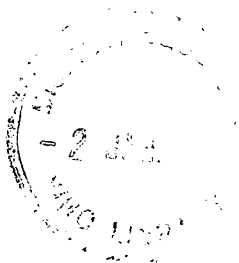


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GEOGRAPHICAL RECONNAISSANCE FOR THE MALARIA ERADICATION
PILOT PROJECT IN NORTH CAMEROUN

by

Dr Ph. Cavalié, Malariologist,
World Health Organization, Regional Office for Africa

Definition

Geographical reconnaissance, an essential part of the preparatory phase of a malaria eradication campaign, is a field operation which is best preceded and followed by studies and calculations. Its aim is to determine: the number of inhabitants; the accessibility, location, number and type of their dwellings, as well as any additional information and data which the programme may require concerning localities, presence of water, habits and customs of the population . . . This work culminates in the production of simple outline maps which are durable, cheaply reproduced and suitable for use by all personnel at all stages of the campaign. It is essential to keep these maps constantly up to date. Information collected in the course of the ethnographic survey may bring special problems to light. (AMRO-134)

These are the principles we tried to apply in carrying out the geographical reconnaissance for the North Cameroun pilot project.¹

¹ In order to cope with the unusual conditions encountered in the Cameroun-6 pilot project area, a good team trained by a team head with sound practical judgement tried out a rapid mapping technique . . . However, attention should be drawn to the fact that the method used cannot be regarded as an established one and it can therefore not be used routinely . . .

This technique is based upon the same principles as those stressed in Doc. AFRO/Op.1, whose aim is to make use as far as possible of scale maps and adapt the scale of the working maps to the population density in the different areas of the project. Fortunately, the advantages of pantographic and photographic reduction of existing topographic maps to the desired scale were realized and skilfully applied.

It seems that the degree of perfection required for a malaria eradication campaign cannot be achieved with a cartographic method in which the houses are not numbered, even when terrain conditions are so extraordinary that it is possible, in the dry season, to count houses at a great distance using binoculars, . . . Obviously, the numbering of the houses covered by the malaria eradication operations is the only way to check whether they have all been treated and also makes it possible to locate and follow up parasite carriers. When the village is a compact one and the houses close together, as in the case of the Cameroun project, simple sketch maps of villages furnish additional aid but, if numbering has been carried out systematically, they may be dispensed with. (Editor's note)

1. DESCRIPTION OF THE PROJECT AREA

The project area is situated in the north of the Republic of Cameroun, between 10 and 11° N. latitude and 14 and 15° E. longitude and lies entirely in the Department of Diamaré. The area covers 7500 km² and has a population of some 240 000.

1.1 Physical geography

The region is a huge quaternary alluvial plain, sloping imperceptibly towards Lake Chad in the north. In the north-west quarter there are chaotic masses of metamorphic rock, the first foothills of the Mandara range, which relieve the monotonous flatness of the terrain as a whole.

The climate is tropical; from November to May, there is a completely dry season; from June to October, a rainy season, during which the rainfall is less than 900 mm (maximum in August: 250 mm). The average temperature varies from 20°C in January to 32°C in April. During the last 20 years, the following extremes of temperature were recorded: maximum 46°C, minimum 12°C. The relative humidity shows daily minima which fall below 10 per cent. in the dry season, whereas in the rainy season maxima of around 95 per cent. occur.

As a result of its topography and sudden tornadoes, this area has a special hydrographic system: the "madje",¹ always temporary in this area, swell suddenly in periods of stormy rain, carry off everything in their path and become lost, in the literal sense of the word, in the "yaérés". These are huge grassy and swampy plains forming the basin moderating the floods of the Logone, a large tributary of the Chari, which itself flows into Lake Chad.

The monotony of the spiny, xerophilous vegetation characteristic of the Sahelo-Sudanese dry savannahs, is relieved by a few large trees along the "madje". The countryside, green from June to November, is burnt up, either naturally or artificially, for the rest of the year. The local crops are either food (millet, groundnuts, "fonio") or industrial ones (cotton).

¹ "Mayo", plural "madje", means in the Peuhl language, all types of water course.

1.2 Human geography

The area has a population of some 240 000. The average density is 30 inhabitants per km².

There are two ethnic groups, differing very greatly from one another:

(a) the Foulbés: Mohammedans of Hamitic (?) origin, populating the plain, which they conquered in the 19th century. They are farmers and shepherds and constitute the majority of the inhabitants of communities in the Maroua area;

(b) the Kirdis: animists of Sudanese origin, gradually turning towards Islam or Christianity. In the west are the Mofus and the Guizigas, and in the south, the Moundangs. Each race has its own dialect, customs and beliefs.

A small fraction of the population is nomadic, but during part of the year only, for in the dry season the shepherds follow their flocks and herds going to graze on the "yaérés" and live in temporary grass huts.

It should also be noted that most of the population sleep outside their huts in the hot period of the dry season (February to May), at least for part of the night. During the rest of the year, some of the villagers continue chatting for one or two hours at nightfall near their huts.

In this paper we shall term "hut" any separate roofed structure, serving as a permanent or temporary shelter for man or animals.

The "saré" constitutes the unit of family habitation and the basic social cell. It consists of a series of huts surrounded by a dried mud wall or a thorn barrier. It shelters the head of the family, his wives, children and livestock (horse, donkeys, goats . . . , but not the oxen which are penned outside the saré, except by the Moundangs).

The huts constituting the saré are of four main types:

(a) round huts with a wall of "banco" and a thatched roof, of the Foulbé type, representing about half the dwellings;

(b) round huts with a straw wall ("sekko") and a thatched roof, very widespread in the plain (particularly Pété and Moutouroua) and especially in the sandy areas;

(c) huts made of "banco" with a flat roof, of the Moundang type, which are few in number and found in the Kaélé region;

(d) round huts with a dry stone wall and thatched roof, of the Mofu type, found in the mountainous regions.

Livestock (bovines, about 250 000 head, sheep and goats) is very plentiful in all the project area. At the northern limits, there is an abundant wild mammalian fauna.

In comparison with the rest of Africa, the road system is fairly good. Travelling by cross-country type vehicles is easy from November to May but very difficult during the rest of the year because of the numerous "madje" which cut the tracks, and the swamps which form where there are layers of clay, making travel by car, and sometimes even on foot, impossible.

2. BASIC DOCUMENTS

From 1953 to 1959, the malaria control campaign carried on in the present project area did not include geographical reconnaissance. However, the documents made available to us showed that there were 0.95 inhabitants per hut and that the average surface area to be treated was 63 m² per hut.

Apart from this, there were only very small-scale diagrammatic maps, suitable for summing up the position as regards spraying, parasite rates, etc., but useless for field work.

2.1 Administrative documents

Every year the Administration draws up a very interesting report of activities, showing a remarkable concern for accuracy. The information given by this source is almost entirely of an economic and social nature.

The censuses carried out from village to village in each canton are very complete, but because of this they are long and difficult to establish and consequently few in number.

It was concluded from these documents and from contacts with administrative personnel, that the population figure was very variable and that the number of inhabitants could be reasonably estimated with an accuracy only of about five per cent.

2.2 Maps

The monochrome 1/100 000 map compiled by the French National Geographical Service in 1953 is, as far as we know, the basic map for the whole area. There is a 1/200 000 map drawn up in 1954 which is a simplified version of the preceding one; it is printed in colours and is thus easier to read.

While looking for geographical data in Maroua, we came across a series of 1/25 000 photographic enlargements of the 1/100 000 map which had been ordered by the Agricultural Service. We were also loaned 1/5000 aerial photographs of the large villages, as well as the original of a plan of the town of Maroua, scale 1/3000.

This documentation proved to be of uneven value:

(a) The basic 1/100 000 map and its 1/25 000 photographic reproduction were of the greatest help to us; the details shown were generally correct as regards roads, tracks, mountains and rivers. On the contrary, villages marked on the map in 1953 had very often changed their location or name, or had even completely disappeared. Since 1953, the development of the cotton crop and industry has resulted in an improvement of the road system and many tracks formerly not entered on the map, or shown as foot-paths, are now suitable for vehicles.

(b) The 1/200 000 map, which is too simplified, is of interest only for over-all planning.

(c) The aerial photographs date from 1957. We made tracings of certain of them and checked them in the field, but found that the number of huts indicated on the picture corresponded only very rarely to the number actually found in the field. On the other hand, it was easy to recognize all details of relief and the general outline of the villages, even of the sarés. The inaccuracy in the number of huts arose from the fact that in the intervening three years some of them had been destroyed and in some cases not rebuilt. In a savannah area of this nature, aerial photography would be the best method for geographical reconnaissance by village, such as we carried out in the field. This type of work should take place from February to April, a time of year when there is no vegetation, so that the huts stand out very sharply on the picture. Another favourable factor at this season is the almost always clear sky and good light. An important point to be borne in mind is that the pictures should be taken in the months or, better, the weeks preceding the first spraying cycle.

Unfortunately, according to our information the cost of reconnaissance for the pilot project alone would have been about 9 000 000 francs CFA (US \$ 36 000) which amounts to 37.50 francs CFA (US \$ 0.15) per head, whereas the cost of the method used came to five francs CFA per head (US \$ 0.02).

(d) The plan of Maroua was very useful to us, but it is extremely easy to prepare such a map of this type.

3. METHODS USED

As the aim of the project changed while it was being carried out, we used two different methods of geographical reconnaissance: one technique which we termed "slow", based on the saré as unit, and a "rapid" technique, based on the village as unit.

A. "Slow" method

In October 1959, the initial plan provided for a spraying campaign in two cycles of five months each with a small permanent personnel who gradually acquired considerable skill in field work.

Reconnaissance was thorough, every hut in the area to be treated having to be noted and entered on sketch maps of the localities. However, there were too many huts for each to be shown separately, so that the saré was adopted as the unit. Since each saré contains an average of 3.5 huts, the cartographic work was reduced correspondingly.

Field work

(a) Personnel: the experimental area was divided into two sectors, north and south, each including approximately half the total number of huts (about 110 000). Each sector chief was responsible for the reconnaissance of his sector. (It was agreed in principle, at the outset, that this personnel would not change sector once operations had commenced.) The sector chief was assisted by a sub-sector chief and four workmen, all without any special training.

(b) Transport: the sector chief drove a Land Rover pick-up which transported the whole team.

(c) Equipment: the team had the equipment described in the Annex. The sector chief took with him the 1/100 000 maps of the sector to be reconnoitred; sometimes he also used the 1/25 000 enlargements.

(d) Methods of work: the team left at the beginning of the week for five days' field work, while the sixth day was devoted to the drawing up at Maroua of sketch maps based on the information collected in the field. Almost all the reconnaissance of the southern sector took place by car, whereas part of the northern sector in the mountainous regions of the north-west had to be reconnoitred on foot.

When the team arrived in a village it asked the chief for a guide familiar with the village and its surroundings. The sector chief then dispersed his men to the different parts of the village. On entering a saré, each workman made a chalk or charcoal mark to show that he had been there, counted the huts making up the saré and reported this figure to the sector chief. The latter then gave him a corresponding number of labels, each indicating the number assigned to the particular saré on the sketch map and the number of huts in it. As the data came in, the sector chief made a provisional sketch of the locality. In each saré the workman also asked how many adults and how many children under 10 were living there and reported these figures to the sector chief, who entered them on a special record sheet.

In the meanwhile, the sub-sector chief took measurements of a sample number of huts. To do this, he used two millet stalks (light, straight wood) 2-3 m long, marked off in lengths of 25 cm and in metres. He noted: the diameter of the hut, the vertical height of the cone, the internal slant height and the length of the overhang, rounding off the figures upwards to the nearest 10 cm.

At Maroua

The teams returned on Saturday to report their results and enter them on the maps. The average of the surface areas measured and the total population were calculated per canton. The sketch maps have a standard format, namely that of commercial sheets of paper (27 x 21 cm), to facilitate filing.

A map of this type is shown in the Annex. Each saré is represented by a circle divided in two by a horizontal diameter; in the upper part of the circle appears the number of the saré and in the lower part the number of huts. Roads, tracks,

madge, wells, mosques, etc., are indicated to serve as landmarks in the field. These maps are drawn on tracing paper with a soft pencil. The scale is generally 1/5000, but in very populous areas it may be reduced to 1/3000.

Output

As mentioned at the outset, this is a slow method, an average of 750 huts being covered per working day in the field and per team, i.e. some 3500-4000 huts per week. It often took the sector chiefs more than only one day to draw up their final sketch maps. If these maps are to be readable, some training as a draughtsman is necessary and even a certain talent. Although we had no draughtsmen attached to the project, the sketch maps prepared by the two sector chiefs were of a high standard.

From November 1959 until the end of February 1960, about 40 000 huts were counted in this way. The work took longer than foreseen because of difficulties - unconnected with the project itself - in the supply of labels.

B. "Rapid" method

At the end of February 1960, the aim of the campaign changed, and a spraying cycle had to be carried out before July, the commencement of the rainy season.

About 40 000 huts had then been recorded using the procedure described above. So that the cycle could be carried out normally, it was necessary for the reconnaissance of about 180 000 huts to be completed by the first half of April, i.e., in seven weeks and with the same personnel.

Work in the field

After a field trial, the new technique took shape, the working unit and that shown on the maps being the village and no longer the saré. The personnel, means of transport and equipment remained the same, but labelling was dropped, this being done by the sprayers themselves on the first treatment of the huts.

The method used was as follows: The reconnaissance team left for the field with 1/25 000 maps of the area in which it was to operate. Using the vehicle as base, the workmen and sub-sector chiefs spread over the village in order to count the huts in the sarés, which they marked on entering them as previously, so as to avoid counting

the same saré twice. In general, a workman returned to report the number of huts enumerated only when the quarter or the village had been completely dealt with. The sector chief marked directly on the 1/25 000 map, without any preliminary sketch, all the data collected, drawing a fairly thick line round the village just reconnoitred. If the name of the map was the same as that given by the inhabitants, he went over the name again in black pencil; if not, he wrote the new name across the circle around the village. When there were several quarters in a single village each was indicated by a circle, inside which was noted the number of huts per quarter. A village formed by the joining together of several quarters was marked with a thick line. The number of huts in the village was always shown in brackets after its name.

Existing and new roads were marked in red and rivers in blue. These colours made the final tracing much easier, because of the large number of lines of no interest to us (contour lines, land marks, etc.) on the 1/25 000 map.

This method did not include a population count, for the survey made by the slow method had shown us that there was an average of 0.97 inhabitants per hut and we did not feel it necessary to continue this census. Similarly, only a few sample huts were measured, because of the lack of time. We feel, however, that such information could be collected during the course of a rapid reconnaissance without slowing down the latter to any great extent; our reason for not doing so was that the results of the slow method had already given us sufficient data.

Work at Maroua

Cartographic work was considerably simplified by this method. On his return to Maroua, each team chief assembled the maps prepared in the field, canton by canton, on a large table. The maps were next covered with tracing paper and, using India ink, a direct tracing made (scale 1/25 000) of the canton concerned. For an average canton of 3000 to 5000 huts, a quarter of an hour to half an hour's work is sufficient, and does not call for a draughtsman or staff particularly gifted for drawing.

Output

This was much greater than with the previous technique. In the mountains, where it is usually necessary to go on foot and sometimes do a little climbing, some thousand huts can be covered per day, on the average. On the plain, and with an average

population density, 2500 to 3000 huts per working day can be recorded; however, in densely populated regions, such as those along the "madje", certain teams have covered up to 6000 huts in a single day.

4. RESULTS

The reconnaissance of 180 000 huts occupied two teams for seven weeks.

4.1 Maps

At the end of the reconnaissance, we had 1/25 000 maps of all the area to be treated, canton by canton, in the form of tracings easy to duplicate by the "Ozalid" method.

At the beginning of the first cycle it was decided not to use the maps which had been prepared by the first method for the following reasons:

- (1) A team sent to check the accuracy of certain maps in the field found that in three months 10 per cent. of the huts had changed.
- (2) The duplication of a very large number of small maps takes a long time and, in the end, only gives information which can all be found on a single 1/25 000 map.
- (3) Maps prepared saré by saré are too precise and too complete for them to be easily interpreted by the chief of the spraying team who, in general, can hardly read and write and does not understand very well how a circle marked on a piece of paper can be a mud and straw hut in the field.
- (4) Finally, the apparent perfection of these maps seems to indicate a permanence quite foreign to the habitations in the area.

The first cycle was therefore commenced with the 1/25 000 maps and a 1/100 000 map showing the villages and the number of huts in each of them. These maps had been drawn up for purposes of DDT distribution just before the beginning of the cycle. As soon as spraying operations commenced, it was realized that, although the 1/25 000 maps were practicable for a small canton, they were very cumbersome and difficult to handle in the bush for cantons of some size. As empty spaces occur more frequently,

in the latter, the corresponding maps were reduced from a scale of 1/25 000 to one of 1/50 000. This scale finally proved to be the most practicable in the field and was adopted for the whole area.

We give in the Annex an example of each type of map used in the project.

4.2 Usefulness of the maps

During the three cycles (two normal and one maintenance) which were carried out in 1960 in the pilot project, the basic usefulness of the preliminary geographical reconnaissance was confirmed anew every day. All the information required was found, generally speaking, on the 1/50 000 maps; only rarely was it necessary to use 1/25 000 maps at the outset, to make sure of certain details.

The maintenance cycle, which took place entirely during the rainy season, showed the extreme variability of the number of habitations with time. In three months, the total number of huts increased by an average of 10 per cent. because of new building. In the first cycle (May-June 1960) we treated 232 780 huts, whereas in the second (October-November 1960) 247 800 huts were sprayed, i.e., an increase of about nine per cent. This increase occurred, mainly, at the commencement of the rainy season, when most of the building work takes place in these regions.

Furthermore, only a single village (with 70 huts) was encountered which had not been entered on the maps at the outset: it was situated at the border between the two sectors (north and south) and was discovered and treated during the maintenance cycle.

These maps enabled us inter alia:

- to distribute the 650 drums of DDT for the first cycle in less than a week, using four trucks, usually one drum being left at each distribution point;
- to calculate field itineraries in accordance with the nature of the terrain and possibilities of access during the rainy season;
- to exercise an indirect check on field work from Maroua;

- to give the chiefs of the maintenance teams precise, dated itineraries for six to eight weeks' work in the bush, to let them know all the DDT supply points in advance and to supervise them directly and indirectly in the field . . .

5. COST :

The cost of a rapid reconnaissance can be estimated at five francs CFA or US \$ 0.02 per hut or per head.

This figure can be broken down as follows:

Cost of field personnel	2.00 Fr. CFA
Cost of paper, Ozalid, etc.	0.20 Fr. CFA
Vehicle (150 km/day, 21 Fr. per km)	1.30 Fr. CFA
Label (made locally)	1.00 Fr. CFA
Administration	0.50 Fr. CFA
	<hr/>
TOTAL	5.00 Fr. CFA

6. CONCLUSIONS

Geographical reconnaissance by village, carried out in the manner described (savannah, 30 inhabitants per square kilometre, one inhabitant per hut) is a simple, cheap and effective procedure which we found to be of the greatest value for health work in the field and which enabled us to achieve the maximum coverage.

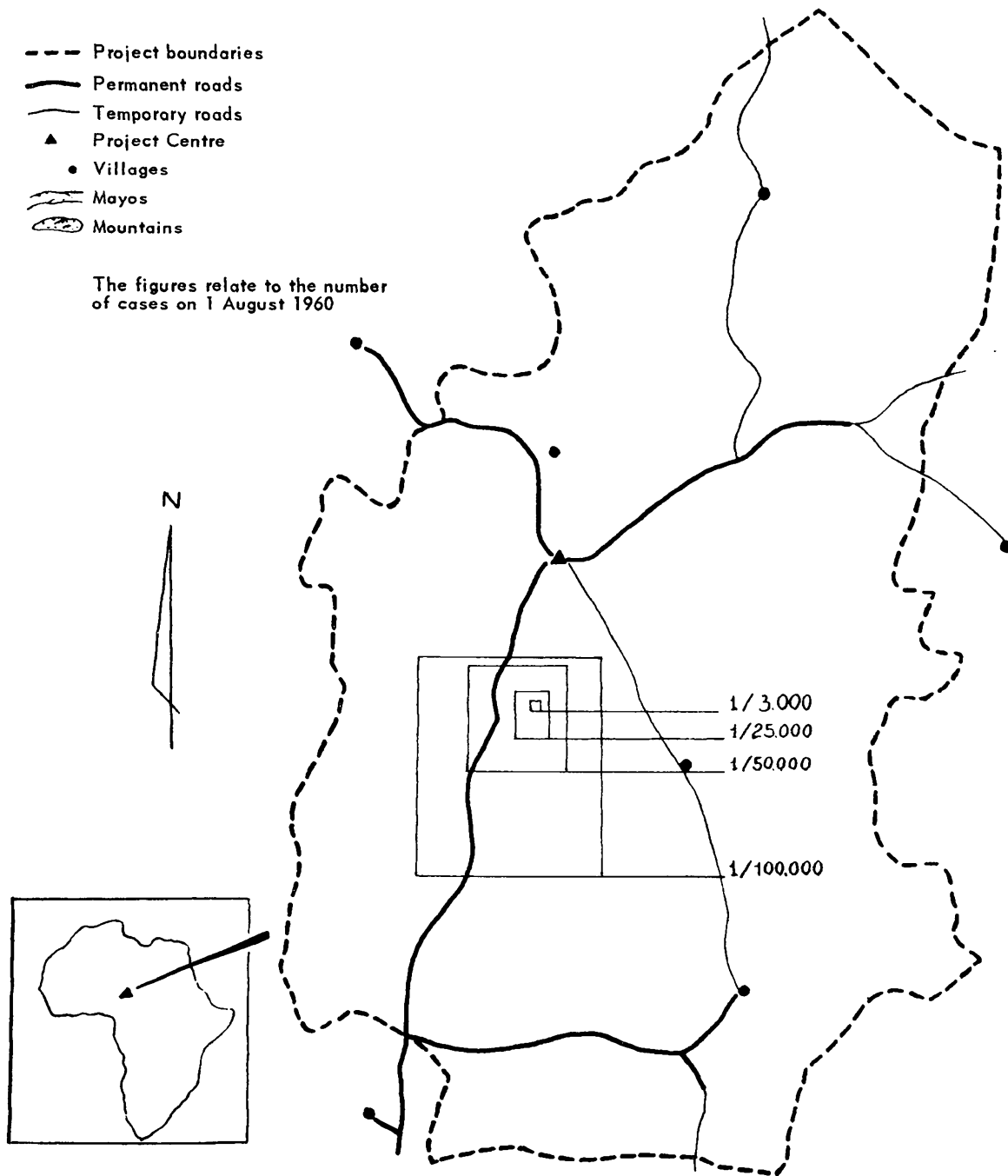
Under the conditions obtaining in N. Cameroun it is not necessary to carry out a very thorough reconnaissance because of the constantly changing distribution of the huts and villages.

To ensure complete coverage, it is important to treat every village and every hut in each village. The maps show the exact location of all the villages in the treatment area, while the label marking each hut treated indicates very clearly when and by whom the said hut was treated. Consequently, it would not seem necessary to push reconnaissance, or rather its graphical representation, further.

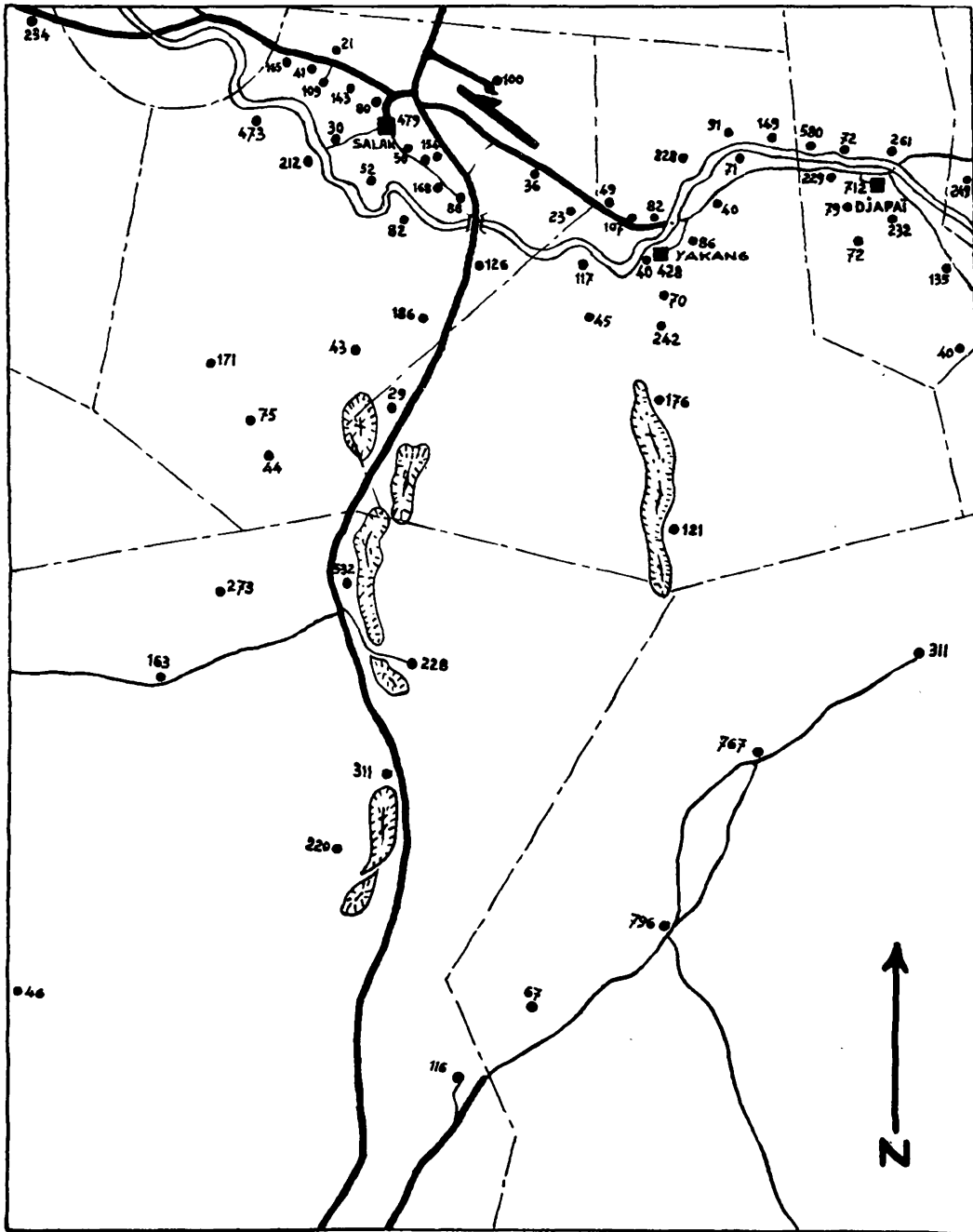
PILOT PROJECT FOR THE ERADICATION OF MALARIA IN THE NORTH OF CAMEROUN MAPS OF VARIOUS SCALES

- Project boundaries
- Permanent roads
- - - Temporary roads
- ▲ Project Centre
- Villages
- ~ Mayos
- ⌒ Mountains

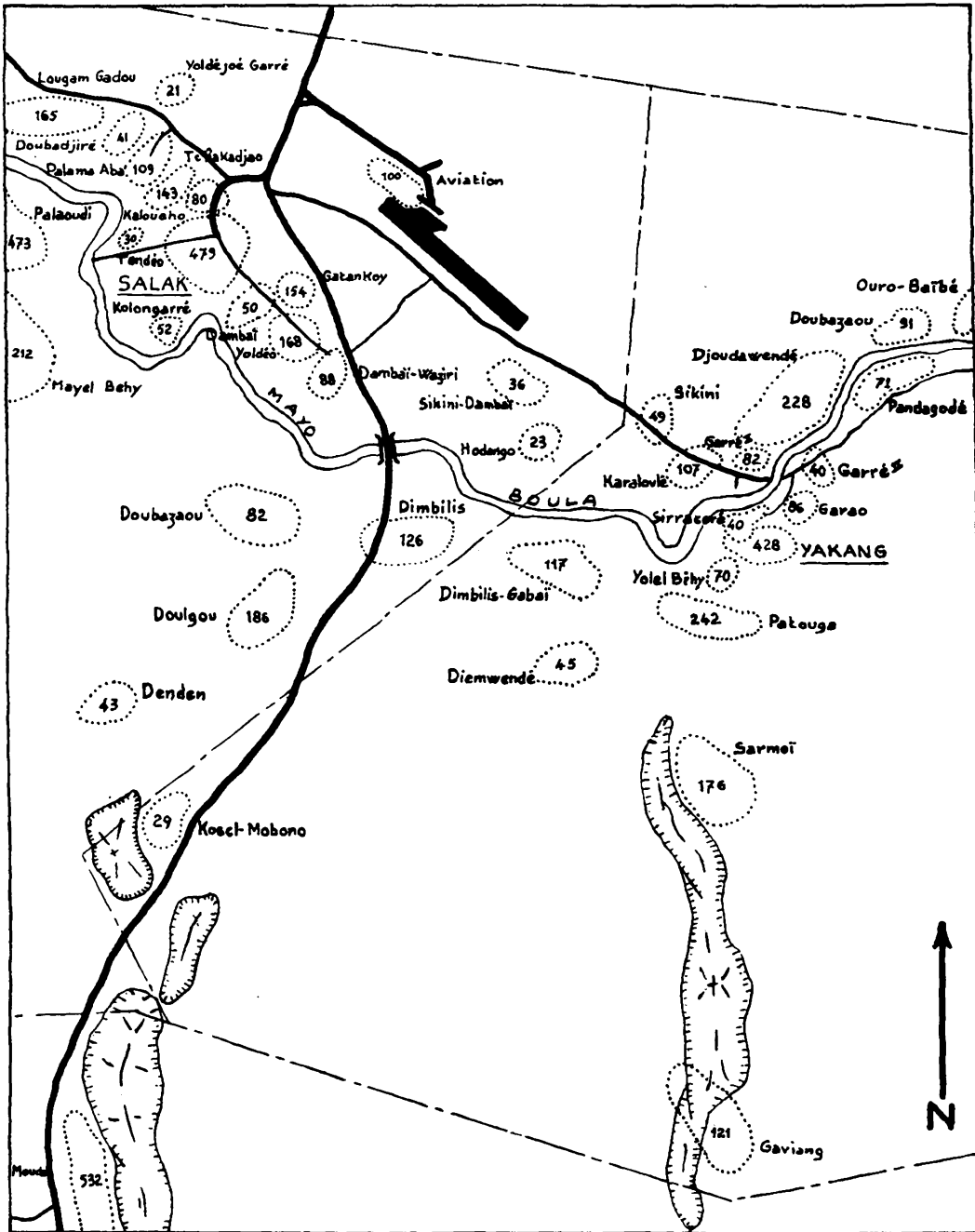
The figures relate to the number of cases on 1 August 1960

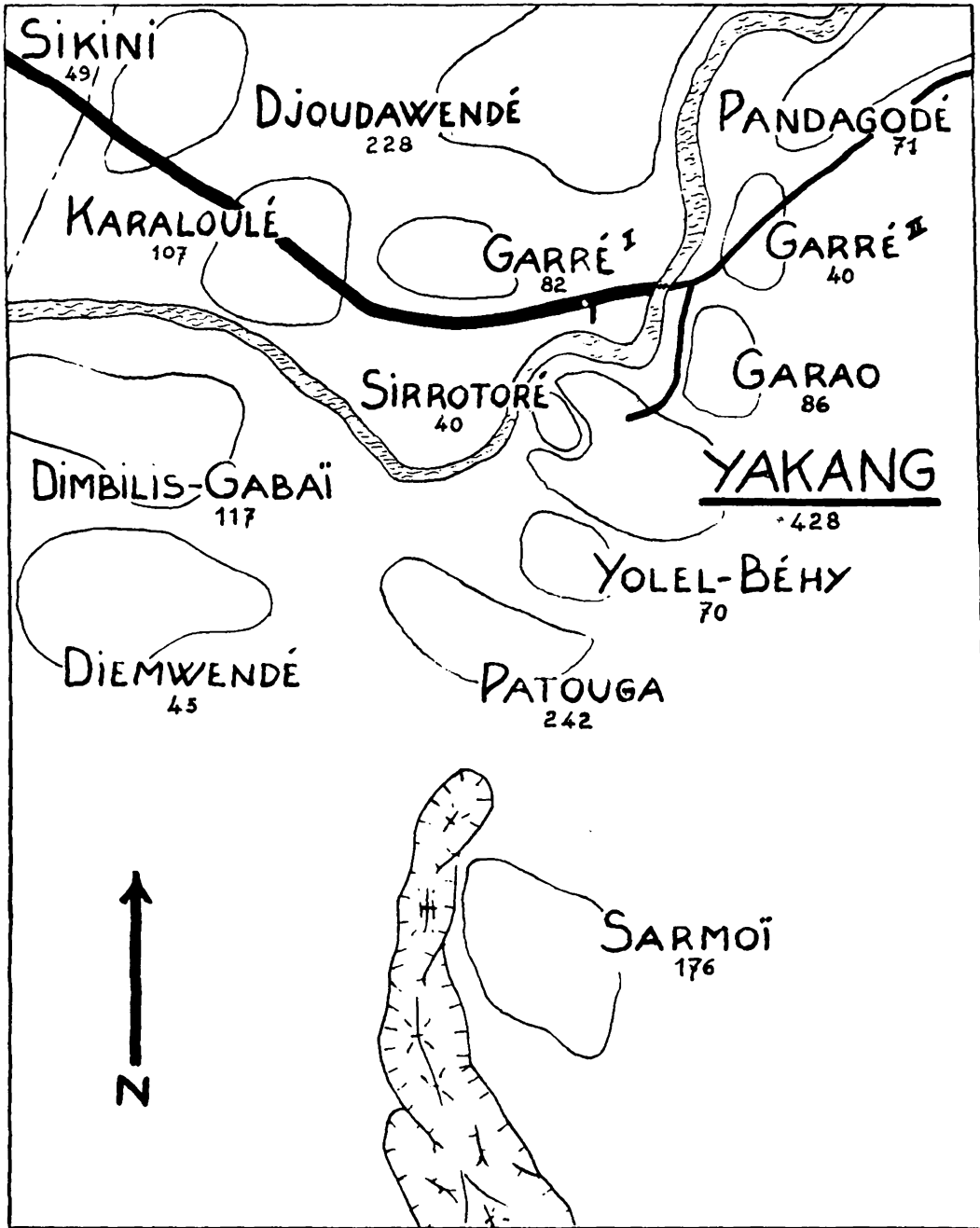
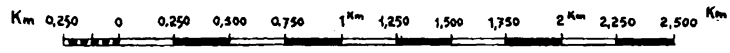


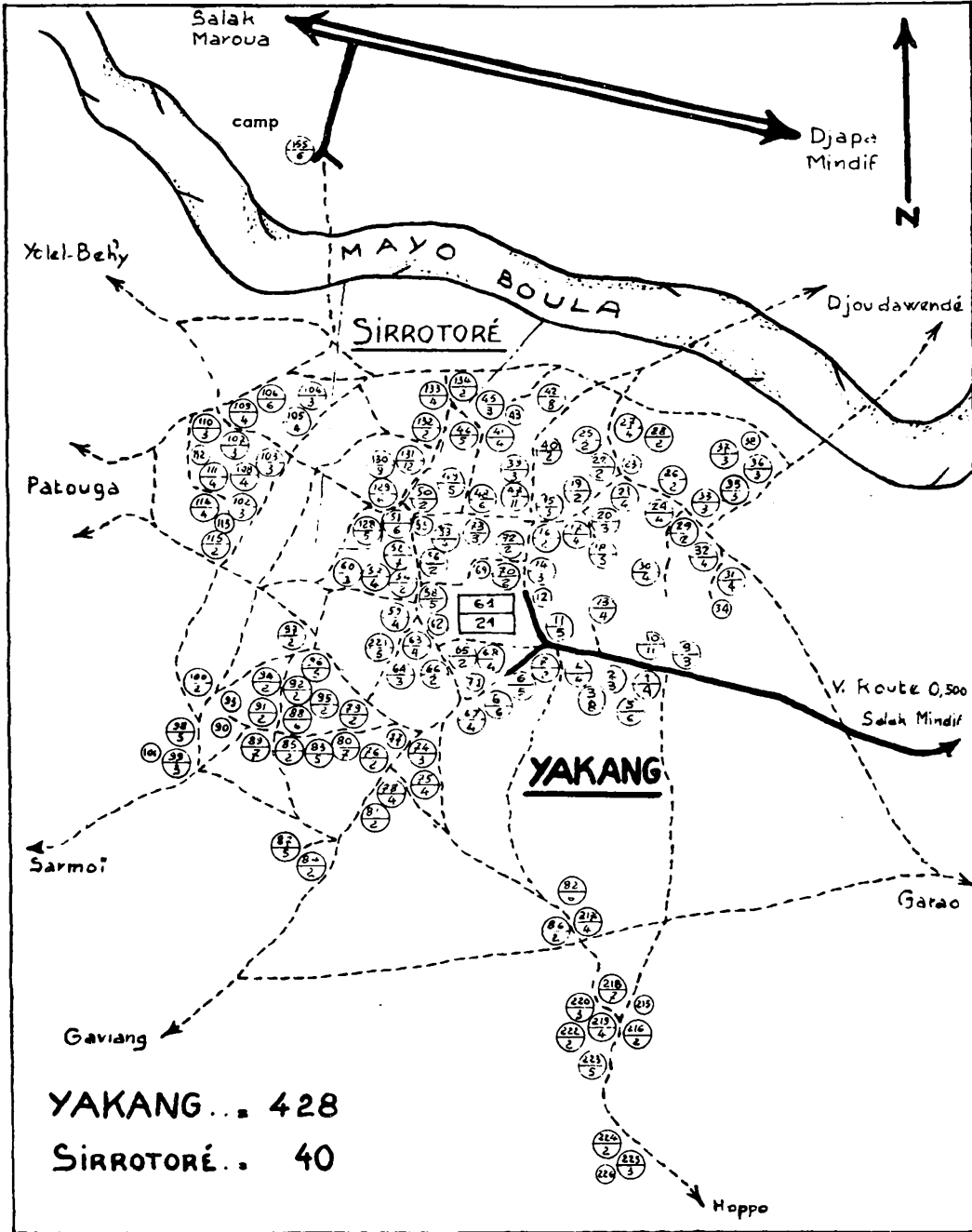
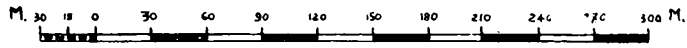
Km 1 0.5 0 1 2 3 4 5 6 7 8 9 10 Km



Km 0.25 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5 Km







The ethnographical data we collected during this project are of very secondary interest: an extremely small part of the sedentary population becomes nomadic during the dry season, in order to take the flocks and herds of a whole village or canton to graze in the "yaérés". These persons and their itineraries are known and it would have been easy, if this had proved necessary, to treat them effectively.

We feel that the scope of this project is too limited to raise the ethnical or other problems which might arise in a national programme of some size; nevertheless, such problems may be of capital importance for the smooth running of operations. We therefore regard it as very important, as has already been pointed out by other authors, to include a geographer-ethnologist among the staff in charge of the geographical reconnaissance for a national programme. His task would be, in addition to collecting geographical and ethnical information, to determine the "average longevity" of the local habitat, a point which we found of vital significance in our own project.

PRACTICAL COMMENTS AND POINTS OF DETAIL

We feel that it may be of interest to describe some of the methods which were of help in our work.

A. In the field

1. Equipment used. The team had simple "isorel" boards to serve as a support for the paper on which they entered their findings; rather soft red, blue and black lead pencils (No. 2 or HB), a rubber and an ordinary ruler. The sector chief should have a table, large and steady enough for him to prepare his maps every evening. It is, in fact, essential for this to be done as rapidly as possible after the field work, since otherwise many details may be omitted or confused with others.

2. Working maps. There should be enough of these to ensure that there will never be any shortage. The personnel should feel quite free to write and draw on them. A basic map on a suitable scale (in our case 1/25 000) is essential for it makes it possible to avoid any gross errors in regard to orientation, scale, and the position of one village with respect to another. If such a map does not exist or is on an inconvenient scale, one can be very easily prepared from a map on a different scale, using the pantograph.

3. Numbering the huts. To prevent the workers losing count of the huts, Mr J. Sanchez had the idea of giving each workman 25 seeds of the size of a pea. The workman keeps them in the righthand pocket of his uniform and whenever he has counted a hut he transfers a seed to the lefthand pocket. When it has no more seeds to transfer, he picks up a small stone which he places in a breast pocket. He then puts all the seeds back in the righthand pocket and recommences the same procedure. In this way, a workman can count up to 400 huts without a mistake. When he comes back to the sector chief, the latter counts the stones and the seeds.

4. Labelling huts. In this area, where the houses have no doors, this way of marking them seemed to be the only practical and lasting one. The labels consist of a rectangle of stiff card which should be of a vivid colour so that they can be easily

Annex

seen in the huts, which are always somewhat dark. They measure 8 x 4 cm and have a brass eyelet so that a piece of iron wire, 35-40 cm long, can be attached. Both sides of the label are stamped with ordinary printing ink.

On one side for use in the first method, appear the words: "Saré No. ..., Hut No. ...". These details are filled in for each hut by the sector chief, according to the information given by the worker who has just visited the saré. For example, suppose the seventh saré to be counted in the village has six huts: the workman reports this to the sector chief, who gives him six labels marked "Saré No. 7, Hut No. 1; Saré No. 7, Hut No. 2; Saré No. 7, Hut No. 3", etc. The workman affixes these labels to the huts in the saré, but not in any particular numerical order, except in the case of the highest figure, which should be placed in the first hut of the saré.

On the other side of the card there are two rows of figures, from one to eight, each representing a spraying cycle. These numbers should be crossed off in the normal way by the sprayer.

In practice, the ink employed to enter these details became rather blurred, particularly in smoky huts. Consequently, we feel that it would be preferable to use metal dies for the numbers so that they could be embossed on the labels.

B. At Maroua

A large drawing board is essential: A simple plywood sheet measuring 2.40 x 1.20 x 0.015 m, resting on drums of insecticide is quite sufficient and it is not really necessary to use costly and complicated professional drawing boards. Once the first maps have been drawn up, no actual drawing is necessary for the following ones.

The equipment should include a set of drawing pens of different thicknesses enabling the ungifted amateur to draw lines of uniform thickness without difficulty.

The pantograph is an essential instrument making it possible to change from one scale to another, and to copy maps or diagrams without it being necessary to know how to draw. An ordinary pantograph is very easy to use and calls for only a few minutes' instruction.

Annex

The tracing paper should always be of excellent quality (95 g/m² for example) since it will be often handled in making copies.

The Ozalid duplicating process is simple and cheap. All that is necessary is to expose to the sun for a few moments (on the average, one or two minutes) an India ink tracing placed on a sheet of special sensitized paper, the whole being kept flat by a sheet of transparent plastic mounted on a light wooden frame, so that the sheets can be pressed together. After the sensitized paper has been exposed, it is left for a few minutes in a very simple developing chamber, in which an electric lamp heats a minute amount of ammonia, whose vapour develops those parts which have not been exposed to the sun.

The paper with which we obtained the best results gives black lines on a white background; when printing is successful, and it is not very complicated, the map obtained seems to be drawn in India ink and is easy to colour, if this is required to indicate any special points.

Two tracings may be superimposed and printed on one and the same sheet of sensitized paper; this makes possible a large number of combinations on the same background map.

REFERENCES

1. Cours de la Jamaïque. AMRO-134. Doc. 1-13
2. Rapport annuel de la France à l'ONU sur la gestion du Cameroun (1957)
3. Lefèvre, Raymond (1957) Le Cameroun
4. Institut géographique national français (communication personnelle)
5. Mansell Prothero, R. Study of population movements as an obstacle to Malaria Eradication Programmes. OMS-WHO, juillet 1960

The purpose of the WHO/Mal series of documents is three-fold:

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