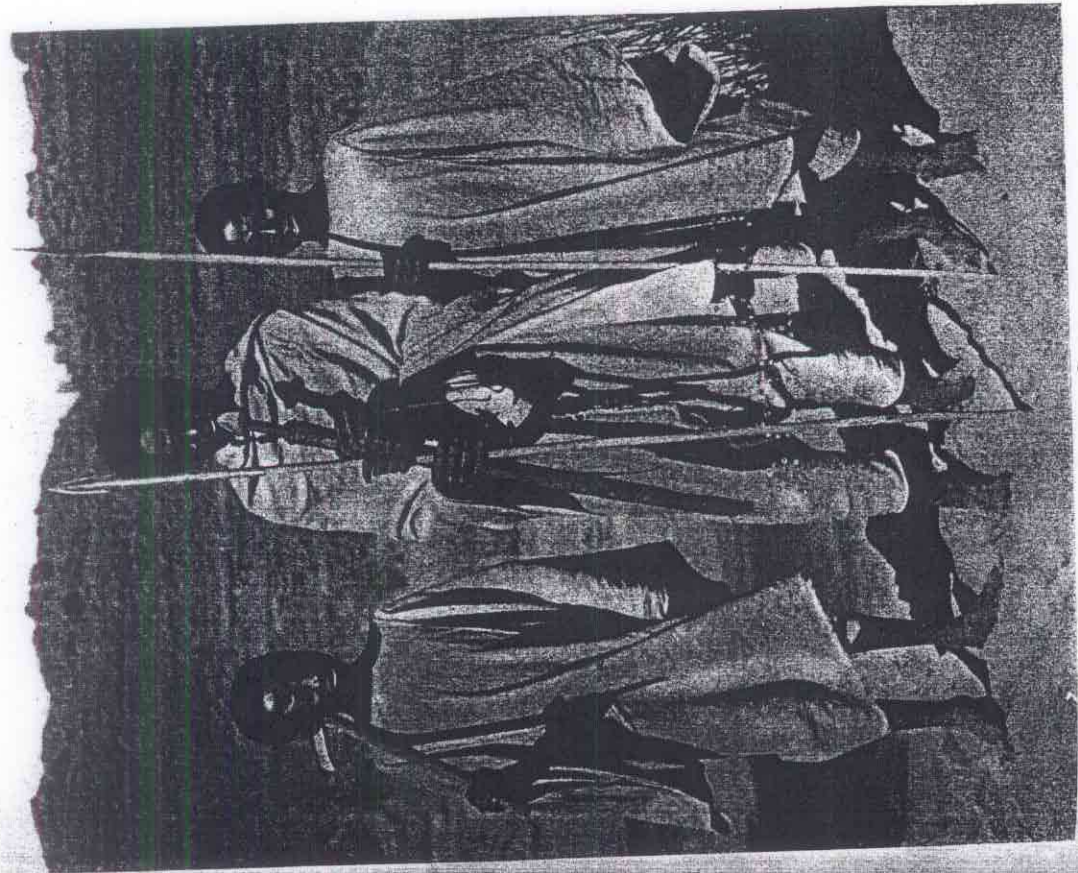


CAMPING IN THE VALLEY OF ERDI AFTER AN 11-DAY TREK FROM THE OASIS OF OUNAT. The sheer walls inclosing this oasis are of red rock, and the sands of the floor are likewise red. Note the author's horse, Baraka, in the shade of the trees at the right.



THROUGH THE VALLEY OF ERDI

While there remained many miles of travel for the expedition after reaching this valley, the long, waterless desert treks were at an end. The march to El Obeid was by easy stages, through fertile country, from village to village (see map, page 236).

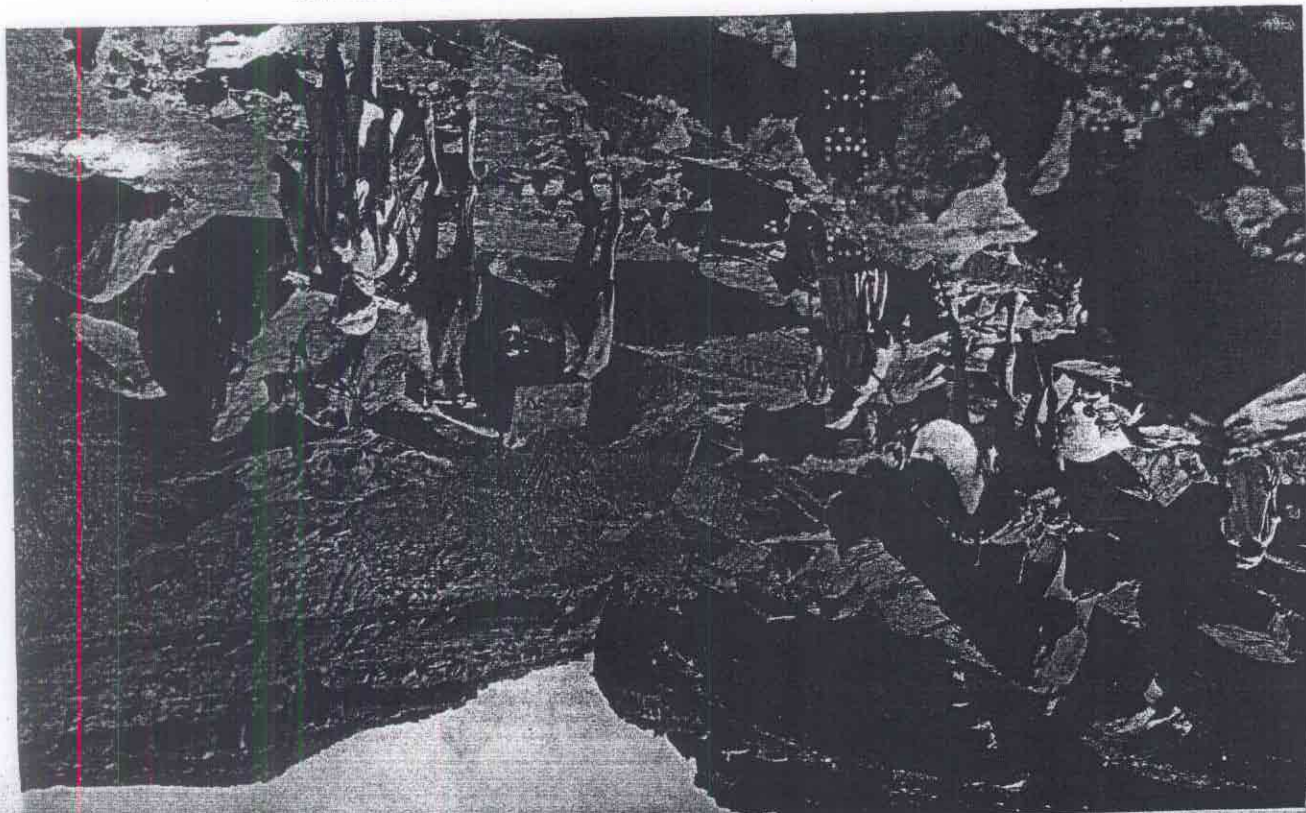


SONS OF GORAN CHIEFS AT AGAH, BEYOND ERDI

One of the kindest and most hospitable natives encountered by Hassanein Bey south of Kufra was a chief of this tribe residing in the Oasis of Ouenat. He was known as Sheikh Herri, King of Ouenat.

This is the worst type of country imaginable for both beasts and men, as the sharp stones cut the padded feet of the camels as well as the thin-soled shoes of the men. Travel by night over such land is practically impossible.

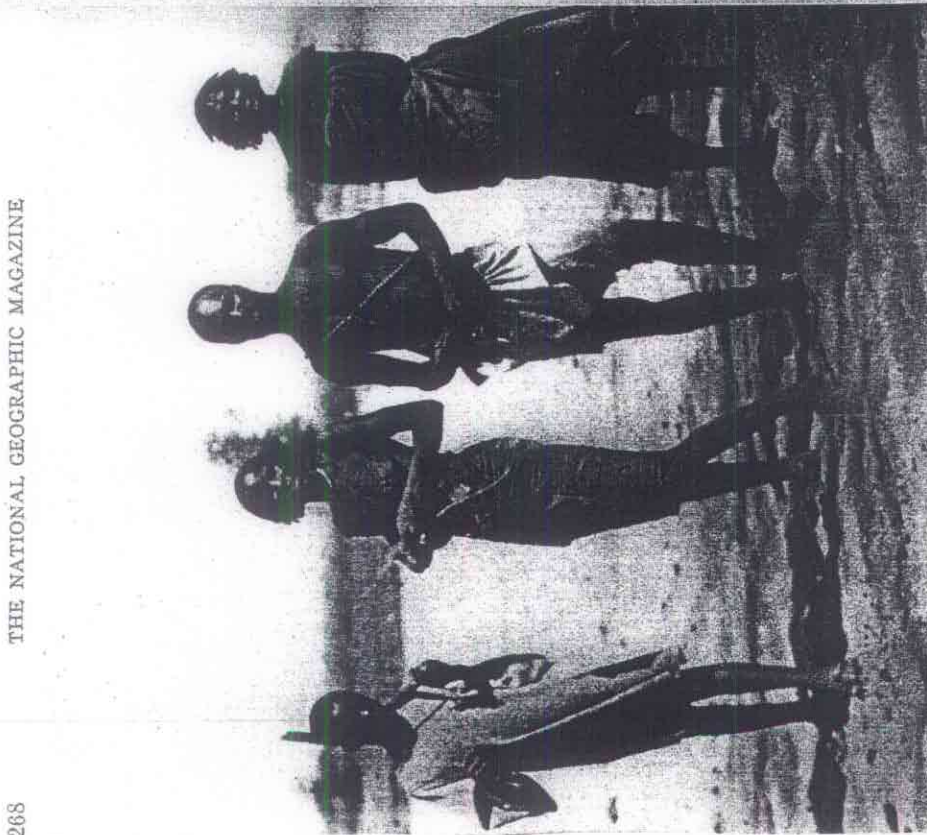
DIFFICULT COUNTRY THROUGH WHICH THE CARAVAN PASSED BEYOND ERDI



The checkerboard is made by pressing holes in the sand with the fingers. Black and white stones are used for the "men."

THE MEN OF THE CARAVAN PLAYING DRAUGHTS ON THE SAND





A BIDJAT FAMILY

From right to left, the mother-in-law, the husband, the wife, and the son.

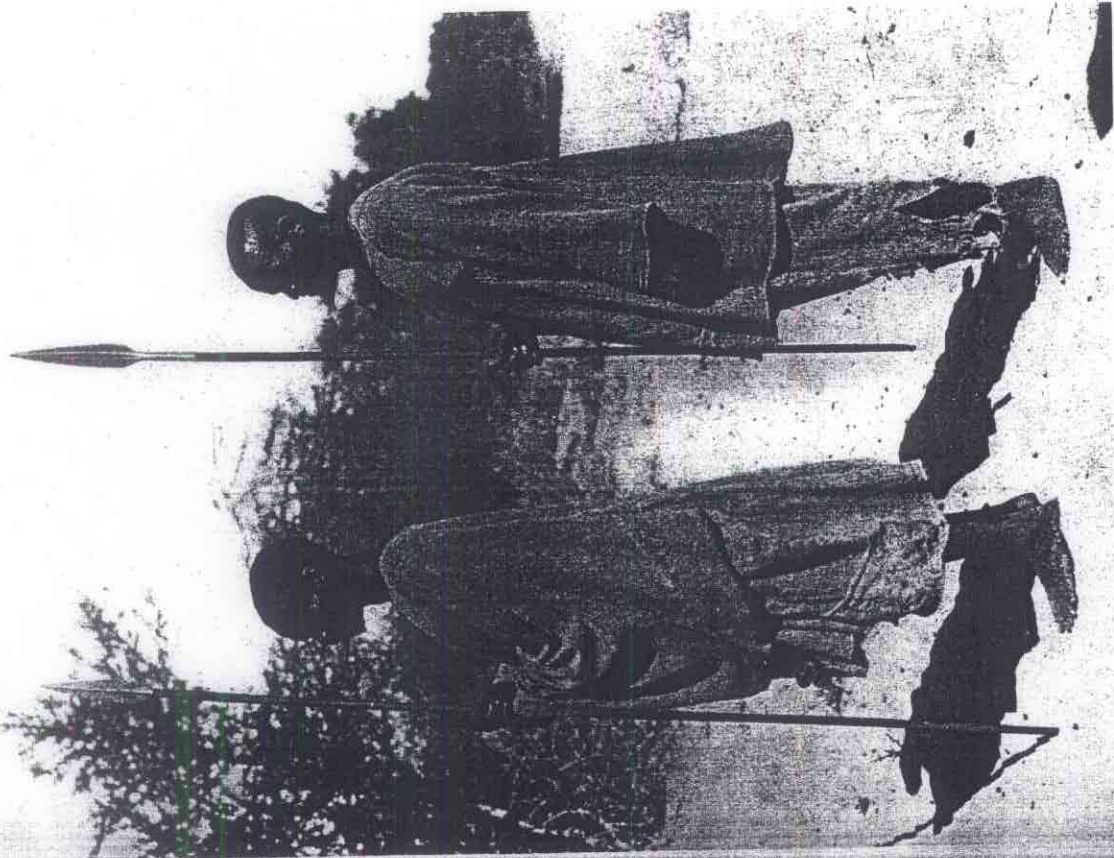
almost invariably concern the virtues of the ungainly but intrepid beast. His praises are sounded in most extravagant terms, and the animal seems to like it. The camel-driver knows his charge so well that he is able instantly to identify the beast by its footprints in the sands; and not only is he able to do this, but also to identify the son of that camel; in other words, it would seem that each camel family has its own footprint peculiarities.

The average animal will carry a burden of from 250 to 300 pounds, but it is the duty of the astute explorer to super-

vise the loading at the beginning of each march, seeing always that the camel which carried a heavy load yesterday is given a light burden to-day.

Where supplies are plentiful, the animals are given grass and barley, but in desert trekking, when these are not obtainable, they are fed twice a day on dried dates, a meal consisting of as much fruit as can be gathered together twice in two hands. The animals are serviceable up to 23 or 25 years of age and are valued at from \$50 to \$100.

It is recorded that, when water supplies have been exhausted, caravan lead-



TWO BIDJAT MEN

"The southern portion of the Libyan Desert is inhabited by tribes of blacks—Tebu, Goran, and Bidjat—who are rather more refined in features than the central African negroes." (see text, page 234).

of a caravan and not merely a beast of burden.

GRUELING MARCHES UNDER TEMPERATURE EXTREMES

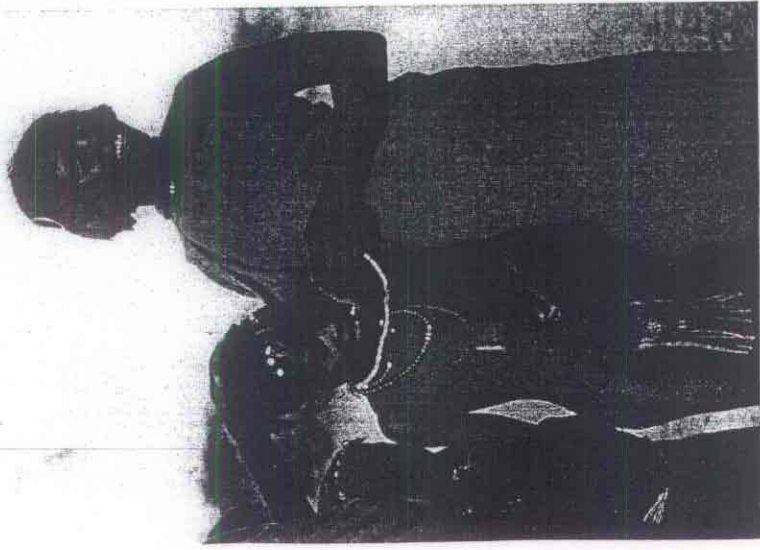
From the standpoint of temperature, the march south from Kufra was the worst stretch of the entire journey, for it was too hot for travel in the middle of the day and too cold at night. We finally found it necessary to break the trek into two parts, starting long before dawn (2 and 2:30 o'clock) and continuing until 9; then resting until 3:45 or 4 in the afternoon and trekking until 8:30 in the evening. For eight days we had only four hours of comfortable sleep in 24.

Finally, one morning just before dawn, after laboring wearily over a series of steep sand dunes, suddenly there loomed up in the distance a range of mountains resembling hoary medieval castles, half hidden in the mist. A few moments later the sun peered above the horizon and flooded these distant gray walls with warm rose and pink (see page 255).

I allowed the caravan to go on without me, and for half an hour I remained seated upon a dune gazing at those hitherto-legendary mountains. For whatever sacrifices I had made and hardships I had endured, there was full compensation in those few moments, as I realized that I had found what I came to seek. Behind those hills lay the valleys of the first of the two lost oases—Arkenu.

The Arkenu range is a series of conical masses rising abruptly from the floor of the desert and sheltering a fertile valley (see page 255).

The oasis has no permanent village, nor is it inhabited throughout the year, but black Bedouins, Tebus, and members of the Goran tribe take camels there during the grazing season. Sometimes, after



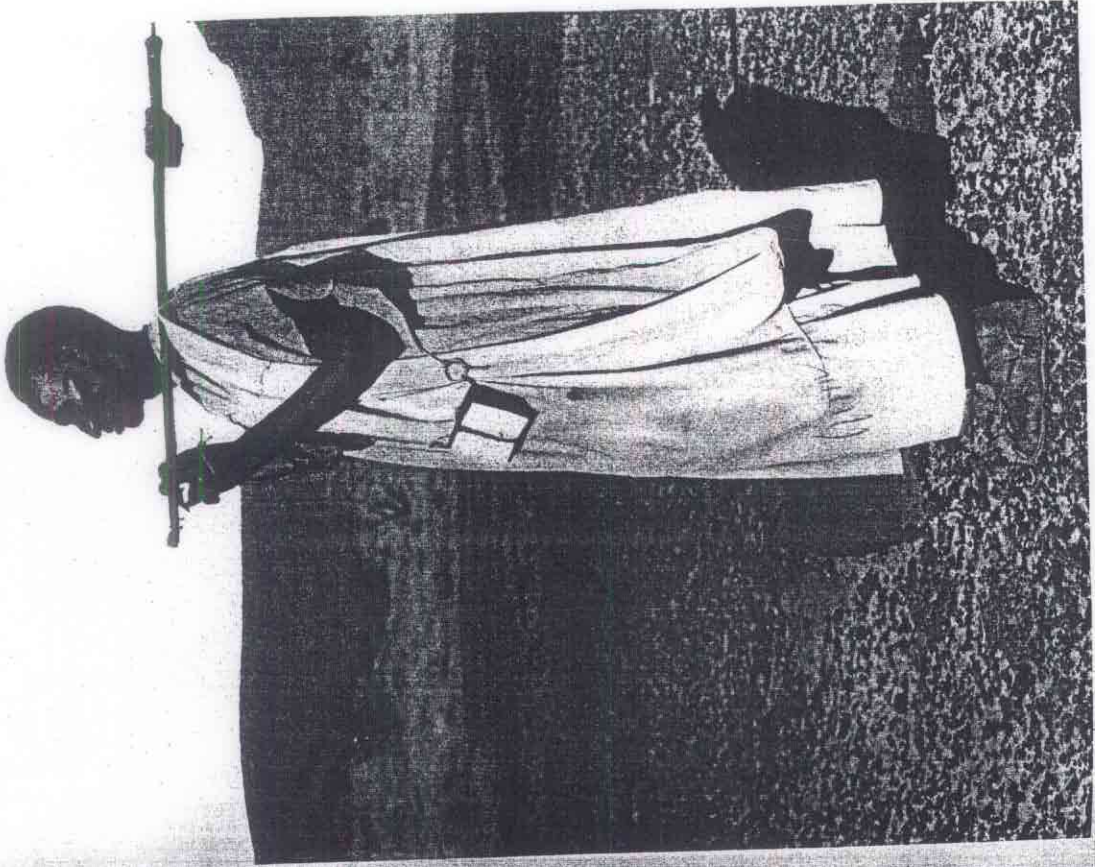
A BIDIAT GIRL WITH HER SISTER

The child is wearing a macaroni necklace. The author gave the natives macaroni to eat, but they quickly converted it into "jewelry."

ers have slain their weaker camels and the drivers have then extracted all the moisture possible from the stomachs of the animals. In the final extremity, the frothy pink blood has, in some instances, been drunk; but this practice inevitably means the end, for such a draught is comparable to the drinking of sea water by shipwrecked persons.

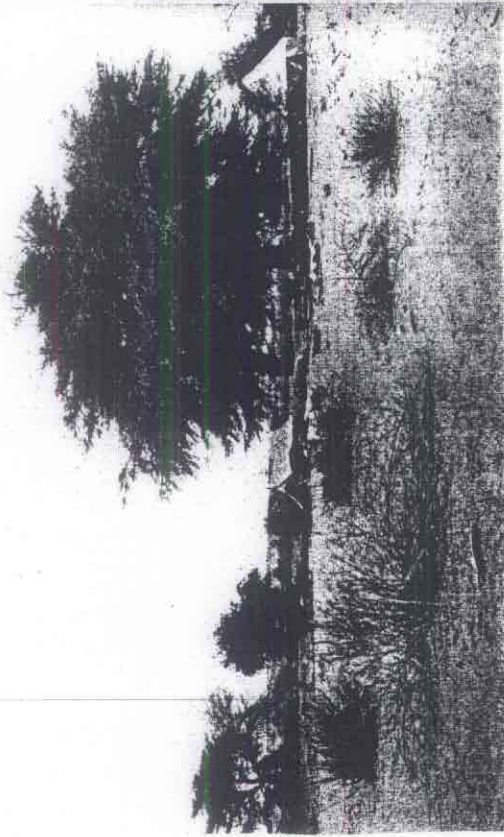
In winter, in case of necessity, a camel in good condition can go for 15 days without water; in summer, from 10 to 12 days is the limit.

If an animal becomes completely exhausted on a trek, it must be killed. This is one of the saddest experiences of the desert, for a camel is really a member



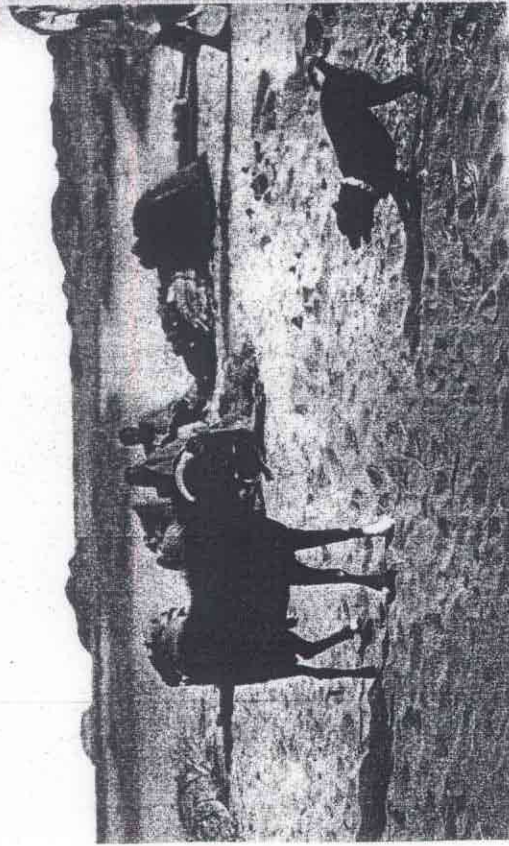
A BIDIAT CHIEF

His sword, over his shoulder, is carried ordinarily on the left arm, with his wrist through the thong.



APPROACHING THE SUDAN

The camp at Bao, on the frontier between the French Sudan and the Anglo-Egyptian Sudan.



BIDO HAS AN ARGUMENT WITH A GIFT GOAT

A friendly chief had presented the goat to the caravan as a symbol of hospitality.

driving their herds into the valley, the owners close the narrow entrance with rocks and leave the animals for three months, at the end of which time they are in wonderful condition.

The mountain chain of Arkenu runs for something less than 10 miles from north to south and perhaps 12½ miles from east to west, but I had no opportunity to explore it fully in the latter direction.

The principal interest in this oasis lies in the possibility it affords for exploring the southwest corner of Egypt, which up to the present has not been penetrated either by military parties or by travelers. No one had known up to this time of the existence of a dependable water supply in this part of the desert.

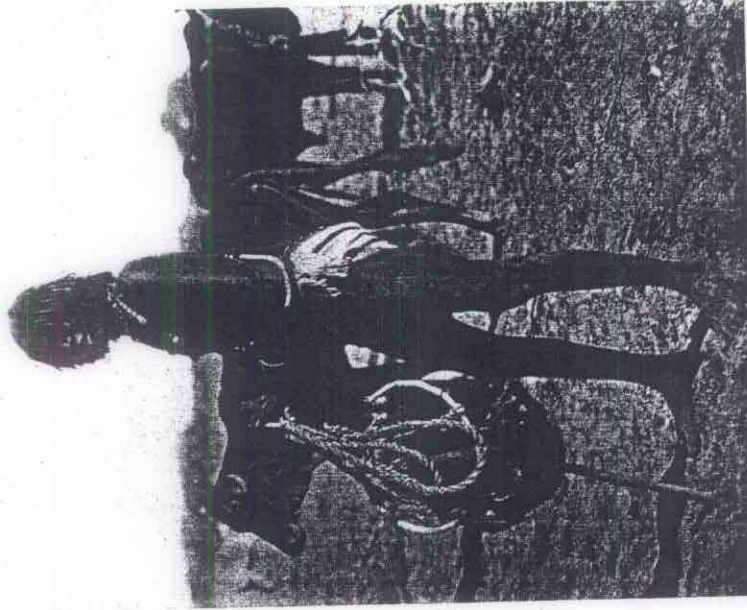
Arkenu may conceivably have strategic value at some future date, for it stands at the meeting point of the western and southern boundaries of Egypt (see map, page 236).

BEGINNING THE ALL-NIGHT TREKS

With one-half of our objective achieved, I set forth in high spirits on the short journey to Ouenat.

It was now the end of April, and since it had grown intensely hot, I decided to leave Arkenu at 9:30 in the evening, thus inaugurating our first all-night trek.

There is a tremendous advantage in night traveling, for one never fails to march less than 12 hours and frequently the time stretches to 13 and even 14, our longest continuous trek being for 14½



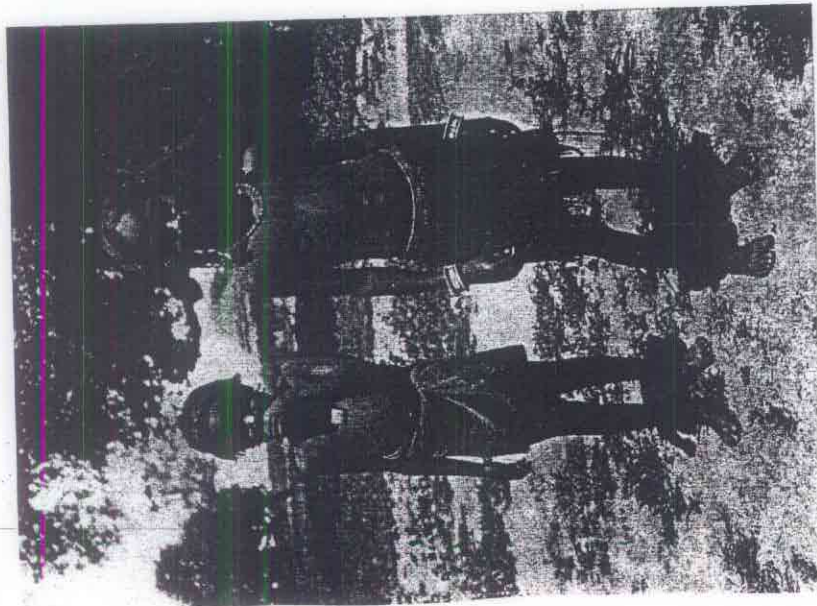
A SUDAN GIRL WITH A HIDE BUCKET

She is wearing a handsome amber necklace, which she refused to sell, even though the author offered gold for it. Amber ornaments are supposed to have found their way into the Sudan from Germany.

hours (between Ouenat and Erdi), covering a distance of a little more than 40 miles.

The reason for the longer period of travel at night is that, once a caravan gets under way after the intense heat of the day is over—that is to say, between 4 and 6 o'clock in the afternoon—the advance continues without respite until sunrise.

From 10 to 1 o'clock at night is the most trying period of desert travel. It is then that the vitality of both men and animals seems to be at lowest ebb, and there have been times between these hours when I have felt that nothing



GIRLS OF THE FOR TRIBE NEAR EL FASHER

They are wearing ivory and silver bracelets.

would be quite so welcome as death, with its accompanying eternal sleep.

It becomes almost impossible to drag one foot after the other, and only through the exercise of most rigid watchfulness can sleep be fought off as fatigue increases.

But if night marches have their advantages, they also have their disadvantages, such as difficult, rocky ground—bad going for the feet of men and camels—and when there is no moon, danger of missing one's way in crossing sand dunes, for the guiding star may be lost.

But with the first break of dawn and the appearance of light in the east, the desert traveler seems to take a miraculous

new lease on life. It is as if he had been suddenly rejuvenated. Miles seem fairly to reel from beneath his feet, and there comes a jubilation of spirit which is indescribable.

After this rebirth of energy, no desert traveler would consent to halt. He is spurred on by an irresistible force, and this urge continues until the sun has appeared above the horizon, giving warning that the time of heat and suffering has arrived.

It is now that camp must be quickly made, tents raised, food cooked and eaten; then a quick drop into the oblivion of sleep, which can last at most only for three or four hours. After that the heat becomes so intense that there is no opportunity for real relaxation and comfort. It often happened that within 15 or 20 minutes from the time that halt was called in the morning our entire camp would be slumbering.

BEDOUIN GUIDE TAKES BEARINGS BY STARS AND SHADOW

The manner in which a Bedouin guide finds his way across the desert at night is a source of wonder to the uninitiated. In a region which provides no familiar landmarks, he depends solely upon the stars. As we were proceeding in a southwesterly direction during most of our night trekking, the polestar was at the guide's back. He would glance over his shoulder, face so that the polestar would be behind his right ear, then take a sight on a star to the south in that line. He would march for perhaps five minutes with his

eye riveted on this star, then turn and make a new observation of the polestar; for, of course, the star to the south was constantly progressing westward. He would then select a new star for guidance and continue.

One of the possibilities of losing one's way in the desert, even when accompanied by a capable guide, may be due to the fact that, after a long series of treks, when days are so hot as to provide insufficient rest for the party, the guide may doze as he walks and thus keep his eye fixed too long on the same star. His bearing in this way shifts westward, out of the true line of march.

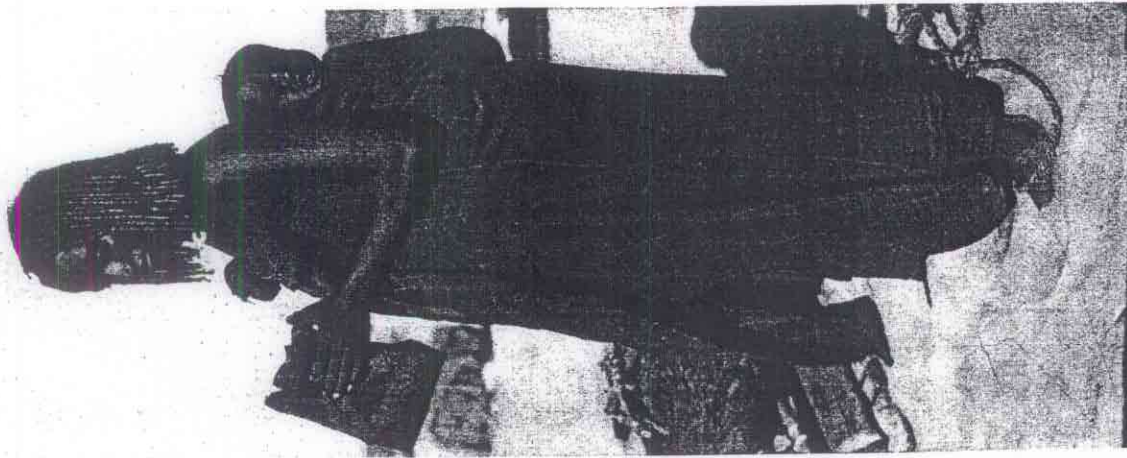
Knowing the method by which the Bedouin keeps his direction, one is not surprised that, between sundown and the appearance of the stars, he is completely lost and is a helpless figure in the desert. At that hour of the evening, and also in the early morning, when the stars had disappeared but the sun had not risen, it was necessary for me to take the lead, following my compass bearings.

OUEMAT IS SIGHTED

At 6 o'clock on the morning after our first all-night trek, we came to the northwest corner of the Ouenat Mountains and an hour later had made camp under their rocky walls.

The range in that vicinity rose in a sheer cliff from the desert floor. Heaped against it were masses of boulders (see illustration, page 258), which through the ages had been worn smooth by the grinding, polishing action of wind and sand. It was as if here were piled the arsenals of Stone-Age giants whose weapons had been Gargantuan slings.

We found ample supplies of water in the deep-shaded recesses of the cliffs. Both Arkenu and Ouenat differ from all the other oases of this part of Egypt, in that they are not depressions in the desert with underground reservoirs, but mountain areas, where rain water collects in natural basins in the rocks. There are said to be seven such basins at



A BIDIAT MOTHER AND HER BABY

Her style of coiffure is almost identical with that of the Tebu girl of Siwa (see page 250). Note the nose bead. Her hair was plaited when she was young and has been oiled from time to time, but never combed out.

Ouenat. I visited four and found the water of each cool and of good quality.

MYSTERIOUS ROCK CARVINGS

It was in Ouenat that I made the most interesting find of my 2,200-mile journey. I had heard rumors of the existence of certain pictographs on rocks, so shortly before 8 o'clock on the evening of our arrival I set out to find them. With a small contingent of my caravan I traveled all night and until the next morning at 10 o'clock, stopping only for prayers. After breakfasting on rice, with the inevitable Bedouin tea, we slept until 4 in the afternoon. Upon waking, I was led by a native to the picture rocks (see illustration, page 260).

The animals are rudely drawn, but not unskillfully carved. There are lions, giraffes, ostriches, and all kinds of gazelles, but *no camels*. The carvings are from a half to a quarter of an inch deep and the edges of the lines in some instances are considerably weathered.

"Who made these?" I asked Malkenni, the Tebu.

He expressed the belief that they were the work of the *jinn*. "For," he added, "what man can do these things now?"

What man among the present inhabitants, indeed!

Here is a puzzle which must be left to the research of archeologists. Suffice it to say that there are no giraffes in this part of Africa now, nor do they live in any similar desert country anywhere.

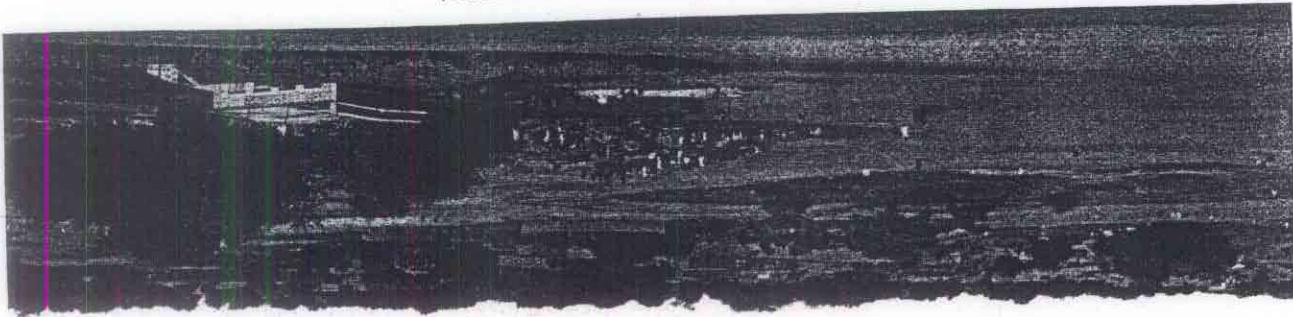
Perhaps even more significant is the absence of camels from the drawings. If they had been native to the region at the time that the carvings were made, surely this most important beast of the desert would have been pictured. But the camel came to Africa from Asia not later than 500 B. C.

Can these carvings antedate that event? Or has the character of this country undergone such astonishing modification as to have converted into desert a fertile region in which the giraffe roamed and the camel was not a familiar burden-bearer?

With the inspection of these rock carvings, my hasty exploration of Ouenat was concluded.

(For an account of Dairfur, see "Adventures in Eastern Dairfur," by Major Edward Keith-Roach, in *The Geographic* for January, 1924.)

EL FASHER, CAPITAL OF DAIRFUR PROVINCE



It was now my chief concern to get safely back to civilization with the scientific data which I had collected, including the verification and the location of these two hitherto-mythical oases.

LAST STAGES OF THE JOURNEY

The march from Ouenat to Erdi, on the French Equatorial Africa frontier, was one of the most difficult experiences of the entire six months of travel. It required long treks over very difficult rocky country.

The caravan was now piloted by an old man of the Goran tribe. He was nearly 65 years of age, was lame, and had not been over that portion of the desert for seven years; but he would trek 12 hours or more each night, and in the morning would still have the most benign expression imaginable.

He was a wonderful son of the desert, and without his help I do not think I could have completed the last leg of the journey. Yet on more than one occasion even he faltered and his "God knows best" (see page 249) was said with qualifying uncertainty.

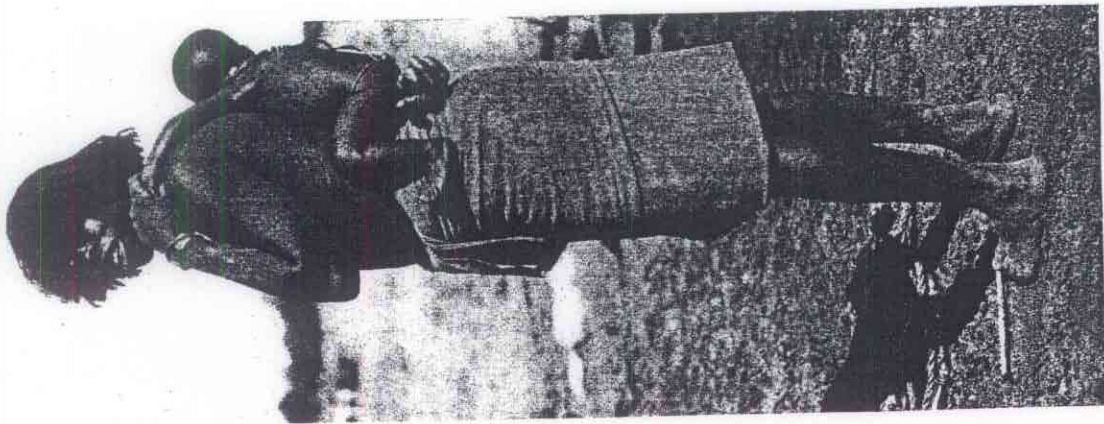
Some of our camels dropped by the wayside and had to be destroyed, while my men were constantly falling out of line to catch a half hour's sleep, then rejoining the caravan at accelerated pace.

Our water ran low and there was more than one night when I thought that the desert would reclaim its secret of the hidden oases by blotting out our little party and swallowing us in the sands.

Happily, we came through, and on the morning of the eleventh day we descended into the valley of Erdi, with its trees, its welcome grass, and its water.

We had still far to go to get in touch with civilization again, but the treks between wells and villages were comparatively short and devoid of unusual hardships, while the natives were no longer unfriendly.

Our receptions at El Fasher and at El Obeid were such as to gladden the heart of him who has wandered into far places and has returned home with the objectives of his journey luckily accomplished.



AN UNCOMFORTABLE PERCH FOR THE INFANT

The mother is a Zaghawa girl whose features are much coarser than those of her desert sister, the Bidiat woman shown on page 275.