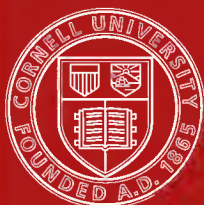


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A MANUAL OF BELGIAN CONGO

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BELGIAN CONGO

INTRODUCTION

THE greater part of our information regarding the Belgian Congo is derived from the work of explorers and travellers, the reports of officials of the Belgian Government, and the researches of investigators in various branches of science. Despite the great mass of this material, however, our knowledge of the country is still very imperfect. When the immense area of the region (about 910,000 square miles), the difficulties of communication within it, and the comparatively limited resources at the disposal of the authorities are taken into consideration, this fact is by no means surprising, but it renders difficult any attempt to give a systematic and co-ordinated account of the country as a whole. No detailed and accurate topographical survey, for example, has yet been made, and the nature of the surface-forms over large areas has never been properly described. Geological investigation has in the main been confined to those districts which are believed to be rich in mineral wealth, and even there it has seldom advanced beyond the preliminary stages. Within recent years a number of reports by officers of the *Service agricole* have provided much useful information regarding the soils of certain localities, but in proportion to the total area of the colony these reports are relatively few in number and limited in extent. A small number of meteorological stations have been established, but their records as a rule extend back for only two or three years and form but a scanty basis for generalization. On the flora and fauna of the country some valuable research has been done by the *Musée du Congo belge* and by various scientists acting independently of it, but many years must elapse before such a survey as they have begun can be satisfactorily completed. The same is true of the state of ethnical inquiry: some of the tribes have been studied in great detail, but of others there is

scarcely a word. The investigation of the economic wealth of the country has naturally received more attention. Various companies to whom concessions have been granted have explored their lands more or less thoroughly, although the results have in many cases not been made public. More important perhaps are the investigations made by the *Service agricole* into the distribution and cultivation of plants of economic value and the suitability of certain areas for the development of a pastoral industry. The chief mineral areas have probably been located, but their extent and value can in most cases only be guessed at. With regard to communications a systematic study of many of the waterways has still to be made, and before the development of the railway system can be undertaken on an extensive scale the best routes have to be determined.

Position and Extent

The Belgian Congo is situated in the basin of the Congo in Equatorial Africa, and lies between the parallels of 5° 20' N. and 13° 40' S., and between the meridians of 12° 10' E. and 31° 30' E. Its area is estimated at 910,000 square miles.

The original idea in the foundation of the Congo Independent State was that it should include the whole basin of the Congo, but various political circumstances have restricted the present Belgian colony within somewhat narrower limits. On the northern frontier all the land drained by the right-bank tributaries of the Bomu, the Ubangi, and the Congo as far as the Cataracts belongs either to French Equatorial Africa or to the Cameroons. Below Manyanga, however, Belgian territory extends to the right bank of the Congo, and includes not only the drainage area of that river, but part of that of the Chiloango, as well as the basins of several smaller streams which flow directly to the Atlantic.

In the north-east the frontier coincides with the Congo-Nile watershed from the sources of the Bomu almost to Lake Albert, but in the east a narrow strip of country which extends southwards as far as the sources of the Ruchuru falls within the basin of the Nile. Farther to the south the eastern and southern shores of Lakes Kivu and Tanganyika, which drain to the Congo, belong either to East Africa or to

Rhodesia. To the south of Lake Mweru also, where the Luapula marks the frontier, part of the Congo basin belongs to Rhodesia.

The eastern part of the southern frontier follows the Congo-Zambezi divide, but west of the Kasai this ceases to be the case, and many of the tributaries of that river rise upon and drain a considerable part of the plateau of Portuguese Angola.

The total area of the basin of the Congo is estimated at 1,425,000 square miles, that of the Belgian Congo at 910,000 square miles. When the area of those relatively small parts of the colony which are not drained by the Congo is deducted and allowances are made for probable inaccuracies in the figures given, it is seen that the Belgian Congo includes between 60 and 65 per cent. of the whole basin of the Congo. The area of Africa is estimated at 11,262,000 square miles, and the Belgian Congo is therefore a little less than one-twelfth the size of the whole continent.

General Considerations

The Belgian Congo is a region of great geographical interest. The low sandstone plateau which forms the central part of the colony is surrounded on all sides by higher peripheral regions which are of more varied geological formation, and are sometimes rich in mineral wealth. The basin which is thus formed lies on both sides of the equator, and this fact is of the greatest importance in regard both to climate and vegetation. The central region has a uniformly high temperature with rain at all seasons of the year; on the periphery the annual range is greater, and in the south at least there is a well-marked dry season. The characteristic features of the vegetation are therefore the dense forests of the equatorial districts and the savannas and steppes of the surrounding uplands. Human activities are profoundly modified by these conditions. In the forest the struggle for existence is on the whole severe, the opportunities for agriculture are restricted, and man has often to devote a considerable part of his time to hunting or fishing; on the savanna the conditions are more favourable, the cultivation of the land presents fewer difficulties, and a more civilized life is frequently possible; the inhabitants of the steppe are sometimes engaged in pastoral pursuits.

The development of the country is also affected to some extent by the same geographical factors. In the forest the exploitation of natural products, such as rubber, palm-oil, and copal, and the establishment of plantations in which tropical plants may be cultivated are the chief pursuits of the white man; the uplands on the other hand contain considerable stores of mineral wealth, and European interests there are mainly concerned with its development.

The problems connected with the civilization and development of the Belgian Congo are both numerous and hard of solution. In the forested region, and to some extent elsewhere, the natives live, and will for long be compelled to live, in small and more or less isolated communities. No common interest unites these different groups, and indeed they are frequently at enmity with one another. Under European control law and order can no doubt be established in the country, and a certain amount of help can be given to the native. But to raise him from the low state of civilization in which he at present exists, to educate him, and to improve his moral and social outlook will be a task of the greatest difficulty. There appear to be no native institutions which can be adapted to these ends, and owing to climatic conditions the number of Europeans resident in the colony must necessarily be small and their influence restricted. The chief hope of the country would seem to be in the mission schools, but whether the natives who have been trained there will exercise a humanizing influence when they return to their villages, or will relapse into the barbarism from which they have so recently emerged is still a matter of doubt.

The economic development of the country will likewise proceed slowly. Apart from mining and the cultivation of plantation products it will depend very largely on the extent to which the native methods of agriculture can be improved. But it must be remembered that within the forest area climatic conditions have an enervating effect, and it may be questioned whether the native is equal to the expenditure of more physical energy than at present, or whether there is much inducement for him to attempt it. On the upland savannas surrounding the central basin conditions are probably more hopeful, but there is as yet too little information to justify any forecast of the lines along which progress will be made.

The development of the communications of the country presents another set of problems. Practically the whole region drains to the river Congo, and the chief means of access is from the Atlantic coast. But the Congo does not give that unity to the region which might have been expected. Both it and its tributaries are in places interrupted by falls and do not form good through routes. Hence some of the peripheral districts show a centrifugal tendency. The Katanga in the south-east belongs physically to the plateau of South Africa, and has been developed as a result of the northward movement of European man on that plateau. Its present outlet is at Beira on the east coast, but its future port may be at Lobito Bay on the west coast. In any case its southern part at least will remain economically outside the Congo basin. The Eastern Highlands which border the Great Rift Valley belong to East Africa, and the movement to bring them within the hinterland of the Indian Ocean, as evidenced by the railway from Dar-es-Salam to Lake Tanganyika, has become pronounced within recent years. The north-eastern districts which border the Congo-Nile divide and the eastern part of the country between the Welle and the Ituri may conceivably turn towards the Nile as they develop. Even at present a certain amount of trade takes place by way of that river.

To a limited extent the Congo attracts trade from regions beyond the borders of the Belgian colony, and its value in this respect was shown in 1911, when the German possession of the Cameroons was extended so as to touch the river at two points. But here also the centrifugal tendency is apparent, and the French contemplate extending their existing line from Brazzaville to Minduli west to Pointe Noire so as to obtain an independent outlet in their own territory.

CHAPTER I

FRONTIERS

THE frontiers of the Belgian Congo were only gradually defined. This arose from the informal and almost irregular way in which the Congo Free State came into existence. During the latter half of the nineteenth century great interest was aroused in Europe by the progress of African exploration, and Leopold II, King of Belgium, was one of those most attracted by the possibilities which it opened up. In 1876 he invited various explorers and others interested in the subject to a conference at Brussels. As a result of it an International African Association was formed with the objects of pursuing the work of discovery in Africa, suppressing the slave trade, and developing commerce as a civilizing agency. The international character of the Association, however, was of short duration, and before long Belgian interests predominated, Leopold himself supplying most of the funds.

In 1878, after Stanley's return from his great journey across Africa, he met the king and some members of the Association in Belgium, and it was agreed to form a subsidiary body of the Association, the *Comité d'études du Haut-Congo*, which later on took the title *Association internationale du Congo*. Under the auspices of the *Comité* Stanley again went to Africa, in 1879, and during the next few years was busily engaged in exploring various parts of the Congo basin, in establishing posts, and in concluding treaties with the native chiefs. His activities caused much anxiety to other Powers, notably Portugal, which considered that they also had claims in the region, and in 1884-5 the Berlin Conference was held to discuss and as far as possible to regulate the whole position. The Act of the Conference provided for freedom of trade in the basin of the Congo and elsewhere, the suppression of slavery, the treatment of natives, the conditions under which commerce might be conducted, and various other matters of

a similar nature. In fact it laid down the general principles on which the country ought to be governed. When the Act was signed the president of the International Association, acting on the authority of King Leopold, signified his adhesion to it.

While the Conference was proceeding, however, the International Association had been negotiating with the representatives of the various Powers attending it, and, after making some concessions to be mentioned later, had been recognized as a sovereign State. It was to this recognition that the Congo Free State owed its origin. Shortly thereafter King Leopold accepted the sovereignty of the country, while the International Association, which had been used as a stalking-horse, appears to have died a natural death.

BELGO-PORTUGUESE (KABINDA) FRONTIER

Before Portugal consented to recognize the sovereignty of the International Association in the Congo basin, there was a lively dispute regarding the lands lying on either side of the estuary. Portugal, on the strength of her long connexion with the region, was anxious to retain both banks of the river. She was eventually compelled, however, to surrender the north bank, but was allowed to remain in possession of the enclave of Kabinda. The treaty of February 14, 1885, by which she recognized the International Association, defined the boundary between their possessions, but, as it was based on insufficient geographical knowledge, it had to be modified in the light of subsequent discoveries. An attempt to do so was made in the Convention of May 25, 1891, but it was not until much later that the matter was finally settled. In 1900-2, a joint delimitation commission considered the whole matter, and its report was ultimately accepted by a protocol dated July 5, 1913.

The arrangement arrived at by this protocol was briefly as follows. From the point at which French, Portuguese, and Belgian territory meet the frontier follows the thalweg of the Chilongo as far as its confluence with the Lukula, and then the thalweg of the latter river to the point ($5^{\circ} 10' S.$, $12^{\circ} 32' E.$) at which it is joined by the Zenze. From there a straight line is drawn southward to the parallel of latitude

which passes through the source of the river Lulofe on the slope of the plateau of Nime-Chiama. The frontier then runs along this parallel westward to the geodetic pillar at Yema ($5^{\circ} 44' S.$, $12^{\circ} 18' E.$), whence it follows first the thalweg of the Lulofe and then that of the Venzo, as far as Mallango. From there a purely conventional frontier runs to the coast, which is reached about a mile and three-quarters north of the lagoon of Lunga.

FRANCO-BELGIAN (MAYUMBE) FRONTIER

Difficulties had also to be settled with France before recognition could be obtained. The Association claimed rights not only in the basin of the Congo but in that of the Niadi Kwilu, while France had not abandoned her desire for land south of the Congo. Finally, an agreement was reached by which the basin of the Niadi Kwilu was assigned to France and the land south of the Congo to the Association. By the Convention of February 5, 1885, it was resolved that the frontier should run from the source of the Chiloango along the watershed between the Niadi Kwilu and the Congo as far as the meridian of Manyanga. From there a line was to be settled, which should follow as far as possible some natural division of the land, and should end between the station of Manyanga and the cataract of Ntombo Mataka, at a point situated on the navigable portion of the river. (By the Protocol of November 22, 1885, the southern portion of this line was defined; it follows various minor irregularities of the land which need not be detailed here). Beyond Manyanga it was arranged that the frontier should follow the Congo up to Stanley Pool, pass through the centre of the Pool, and continue along the river to a point above the Likona-Nkunja. From there a line was to be drawn, following as far as possible the water-parting of the latter river, until it met the 17th degree of longitude east of Greenwich, which then became the frontier. As will be seen later, the latter portion of this convention had to be modified subsequently.

TERRITORIES CLAIMED BY THE INTERNATIONAL ASSOCIATION

In the preceding paragraphs the frontiers of the territories claimed by the International Association have been described in so far as they were affected by treaties made with Portugal.

and France. In its Declaration of Neutrality on August 1, 1885, the Congo Free State defined the extent of its possessions as it then understood them. From the point at which the watershed of the Likona-Nkunja reached the 17th meridian of east longitude that meridian was to constitute the boundary until it met the 4th parallel of north latitude, which then became the frontier as far east as the 30th degree of east longitude. This meridian was then followed to $1^{\circ} 20'$ south of the equator, and from that point a straight line was drawn to the northern extremity of Lake Tanganyika. From there the boundary ran along the median line of Lake Tanganyika, the straight line connecting Lake Tanganyika with Lake Mweru by $8^{\circ} 30' S.$, the median line of Lake Mweru, the watercourse which connects it with Lake Bangweulu, and the western shores of that lake. On the south the frontier was described as running westward from the southern extremity of Lake Bangweulu along the Congo-Zambezi divide as far as the 24th degree of east longitude. From there it followed the watershed of the Kasai between the 12th and 6th parallels, and then went due west until it met the Kwango. This river then became the boundary as far north as the parallel of Noki, and from the point where they met the frontier turned due west again until it reached the meridian which passes through the mouth of the Wango Wango. We have now to examine how far this provisional boundary was subsequently modified.

FRANCO-BELGIAN (CONGO-UBANGI) FRONTIER

As the Belgians began to occupy effectively the lands to which they laid claim, various questions dealing with frontiers arose to cause trouble with neighbouring States. One of the first of these had regard to the Franco-Belgian boundary, which was to follow the Congo above Stanley Pool to a point to be fixed above the Likona-Nkunja, thence to longitude $17^{\circ} E.$, following as closely as possible the water-parting between these two rivers. Differences of opinion arose as to the river called Likona-Nkunja, but eventually the French contention that the Ubangi was the river really intended was accepted by King Leopold. A protocol signed on April 29, 1887, stated that from its confluence with the Congo the thalweg of the

Ubangi shall form the boundary until its intersection by the 4th parallel of north latitude. The Congo Free State undertook not to exercise any political action on the right bank of the Ubangi to the north of the 4th parallel, while the French Republic made a similar promise with regard to the left bank north of the same parallel. It was further agreed that in no case should the frontier of the Free State be drawn to the south of the 4th parallel, which had been assigned to it by the Convention of February 5, 1885.

Matters rested in this position for a few years, when the designs of Leopold in the basin of the Bahr-el-Ghazal led to further trouble. The French maintained that the boundary of the Free State was marked in this region by the 4th parallel, while the Free State argued that the 4th parallel was merely a minimum boundary, that the Ubangi ceased at the confluence of the Bomu and Welle, and that she was therefore entitled to take possession of the lands in the basin of the Bahr-el-Ghazal, which were vacant when she entered them. Relations were further strained by the treaty of May 12, 1894, to be referred to presently, between Britain and King Leopold, but eventually the latter yielded, and on August 14, 1894, an agreement was signed with France. From the confluence of the Bomu and the Welle the boundary was to follow the Bomu up to its source, cross in a straight line to the Congo-Nile watershed, and follow it to its intersection with the 30th meridian of east longitude. The Free State on the other hand undertook to renounce all occupation and to exercise no political influence in the basin of the Bahr-el-Ghazal north of the parallel 5° 30' N.

A Declaration made on February 5, 1895, and renewed in a treaty signed November 28, 1907, defined more clearly French and Belgian interests in the district of Stanley Pool. The boundary was to follow the median line of the Pool up to the point of contact with the island of Bamu, the southern shore of this island up to its eastern extremity, and then the median line of the Pool. The effect was to transfer the island to France, but it was agreed that it should not be made into a military post.

ANGLO-BELGIAN (NORTH-EASTERN) FRONTIER

In pursuance of his schemes in the Upper Nile Leopold tried to obtain from Britain what he could not obtain from France, and as, in 1894, Britain was disinclined to pursue an active policy for the reconquest of the Sudan, but was not unwilling to see a weaker Power than France established in the Upper Nile, Leopold had little difficulty in negotiating a treaty. This treaty, which was signed at Brussels on May 12, 1894, laid it down that the sphere of influence of the Free State, north of the German sphere in East Africa, should be limited by a frontier following the 30th meridian east of Greenwich up to its intersection with the Congo-Nile watershed, and should then follow that watershed in a northerly and north-westerly direction. In addition Great Britain granted to Leopold a lease of certain territories for his own life. These territories were to be bounded by a line starting from a point situated on the west shore of Lake Albert immediately to the south of Mahagi, and running to the nearest point of the frontier defined above. Thence it was to follow the watershed between the Congo and the Nile up to the 25th meridian east of Greenwich, and that meridian up to its intersection with the 10th parallel of north latitude. From there it was to run along the 10th parallel to a point to be determined to the north of Fashoda, after which it was to follow the thalweg of the Nile southward to Lake Albert and the western shore of Lake Albert to the point above indicated south of Mahagi. Further it was stipulated that on the death of Leopold the treaty should remain in force as far as concerned all the portion of this territory to the west of the 30th meridian, as well as a strip 25 kilometres in breadth to be delimited by common consent, stretching from the watershed between the Nile and the Congo up to the western shore of Lake Albert and including the port of Mahagi. In return for this the Free State leased to Britain a strip of land, 25 kilometres broad, extending from the most northerly point on Lake Tanganyika to the most southerly point of Lake Albert. Germany, however, protested so strongly against this latter arrangement that it was abandoned by Britain in a Declaration signed at Brussels on June 22, 1894. At the

same time that the above agreement was signed letters were exchanged between the contracting parties containing assurances that they did not ignore the claims of Turkey and Egypt in the basin of the upper Nile.

Before the effective occupation of the leased territory took place, however, the situation had radically altered. In 1898 the power of the Khalifa was overthrown by Lord Kitchener, and, although the Free State sought to take advantage of the Dervish defeat by occupying various posts in the leased territory, Britain contended that the rights of Egypt over the region had revived. A period of strained relations followed, and it was not till 1906 that an agreement was reached. On May 9 of that year a treaty was signed which annulled that part of the Agreement of May 12, 1894, dealing with the leased territory, but allowed Leopold to retain for his own life the district known as the Lado enclave, the extent of which was defined as follows: 'The Enclave comprises the territory bounded by a line drawn from a point situated on the west shore of Lake Albert, immediately to the south of Mahagi, to the nearest point of the watershed between the Nile and Congo basins; thence the boundary follows that watershed up to its intersection from the north with the 30th meridian east of Greenwich, and that meridian up to its intersection with the parallel of 5° 30' of north latitude, whence it runs along that parallel to the Nile; thence it follows the Nile southward to Lake Albert, and the western shore of Lake Albert down to the point above indicated south of Mahagi.'

At the same time the boundary between the Congo and the Sudan was defined. Starting from the point of intersection of the meridian of 30° east of Greenwich with the watershed between the Congo and the Nile, the frontier was to follow that watershed in a generally north-westerly direction until it reached the frontier between the Free State and the French Congo. It was also decided, however, that the strip of land 25 kilometres broad, stretching from the Congo-Nile watershed to Lake Albert, already referred to, should continue in the possession of the Free State.

Before describing the final adjustment of frontiers in this part of the colony, it is advisable to consider the evolution of the frontier between the Belgian Congo and the British possessions in East Africa. As already indicated, the Declara-

tion of Neutrality issued by the Independent State in 1885 stated that the 30th meridian east of Greenwich should form the eastern boundary of its possessions between the parallels of 4° N. and 1° 20' S. By this arrangement a considerable stretch of territory belonging to the basin of the Congo and lying to the west of Lake Albert was excluded from the Independent State. On December 28, 1894, however, after the Franco-Belgian frontier had been defined, and geographical knowledge of the region considerably extended, a new Declaration of Neutrality was issued, and in it the boundary, which now ran along the thalweg of the Bomu to its source, and then in a straight line to the Congo-Nile watershed, was continued along the watershed to its intersection by the 30th meridian, and then along 'the extension of this watershed until its second intersection by the aforesaid meridian'. From the latter point the 30th meridian again became the boundary as far south as the parallel 1° 20' S. This arrangement appears to have been accepted by Britain in the Agreement of May 12, 1894, though it is not quite clearly stated there. As the Independent State was still excluded from Lake Albert by this arrangement, the Mahagi strip was constituted in order to give it access to that lake.

Further difficulties soon arose. A delimitation commission found that the 30th meridian did not lie where it had been thought that it did, but between 11 and 12 miles farther to the east. One result of this discovery was that the British found themselves excluded from Lake Edward. Moreover difficulties had arisen with Germany. According to the Declaration of Neutrality the boundary was to run from the 30th meridian at its intersection with the parallel of 1° 20' S. to the northern extremity of Lake Tanganyika. At this time, however, the existence of Lake Kivu was unknown, and when it was discovered, in 1894, Germany claimed a right of access to it. The matter remained long in dispute, and the difficulty was accentuated when Britain and Germany came to an agreement regarding some territory to the north of Lake Kivu which the Free State claimed. Finally on May 14, 1910, a protocol was signed by representatives of Belgium, Britain, and Germany, whereby a settlement was effected of various matters on which differences of opinion had arisen.

By this protocol the highest summit of Mount Sabinio, which lies to the north of Lake Kivu, was taken as the point where British, Belgian, and German possessions met. From there the Anglo-Belgian frontier was to run in a straight line to the summit of Mount Nkabwa, but it was provided that in delimiting this section of the frontier the commissioners appointed for the purpose might deviate from a straight line to a distance of 3 kilometres on either side in order to take advantage of natural features when it was of advantage to do so, as long as the total area of British or Belgian territory was not affected. The commission completed its work in 1911, but its report, dealing with rather minute points, need not be detailed here. They are incorporated in a protocol signed at Buswenda on May 14, 1911, and in the agreement signed at London on February 3, 1915.

From the summit of Mount Nkabwa the boundary as far north as a point on the parallel $2^{\circ} 7' N.$ midway between the shores of Lake Albert, as determined by a mixed commission at Brussels in 1910, was accepted in the protocol signed there on May 10 of that year. It follows first the parallel of latitude of the summit of Mount Nkabwa eastwards to its intersection with the thalweg of the river Manyaga, the thalweg of that river to its confluence with the thalweg of the Ishasha, and the thalweg of the Ishasha to its mouth in Lake Edward. From the mouth of the Ishasha it crosses Lake Edward in a straight line to the mouth of the river Lubilia-Chako, and ascends the thalweg of that river to its source. It then follows straight lines connecting the source of the Lubilia-Chako with the summit of Margharita Peak (the highest point of the Ruwenzori range), and Margharita Peak with the source of the river Lami, situated about 5.4 kilometres north-west of the peak Kalengili and about 20 kilometres south-west of the hill-top Karangora. The thalweg of the Lami as far as its confluence with the thalweg of the Semliki, and the thalweg of the Semliki then form the frontier as far as Lake Albert. In Lake Albert itself the boundary is formed by a succession of straight lines passing through the points situated midway between the shores of the lake on the parallels of $1^{\circ} 30' N.$, $1^{\circ} 45' N.$, and $2^{\circ} N.$ to a point midway between the shores of the lake on the parallel of $2^{\circ} 7' N.$ By this arrangement Britain remained in possession of an outlet on Lake Edward, while the Belgian Congo received

the left bank of Lake Albert, which placed it in communication with the valley of the Nile.

As a result of this arrangement the necessity for the Mahagi strip ceased to exist, and the Protocol of 1910 arranged that the frontier between the point already mentioned on the parallel $2^{\circ} 7' N.$ and the Congo-Nile watershed should run in a westerly direction to the point of intersection of the shore with the southern boundary of the Mahagi strip, and then along the southern boundary to the watershed. But when this region came to be examined in detail it was found that, owing to a bend in the watershed, the Mahagi strip had an east-and-west direction and not a north-and-south one as was usually indicated on the maps. A joint Anglo-Belgian commission appointed to delimit a suitable frontier reported in 1913, and after some modifications its proposals were adopted and embodied in the Agreement of February 3, 1915. From the point on parallel $2^{\circ} 7' N.$, midway between the shores of Lake Albert, the boundary runs northward till it meets a straight line drawn from the summit of the hill Kagudi through the summit of a knoll on the coast about 1.7 kilometre south-east by east of the hill Kagudi, then a straight line to the summit of the hill Kagudi, and then another straight line drawn towards the summit of the hill Biet as far as its intersection with a straight line joining the summit of the hill Milia to the confluence of the rivers Nashiodo and Alala. From this point a straight line was drawn to their confluence, after which the boundary followed the Nashiodo to its source nearest the summit of the hill Keresi; thence a straight line to the summit of the hill. From here the boundary follows in succession the watershed of the Sido basin to the summit of the hill Aminzi, a straight line to the top of the rock Monda, a straight line to the confluence of the rivers Narodo and Niabola, the thalweg of the river Niabola upwards to the point on it nearest to the summit of the hill Agu, and a straight line to the summit. Beyond this point the boundary is traced first along the watershed of the Aioda river basin to the summit of the hill Sisi and then along the watershed of the Leda river basin to the summit of a knoll situated about 4.2 kilometres south-east and east of the hill Cho. It then runs along the watershed between the Niagaki river basin and the tributary which joins it just below its confluence with the

Ammodar as far as the point on this watershed nearest to the confluence of the Niagaki and Ammodar; thence a straight line to this confluence. The thalweg of the Ammodar then forms the boundary upwards to its junction (at a point about 1,600 metres south-west of the summit of the hill Akar) with the thalweg of that tributary of which the source is close to a knoll on the Congo-Nile watershed, about 5.6 kilometres south-south-east of the summit of the hill Ham and about 6.2 kilometres west-south-west of the summit of the hill Akar. Beyond this the thalweg of the tributary is followed to its source, from which point a straight line is drawn to the summit of the above-mentioned knoll on the Congo-Nile watershed.

BELGO-GERMAN (LAKE TANGANYIKA) FRONTIER

The events which led to disagreement between Belgium and Germany on the eastern frontier have already been mentioned. The joint commission whose recommendations were embodied in the Protocol of 1910 had their work ratified by their respective Governments in 1911. At least part of the proposed boundary was actually delimited before the outbreak of war.

According to the protocol the boundary leaves the median line of Lake Tanganyika at its northern end and follows the thalweg of the principal western branch of the Rusisi as far as the northern point of the delta. It then keeps along the thalweg of that river to the point where it leaves Lake Kivu. Where the river divides into several branches the local authorities are to determine which is the principal branch. Across Lake Kivu a line was drawn from the Rusisi to a point in the north situated midway between Goma and Kisenyi in such a way as to give the islands of Iwinza, Nyamaronga, Kwidjwi, and Kitanga in the west to Belgium and the islands of Kikaya, Gombo, Kumenie, and Wau in the east to Germany. (The map showing the exact tracing of this line has not been published.) To the north the frontier was to follow as far as possible the meridian of the point situated midway between Goma and Kessegnyies as far as another point about 500 metres to the south of the road going from Goma by Bussoro, Iwuwiro, Niakawanda, and Buhamba to the pass between the Rukeri and the Hehu. It was provided that in delimiting this part of the frontier native tribes should as far as possible be left in German territory. From the point last indicated the frontier

turns to the north-east and runs at a distance of 500 metres to the east of the road already mentioned as far as the parallel of Niakawanda. Where there are suitable natural features the frontier may be carried 1,000 metres from the road. To the north of Niakawanda the frontier could only be approximately traced, but it was understood that it should not go east of the greatest depression between the slopes of Ninagongo and Karissimbi. To the north of the parallel of the hill Bihira the boundary was to be drawn in such a way as to follow as far as possible the natural features of the land and to pass about midway between Bihira and Buhamba to the northern point of the Hehu. (The maps referred to in this part of the agreement were not published. The delimitation was entrusted to a joint commission, whose work, though completed, does not appear to have been ratified.) From the summit of the Hehu the frontier runs in a straight line to the highest point of Karissimbi and from there to the summit of the Vissoke. It then follows the crest of the chain of small craters to the summit of Mount Sabinio.

The southern part of the Belgo-German frontier as defined by the Declarations of Neutrality is the median line of Lake Tanganyika.

ANGLO-BELGIAN (RHODESIA) FRONTIER

The boundary between the Belgian Congo and Rhodesia was settled by the Agreement of May 12, 1894. It was then decided that the frontier should follow a line running direct from the extremity of Cape Akalunga on Lake Tanganyika, situated at the northernmost point of Cameron Bay at about 8° 15' S., to the right bank of the river Luapula where this river issues from Lake Mweru. From there the line was drawn directly to the entrance of the river into the lake, being, however, deflected towards the south of the lake so as to give the island of Kilwa to Great Britain. It was then to follow the thalweg of the Luapula up to its issue from Lake Bangweulu, and from there southwards along the meridian of longitude of the point where the river leaves the lake to the watershed between the Congo and the Zambezi, which it was to follow until it reached the Portuguese frontier.

It was only in 1911, however, that an attempt was made to delimit this frontier, and then it was found that a further rearrange-

ment would be necessary with regard to the strip of Congo territory which according to the Agreement of 1894 was supposed to be bounded on the west by the Luapula and on the east by the meridian of Panta, the place at which the river issues from Lake Bangweulu. The river which leaves the lake appears to lose itself in the swamps to the south of it, and the river which leaves the swamps flows alternately east and west of the meridian in question. The simplest method of re-adjusting the frontier would be to carry it along the thalweg of the Luapula from Lake Mweru to the point at which it first meets the meridian of Panta and then to follow that meridian south to the Congo-Zambezi divide. This would involve the surrender of a small strip of land which Belgium has hitherto considered to be her own property and would deny her access to the lake, but the loss in either case would be slight.

The survey of the boundary between the Congo and Rhodesia was completed in 1914, but the outbreak of war stopped negotiations for the time being.

BELGO-PORTUGUESE (ANGOLA) FRONTIER

In the Convention between the International Association and Portugal dated May 14, 1885, very little is said about the boundary between the Congo and Angola. It was merely defined in the parallel of Noki, from that town to the point at which it intersects the Kwango, and the Kwango itself in a southerly direction—presumably as far as the 6th parallel, which, according to the Declaration of Neutrality signed shortly after, marked the southern limit of the possessions of the International Association as far east as the eastern watershed of the Kasai. As the Belgians pushed forward in the south, however, they passed beyond the limits here indicated, and in 1890 Leopold II created the district of East Kwango, which included Lunda, as the result of an expedition by Dhanis, who had concluded treaties with the native chiefs. A period of strained relations which followed was ended by two treaties signed May 25, 1891. The principal point in these treaties was that the frontier should follow the thalweg of the Kwango from the parallel of 6° S. to the parallel of 8° S., the latter parallel to its intersection of the Kwilu, the Kwilu in a northerly direction as far as the parallel 7° N., and the parallel 7° N. as far as the Kasai.

In the work of demarcation between the 7th and 8th parallel from the Kwango to the Kasai account was to be taken of the natural configuration of the land and the limits of the native States. From the point at which the 7th parallel meets the Kasai the frontier was to follow the thalweg of the Kasai to the mouth of that one of its sources which originates in Lake Dilolo and the course of this affluent to its source. Thereafter it was to run along the Congo-Zambezi watershed to the 24th meridian east of Greenwich.

The delimitation of the frontier between the Kwango and the Kasai, provided for in the above treaty, took place in 1892-3, when the Free State was represented by the Congo missionary, George Grenfell. The Commissioners departed in so many particulars from the general indication of the frontier laid down in 1891 that the result of their work may be briefly stated here. Following the thalweg of the Kwango from the 8th parallel as far as its confluence with the Tungila ($8^{\circ} 7' 40''$ S. approx.), the frontier ascends the latter river as far as its intersection with the canal through which pass the waters of the Lola, and the thalweg of the same canal as far as its confluence with the Komba. From that point it runs due east to the Wamba, follows the thalweg of that river as far as its confluence with the Uövo Nuovo, the thalweg of the Uövo to its confluence with the N'Kombo, and the thalweg of the N'Kombo and the Kamanguna as far as the parallel of 8° S. From this point the boundary is the 8th parallel as far as the thalweg of the Lucaña, the thalweg of that river as far as $7^{\circ} 55'$ S., and the parallel of $7^{\circ} 55'$ S. as far as the Kwengo. The Kwengo then forms the frontier to the 8th parallel S., and from there the boundary runs eastward to the Luita and follows the thalweg of that river to its confluence with the Kwilu. The parallel of this confluence ($7^{\circ} 34'$ S. approx.) then becomes the frontier eastward to its intersection with the Kama Bomba or Kangulungu, the thalweg of that river to its confluence with the Loangué, and the thalweg of the Loangué as far as the 7th parallel S. From the point of intersection of the 7th parallel S. and the thalweg of the Loangué the frontier follows the parallel as far as its intersection with the thalweg of the Lovua, after which it follows the thalweg of the Lovua to the parallel of $6^{\circ} 55'$ S. The remainder of the boundary is formed by this parallel as far as its intersection with the thalweg of

the Chikapa, the thalweg of that river as far as $7^{\circ} 17' S.$, and the parallel of $7^{\circ} 17' S.$ as far as the thalweg of the Kasai.

The report of the Boundary Commissioners was ratified by a Declaration signed at Brussels, March 24, 1894. Several minor adjustments had, however, still to be made. In the treaty of May 25, 1891, it was assumed that Lake Dilolo lay on the Congo-Zambezi divide. Subsequent investigations showed, however, that no tributary of the Kasai flowed from Lake Dilolo and that the lake, such as it was, was situated in the basin of the Zambezi some miles to the south of the watershed. The difficulty was settled by an exchange of letters, in April and June 1910, by which it was arranged that the frontier should follow the thalweg of the Kasai from the point of its intersection with the parallel of $7^{\circ} 17' S.$ as far as its confluence with the Luakannu, and then the thalweg of the Luakanu and that of its eastern tributary which takes its source near Cha Calumbo, as far as the source of the latter river. From there a straight line was to be drawn to the Congo-Zambezi watershed.

By a treaty signed at Brussels on July 5, 1913, the details of the Noki-Kwango frontier were finally settled. The boundary now starts from Noki at a point situated 100 metres to the north of the principal building of the old factory of Domingos de Souza, and runs from north-west to south-east until it meets the parallel of $5^{\circ} 52' S.$ It then turns eastward and follows in a general way that parallel as far as the Kwango. Forty-five places are, however, mentioned through which it is to pass, and some of them lie to the north and others to the south of the parallel in question.

BELGO-GERMAN (GERMAN CONGO) FRONTIER

The serious political differences which arose in Europe on the Morocco question in 1911 did not affect the territorial arrangements of the Belgian Congo, but as a result of the readjustments which were then made Germany obtained outlets on the Congo and on the Ubangi. Access to the Congo was secured by the cession of the valley of the lower Sanga to its confluence with the Congo, and to the Ubangi by the cession of the valley of the Lobaye to its confluence with the Ubangi. These cessions gave Germany in all a frontier of about 10 miles on the Congo-Ubangi.

CHAPTER II

PHYSICAL GEOGRAPHY

INTRODUCTION

THE general character of the physical structure of the Belgian Congo may be comprehended at a glance. In the south of Africa there is a high plateau, which is continued northwards by the highlands of East Africa and the coastal mountains of West Africa. Between these lies the central basin of the Congo, which in relation to its surroundings is a plateau of relatively low elevation. The greater part of this plateau belongs to the Belgian Congo, of which it forms the nucleus, and only in the north-west does it pass beyond the political frontiers of the colony into French Equatorial Africa and the former German possession of the Cameroons. Around it the land rises on all sides, sometimes to very considerable heights. In the south-east there is the Katanga, which is a continuation of the high veldt of South Africa and Rhodesia, and on the south the northward-facing escarpment of the lower Angolan plateau. To the east are the mountains bordering the great rift-valley which contains Lakes Albert, Edward, Kivu, and Tanganyika. The north-east has a lower elevation, and consists of a plateau-like stretch of country which forms the divide between the waters of the Congo and those of the Nile. Farther to the west this upland region separates the basins of the Congo and Lake Chad. The western rim of the central basin lies for the greater part outside of the Belgian Congo, and is formed by the highlands which run along the west coast of Africa. In the south, where it falls within the colony, it is known as the Crystal Mountains. To the west of these mountains lies the coastal region in which the hill country of Mayumbe is the most important feature.

The Belgian Congo may therefore be divided into the following physical regions: the coastal region and Mayumbe, the Crystal Mountains, the Central Basin, the north-east

plateau or Welle region, the Eastern Mountains, the Katanga, and the northern slopes of the Angolan plateau or Kasai region. Owing to the want of sufficient topographical and geological information, it is not always possible to delimit these regions with exactitude, but notwithstanding that difficulty they serve as the best basis for a discussion of the physical geography of the country.

GEOLOGICAL OUTLINES

In its broad outlines the geology of the Belgian Congo is now fairly well known, but detailed work has hitherto been confined to a few regions, chiefly those in which minerals are known or believed to exist.

The coastal region is underlain by gently folded sandstones and shales of marine origin, which have a general inclination towards the ocean. They are believed to be of Cretaceous and Tertiary age, but around the estuary of the Congo they are covered with recent alluvium.

The Crystal Mountains consist of rocks of Palaeozoic and pre-Cambrian age, which strike NNW.—SSE., with a predominant dip to the east. The older rocks of the series occupy the western portion of the belt, and the degree of metamorphism increases from east to west. In the west they form a complex series of gneisses, quartzites, and various schists and other rocks all highly folded and metamorphosed by granitic intrusions. To the east of them the rocks consist of limestones and calcareous schists, which form a cherty dolomitic series, and are overlain still farther east by sandstones and shales. West of the Crystal Mountains the greater part of the Mayumbe region appears to consist of granitic rocks.

The most widely distributed geological formation in the Belgian Congo is that known as the Lubilash. It consists almost entirely of white or red sandstones and soft schists, which cover the greater part of the Central Basin and sometimes extend into the plateau and mountain regions which surround it. These rocks, which have a thickness of at least 1,000 feet, incline very gently towards the centre of the Congo basin. They appear to have been deposited upon a peneplain of ancient rocks similar to those which are found in the Crystal Mountains and in the eastern part of the colony. The soil derived from the sandstone is generally porous and,

except where it has been enriched by humus, infertile. Where schists predominate on the other hand they give rise to a tenacious clay, which being impermeable leads to the formation of marshes along the rivers and in the depressions of the surface.

The Lubilash formation is believed to have been deposited in a large but somewhat shallow inland sea. Owing to the want of evidence, however, complete agreement has not yet been reached as to the period at which this deposition took place. As a rule those who have made investigations in the country appear to support Cornet's opinion that the Lubilash rocks belong to Triassic-Jurassic times. F. E. Studt on the other hand considers that they are much older and were probably deposited during the Devonian period.

The Lubilash formation, though most fully developed in the central basin of the Congo, is also found in other parts of the country. Practically the whole region drained by the Kasai and its tributaries belong to it, the main exceptions being where the underlying rocks of pre-Cambrian and Palaeozoic age rise as monadnocks from amidst the sandstone, or where the rivers have cut their way down through the sandstone on to the same older rocks. In the Welle country there are also large areas of sandstone, although the most widespread formations are either metamorphic or granitic. The Great Rift Valley north of the Lukuga is bordered by a zone of ancient rock, but between it and the Lualaba sandstone is again the prevailing formation.

The geological structure of the Katanga appears to be more varied than that of other parts of the Belgian Congo. Apart from the granites which form the Bia Mountains, the Hakanson plateau, and the Marungu west of Lake Tanganyika, the rocks of this region are believed to range from pre-Cambrian to Permo-Carboniferous. The oldest, the Kafubu beds, cover extensive areas to the west of the Bianco plateau and to the north of Kundelungu. They consist of compact granular quartzites, usually white or pale red in colour, and are probably of Cambrian age at least. Overlying them unconformably are the Wemashi rocks, which are formed of dark-coloured conglomerates, greywackes, and shales of Silurian age. They pass upward into the Kambove beds, which consist of grey dolomites, sandstones, and shales, more or less pyritic, and

belong to the same geological period as the Wemashi rocks. The two series cover a considerable area in the south of the colony, and are also found to the west of the Luapula and Lake Mweru as well as in other parts of the country. The copper deposits of the Katanga are practically all found in the dolomitic rocks of the Kambove series, which also contain the Ruwe gold and platinum deposits and numerous deposits of iron ore. The Lufira beds, which are probably of Devonian-Silurian age and consist of fine-grained, brick-red sandstones and shales with interlaminated brownish sandstones and red and white-banded clay slates, occur in the south-east of the Katanga, where they come to the surface close to the Bianco plateau, along the Koni hills, and along the foothills of the Kundelungu plateau. They are also found in other parts of the Katanga. Above them are the Kundelungu beds, formed mainly of coarse arkose sandstones and compact felspathic quartzites, often false bedded, and interspersed with fine shale bands. With regard to the time of their deposition there appears to be some difference of opinion. Hitherto they have been regarded as of Permian age, but Studt considers that they lie conformably on the Lufira beds and belong to Devonian-Silurian times. They occur chiefly to the east of the Lualaba river on the high country of the Bianco, Mutenga-Miambo, Kundelungu, and Kibala plateaus, and in the valleys of the Luvua, Lomami, Luembe, and Sankuru rivers, as well as in various other districts. Their extension, however, is greatly hidden by the Lubilash beds, which have already been described. These overlie the Kundelungu beds unconformably on the highest parts of the Bianco and Kundelungu plateaus, and also cover immense tracts of country to the west of the Lualaba.

The Lualaba beds have only a limited extension in the Katanga, where they occupy a small area in the Lualaba valley about $9^{\circ} 45' S$. In other parts of the colony they are more widely distributed, and are found on either side of the Congo for considerable distances above and below Stanleyville. They consist in the main of sandstones and calcareous shales, and outside of the Katanga at least are believed to be older than the Lubilash and to belong to early Secondary times. With regard to the Katanga, however, Studt is of the opinion that the Lualaba series overlies the Lubilash.

Alluvial deposits are found in the valleys of many of the

larger rivers in the central part of the Congo basin, and they also cover some considerable areas in the rifts of the Katanga region.

DRAINAGE SYSTEM

The Congo is the central artery of the drainage system of practically the whole country. Concerning the source of the river there has been considerable discussion. If its length from its mouth to the point at which its most distant tributary rises is to be the test, the source of the Congo must be sought for among the headstreams of the Chambezi to the south of Lake Tanganyika. The Chambezi flows into the south-eastern part of Lake Bangweulu, losing itself in the extensive marshes which mask the southern end of that lake, and the river which issues from it is known as the Luapula. The Luapula, after marking the boundary of the Belgian Congo for practically the whole of its course, flows into Lake Mweru, issuing from it as the Luvua to join the Lualaba at Ankoro. If, however, the matter is considered from a purely geographical point of view, it would appear that the Lubudi, which flows into the Lualaba above Bukama, is to be regarded as the true source of the Congo. From the headstreams of the Lubudi to the mouth of the Congo the valley of the river is normally developed. Its basin was formerly limited by the long diagonal range of the Mitumba Mountains, and the events which have added to it the drainage of the Katanga are of more recent date. The Lualaba, by which this region is partly drained, has its sources on the Congo-Zambezi divide about 12° S. Between it and the Luapula, farther to the east, is the Lufira, which also rises on the divide. The two rivers, Lualaba and Lufira, pursue a northerly direction with many windings, passing through the Mitumba range in deep gorges. In about $8^{\circ} 20'$ S. the two rivers unite in Lake Kisale, beyond which the river is sometimes known as the Kamalondo.

The next important tributary of the Lualaba is the Lukuga, which is connected with Lake Tanganyika, and in this way drains a considerable part of the former German possessions in East Africa. The true source of this river, however, is on the north-west of the Marungu plateau, and the geological accident which has converted it into an outlet for Lake Tanganyika is of comparatively recent date. The discharge

of water from the lake is far from constant, ceasing almost entirely after a period of scanty rainfall, and becoming again established when the level of the lake has been raised by a series of rainy years. About 1880 it was running strongly, but about then a gradual fall in the level of the lake set in, and was continued with occasional pauses for about twenty years. Since about 1900 there appears to have been a change, the level of the lake has risen, and the river which leaves it has now an average depth of about 10 to 12 feet. The Lukuga has a fall of about 1,000 feet in its course of 300 miles, and its bed is therefore much interrupted by rapids.

To the north of the Lukuga a number of rivers enter the Lualaba before it turns to the north-west at Stanley Falls. Among these are the Luama, the Elila, the Ulindi, and the Lowa with its great tributary, the Oso. All of them rise in the high mountainous country bordering the Great Rift Valley and pursue rugged courses almost to the points at which they enter the main river.

Below Stanley Falls, where the main river definitely takes the name of Congo, the first large affluent is the Lindi, which with its tributary, the Chopo, enters from the hill country to the east. Much more important is the Aruwimi, which enters the Congo at Basoko. Its headstreams, the Ituri, the Shari, and various others, rise on the southern slopes of a knot of mountains lying to the west of Lake Albert. Among the tributaries which it receives are the Ibina, which comes from the heights above the Semliki valley, and the Epulu and the Nepoko from the Aruwimi-Bomokandi watershed. The Aruwimi flows almost entirely through the great equatorial forest, which appears here to attain its maximum density.

Farther west the Itimbiri and the Mongala drain much of the relatively low country lying between the Congo and the Ubangi-Welle. The former, which is also known as the Rubi or Lubi, rises to the west of the Nepoko and enters the Congo near Bumba. The latter is formed by the confluence of several streams, the most important being the Dua, the Ebola, and the Likame.

The Aruwimi, Itimbiri, and Mongala flow for a great part of their way through the northern part of the Central Basin. The Ubangi occupies a somewhat different position. Its headstreams, the Bomu and the Welle, which follow roughly

parallel courses, belong essentially to the plateau region which borders the Central Basin and forms the Congo-Nile divide. The Bomu forms the northern boundary of the colony, and as it has few important tributaries from the south it does not collect a large part of the drainage of the plateau except in the west, where the Bili, which joins the Bomu just above its confluence with the Welle, is the most important river of this Mesopotamian region. The farthest headstream of the Welle rises in the same group of mountains as do the Ituri and the Shari, but it receives its chief northern tributaries, the Dungu, Duru, and Were, from the Congo-Nile divide. On the left bank its principal affluents are the Bomokandi, whose sources are not far from those of the Epulu, and the Bima, which rises near the Itimbiri. Below the confluence of the Bomu and the Welle, the Ubangi forms the international boundary. Its largest affluents on the left bank are the Lua and the Giri, both of which belong to the Central Basin. Above Irebu the Ubangi joins the Congo, which then becomes the frontier.

Turning now to the left-bank tributaries of the Congo, the first to demand attention is the Lomami. It rises in mountainous country, but as it flows northwards almost parallel to the Lualaba a great part of its course lies within the central lowlands. West of the confluence of the Lomami with the Congo there is a long stretch in which the main stream receives no left-bank tributary, as the great plain to the south is drained by rivers flowing in the same direction as the middle Congo. Of these the most important are the Lulonga, formed by the confluence of the Lopori and the Maringa, and the Ruki system, which lies just south of the equator. The latter is formed by the confluence of the Busira and the Momboyo. The larger affluents of the Busira, the Chuapa and Lomela, rise in the east not far from the Lomami. The Salonga, which also flows into the Busira, and the affluents of the Momboyo are shorter and rise farther to the south. The Lukenie, whose headstreams likewise rise near the Lomami, drains the most southerly part of the same region, but flows into the Kasai. Below the point at which it collects the surplus waters of Lake Leopold it is known as the Fini.

The last great tributary of the Congo is the Kasai, which with its tributaries drains the northward-facing slopes of the South African plateau. On this plateau a number of large

rivers rise and flow north towards the Central Basin. The more important of these from east to west are the upper Sankuru, known as the Lubilash, the Lulua, the upper Kasai, the Loange (Loangué), the Kwilu, the Kwengo, the Wamba, and the Kwango. The upper Sankuru and the Lulua, with their tributaries, lie wholly within Belgian territory, but the upper Kasai and the rivers farther to the west have their sources on the plateau of Angola, which belongs to Portugal.

The Sankuru may perhaps with justice be regarded as the true continuation of the Kasai, notwithstanding the fact that its contribution to the combined stream at Basongo is considerably less. Along with its numerous tributaries it drains a large area in the east before it makes its great bend to the west some distance below Lusambo. Apart from its headstream the only important affluent which it receives on the right bank is the Lubefu, which lies between it and the Lomami. Farther west the Lukenie is the main drainage channel of the country lying north of the Sankuru. On the left bank the Sankuru receives the Lubi at Lusambo and the Lubudi at Bolombo.

The westward-flowing Sankuru meets the upper Kasai at Basongo, and the combined stream, now known as the Kasai, flows in a west-north-west direction to its confluence with the Congo at Kwamouth. The most important tributary of the upper Kasai is the Lulua, which joins it at Bena Makima and drains a considerable area to the west of the basin of the upper Sankuru. Farther to the west the Kasai receives the Kwango, which, with its tributaries, the Wamba and the Kwilu, forms the chief river-system in the south-western part of the colony. The confluence of the Kasai with the Kwango is at Wissmann Pool, a short distance above the point at which the Fini enters the main stream.

Below Kwamouth the Congo receives no large tributary, but in its passage through the Crystal Mountains it is joined by a number of short streams. Of those flowing through Belgian territory the most important are the Eluala, which enters on the right bank, and the Inkisi, the Kwilu, and the Lufu, which enter on the left. In the district of Lower Congo a large part of Mayumbe is drained to the Chiloango, which enters the Atlantic through the northern part of the Kabinda enclave. This part of the Chiloango basin and a comparatively small

district in the north-east which lies within the basin of the Nile are the only regions in the colony which do not lie within the drainage area of the Congo.

The Belgian possessions in the northern part of the Great Rift Valley lie, as has just been indicated, in the basin of the Nile. The Ruchuru, which rises in the volcanic region to the north of Lake Kivu, flows northward into Lake Edward, while the Semliki, which leaves that lake, carries its surplus waters to Lake Albert. Part of this drainage system lies within Belgian territory; it includes the basins of various small rivers which flow directly into the lakes.

From this brief survey it will be seen that the rivers of the Belgian Congo can be more or less closely related to the main physical regions into which, as already indicated, the country can be divided. The Lubudi-Lualaba-Congo, with its tributaries below Stanley Falls, the lower Aruwimi, the Itimbiri, the Mongala and the Ubangi proper, on the right bank, and the lower Lomami, the Lulonga, the Ruki, and the Fini on the left, form the great rivers of the low central plateau. The upper Lualaba, the Lufira, and the Luapula drain the Katanga. The Eastern Highlands lie in the basins of the Lukuga, Ulindi, Lowa, Ituri, and other rivers which flow westwards towards the Congo. The rift-valley finds one outlet to the Lukuga and another to the Nile. The Congo-Nile plateau in the north is within the drainage area of the Bomu and the Welle, while the higher and more extensive plateau in the south of the colony sends its waters northward to form the Kasai. The short streams which rise in the Crystal Mountains flow directly to the Congo. The coastal region and Mayumbe drain mainly to the Chilongo in the north or to the Congo in the south, but a few small streams in the west find their outlet in the Atlantic.

Régime of the Congo and its Tributaries

The rivers of the Congo system seldom remain at their mean level, and as a rule are either rising or falling. According to their position they have either a double or single maximum and a double or single minimum. The Congo and its left-bank affluents, more particularly the Kasai, have two periods of high water each year and two periods of low water. The

right-bank tributaries on the other hand, and especially the Ubangi and the Sanga, have only one maximum and one minimum in the course of the year. On the Congo there is low water in March and high water about the middle of May. This is caused by the heavy rains, which have taken place somewhat earlier in the Kasai region, in the Katanga, and in the southern part of the Eastern Highlands. The rivers flowing from these regions are not only in flood themselves, but they cause the main river to rise rapidly. After this the Congo again begins to fall, and low water is reached at Stanleyville in July, where the minimum is lower than that of March. At Lukolela, opposite the confluence of the Congo and the Sanga, the reverse is the case, the main river being lower in March than in July. This is due to the fact that in April the Ubangi begins to rise, while the Itimbiri, Aruwimi, and other right-bank tributaries are also in flood about this time. Owing, however, to the great diminution in the discharge of the Kasai the effect of this increase is not felt below the confluence of that river with the Congo, and at Leopoldville the Congo is at its lowest in July and August.

The second maximum on the Congo is reached about the middle of December. The Ubangi and Sanga have a régime somewhat like that of the Nile, and do not attain their maximum height until the month of October. It is not, however, till the left-bank tributaries begin to rise as a result of the increasing rainfall south of the equator that the Congo reaches its second maximum. This, as has just been said, is about the middle of December, after which, as a result of the annual fall in the northern tributaries and the intervention of a short dry period to the south of the equator, the river falls until it reaches the March minimum.

If the above account of the régime of the Congo be correct, as would from recent investigations appear to be the case, it follows that the double maximum and minimum are due not so much to the alternate flooding of the tributaries lying respectively north and south of the equator, as was formerly believed, but rather to the double rainy season in the region to the south of the equator. The northern tributaries contribute to the result, but the southern appear to control the régime of the river.

The variations from year to year in the amplitude of the

annual floods of those rivers of which the discharges have been carefully measured is considerable, but whether the flood be high or low its general character along its course remains the same from year to year. On the Congo, Ubangi, Sanga, and Kasai this is particularly the case, variations in the discharge of their tributaries and local precipitation having only a slight modifying effect. From the point of view of navigation this is a matter of some importance. When one of these rivers has once been properly surveyed it is possible by measuring the height of water at any point to estimate within about a foot the height at all other points along the course of the river.

REGIONAL SURVEY

The Coastal Regions and Mayumbe

To the west of the Crystal Mountains the land is diversified in appearance and presents little geographical unity. The coast, which is little over 20 miles in length, is generally low and sandy, and the shoal by which it is fringed makes it unsafe for navigation. This shoal, which begins a few miles south of Red Point ($5^{\circ} 44' S.$), carries the three-fathom line three and a half miles and the five-fathom line six and a half miles from the shore. Behind the coast the land rises, often perpendicularly, to a low plateau which seldom exceeds 100 feet in height. It is sandy in some places, marshy in others, and is much cut up by the valleys of the various streams by which it is drained. At some distance inland there is a second and higher plateau, the escarpment of which, like that of the first, runs parallel to the coast. It also appears on the right bank of the Congo estuary between Banana and Malela, where it varies in height from 240 to 300 feet (75 to 90 metres). This plateau, which is covered with sandy or sandy-clay soils, extends inland to the hill country of Mayumbe. The vegetation is generally poor, except in the valleys of the Luibi and Bola, where there are considerable tracts of forest.

Along the estuary of the Congo the scenery is as a rule very different in character. The land, which has for the most part been formed by the débris carried down by the great river, is low-lying, and is cut up by creeks in every direction. In many places there are mangrove swamps. The bed of the river, also, contains many islands and sandbanks. Of these

the island of Mateva, which lies below Boma, is the largest, but there are several others belonging to Portugal which are of considerable size.

Mayumbe is the third region into which the country west of the Crystal Mountains may be divided. It is bordered on the west by a line which runs more or less parallel to the coast and cuts the rivers Chiloango, Lubuzi, and Lukula, where they form falls in passing from the hills to the low plateaus which border the ocean. On the south and east Mayumbe proper does not as a rule extend beyond the divide between the basins of the Congo and Chiloango, while on the north it is separated by the Chiloango from its extension in Portuguese Kabinda and French Gabun.

Mayumbe therefore belongs in the main to the basin of the Chiloango. It is an elevated and broken country in which the hills rise, sometimes abruptly, to heights varying from 1,500 to 2,500 feet (460 to 760 metres). The valleys are narrow and deep, and the rivers flow in tortuous courses which are much cut up by rapids and falls. The soil is fairly thick, and consists of clay or clay and sand intermingled, resting upon hard rocks such as gneiss, schist, and quartzite. Much of the land is forested, but in places there are clearings which become larger and more extensive towards the south.

Three different zones may be distinguished. In the first, which lies between the Chiloango and the hills on the left bank of the Lubuzi, the land rises from 300 feet (90 metres) in the west to over 1,500 feet (460 metres) in the east, and is even higher in the south. The soil is generally fertile, and in places there are considerable tracts of virgin forest. The conditions are accordingly favourable for the establishment of plantations, of which there are a number at Ganda Sundi, Chela, and elsewhere.

The second zone lies between the high hills which border the Lubuzi and the sources of the Lukula and Nyanzi. In it the land rises to greater heights, and frequently passes into plateaus of considerable extent. The forest areas are more limited, and much of the vegetation consists of savanna and scrub.

In the third zone, which extends to the south of the Lukula-Congo divide, the land is lower, and the valleys, which are broader, are often bordered by marshes or gallery forests.

The Crystal Mountains

The name, Crystal Mountains, given by the earlier geographers to the mountainous area which separates the central basin from the coast, is an unfortunate one, but no better term has as yet been suggested. The region was at one time occupied by a great mountain range, which was first reduced by the processes of denudation to a peneplain and then eroded into a much-dissected plateau. In the more elevated districts it reaches heights of considerably over 2,000 feet (610 metres). The Congo in its passage through this region encounters rocks of different degrees of resistance, and thus has a course which is much interrupted by rapids and low waterfalls. Hence from Matadi to Leopoldville there are numerous stretches of unnavigable water.

The physical geography of the Crystal Mountains has been carefully studied in places, and more especially along the line of railway which now connects the navigable reaches on the lower and middle Congo. Its general character south of the river is fairly well known. In the vicinity of Congo da Lemba, north-east of Matadi, it has the appearance of a much-dissected plateau. Stretches of relatively level ground are rare, the hills are prominent, and the whole country is cut up by numerous river-valleys. Between this region and the series of plateaus which lie north of Matadi on the right bank of the river, the Congo makes its way from north to south in a gorge, the sides of which are often from 500 to 1,000 feet (150 to 305 metres) in height. In this the most turbulent part of its course the river has an average fall of about $5\frac{1}{2}$ feet per mile (1 metre per kilometre).

Farther to the east and the north-east, that is, in the basin of the Kwilu and its tributary the Kwilu-Madiata, the elevation of the land is less and usually varies from 1,100 to 1,300 feet (335 to 395 metres). The surface is less irregular, and along the railway line between Songololo and Kimpese is almost level. To the north, however, its character changes: high hills and deep valleys succeed one another, while the average height of the land is from 1,600 to 2,000 feet (488 to 610 metres). This type of country is continued north of the Congo below Manyanga. In places it assumes a mountainous aspect, and is deeply dissected by numerous rivers. Between Manyanga

and Isangila the Congo itself has a much less turbulent course than higher up or lower down, and in places has even been navigated by steamboats. But on account of some low falls and various rapids this stretch is of little value.

Returning to the left bank of the river, the next region to demand attention is the mountainous massif of Bangu, which is bounded on the north by the Congo, on the south and west by the Lukunga, and on the east by the Pioko. It is not a continuous plateau but a highly dissected region which rises in the centre to Mount Uia, 3,445 feet (1,050 metres) above sea-level. On the south and west, along the right bank of the Lukunga, and on the east along the left bank of the lower Pioko, Bangu terminates in cliffs which rise from 800 to 1,000 feet (244 to 305 metres) above the level of these rivers. In the south it is particularly mountainous, its hills and elevated plateaus rising to heights of over 2,000 feet (610 metres), while its deep valleys are often deeply wooded. Northern Bangu on the other hand is lower and much less rugged; the land is undulating, the hills are low and rounded, and the wide valleys which separate them from one another have gentle grass-covered slopes.

Mountainous country is also found towards the south-east of the massif of Bangu, especially between the Kwilu-Madiata and Thysville, where the Matadi-Leopoldville railway reaches its highest point, 2,428 feet (740 metres) above sea-level.

North-east of Bangu the land is somewhat similar to that which lies to the west of the massif. At Leopoldville the Congo enters the gorge by which it passes through the Crystal Mountains, and from there to Manyanga—a distance of 87 miles—it flows in a bed which is sometimes as much as 1,300 feet (395 metres) below the level of the surrounding land. Its course is exceedingly tortuous and irregular. In some places it passes through narrow defiles where the rocks rise perpendicularly to heights of 300 to 600 feet (90 to 180 metres), in others it broadens out, and the river forms caldrons and pools often of considerable size. Rapids are numerous, and navigation is impossible.

The Belgian part of the Crystal Mountains belongs almost entirely to the basin of the Congo. The principal tributaries which join the main stream on its right bank are the Fulukari or Kenke, the Tombe, and the Eluala, and on its left bank the

Inkisi, the Lukunga, the Kwilu, and the Lufu. As they all flow through hilly country, they are practically of no value for navigation.

The Central Basin

Detailed information regarding many parts of the Central Basin does not exist. For this there are several reasons. Over the whole region there is great uniformity in the physical character of the land, and the minor differences which occur are in many cases obscured by dense vegetation. The rivers, which form the chief means of communication, have generally been followed by travellers, and away from them there are many districts which have never been described. The mineral wealth of the country appears to be confined to the peripheral regions, and the necessity for investigating their physical and geological structure has rather led to the neglect of the Central Basin.

To state precisely the extent of the region under consideration is a matter of some difficulty. It certainly includes all the land with an elevation of less than 1,600 feet (488 metres) above sea-level, and in many places the 1,600-foot contour would mark the limits of the region very well, as the land frequently rises much more rapidly above it. But if it be taken a large district lying to the west of the Lualaba and to the north of the Kasai-Sankuru will be excluded from the region, and for this there appears to be no adequate reason. East of the Lualaba above Kindu and south of a line joining Nyangwe with the confluence of the Sankuru and Lubefu the land begins to rise rapidly only when the 2,000-feet (610 metres) contour has been reached, and that line may therefore be considered as marking in this part of the country the meeting place of the Central Basin with the uplands which surround it.

The boundary of the Central Basin may therefore be provisionally defined as follows. On the west it is formed by the Congo and the Ubangi from Stanley Pool in the south to the vicinity of Libenge in the north. From Libenge it follows an easterly direction, keeping to the north of the Dua and Itimbiri, and then bears to the south, crossing the Rubi above Buta and the Aruwimi below Avakubi. The eastern boundary runs more or less parallel to the course of the Lualaba, and at no great distance from its right bank, to the neighbourhood of

Nyangwe, while the southern coincides more or less with the fall-line where the left-bank tributaries of the Kasai-Sankuru make their last descent from the Angolan plateau. On almost all sides the Central Basin slopes down to Lake Leopold, which is only about 1,000 feet (305 metres) above sea-level. The extreme difference in level between the highest and the lowest parts of the region is therefore generally less than 1,000 feet. But only in a few places is there any sudden change in the topography of the surface. In the west a great stretch of country, including the land on either side of the middle Congo as far up as the confluence of the Aruwimi, the greater part of the basins of the Lopori and the Maringa, and the western parts of the Ruki and the Fini, has an elevation of less than 1,300 feet (400 metres). On the other hand the land which is over 1,600 feet (488 metres) in height is limited in the main to the upper basins of the more important headstreams of the Ruki and the Fini, and from there westward to the Lualaba. There are also one or two detached districts, the most important of which lies north of and parallel to the Kasai.

Probably the best way in which to get a general idea of this immense and imperfectly investigated area is to follow the courses of its more important rivers, and as far as possible to describe the lands which they drain. Above Stanley Pool the Congo flows for over 100 miles between steep-faced hills which are high and close to the river in the south, but in the north become lower and recede from it. Across them the Kasai cuts its way in a gorge about 40 miles long to join the main stream at Kwamouth. About 40 miles to the north of Kwamouth the hills begin to disappear, and at Bolobo only a few traces of them are left.

Above Bolobo there are few interruptions in the general monotony of the surface. The narrows at Lukolela are formed by low hills of conglomerate, which do not rise more than 50 feet above the level of the river, and from Irebu to Upoto the Congo flows through a vast plain, which appears to extend to a great distance in every direction. On the left bank there is much marshy land round Lake Tumba, while farther to the north the Ruki, the Ikelemba, and the Lulonga mostly traverse very flat country in their lower courses. In the region between the right bank of the Congo and the Giri there are great

areas of swamp which extend upstream as far as the confluence of the Mongala. The drainage of this part of the country indicates very well the general character of its topography. The rivers are numerous, and at times of high water overflow their banks for a mile or two on either side, while various channels unite them with one another. From the Mongala, about a day's sail above Mobeka, there is a water route to the Ubangi by way of the Giri. Similar channels from the Congo below and above Nouvelle Anvers lead to the Lua or upper Giri. The Congo is also connected with the Lulonga by a waterway which leaves the former river opposite Nouvelle Anvers and enters the latter about three days' sail above its confluence with the main stream. In short a great part of the country between the Congo and the Ubangi as far north as the parallel of Mobeka is under water, and the population live on numerous small islands which rise above the surface of the water.

At Upoto, which is situated almost in the extreme north of the great bend of the Congo, the aspect of the country begins to change. A range of hills which rise about 360 feet (110 metres) above the level of the river run along its right bank as far as Bumba. On the south they fall somewhat steeply to the Congo, but on the north they have a gentle slope towards the Motima and are cut up by several small valleys. Beyond Bumba they leave the river and run towards the interior in a north-easterly direction. Farther to the north, between the Motima and the Dua, there is another range, somewhat lower and without steep slopes. On the whole the country which lies between the Congo and the Dua-Mongala has the appearance of a gently undulating plain, with a general increase in height towards the north. The surface is more deeply incised by the rivers which flow across it, and, while the larger ones have developed broad flood-plains frequently under water during the rainy season, the smaller ones sometimes flow in beds so deep that in order to cross them a descent and corresponding ascent of nearly 100 feet are in some cases necessary. This feature is even more marked farther to the north, along the watershed between the Dua and the Ebola, near Mogbogoma, where the land rises to a height of over 1,600 feet (488 metres), and the streams flow in deeply cut valleys.

Above Bumba, where the hills which began at Upoto recede

from the river, the Congo once more flows in a great plain, which on the right is crossed by the Itimbiri and the Aruwimi. The lower courses of these tributaries lie within the Central Basin, and the land through which they flow is either flat or gently undulating. The Itimbiri is said to be bordered in places by red cliffs, which rise perpendicularly from the river, while on the right bank of the Aruwimi there are ridges of low hills between Moganjo and Yambuya. Away from these rivers comparatively little is known about the topography of the country.

On its left bank the Congo is joined by the Lomami some distance above its confluence with the Aruwimi. The lower part of the basin of the Lomami belongs to the plain through which the Congo flows, and part of the land between the two rivers appears to be covered with marsh. Between Sendwe upon the Lualuba above Riba-Riba, and the Lomami above Bena Kamba there is a depression which during the rainy season is also transformed into an impracticable marsh. Farther to the south the country becomes somewhat higher and more undulating, but it has never been properly explored, and very little is known regarding it.

Above the confluence of the Congo and Aruwimi at Basoko the land on either side of the main stream becomes more broken in character. Even below Basoko rocks and low hills appear on the left bank, and by the time that post is reached they have become continuous and rise to a height of nearly 200 feet. Above it, however, they soon give place to low-lying and swampy land. On the right bank the hilly country begins east of Basoko and continues with little interruption as far as Stanley Falls. These hills nowhere rise to any great height, but they indicate that the land generally is becoming more undulating in character, and that the surface features are less monotonous than those in the western part of the Central Basin. Beyond Stanley Falls the same type of scenery prevails as far as Nyangwe, and, although the country is somewhat broken, no hills of any size lie near the river. Farther east of course the land begins to rise rapidly, while to the west a low watershed separates the basin of the Congo from that of the Lomami.

The characteristic surface features of the western part of the Central Basin of the Congo are also found in the south

of the region drained by the Ubangi. From the confluence of the two rivers northwards for a considerable distance much of the land which lies between them is under water for part of the year. The Giri, a tributary of the Ubangi, flows through a great swamp, where for at least three or four months out of the twelve the trees rise directly from the stagnant water. Some distance north of the Giri the land increases in height, the swamps disappear, and the surface features assume a more varied aspect. Rolling down-like country extends from here northwards to the low hills which border the left bank of the Ubangi above its great bend, and mark the northern limits of the Central Basin. For the sake of convenience, however, these hills may be described here. They run with a general direction of west-north-west to east-south-east, and are more or less parallel to the upper course of the Ubangi. Seen from the rolling country to the south they appear low and of little importance, but when viewed from the north they are somewhat more imposing, as they sometimes rise to heights of at least 1,000 feet (305 metres) above the level of the Ubangi.

To the north of these hills, and above the rapids where they are crossed by the Ubangi between Zongo and Mokoange, the valley of that river is broad and somewhat diversified in appearance. In places it consists of gently undulating land, while in others there are belts of rounded hills which sometimes approach close to the river and sometimes recede from it to a considerable distance. The vegetation is also varied, and on the whole the Belgian side of the Ubangi has a pleasing aspect.

The southern part of the Central Basin falls within the drainage area of the Kasai. In the west lies Lake Leopold, which with the rivers flowing into it is drained by the Fini. This lake appears to be the remnant of a great inland sea into which the waters of the upper Kasai, the Kwango, and the Fini at one time drained. It was cut off from the Congo by a low ridge, to which the name of Mantere Hills has been given, and across which the Kasai at a later date cut the gorge that terminates at Kwamouth. A great part of the land formerly covered by this ancient sea lies to the east of Lake Leopold, and consists of marshy ground now drained by various rivers, of which the Lutoi and the Lokoro are the most

important. Deposition has played a great part in modelling the surface features, and the remains of ancient sandbanks are still to be seen. To the west of Lake Leopold the land appears to be higher, and at the southern end of the lake there are hills from 50 to 200 feet in height. Below the lake also the Fini passes through gently rolling downs which Grenfell declared to be among the most promising districts in the whole of the Central Basin.

In the lands which border the Kasai-Sankuru the topography is somewhat more varied than it is farther to the north. The valley of the Kasai is well cut into the plateau of the Central Basin, which here slopes to the north. Near Dima, a short distance above the mouth of the Kwango, the surface of this plateau lies about 200 feet above the level of the Kasai, while at Basongo, where the latter stream meets the Sankuru, the difference of level is at least 400 feet.

The valley of the Kasai is of varying width. About 15 miles above Kwamouth it is at least a mile broad, while the edge of the plateau proper is seven or eight miles distant. Below Wissmann Pool it increases to at least 20 miles, and the Pool itself is only a large island-studded expansion of the river. Near the confluence of the Kwango with the main stream the valley is still broader, but near Dima it begins to contract, and from about 30 miles above that post the river flows between two gently inclined banks. Farther to the east these increase in height, and near Mount Pogge the undulating plateau which borders the Kasai is between 400 and 500 feet above the level of the river. Higher up towards Basongo the affluents of the main stream are more numerous, and the plateau assumes a more dissected appearance.

Farther to the east the general character of the land remains much the same. A gently undulating plateau occupies most of the country east of the upper Kasai and south of the Lukenie. It slopes towards the north, and seldom exceed 1,500 feet (457 metres) in height. The valleys of the principal streams are deeply incised, and the land in their neighbourhood is often broken. The smaller rivers on the other hand flow in shallow valleys and do not greatly affect the topography of the surface. Minor features depend upon the nature of the underlying rocks. In the sandstone districts the smaller affluents of the large rivers flow in steep narrow valleys, which, as in the case

of some near Lusambo, are almost cañon-like in appearance. Where schists are found the valleys have greater slopes, and often contain small clay-covered plains, which are frequently marshy.

The Welle Region

That part of the Belgian Congo which is drained by the Welle and the Bomu with their tributaries belongs to the Congo-Nile watershed. In general form it consists of a great undulating plateau sloping on the whole from the north and east towards the south and west, and varying in height from over 4,000 feet (1,220 metres) in the former districts to about 1,600 (488 metres) in the latter.

The eastern part of the region as far west as 29° E. has a more irregular topography than the remainder of the country under consideration. A plateau, the average height of which is probably about 4,250 feet (1,300 metres), slopes down gently towards the north and west, where it gives place to an immense plain from 2,300 to 2,600 feet (700 to 800 metres) above sea-level. The plateau and the plain are separated from one another by an intermediate zone, in which there are numerous isolated hills rising from 330 to 660 feet (100 to 200 metres) above the level of the surrounding land. On the east of the plateau are a number of hills which form the Congo-Nile watershed, and on the south, near the Welle-Ituri watershed, some groups of mountains rising to heights of at least 4,500 feet (1,370 metres). Elsewhere the plateau appears as an almost unbroken plain cut up by numerous small streams. It is a region of special interest on account of its suitability for stock-raising, and the Lugwarets, who are its inhabitants, possess numerous herds of cattle.

The intermediate zone of hills which lies to the north and west of the high plateau has in general a lower elevation. Many of the small isolated massifs which characterize the zone are of granitic formation, and the soil in their vicinity appears to be very fertile. In the neighbourhood of the Kibali the surface is much more broken, and a number of hills which rise to at least 330 feet (100 metres) above the general level of the land consist almost entirely of iron ore.

West of the districts just described the physical geography of the Welle region presents comparatively few features of

interest. As the rainfall decreases from south to north, the tributaries of the Welle are more powerful than those of the Bomu, and have cut their way back to such an extent that, east of the Were at least, the greater part of the country is drained by the former river. West of the Were, the Bili and other tributaries of the Bomu flow in a westerly direction, and on the whole the general slope of the land is towards the west and south-west. On the south the country falls, somewhat steeply in places, towards the Central Basin.

Over the whole of this region the land forms a series of broad undulations which produce hardly any visible effect on the contour of the surface. North of Niangara, for example, the country is very flat, devoid of hills, and but slightly undulating, and as far as the Congo-Nile divide it appears to consist in the main of a series of monotonous plains. The actual water-parting, however, is clearly marked. To the south and west of Niangara the country retains the same general character, but is somewhat lower, except where one or other of several groups of hills rises above the level of the surrounding land. Mount Angba, which is situated on the right bank of the Welle near Amadis, and rises to a height of between 600 and 700 feet above the river, is an enormous mass of iron ore. To the south of it Mount Majema on the Bomokandi near Poko is of similar formation, while higher up the same river lies Mount Tena. The latter, which is said to rise to a height of 4,900 feet (1,490 metres) above sea-level, is also a mass of iron ore.

Considered as a whole, the region is one which has not yet been dissected by rivers to any great extent. The Welle and most of its tributaries wind their way between high banks of clayey alluvium, and the broad depressions in which they flow are much too shallow to be termed valleys in the ordinary sense. The courses of the streams are interrupted by numerous falls which prevent continuous navigation. In the intervening reaches, where the fall of the rivers is slight, they sometimes expand during the rainy season into large swamps. There do not, however, appear to be any marshy districts similar to those found in some parts of the Central Basin.

Over a great part of the country the soils consist of sandy clays. In many places, and especially, it is said, in the neighbourhood of the iron mountains, these soils are rich in

limonite, which sometimes forms a hard crust on the surface and makes the land unfit for cultivation. Alluvial soils occur in the vicinity of the rivers, and it is probably in these districts that the most extensive areas of cultivable land are to be found.

The Eastern Highlands

The Eastern Highlands are here taken to include the mountain system which borders the Great Rift Valley on the west, together with that part of the valley itself which lies within the Belgian Congo. The region is one of considerable orographical complexity, and in many places its features are known only in broad outline. As a general rule, however, the land rises gradually from the central basin to the mountains which border the rift, and then falls steeply to the great valley in which lie Lakes Albert, Edward, Kivu, and Tanganyika.

Lake Albert.—These general characteristics are well brought out in the country to the west of Lake Albert. The eastern slopes of the mountains are drained by short rapid streams, while the western lie within the basin of the Ituri and its tributaries. Along the central part of the lake the mountains run parallel to the coast, from which they are not more than a few miles distant. Farther north they recede from it, and the plain of Mahagi, which on its landward side is bordered in places by escarpments 700 to 1,000 feet (214 to 305 metres) high, intervenes between them and the lake. Towards its southern end also Lake Albert is bordered by a continuation of the Semliki plains.

The western slopes of the mountains have been much cut up by the Ituri and its tributaries, more especially by the Shari and the Nzi. For the greater part of their course these two rivers flow through very rugged country, but near their confluence there is a large and important plain. In the region round Nioka, farther to the north, the land is less rugged, and there is a succession of hills with gentle slopes separated by small river-valleys. In the forest zone which lies farther west than the region just described the land is lower, but is often hilly and even mountainous in places. Among the more important heights in the range are the Korowi Mountains, the Pikoti Mountains, the Aja Mountains, and the Numa Mountains. These range in height from about 6,500 to 8,400 feet (1,980 to 2,560 metres).

The Semliki.—The rift-valley is continued to the south of Lake Albert by the valley of the Semliki, which flows from Lake Edward. It is a large river, but owing to the difference of level between the two lakes, 968 feet (295 metres), it is broken up by rapids to such an extent that it is unnavigable except in its lower course, where it winds about in the marshy plain to the south of Lake Albert.

The mountains which border Lake Albert on the west fall at Boga (south-west of the point at which the Semliki enters the lake) to a height of about 4,250 feet (1,295 metres). They rise again in Kiamata to 5,050 feet (1,540 metres), but south of that mountain their elevation is again reduced, and a gap is formed which to the north-west of Beni does not exceed 4,035 feet (1,230 metres). It is through this gap, over 30 miles wide, that the great tropical forest of the central Congo makes its way eastward to the slopes of Ruwenzori. To the south-west of Beni the mountains increase in height, and the escarpments towards the rift-valley again becomes well marked. The western slopes of this range are drained by the Ibana, a tributary of the Ituri, and to a great extent they are covered with virgin forest.

On the east of the rift-valley part of the massif of Ruwenzori lies within the Belgian Congo. This massif forms the eastern escarpment of the rift for a distance of about 70 miles. Its highest point is 16,600 feet (5,060 metres) above sea-level, and a considerable area on its summit is covered with perpetual snow. It has not yet been ascended from the western or Belgian side.

Lake Edward.—West of Lake Edward the escarpment runs close to the shore. Its altitude is considerable, and in several places heights of over 7,000 feet (2,134 metres) are reached, while the culminating point near the northern end of Lake Edward is 10,216 feet (3,114 metres) above sea-level. The massif as a whole appears to be very broad and to fall steeply on the west, where it is much cut up by tributaries of the Lindi and the Lowa.

The Ruchuru.—The upper course of the Ruchuru is mountainous, but in its lower course it flows through a plain which forms part of the rift-valley. On the west the plain is bordered by the escarpment of the Itongo Mountains, the summits of which rise to an average height of about 7,250

feet (2,210 metres). The escarpment on the east of the plain also belongs in part to the Belgian Congo; in the south it is high and deeply ravined, but towards the north it is much lower and descends gently to the level of Lake Edward.

The Virunga Mountains.—To the south of the plain of the Ruchuru the rift-valley has been blocked by a number of volcanoes to which the general name of Virunga Mountains has been given. These volcanoes may be separated into three clearly distinct groups, a western, a middle, and an eastern. The western group contains Namlagira and Ninagongo, both of which are still active. The eastern and central groups on the other hand are each composed of three extinct volcanoes, those in the former group being Sabinio, Mgahinga, and Muhavura, and in the latter Vissoke, Karissimbi, and Mikeno. The Belgogerman frontier crosses the region, so that some of the volcanoes lie partly, and others entirely, outside of the Belgian Congo. The highest is Karissimbi, which rises to 14,783 feet (4,506 metres) above sea-level.

In addition to the eight large volcanoes there are a number of craters, most of which are in a more or less advanced state of denudation. They often follow well-marked lines of fracture.

Lake Kivu.—The western escarpment of the rift-valley, which may be traced from the north past the region of the volcanic mountains, is continued along the west of Lake Kivu, into which it often steeply descends. The lake itself is about 60 miles in length, and contains the mountainous island of Kwijwi, which belongs to the Belgian Congo. The western slope of the escarpment drains to the Lowa and the Ulindi, and has the same general character as farther north.

The Rusisi.—The Rusisi flows from Lake Kivu to Lake Tanganyika. Between the southern end of the former lake and the plain in which the river flows for the greater part of its course there is a great barrier of primitive and eruptive rocks, which stretches across the rift-valley and rises to a height of about 2,300 feet (700 metres) above the level of the plain. On the east it passes insensibly into the mountains which border the rift-valley, but on the west the escarpment is clearly visible and can be traced by its high summits with rounded outlines.

Across this barrier the Rusisi makes its way in a deep

gorge. The difference in level between Lakes Kivu and Tanganyika is about 2,230 feet (680 metres), and the Rusisi falls very rapidly during the first part of its course. Later on its speed becomes less, and it flows through a low marshy plain.

The western escarpment still remains high and steep. Towards the Congo the land falls much more gradually, and the basins of the rivers which drain it, the upper Ulindi and the Elila, are mountainous in the east, hilly in the centre, and fairly flat in the west. All the more important rivers are cut up by numerous falls and many rapids.

Lake Tanganyika.—Seen from the delta of the Rusisi, Lake Tanganyika has the appearance of an immense corridor lying between high and almost perpendicular walls. It has a length of about 400 miles, and an average breadth of about 30 miles. At one time the level of the lake appears to have been higher than it is at present, and the modern shore-line is often separated from the foot of the mountains by a long belt of gently sloping land, which terminates near the lake in a sandy beach.

The western escarpment between Uvira and Baraka is particularly high, and sometimes rises to 4,000 feet (1,220 metres) above the level of the lake. It appears to form a high broken plateau, which has been carved by the rivers draining it into separate table-topped mountain ranges. This region, which is known as the Maniema, lies within the basins of the Elila and the Luama. To the south of it the valleys remain high as far as the remarkable valley through which the Lukuga flows from Lake Tanganyika to the Lualaba.

The region through which the Lukuga flows is much lower, especially to the south of the river. There the characteristic features are wide plateaus and undulating hill country, cut up by numerous valleys, which are all more or less narrow and deep. The affluents of the Lukuga which flow in these valleys are rushing torrents during the rainy season, but during the dry season are often reduced to a mere trickle. Near the main stream the land is low and marshy, but farther off it rises, sometimes by terraces, to the mountains which border it on either side.

South of the Lukuga the mountainous region which lies to the west of Lake Tanganyika is known as the Marungu.

In the more elevated districts to the south there are, to the north of the Lunangwa, great scarped heights separated from one another by deep and steep-walled valleys, and huge shelving ridges whose surface is dotted with minor peaks. Towards the north and west these disappear to a great extent, and their place is taken by undulating plains, the elevation of which is not so great. To the former region the name of High Marungu has been given, while the latter is known as the Manika, or Low Marungu. The more important heights of the High Marungu rise to 7,000 or 8,000 feet (2,135 or 2,440 metres) above sea-level, while the river-valleys are at least 2,000 feet lower. In the Low Marungu the average elevation is about 2,000 feet above sea-level.

Katanga

The Katanga, which occupies the south-eastern part of the Belgian Congo, is an extension of the high plateau region of South Africa and Rhodesia. Towards the north it has undergone considerable radial dislocation, and large rifts or graben have been formed. Several important sub-regions may be distinguished.

In the south, along the Congo-Zambezi divide, the country consists of an undulating plateau with an altitude of between 4,000 and 5,000 feet (1,220 and 1,525 metres) above sea-level. To the north of it the country in which the copper mines are found is diversified by frequent hill ranges, and generally lies between 3,500 and 5,000 feet (1,065 and 1,525 metres) above sea-level. It is well watered by tributaries of the Luapula, Lufira, and Lualaba rivers, and is as a rule covered with relatively thin forest.

Still farther north the country rises by steep escarpments to higher plateaus which have altitudes of 4,500 to 6,000 feet (1,370 to 1,830 metres) above sea-level. The upland plains on these plateaus are undulating and furrowed by numerous watercourses, which cut out steep and wide ravines. The main watercourses find their way through this region by large valleys, and fall rapidly to much lower levels.

The chief physical regions into which the Katanga as a whole may be divided are the following.

The Southern Katanga.—At a first glance the whole of this region seems to consist of a region of hills and peaks, but

when viewed from any one of the latter it assumes its true form and appears as a vast undulating plateau. On the south it passes into the similar plateau of Rhodesia; on the north-west it is bordered by the south-west prolongation of the Bianco plateau, and towards the north-east by the plateau of Kundelungu. On the north it falls steeply to the Low Katanga.

The Kundelungu Plateau.—Kundelungu is the high plateau which lies between the Luapula and Lake Mweru on the east and the valley of the Lufira on the west. Two distinct regions may be recognized, the plateau proper and the slopes which lead up to it from the rifts by which it is partly surrounded. The former has an area of at least 6,000 square miles, and an average height above sea-level of over 5,000 feet (1,525 metres). It presents on the whole a gently undulating and only slightly diversified surface. Here and there, there are shallow basins where, as a result of the impermeability of the sub-soil, and it may be the neighbourhood of a spring, the soil is damp throughout the year. These 'dembos', as they are called, are sometimes ten to twelve miles long and two miles broad, and their surface soils are often very fertile.

The slopes of the plateau on the other hand are much cut up by rivers, and often terminate in almost perpendicular cliffs which mark the lines of fracture. On the west, for example, the Kasanga and the Lofoi leave the plateau to join the Lufira by hanging valleys and falls from 600 to 700 feet in height. On the east again the western fault of Lake Mweru seems to be continued to the south along the flank of the plateau, where a whole series of rivers leave the plateau by falls hundreds of feet in height.

The eastern slope of the plateau between the Luizi and Lake Mweru differs somewhat from the escarpment farther to the south. The rivers have cut deep valleys well back into the plateau, and the land through which they flow forms rough, hilly country. In the lower courses of these and other rivers there are often tracts of rich alluvial soil.

The Kibala and Mulumbwe Plateaus.—Separated from the Kundelungu by the high valley of the Lubule lies the region of Mulumbwe. Here the forces of erosion have long been active, and the country consists of a succession of hills and broad valleys. The summits of the larger hills are almost horizontal

and are covered with a fertile light clay, on which the savanna is comparatively luxuriant, while the valleys contain large tracts of alluvium on which the vegetation is particularly rich.

The Kibala plateau, which lies to the north-west and north of the Mulumbwe plateau, forms an undulating country drained by various tributaries of the Lualaba. Parts of the surface appear to be covered with laterite similar to that on Kundelungu, but in the larger valleys, where alluvial soils have accumulated, there are many fertile districts.

The Mweru-Luapula Rift-Valley.—To the east of the Kundelungu plateau lies the rift-valley of the Luapula and Lake Mweru, which here separate the Belgian Congo from Northern Rhodesia. Its western border has already been described, and its eastern is somewhat similar in character. In the valley itself much of the soil is alluvial, and there are many fertile districts along the course of the Luapula and to the south-west of Lake Mweru. On the other hand considerable tracts of country, especially in the valley of the lower Luapula, become marshy during the rainy season. The region has a height of about 3,000 feet (915 metres) above sea-level. Lake Mweru itself is a shallow sheet of water, and the greatest known depths do not exceed 50 feet (15 metres). It appears to be gradually filling up, partly as a result of the sand carried into it by various rivers, and partly by the vegetation which grows in its bed.

The Lufira Valley.—Between the Kundelungu plateau on the east and the Bianco plateau on the west the Lufira flows through another region which has been formed by subsidence. It is roughly triangular in shape, and is drained by the Lufira from the south, the Dikulwe from the south-west, and the Luvua from the north. In the south of this region lies a detached hilly region known as the Pompora and Koni Hills. Structurally it is a horst, akin to the Kundelungu and Bianco plateaus.

The Bianco Plateau and the Bia Mountains.—These also form a horst lying between the region of subsidence in the valley of the Lufira just described, and the similar region in the valley of the Lualaba farther west known as the rift-valley of Upemba. The Bianco plateau has a height of about 5,000 feet (1,525 metres); its flat surface is almost unbroken, and the rivers which originate on it descend by steep slopes to the lowlands

It is continued to the north by the Mutenga-Miamba spur, to the west and north-west of which lie the Bia Mountains. These mountains, which form the border of the Bianco plateau, consist partly of granitic rocks and are very irregular in outline. Their future economic development will probably depend mainly upon the large deposits of tin which they contain.

The Rift-Valley of Upemba.—The Upemba rift-valley, which is occupied by the Lualaba, runs from south-west to north-east. Its south-eastern border is formed by the Bianco and Kibala plateaus, and the north-western by the Hakansson plateau. The escarpments are steep, but their sharp outlines have been much reduced by river erosion and denudation. The larger rivers which enter the valley descend from the plateaus by long series of falls and cascades.

The valley itself presents several features of interest. The greater part of the ancient lake which at one time occupied it has been filled up partly by alluvial matter carried down by the rivers from the surrounding uplands, and partly by the remains of the papyrus reed which flourished in the shallow waters near the land. Lakes Upemba and Kisale, the largest remaining portions of it, are gradually being reduced in size in this way. In all there are about thirty-five of these fluvial lagoons. At times of flood the level of the rivers is much higher than during the dry season, and as a consequence vast marshes are formed. Between these lie the villages and the cultivated lands which surround them.

The Hakansson Plateau.—This forms a well-defined system falling steeply towards the Lualaba on the south-east, and more gently towards the Lovoi on the north-west. The axis of the chain consists of a granitic massif, the summit of which has been worn down into an undulating plateau broken here and there by a few hills and low ridges. Towards the east the topography is somewhat more varied, as the rivers which flow from the plateau into the Upemba rift cut up the escarpment and give it a more mountainous aspect. Beyond the confluence with the Kilubi, the Lovoi cuts its way through the range, which is continued to the north by a series of comparatively low hills.

West of the Hakansson and Bianco plateaus are other plateaus of similar character connecting the Katanga with the Kasai region.

The above survey of the physical features of the Katanga

indicates that it is a region of great topographical diversity. At the present time the large deposits of copper which occur in the south constitute its chief claim to attention, but there are considerable areas where agriculture in one form or another could be pursued. Its soils, as might be expected, differ greatly in character. Alluvial plains and swamps, some of which are of considerable size, occur in various localities, the most important being those in the Dikulwe-Lufira-Luvua area and along the Lualaba in the Upemba rift. Many parts of the high plateau are covered with sand, evidently derived from the Lubilash rocks which are widely distributed throughout the region. Such districts form rolling short-grass country, on which trees are generally absent. Laterite is generally observed where the subsoil is more or less impermeable, and chiefly in flat country, where surface drainage is slow. Gravels are found in many river-valleys.

Another feature of interest in the Katanga are the thermal and mineral springs which occur all over the country. The waters from these springs contain sulphuretted hydrogen, sodium chloride, magnesium sulphate, calcium and magnesium carbonates, and silica. In some cases their temperature is little below boiling-point, while in others it is little above that of the surrounding rock. The more saline springs are frequently used by the natives as sources of common salt, which they collect in various ways.

The Kasai Region

The country known as the Kasai region lies somewhat to the south of that river and its main tributary, the Sankuru. Its boundary towards the north is determined by an escarpment, the exact position of which will be defined later. In general character the region is a plateau with a gentle slope from north to south. The rivers as a general rule follow the slope of the land, and their valleys, often deeply cut, provide the main features in the relief of the surface. The sandstones of the Lubilash series, by which it is mainly covered, were deposited upon a peneplained surface of older rocks which appear as residual mountains rising above the level of the surrounding sandstone or are found underlying the sandstone in the valleys of the more important rivers.

In the extreme west the basin of the Inkisi, a tributary of the Congo, is much dissected by the various rivers which drain it, but it has the general appearance of a plateau, with an average height of about 1,500 feet (457 metres), cut up by numerous valleys of erosion. The eastern border of this basin is formed by a relatively high escarpment which runs approximately from north to south, and leads to a second plateau with an average height of about 2,500 feet (762 metres) above sea-level. This plateau stretches eastward as far as the upper Sankuru, where it attains a height of about 2,800 feet (854 metres).

Towards the north the plateau terminates in the low escarpment which has already been mentioned. This escarpment begins on the Kasai west of the Kwa gorge, and at first runs southward more or less parallel to the course of the Kwango, but north of the fifth parallel it bends to the east and crosses that river between Muene Kundi and Kingunshi. From there it runs by way of Kenge on the Wamba and Madibi on the Kwilu to Bena Makima on the Kasai, whence it goes in a north-easterly direction to the confluence of the Sankuru and Lubefu. The edge of the plateau is about 650 feet above the level of the rivers. The escarpment is much dissected, and when viewed from the north presents a somewhat mountainous aspect. To the south of the escarpment the land increases in altitude, and about the fifth parallel assumes its proper form of a continuous plateau.

The falls by which the rivers draining the plateau descend from it lie back, often a considerable distance, from the escarpment. To the west of the Loange there are vertical falls, and the total difference in level between the upper and lower courses of the rivers is often about 1,000 feet (305 metres). Below the falls the rivers in this part of the country flow in deep cañon-like valleys. (Some of the falls marked on maps, such as the Archduchess Stephanie Falls, are merely rapids, and the true falls lie higher up the river.) To the east of the Loange the falls are not well marked, and the rivers descend a few yards at a time over several miles, the total change of level thus produced being considerable. The valleys, though deeply entrenched, are not cañon-like as they are in the west. In the west the falls are probably due to a change of level caused by sinking in the central part of the Congo basin—

a change of level with which the rivers have not been able to keep pace. In the east on the other hand the immediate cause of the difference of level appears to be the hardness of the granitic substratum on which the rivers make a relatively slight impression. The Loange itself is an important river without any important fall, and it has been suggested that it flows in a fractured valley.

The soils of the region vary in character. On the plateau they consist mainly of sands or sandy clays; on the slopes of the valleys clays are more abundant, while in the valleys themselves large areas are covered with clay underlain with an impermeable subsoil.

To the east of the upper Sankuru the country gradually becomes transitional between the Kasai region proper and the Katanga. At first the land is much broken, and consists of a succession of hills and plateaus on which the soil is generally poor. Farther east there are large plateaus almost similar to that of the Bianco. The land is unforested, and is covered in many places by a sandy clay soil.

CHAPTER III

CLIMATE

THE data available for a study of the climate of the Belgian Congo are still very scrappy and imperfect. Prior to 1911 they consisted in the main of scattered observations which had been made as circumstances permitted, and seldom extended continuously over a whole year, much less over a series of years. In 1911, however, attempts were made to improve matters, and the control of the Meteorological Service was handed over to the Department of Agriculture. The Service was then reorganized, and a number of observing stations established throughout the country. Of these the most important and best-equipped were at Banana, Eala, Stanleyville, and Elisabethville. At Ganda-Sundi and Kitobola arrangements were made to record temperature, rainfall, humidity, and the direction and intensity of the winds, while at twenty-four other places throughout the country rain-gauges were set up and observations provided for. About the beginning of 1913 most of these stations were in working order, but the outbreak of war appears to have disarranged matters, and comparatively few records covering more than a year or two are available. If sufficient material now exists to enable a general statement regarding the climatic conditions of the country to be made, it must also be borne in mind that few of the figures given below can be considered as more than approximate.

GENERAL CONDITIONS

The most important factor affecting the climate of the Belgian Congo is its equatorial position. To this is due the uniformly high temperature which prevails over the greater part of the country, and the well-marked double maximum in the annual rainfall. The heat equator lies to the north of the geographical equator, and the lands to the north of the latter have therefore a higher mean temperature than those to the

south of it. Partly because of this the dry season is more marked to the south of the equator than to the north of it—a fact which also appears to exercise an important influence on temperature. The Katanga, on account of its high elevation and southerly latitude, has characteristic features of its own, and must to a certain extent be treated separately. The districts to the west of the Crystal Mountains also have some peculiarities owing to their proximity to the Atlantic.

TEMPERATURE

Throughout the greater part of the country the highest temperatures are reached in February, March, or April, March as a rule being the warmest month. This applies to the regions lying north of the equator as well as to those lying south of it, and appears to require a word of explanation. The reasons for it, however, are by no means clear, but may be somewhat as follows. South of about latitude 2° S. a well-marked dry season begins to manifest itself. This occurs when the sun is north of the equator, and the land is consequently cooled by radiation, the lowest temperatures being reached about July. When the sun comes south again the temperature begins to rise, at first somewhat rapidly, but after the beginning of the rainy season more slowly. This continues during the whole time the sun is south of the equator, and the maximum temperatures are reached shortly after it has passed overhead on its way north, that is, about March. In the northern hemisphere on the other hand, owing to the fact that the heat equator is north of the geographical equator, there is no well-marked dry season, and the sky is much overcast throughout the year. Radiation is not so great, and the temperature is more uniform. On the other hand the rainfall is somewhat heavier and exercises a greater cooling effect. Consequently the highest temperature is reached when the sun is on its way north, but before the heavy rains begin, that is, in February, March, or April.

In the hottest month of the year the mean temperature varies from about 78° to 82° F. On the whole it is higher to the north of the equator than to the south of it. July or August is as a rule the coolest month except very near the equator, where the minimum occurs in the last quarter of

the year. The mean temperature varies from 75° to 80° F., and is on the whole lower for the southern districts than for the northern.

It would be rash to place too much reliance on the figures which are available, but when they are reduced to sea-level it would appear that the distribution of mean annual temperature is somewhat as follows. From the equator there is a rise both to the north and to the south. In the north this rise is continued well beyond the frontier of the Belgian Congo; in the south it probably ceases somewhere between the sixth and tenth parallels, but in the absence of fuller information it is impossible to say precisely where.

The annual range of temperature is least in the equatorial districts, and becomes greater to the north and to the south of them. The figures available for places within 2° of the equator show a range of about 2° to 4° F. For the country to the north of this no observations have been made in the Belgian Congo, but at Mobaye on the French side of the Ubangi the annual range is 6° F. To the south of the equatorial districts it varies as a rule between 7° and 10° F.

The mean daily range as far as it is known is fairly uniform over the greater part of the country apart from the Katanga, and varies from 12° to 20° F. Absolute extremes which have been recorded show maxima as high as 104° F. at Luluabourg and 102° F. at Eala, and minima as low as 54° F. at Ganda-Sundi and Vivi. On the uplands of the Congo-Nile divide and on the plateau south of the Kasai the range is probably much greater at times.

Several regions present features of special interest. In the districts bordering the lower Congo west of the Crystal Mountains the temperature of the warmest month (February or March) is well up to the average, being about 80° F. In July or August, however, the mean temperature falls to about 70° F., which is rather less than that of places in the same latitude farther to the east. These lower temperatures may perhaps be explained by the presence off the west coast of Africa of a cold current, and its cooling effect on the local south-westerly winds which at that season blow over the districts referred to.

The greater part of Katanga, on account of its southerly latitude and high elevation, has climatic conditions peculiarly

its own. The temperature is lower both in summer and in winter, and the annual range is greater. Elisabethville, which lies over 4,000 feet above sea-level, has its highest temperatures in October or November, that is, when the sun is on its way south and just before the rainy season has begun to cool the air. The coldest months are May, June, and July, when the sun is overhead in the northern hemisphere. The annual range is from about 60° F. in the coldest months to about 75° F. in the hottest. The variations in the mean daily range are also much more marked here than in other parts of the country. It appears to be greatest about July, when it is as much as 45° F., least about February, when it does not exceed 20° F.

For the Eastern Highlands and the Kasai uplands no reliable figures are available. In the former region the high temperature of the equatorial belt is modified by the great height of the land, and certain districts enjoy a climate of the warm-temperature type. The Kasai uplands are intermediate in latitude and altitude between the central basin of the Congo and the plateau of the Katanga, and in temperature they resemble in a modified form the southern part of the Central Basin.

RAINFALL

The seasonal distribution of rainfall in the Belgian Congo is governed by the northward and southward movements of the sun across the country. As a result of this movement there is practically everywhere, except in the Katanga, a double maximum and a double minimum in the course of the year. The districts bordering the equator lie well within the rain-belt at all seasons, but even there the seasonal variation is established. At Eala (0° 5' N.), for example, the maxima occur in March and October and the minima in July and January, the extremes being 3.2 inches in January and 7.9 inches in October. Farther in the interior Romee (0° 25' N.) has its maxima in April and November and its minima in February and August, the extremes being 3.3 inches in August and 12.4 inches in April.

Farther north, about midway between the equator and the northern frontier, the rainfall is less evenly distributed throughout the year, the maxima are as a rule closer together,

and one minimum is longer and drier than the other. There is, however, no well-marked dry season. At Yambata, which is in some ways typical of this region, the months of maximum rainfall are April and August, and the months of minimum rainfall June and December. The wettest month in 1911 was August, with over 12 inches, and the driest December, with about half an inch.

The region between the Welle and the Bomu is the only part of the country north of the equator with anything approaching a dry season. At Uere the maxima are in May and October, for which months the rainfall is 7.4 and 14.9 inches respectively. The first minimum is in July, which has 4.8 inches, and the second in December and January, during which period less than 2 inches fall.

South of the equator the dry season is much more marked. In the districts round the lower Congo the first maximum is in March or April, and the second in November or December. There is a reduced rainfall in January and February, and a dry season which usually lasts from about the beginning of June till the end of September. At Banana, for example, April and November have over 8 inches, January and February about 3.5 inches, and June, July, August, and September less than half an inch in all. In the interior the same characteristics prevail, but the dry season is shorter: at Luluabourg and Kasongo, for example, it lasts only during June and July; farther east it is somewhat longer. To the south, in the Kasai uplands, the dry season is of greater duration and the total precipitation less.

In the Katanga, more especially in the southern part of it, there appear the first indications of a single maximum in the rainy season. The observations made at Elisabethville cover only a few years, and the results are not always consistent, but the tendency is for the rainfall to begin about the end of September, to increase to a maximum about February, and to cease in April or at the beginning of May.

Great caution must be observed in any attempt to estimate the total annual rainfall of the different regions of the Belgian Congo, as the small number of stations, the short periods during which observations have been made, and the uncertainty which must necessarily exist regarding the accuracy of the records render generalization dangerous. In the Central

Basin a number of stations have an annual precipitation between 60 and 65 inches. The figures based on one year's observations for Likimi in the basin of the Mongala and for Avakubi on the Aruwimi are higher and are between 70 and 75 inches. As these places occur in densely forested districts which require a heavy rainfall, it is not unlikely that they are typical of considerable areas, and are not exceptional either in time or in place. If this be so, it would follow that the mean annual rainfall over the greater part of the Central Basin is between 60 and 75 inches; in all probability, however, the area with less than 65 inches is much larger than that which has over that amount. The records of Lusambo and Luluabourg indicate that the area with a rainfall of over 60 inches may be carried well to the south of the fifth parallel in the country between the Kasai and the Sankuru.

The peripheral regions have on the whole a lower rainfall than the Central Basin. To the north of the Welle the mean annual precipitation appears to fall to between 50 and 60 inches, but is probably nearer the latter amount than the former. In the Eastern Highlands rainfall diminishes towards the east, and Kwesi, Nya Lukemba, and Albertville have an annual mean of about 45 inches, while other districts have probably somewhat less. To the west of the Crystal Mountains the rainfall is more variable, and ranges from 35 to 55 inches, being highest in the hill country of Mayumbe and lowest along the Congo.

In the Kasai uplands the rainfall is also less than in the Central Basin, except in the district already mentioned between the Kasai and the Sankuru. Farther west, between the Kasai and the Kwango, precipitation appears to decrease towards the south, and probably falls to 45 inches or less. The southeastern districts are among the driest in the country, and it is doubtful whether the mean annual precipitation in the basins of the Luvua and the Lufira reaches 45 inches. On the High Katanga on the other hand the summer rainfall is heavy, and amounts to between 45 and 50 inches.

Considering these facts as a whole, it is evident that the rainfall of the Belgian Congo is not very great, and is indeed less than might have been expected. It is questionable whether as much as 80 inches falls anywhere throughout the colony. This is a low maximum as compared with the

Cameroons, where records of over 150 inches are not uncommon. Nor is the number of days on which an appreciable amount of rain falls at all excessive, and very few places appear to have on an average more than 110 such days in the course of the year. As a rule the sky is usually clouded over at sunrise during the rainy season, but gradually clears as the morning advances. Between one and two in the afternoon storm clouds appear, and these may, or may not, lead to rain. Thunderstorms are of frequent occurrence in the rainy season.

WINDS

Few accurate observations have been made regarding the strength and direction of the winds, and most of the information regarding them has to be gleaned from miscellaneous sources. Westerly winds prevail on the coast during the greater part of the year, and appear to make their way well into the interior of the continent. It is only in the east, and more especially in the south-east, that winds with an easterly component gain the upper hand.

Mention is frequently made of tornadoes by residents and travellers in the Congo. Most of these, however, appear to be atmospheric disturbances caused by thunderstorms, and are not tornadoes in the true sense of the term.

CLIMATIC REGIONS

The foregoing discussion indicates that the Belgian Congo may be divided into a number of climatic regions corresponding more or less closely with the physical regions already described. The main characteristics of each region may now be summed up and the records of a few typical stations added.

Central Basin

The Central Basin, owing to its equatorial position, has a uniformly high temperature. The annual range is slight, and the diurnal range, though considerable, is not excessive. Rainfall is heavy and is well distributed throughout the year, though towards the northern and southern margins of the region there are indications of a dry season. As a result of the heavy and more or less continuous rainfall the relative humidity of the atmosphere is generally high.

TEMPERATURE

Station.	Lat.	Long.	Jan.	Feb.	Mar.	April	May	June
Eala	0° 5' N.	18° 21' E.	75.9	75.4	76.5	76.8	76.8	76.6
Nouvelle Anvers .	1° 5' N.	19° 9' E.	79.0	79.7	78.8	78.4	78.8	78.3
Leopoldville . .	4° 2' S.	15° 19' E.	77.0	78.3	80.0	79.5	77.7	75.7

Station.	Lat.	Long.	July	Aug.	Sept.	Oct.	Nov.	Dec.
Eala	0° 5' N.	18° 21' E.	75.4	75.6	75.2	75.6	74.8	76.3
Nouvelle Anvers .	1° 5' N.	19° 9' E.	76.3	76.1	76.6	76.8	77.4	77.5
Leopoldville . .	4° 2' S.	15° 19' E.	72.3	74.7	77.9	77.7	77.9	77.9

RAINFALL

Station.	Lat.	Long.	Jan.	Feb.	Mar.	April	May	June
Eala	0° 5' N.	18° 21' E.	3.2	3.5	5.0	6.0	5.7	3.5
Dundu Sana . . .	3° N.	22° 26' E.	1.9	1.6	2.7	11.2	3.9	3.9
Lusambo	4° 58' N.	23° 23' E.	5.5	6.8	8.5	7.9	3.0	1.5

Station.	Lat.	Long.	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Eala	0° 5' N.	18° 21' E.	3.4	4.1	7.7	7.9	5.9	5.5	61.4
Dundu Sana . . .	3° N.	22° 26' E.	3.3	6.3	7.7	11.8	5.8	0.7	60.8
Lusambo	4° 58' N.	23° 23' E.	5.0	2.2	6.4	6.8	5.0	7.0	65.6

Lower Congo

The Lower Congo, on account of its proximity to the ocean and more southerly latitude, differs in several respects from the Central Basin. The mean temperature of the warmest months is at least as high, but the annual range is greater on account of the low temperatures of July and August. The total precipitation is also much less, and there is a dry season of several months' duration. For these reasons the region is better adapted to Europeans than the preceding one.

TEMPERATURE

Station.	Lat.	Long.	Jan.	Feb.	Mar.	April	May	June
Banana	6° S.	12° 27' E.	80.0	80.6	82.0	81.3	79.1	75.0
Ganda-Sundi . .	4° 8' S.	12° 52' E.	78.4	79.8	80.0	77.5	78.4	74.1

Station.	Lat.	Long.	July	Aug.	Sept.	Oct.	Nov.	Dec.
Banana	6° S.	12° 27' E.	73.0	72.8	75.9	78.4	79.5	80.2
Ganda-Sundi . .	4° 8' S.	12° 52' E.	69.6	70.9	72.3	73.4	75.4	75.6

RAINFALL

Station.	Lat.	Long.	Jan.	Feb.	Mar.	April	May	June
Banana	6° S.	12° 27' E.	3.5	3.6	4.0	8.4	2.2	0.0
Ganda-Sundi . .	4° 8' S.	12° 52' E.	6.2	9.3	8.7	8.4	5.6	0.0

Station.	Lat.	Long.	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Banana	6° S.	12° 27' E.	0.0	0.2	0.2	1.9	8.3	4.6	36.9
Ganda-Sundi . .	4° 8' S.	12° 52' E.	0.0	0.2	0.3	2.4	8.7	5.2	55.0

Welle Region

The Welle region is the most northerly in the country, and approaches the Sudan in its climatic characteristics. The temperature is on the whole somewhat higher, and the annual range greater than in the Central Basin, and, although there is rain throughout the year, the precipitation during the southern summer is markedly low. The climatic régime of the region can best be illustrated by the records of Mobaye in French Equatorial Africa, though the rainfall there is somewhat greater than it is farther east.

TEMPERATURE

Station.	Lat.	Long.	Jan.	Feb.	Mar.	April	May	June
Mobaye . . .	4° 20' N.	21° 10' E.	77.7	77.5	80.0	77.9	78.2	77.5
Station.	Lat.	Long.	July	Aug.	Sept.	Oct.	Nov.	Dec.
Mobaye . . .	4° 20' N.	21° 10' E.	76.1	74.3	75.9	75.9	76.5	77.7

RAINFALL

Station.	Lat.	Long.	Jan.	Feb.	Mar.	April	May	June	
Mobaye . . .	4° 20' N.	21° 10' E.	0.5	1.5	4.6	6.4	15.2	7.3	
Station.	Lat.	Long.	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Mobaye . . .	4° 20' N.	21° 10' E.	4.4	6.6	7.2	8.8	5.4	1.1	68.6

Eastern Highlands

The Eastern Highlands have a temperature which decreases with altitude, but, as no observations have been made, it is impossible to say at what rate that diminution takes place. It is obvious, however, that the climate must be sub-tropical rather than tropical in the more elevated areas, and it is possible that some districts may even be suitable for European settlement. The rainfall is also less than in the Central Basin, and appears to diminish towards the east. To the north of the equator it takes place at all seasons of the year, but to the south there is a dry season. No figures for temperature exist.

RAINFALL

Station.	Lat.	Long.	Jan.	Feb.	Mar.	April	May	June	
Kwesi . . .	1° 8' N.	29° 59' E.	4.6	2.9	2.5	7.0	1.8	3.1	
Albertville (Toa)	5° 43' S.	29° 23' E.	4.6	3.2	6.5	6.0	2.6	0.2	
Station.	Lat.	Long.	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Kwesi . . .	1° 8' N.	29° 59' E.	3.2	5.1	2.8	6.6	2.9	1.7	44.2
Albertville (Toa)	5° 43' S.	29° 23' E.	0.2	0.4	0.9	2.3	9.7	8.3	44.9

Katanga

The Katanga, or at least the High Katanga, belongs climatically to the northern part of the plateau of South Africa rather than to the Belgian Congo. The summers are hot and wet, and the winters warm and dry. The range between the hottest and coldest months is considerable, and at Elisabethville amounts to as much as 15° F. There, also, the diurnal range is very great, especially in June, July, and August, when it appears to exceed 45° F. At that season minimum temperatures in the vicinity of freezing-point are frequently registered, while the mean maximum temperature for October, the hottest month, is between 90° and 95° F. With the possible exception of part of the Eastern Highlands, the High Katanga is the only part of the Belgian Congo which can be considered as at all suitable for European settlement.

TEMPERATURE

Station.	Lat.	Long.	Jan.	Feb.	Mar.	April	May	June
Elisabethville .	11° 40' S.	27° 29' E.	72.1	71.8	70.7	70.6	66.0	60.6

Station.	Lat.	Long.	July	Aug.	Sept.	Oct.	Nov.	Dec.
Elisabethville .	11° 40' S.	27° 29' E.	60.3	64.2	70.9	74.8	74.0	71.4

RAINFALL

Station.	Lat.	Long.	Jan.	Feb.	Mar.	April	May	June
Elisabethville	11° 40' S.	27° 29' E.	9.3	10.3	9.5	1.3	0.5	0.0

Station.	Lat.	Long.	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Elisabethville	11° 40' S.	27° 26' E.	0.0	0.0	0.3	0.5	4.0	11.4	47.1

Kasai Region

The Kasai Region may in some ways be compared with the Welle country. Like the latter it has, in the north at least, a somewhat higher mean temperature than the Central Basin; in the southern, more elevated districts, it is probably somewhat cooler, with a greater annual and diurnal range. In the central districts between the Kasai and the Sankuru the rainfall may be heavier than in the Welle country; elsewhere it is probably about the same in the north, but decreases toward the south. There is, however, everywhere a well-marked dry season. The only figures for the region are those for Luluabourg, but they can hardly be regarded as typical.

CLIMATE

TEMPERATURE

Station.	Lat.	Long.	Jan.	Feb.	Mar.	April	May	June
Luluabourg .	5° 56' S.	22° 25' E.	75.7	75.6	75.9	76.3	76.1	75.9
Station.	Lat.	Long.	July	Aug.	Sept.	Oct.	Nov.	Dec.
Luluabourg .	5° 56' S.	22° 25' E.	76.3	76.3	75.6	75.9	75.9	76.8

RAINFALL

Station.	Lat.	Long.	Jan.	Feb.	Mar.	April	May	June	
Luluabourg .	5° 56' S.	22° 25' E.	7.2	5.4	7.9	6.1	3.1	0.2	
Station.	Lat.	Long.	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Luluabourg .	5° 56' S.	22° 25' E.	0.1	2.5	6.5	6.6	8.7	6.6	60.9

CHAPTER IV

VEGETATION

NOTWITHSTANDING much valuable work on the natural vegetation of the Congo, there are still large areas about which very little information is obtainable. Many parts of the country have not yet been subject to a detailed survey, and even the limits of the great botanical regions are in some places imperfectly known. The present chapter is therefore confined to an account of the main types of vegetation in so far as they influence human activities, and no attempt is made to discuss the subject from a purely botanical point of view.

Several distinct types of vegetation may be recognized, and these correspond more or less closely with the natural regions of the country as defined by physical and climatic conditions. The tropical forest covers the greater part of the Central Basin, and is also found in the river-valleys of the surrounding regions. Savanna is characteristic of the Welle country, and along with steppe covers the greater part of the Kasai uplands. In the Katanga vegetation is more varied, and ranges with altitude from tropical forest to steppe. The latter formation is also the prevalent type on the higher slopes of the Eastern Highlands. On the Crystal Mountains and in the country to the west of them, where physical and climatic conditions are more varied, there are large areas both of forest and of savanna. On the whole therefore it may be said that tropical forest is the characteristic type of vegetation in the Central Basin, while savanna covers the greater part of the peripheral region except in the highland areas, where it frequently gives place to steppe. As a rule, however, the limits of these different formations cannot be clearly drawn, since in many places, more especially in marginal regions, local conditions of soil and climate exercise an important influence.

THE COASTAL DISTRICTS

To the west of the Crystal Mountains the natural vegetation is somewhat varied in character. The banks of the Congo and the large islands which lie in the bed of that river are often fringed with mangrove, brushwood, or occasional clumps of forest in which raphia, oil-palms, and *Pandanus* are found. Farther inland brushwood and savanna are the dominant types. On the low plateaus which fringe the coast and extend inland to the hill country of Mayumbe the forest is as a rule confined to the valleys of the rivers. Towards the north these forests are sometimes extensive and contain raphia, oil-palm, and other trees of economic importance, but in the south, where the valleys open out and give rise to big marshes, they disappear, and their place is taken by large tracts of papyrus. In the valleys of the Luibi and Bola, however, the forests are continued to the coast between Banana and Malela. The plateaus and plains of the region are as a rule covered by a high herbaceous vegetation in the midst of which oil-palms, bamboos, and baobabs are occasionally found.

In the central part of Mayumbe, between the sources of the Nyanzi and the Lukunga, south of the Lukula, and the mountains south of the Lubuzi, the forest is more widely distributed, but is frequently interrupted by open clearings which are covered with herbaceous plants and by plateaus on which brushwood is the prevailing type of vegetation. On the whole the forest is less rich than it is farther north, and trees of economic value do not attain their maximum development. The oil-palm nevertheless appears to grow well.

The northern part of Mayumbe, between the mountains south of the Lubuzi and the Chiloango, appears to be completely wooded and to contain considerable tracts of virgin forest. In addition to various other trees of economic value this region possesses large numbers of oil-palms.

In many parts of Mayumbe the virgin forest has disappeared and has been replaced by a secondary formation which is usually of much less economic value. The destruction of the primitive forest as a preliminary to the cultivation of the land is naturally most active in the river-valleys and lowland districts. Hence it is chiefly on the mountain-slopes that the largest areas of virgin forest are now found.

THE CRYSTAL MOUNTAINS

The so-called Crystal Mountains separate the Coastal Region from the Central Basin. Except along the line of the railway between Matadi and Leopoldville and in a few other districts, comparatively little is known about their vegetation, but its general character is somewhat as follows. To the north of the Congo the river-valleys are usually fringed by gallery forest, while the intervening mountains are covered with herbaceous plants and form extensive savannas. South of the river brushwood is the dominant type except in the river-valleys, where there are gallery forests, and in certain districts where considerable stretches of land are also under forest. One of these districts is situated north and north-east of Congo da Lemba, and extends from the valley of the Bembezi to that of the Lufu. Another, known as the Forest of Ziaka, lies at the confluence of the Kwilu and the Kwilu-Madiata. In the southern part of the Bangu massif the valleys, and sometimes the hills, are heavily wooded, and the raphia and the oil-palm, the umbrella-tree, and the baobab are all common; in the north of Bangu on the other hand the forest is less extensive, and the greater part of the land is covered with brushwood. In addition to the oil-palm the Bangu forests contain a number of trees of economic value.

THE CENTRAL BASIN

The limits of the tropical forest can as yet be stated only in general terms, as much of the region remains unsurveyed, but on the whole it may be said to occupy the greater part of the Central Basin, where the elevation of the land is less than 1,600 feet above sea-level. In this region there is only a slight range of temperature between the warmest and coldest months of the year, while rain falls at all seasons. In the north the border of the forest appears to be more regular than in the south, and is probably determined by climatic conditions alone. The main rivers flow from east to west, and the northern limit of the forest runs more or less parallel to them. In the south on the other hand, where the chief tributaries of the Kasai flow towards the north, the forest frequently follows their valleys southward for a considerable distance. On the east

the limit of the forest is generally determined by the mountainous borderland of the State.

Within the limits thus roughly defined lies the great tropical forest. It ought to be stated at once, however, that the virgin forest is by no means continuous over the whole of this area. It is interrupted in places by stretches of secondary forest, brushwood, and savanna, but, owing to the want of precise information, no exact account of their distribution is possible. It is probable, as will be seen later, that the virgin forest was formerly more extensive than it is now, and that the other formations mentioned are in many cases the result of man's interference with it.

Bearing in mind then the difficulties which exist, an attempt may now be made to define somewhat more exactly the limits within which the tropical forest is found. According to Thonner and Chevalier its northern border appears on the left bank of the Ubangi at Bangi and runs southward a no great distance from the river to about the latitude of Libenge. After curving to south-east until it is a little north of Bwado it follows an east-north-east line to north of Boyolo and Abumombazi, and finally runs eastward to south of the Welle. M. de Wildeman, who is in agreement as far as the west is concerned, is inclined to carry the eastern part of the border-line farther to the north, and believes that it cuts the Welle shortly before its confluence with the Bomu. According to him a considerable part of the lower Welle at least falls within the forested area. This opinion is to some extent endorsed by a recent writer in the *Bulletin agricole*, who has traversed a considerable part of the region in question and has drawn the northern limit of the forest along the Bili from its confluence with the Bomu to a point about $24^{\circ} 30' E.$, then south-east to Bima on the Welle and from there along that river and its tributary the Bomo-kandi to the east. The diversity of opinion thus indicated is probably due in the main to the transitional character of the region. As the northern limit of the forest is approached it is interspersed more and more freely with stretches of savanna and it becomes increasingly difficult to say where the one formation definitely gives place to the other.

The southern limit of the forest is even more difficult to determine. M. Chevalier considers that it begins at Lukolela

on the Congo, and runs southward so as to embrace the greater part of Lake Leopold, after which it bears away to the east. M. de Wildeman on the other hand, while admitting that the land on either side of the Kasai-Sankuru is a region of transition, considers that it should be included within the tropical forest. From the botanical point of view this is no doubt correct, but it is also true that very considerable areas of savanna lie between that river and the Congo, especially in the east.

In the east of the country, also, there is still much that is uncertain. South of the Welle the forest follows the Aruwimi and Ituri eastward, crosses the Semliki, and passes between Lakes Albert and Edward on to the lower slopes of Ruwenzori. Dr. Milbraed considers that the southern limit of this part of the forest runs from Nyangwe on the Lualaba to Burton Gulf on Lake Tanganyika, but whether all the region between this line and the Aruwimi-Ituri can be considered as virgin forest is exceedingly doubtful. In the vicinity of the Aruwimi much of the vegetation appears to be of secondary formation, while to the south of the Ituri it passes quickly into the steppe of the Eastern Highlands. Farther south, however, in the district of Lowa, there are considerable tracts of virgin forest in the basins of the Ulindi and Elila. It is just possible that the gallery forests of the region have fostered the idea that the tropical forest is more continuous than it really is.

Within the region which has been delimited the tropical forest is characterized by the great height and girth of the trees of which it is composed. The lianas which have grown up with the forest push their way towards the light, and produce their fruit and flowers among the upper branches of the trees. Here also epiphytes of all kinds grow in profusion, and combine with the rest of the vegetation to produce that gloom which is everywhere so marked a feature of the tropical forest. Among the plants there are many of considerable economic importance. The African rubber-tree (*Funtumia elastica*), various rubber-producing lianas (including *Landolphia owariensis* and *Clitandra Arnoldiana*), the oil-palm (*Elaeis guineensis*), the raphia palms (*Raphia Laurentii* and *Raphia vinifera*), and the copal tree (*Copaifera Demeusei*) are most exploited at the present time. In addition to these there are many trees which would furnish timber for building and

cabinet-making if the communications of the country would permit of their exportation.

In many places, as already pointed out, the primitive forest appears to have been replaced by a secondary forest which is much less impressive. In it the vegetation is on the whole not nearly so dense, the trees consist as a rule of softer woods and herbaceous plants are abundant. The greater development of the undergrowth is indeed the most characteristic feature of the secondary forest, and probably explains the term *brousse* so often applied to it by travellers in the Congo.

The existence of the secondary forest has given rise to much discussion, but no definite conclusion as to its origin yet appears to have been arrived at. The prevailing opinion however, seems to be that it has grown up in clearings which have been made at one time or other by the natives for purposes of cultivation, and have at a later period been abandoned. Experience in India and elsewhere lends weight to the argument that the primitive forest once destroyed never reappears in its original form. The problem is one which when solved, may throw considerable light upon the future development of the whole region. It has generally been argued that the luxuriance of tropical vegetation is so great that man cannot as a rule fight successfully against it. But if he can, even when uncivilized, so profoundly modify its general character, it does not seem impossible that at a more advanced stage of civilization he should overcome the difficulties which it presents, and turn at least the more suitable part of the forest area to his own account. On the other hand the reckless destruction of many valuable trees which is, and has for long been, taking place as a result of native methods of cultivation is a matter of serious consideration, and, if not in some way checked, will lead to the loss of what might ultimately prove to be a great source of wealth to the country.

It is also important to note that the forest, whether it be primitive or secondary, is not continuous over the whole region which has been assigned to it. Very frequently it is cut up into savannas, which sometimes lie along the banks of the rivers but at other times are found on the higher lands separating their valleys. On these savannas grasses and herbaceous plants are dominant, and trees, and even woody shrubs, are either few in number or entirely wanting.

An account of the distribution of these three types of vegetation—virgin forest, secondary forest, and savanna—can be given for only the better-known parts of the region under consideration. In the north the country between the Ubangi and its tributary the Giri appears to be in the main covered with virgin forest, at least in the better-known parts near the rivers. Farther east, between the Giri and the Congo, west of Mobeka, the land, which is low-lying and marshy, is also covered with virgin forest. Along the courses of the Mongala, the Dua, and the Motima there are great stretches of almost level country, which are inundated during the rainy season. In these districts the tropical forest is particularly dense, and the large numbers of lianas which it contains render it almost impassable. Away from the rivers, however, there appear to be considerable tracts of secondary forest. Farther east, in the neighbourhood of Dobo, the right bank of the Congo is fringed by a savanna, beyond which there is a belt of forest. To the north of this forest lies a more extensive savanna, which stretches from the Molua to the Loeka, and in which grasses are the chief plants. Higher up the Congo, near Bumba, and perhaps farther to the east, this savanna reappears on the banks of the river, but as a rule it is separated from it by a belt of forest. Along the Aruwimi the tropical forest fringing the river often gives way to secondary formations at no great distance off. This seems to be the case between Panga and Banalia, where, to the north of the river especially, there appears to be a considerable tract of secondary forest. In some places even the banks of the river are covered with herbaceous plants.

To the south of the Congo the forest appears to be even less continuous than it is to the north. In the neighbourhood of the confluence of the Congo and Kasai at Kwamouth the banks of both rivers are well wooded, but away from them there is bush, and in places the country has a savanna-like appearance. The banks of the Fini, which connects Lake Leopold with the Kasai, are inundated at certain seasons of the year, and are covered with a herbaceous vegetation from which trees are as a rule absent, but farther away from the river and around the lake the virgin forest reappears. It also covers much of the western part of the country drained by the Lopori, the Maringa, and the Busira, though it is reported to be less dense

in these regions than elsewhere. In places the rivers are somewhat deeply entrenched, and the summits of their divide are frequently covered with secondary forest. This is probably due to the fact that the population here is relatively dense and that much of the land in the more elevated districts has at one time or other been cleared for agriculture. It has been suggested, however, that the water-parting between the Busira and the Maringa is primitive bush-land. Regarding the country drained by the upper courses of these rivers and their tributaries probably less is known than of any other part of the Congo. All that can with safety be said is that in the eastern part of Equateur and in Sankuru there appears to be very little virgin forest away from the rivers, and the greater part of the land is covered with bush or savanna. Farther to the east, in the lower valleys of the Lomami and Lualaba as well as over a part of the region between them, there is again forest, but of its character little is known.

Towards the south, where the Kasai-Sankuru marks somewhat roughly the limit of the tropical forest, secondary formations become more frequent. On ascending the Kasai from its confluence with the Congo, the forest is frequently seen to retreat from the banks of the river—at Bokala, for example, it is distant by about a day's march, and the intervening area is occupied by bush. Farther upstream the gallery forest follows the river, but beyond it savanna extends as far as the eye can reach. Along the Sankuru, also, the forest retains its transitional character. At Butala the soil is sandy, and forest and savanna alternate, while at Bena Dibèle forest again becomes the dominant type. On the whole the characteristic features of this region are the gallery forests along the rivers and the savannas and occasional forests of the interior.

In conclusion then it seems evident that the region which has been described is essentially one in which the tropical forest is the dominant natural formation, and in the lower and wetter parts of the country it still appears to be in almost exclusive possession of the land. On the higher ground beyond the river-valleys, where it is naturally less dense, and where conditions are more favourable for human settlement it has been destroyed to a great extent by man and replaced by the less valuable secondary forest. Savanna, as might be expected, is most common on the margins of the region and in the drier districts which lie to the west of the Lomami.

THE WELLE REGION

The vegetation of the country north of the Welle is much more diversified than that of the preceding region. In the valleys of the Bomu and the Welle, as well as in those of their more important tributaries, there are frequently considerable areas of virgin forest, which are probably due in part to the heavy flooding which takes place in these districts during the northern summer. In the gallery forest rubber-producing plants are common, the oil-palm is found in the vicinity of native towns such as Niangara, Poko, and Amadis, and coffee (*Coffea Canephora*) grows in the wild state, the best varieties being obtained from the northern and eastern districts. On its borders the virgin forest gives place to secondary forest and brushwood, which in some places is of considerable breadth, while in others it is quite narrow. The brushwood is composed of shrubs 10 to 20 feet in height, among which there are numerous small trees and an occasional large one. In the secondary forest on the other hand low trees predominate, while the undergrowth only is formed of shrubs.

On the extensive plateaus which lie between the rivers savanna is the prevailing type of vegetation. It frequently stretches for immense distances in every direction, and is composed in the main of grasses and herbaceous plants. Of the grasses *Imperata cylindrica* is perhaps the most widely distributed; it reaches a height of about six feet, and is said to form good food for cattle. On the other hand it proves a great obstacle to the cultivation of the land, and native plantations have frequently to be abandoned by their owners after it has taken possession of them. Intermingled with the grass are shrubs and bushes, together with various flowering plants. All are more or less burned up during the dry season, but spring up again immediately after the rains.

THE EASTERN HIGHLANDS

The vegetation of the eastern borderland of the Belgian Congo is very varied, but, as much of the region is practically unknown, it is impossible to do more than give a very general account of the greater part of it. Among the more important causes of the diversity which exists are altitude, surface features, exposure, and climate, and in the short survey which

follows it will be seen that each of these is of considerable importance. On the western slopes of the mountains which border the great African rift-valley, the equatorial forest gradually disappears, and as altitude increases its place is taken by savanna, mountain forest, and steppe. In the north between Kilo and the Ituri, the forest appears in places, but there are considerable stretches of land where trees are entirely wanting, and where the vegetation consists almost entirely of herbaceous plants and grasses. The false sugar-cane and *Imperata cylindrica* are characteristic of these districts. The Shari and Nizi in their mountainous parts are sometimes bordered by a little gallery forest, but when they descend into the plain they flow through land which is almost entirely savanna. Farther east, between the route from Irumu to Mahagi and Lake Albert, the vegetation of the mountainous region is composed almost entirely of grasses mixed with bushes and semi-woody plants.

West of the Semliki the vegetation is somewhat different. North of Beni the equatorial forest is almost continuous, and extends across that river to lose itself on the lower slopes of Ruwenzori, or to turn towards the north and south of the mountainous massif. Farther south the western side of the mountains which border the rift-valley appear to have savanna on their lower slopes and steppe on their upper.

In the rift-valley itself there is also considerable diversity. As already mentioned, much of the country immediately to the west of Lake Albert is covered with grass and bushes. In the valley of the Semliki, also, the vegetation is comparatively poor. Round Kisindi in the south there are acacia forests; farther north, to the west of Beni, there is a great grass plain, which is largely overgrown with *Borassu* palm; near Lake Albert expanses of reed-grass alternate with patches of elephant-grass, barren steppes, and trees. To the east of the Semliki the western slopes of Ruwenzori also fall within the Belgian Congo. On them several distinct zones of vegetation may be recognized. Between 3,000 and 6,000 feet above sea-level a great part of the land is covered with savanna. Towards the lower limit it consists in the main of short grasses, while the acacia with which it is sometimes dotted gives it a park-like appearance; higher up there are much elephant-grass and occasional forests rich in ferns.

Above 6,000 feet the mountain forest begins to appear, and reaches its maximum development between 7,000 and 8,000 feet. Beyond that the slopes become steeper, and the forest less dense; in it the bamboo is an important plant, and is found as far as 10,000 feet above sea-level. Higher up the vegetation gradually assumes a more or less alpine-like character.

On the shores of Lake Edward there are many marshes, in which thorny bushes, reeds, and similar plants are found in quantity. To the south of it the plain of the Ruchuru has the appearance of a bare level steppe covered with short grass and dotted here and there with light acacia bush. Near the lakes the bush becomes denser, and in various places there are occasional tracts of forest. East of the Ruchuru lie the volcanic Virunga Mountains. Here, owing to lava flows more or less recent, much of the vegetation is still in a state of development. On the lower slopes of Ninagongo, for example, the land is covered with what has been called virgin bush-forest. It consists of thickets of shrubs and trees of medium height, and is in places almost impenetrable. Great trees with tall trunks grow isolated here and there. Higher up the trees disappear, and a mass of bushes and shrubs hardly the height of a man, with rod-shaped branches, grows crowded together. Above the brushwood, which is representative of the subalpine region, come the alpine growths, of which the most characteristic plant is the arborescent *Senecio Johnstonii*. Much, however, depends upon the age of the lava, and on Karissimbi, above the bamboo forest, there is open wood formed almost entirely of extremely old *Hagenia* stems.

The northern shores of Lake Kivu are formed of banks of recent lava which are only partly decomposed, and the vegetation is consequently stunted. In the valleys of the rivers which flow into the lake there are frequently large tracts of papyrus. On the Belgian side the mountains are said to be covered with short grass, broken here and there by clumps of trees more or less extensive.

The valley of the Rusisi varies considerably in altitude. On the plateau towards the west steppe conditions prevail, and much of the land is suited for pasture. The lower part of the valley is covered with reeds and hardy herbs, while round

the mouth of the river, on Lake Tanganyika, there are great clumps of *Borassus* palm. The western margins of the lake as far south as the Lukuga are occupied by marshes and grassland; in the latter *Imperata cylindrica* is often the most important plant.

On the whole therefore the vegetation of the Eastern Highlands is relatively poor, and this is explained by the high altitude and comparatively low rainfall of the region. Probably the areas which will eventually prove most useful to man are those in which savanna or steppe formations prevail. In the more fertile districts much of the land seems well suited for agriculture, while in the less fertile large numbers of cattle can be reared. It is even possible that some parts of the country may prove of value for European colonization.

THE KASAI REGION

In the Kasai region topographical and climatic factors are of peculiar importance. The land slopes down from the plateau of southern Africa to the central basin of the Congo, and all the main rivers flow from south to north. As there is everywhere a well-marked dry season, it is only in the valleys of these rivers and in some restricted areas on the plateau that water can be found at all seasons of the year. Consequently the characteristic features of the vegetation of the region are the gallery forests of the valleys and the savannas and steppes of the more elevated districts.

Many of the rivers which rise upon the plateau have their origin in marshes of greater or less extent. When these marshes are permanently wet they are frequently surrounded by a belt of woodland which soon passes into savanna, and eventually into steppe. The woods in the vicinity of the marshes are, however, very unlike the tropical forest. The trees do not reach any great height, while the undergrowth is poor and the lianas few and undeveloped. *Carpodinus gracilis*, a rubber-producing plant, is often found in such districts. It is probable that the sandy-clay soils in the vicinity of the marshes were at one time more extensively forested than they are at present, and that considerable areas have been cleared in comparatively recent times in order to meet the demands of native agriculture.

Over the higher parts of the plateau a steppe vegetation

generally prevails, modified more or less in places by local conditions. The soil is frequently an infertile sand, which bears neither tree nor shrub, and the only plant of economic importance which need be mentioned is *Landolphia Thollonii*, from which much of the 'grass rubber' of the Kasai region is obtained. Even the grasses fail to reach any considerable size. Small ponds frequently occur on the higher parts of the plateau; when permanent, they are often fringed by clumps of trees, but when intermittent, a few herbaceous shrubs alone differentiate the land from the surrounding steppe.

The vegetation in the valleys is much more varied. In their upper parts the rivers flow in slight depressions on the plateau. Here and there are stretches of land which are inundated during the rainy season, but dry up more or less quickly, and beyond them are lightly wooded savannas which occupy the borders of the depressions and soon pass into steppe. A little lower down, where the rivers cut their way more deeply into the plateau, the vegetation begins to change in character. In the marshy parts of the river-beds woody plants appear, and give the first indication of the gallery forest. To begin with, they occur only in scattered patches, but later on they become more numerous and form a continuous fringe to the rivers.

In their middle courses the rivers flow in deeper valleys, from which marshes are usually absent, but, as evaporation is less intense than on the plateau, the soil remains humid. As a result the gallery forest assumes considerable importance, and two types may be distinguished. In the immediate vicinity of the rivers the land is inundated for at least part of the year, and the trees here attain their maximum development. Among those of economic value may be noted *Clitandra Arnoldiana* and *Clitandra robustior*, from which rubber is obtained. In the dry forest which lies farther up the slopes of the valley other rubber-producing trees, such as *Landolphia owariensis* and *Funtumia*, are found. Parts of the dry forest have been destroyed by the natives in order to obtain land for cultivation, and in the vicinity of the native villages the oil-palm is often grown. Beyond the forest fringe lies the savanna on gently inclined or undulating ground. In favourable conditions the trees grow fairly close to one another, and give a park-like aspect to the landscape, but where the

humidity is less they grow in open formation, and are often stunted in their growth. In this open savanna *Landolphia humilis* and *Carpodinus gracilis* are common. As in the dry forest, much of the land has been cleared by the natives. Beyond the savanna of course lies the steppe.

In the lower courses of the rivers of the Kasai region the rate of the current is checked, and the débris carried down from the plateaus is deposited and forms extensive sandbank and intermittent marshes. These are unsuitable alike for forest and savanna, and are as a rule covered with papyrus. Beyond them savanna sometimes appears, but they often pass directly into steppe.

In a highly generalized account such as the above it is obviously impossible to take account of local conditions. These are sometimes of considerable importance. On the plateau the soils with an admixture of clay usually bear a richer vegetation than those which consist only of sand. In the same region the depressions on the surface of the land are sometimes covered with forest to a greater or less extent. It is possible indeed, as has often been argued, that the forest area of the Kasai region was formerly much greater than it now is, and that by a process somewhat similar to that which has taken place in the Central Basin it has been reduced within its present limits. The natives, when seeking land suitable for cultivation, naturally selected the more fertile districts, but in burning off the vegetation they did much to destroy the fertility of the soil.

KATANGA

The Katanga on the whole may be regarded as a region of transition between the evergreen tropical forest of the Central Basin and the steppes of the South African plateau. Owing to the variety of its geographical features, however, and to corresponding differences in soil and climate, there is considerable diversity in its vegetation, and gallery forest, savanna of various types, steppe, and marsh are all to be found.

The greater part of the High Katanga is a wooded savanna. From a distance it has the appearance of an impenetrable forest, but on closer investigation it is seen to be very different.

The trees belong in the main to the Leguminosae, and among them *Acacia* and especially *Cryptosepalum* are very abundant. They grow in open formation, and their slender trunks are seldom more than 20 to 40 feet in height. In the humid districts, and more especially along the banks of the rivers, they are more closely planted, and are sometimes bound together by lianas. When the soil is very dry on the other hand they become xerophilous and consist in the main of thorny acacias. From place to place the continuity of the forests is broken by clearings, which may be several miles in length, and this alternation of forest and steppe is one of the most characteristic features of the country. Moreover the hills which lie between the rivers are often covered with coppice and grass. The region is essentially one in which there is a constant struggle between forest and steppe, and the growing interference of man tends to give the victory to the latter. The annual fires originated by the natives, and the felling of timber for fuel by Europeans in the mining areas, alike contribute to the limitation of the woodlands.

In the more elevated parts of the Katanga—at heights of 5,000 feet and more—savanna gives place to steppe. The plateau of Kundelungu may be regarded as typical in this respect. The plants, among which leguminous varieties predominate, are hard and thick-set. There are few flowers, and in general the country presents the aspect of a somewhat bare greenish-yellow region extending in all directions. Only in the neighbourhood of the marshy districts in which the rivers have their sources, and along the numerous water-courses, are there any trees. Among them are tree-ferns and various kinds of palms; in places bamboos are also found. Farther down on the slopes of the plateau the vegetation gradually becomes richer and more abundant.

Elsewhere in the high country plant life is similar to one or other of the two types which have just been described. On the Kibala and Mulumbwe mountains savanna predominates. On the Kibala mountains it is rich, while on the Mulumbwe it is poor, and trees are found only round the sources of the rivers and along their courses. The Manika plateau on the other hand is a steppe, and its vegetation consists of low grasses intermingled with various flowering plants. The Marungu, as the mountainous region to the west of Lake

Tanganyika is called, is somewhat similar in character, and is covered with grasses and various herbaceous plants. Trees are found in the more humid districts and in the vicinity of the watercourses.

In the north of the Katanga the transition towards the evergreen tropical forest becomes well marked, and along the rivers, which flow in relatively deep valleys, at the foot of the waterfalls, where they descend from higher to lower lands, and in the plains which lie beyond, there are considerable tracts of relatively dense gallery forest. The rift-valleys have a vegetation peculiarly their own. Along the course of the Lualaba, between Bukama and Ankoro, lies the rift-valley of Upemba, in which there are great tracts of marsh-land. Here papyrus is the most important plant, and it grows so extensively that the great masses of it which break away during the rainy season render navigation on the river and lakes extremely difficult. Large tracts of papyrus also occur in the valley of the Lufira near Sampwe, and in the valley of Lake Mweru and the Luapula. Trees of considerable size, with a dense creeping undergrowth, often border these valleys, but on the whole the vegetation is not so dense as in the tropical forest. Along the shores of Lake Mweru, also, there are often extensive tracts of high grass.

CHAPTER V

FAUNA

A BROAD distinction may be drawn between the savannas and the forest with respect to the wild animals by which they are inhabited. To the former region belong the large ungulates, such as the antelope, giraffe, zebra, buffalo, wild ass, and the rhinoceros, together with some of the carnivores, such as the lion, one species of the leopard, and the hyena. The forest on the other hand is particularly the home of the chimpanzee, the gorilla, and almost innumerable monkeys. The elephant is found in both regions, while the okapi and one species of the leopard are confined to the forest.

Of the carnivores the leopard is by far the most dangerous in the Belgian Congo. The big leopard or panther inhabits the eastern, southern, and south-western parts of the Congo basin. Over the rest of the country it is the forest leopard (which has shorter legs than the panther and larger rosettes) that is the prevailing type. On the north-east frontier, near Ruwenzori, there is a third species, which has markings almost like those of the jaguar.

The lion is found across practically the whole of the Kasai region in the south, and he has also made his way into the Ubangi region in the north. On the whole he shuns the dense forests and the more thickly populated parts of the country.

The spotted hyena, *Hyaena crocuta*, appears to be practically confined to the savanna lands, and is of very doubtful occurrence in the forests or in the west of the country. In the north and south it grows to a considerable size, and is very fierce.

Cats of various kinds are widely distributed. The golden cat, *Felis aurata*, is found throughout the northern half of the Congo basin, and smaller wild-cats are found almost everywhere. The cervalini cat is found in the north and north-east, and the civet-cat in all parts of the country except the densely forested regions, where there are large numbers of genets.

The various groups of animals included under the general name of antelope are well represented in the Belgian Congo. Among the *Tragelaphinae* are the bongo (*Boöcercus*), the bushbuck or harnessed tragelaph (*Tragelaphus*), and a variety of the marsh-loving tragelaph (*Tragelaphus gratus*). The bongo is an inhabitant of the forest regions to the north, west, and east of the central region; the bushbuck is found in one form or another in different parts of the country; *T. gratus*, which has elongated hoofs so that it may walk in soft mud, spends most of its time in water, and may often be seen among the reeds with all but its head and horns submerged. Several varieties of eland are known. *Taurotragus oryx livingstonei* is found in the extreme south-west, south, and south-east of the Congo basin. A second group of antelopes, the *Hippotraginae*, is represented by the roan antelope (*Hippotragus equinus*), said to be found in the northern basin of the Ubangi, while another form of the same animal belongs to the south-west and south-east of the Congo basin. Among the *Cervicaprinae* are the reedbuck (*Cervicapra*), one species of which is found in the western Congo, while others occur over all the southern half of the country outside of the forest area, and the waterbuck (*Kobus*), of which there are also various kinds. The most important member of the *Cephalophinae* is the yellow-backed duiker (*Cephalophus sylvicultor*), which has now been recorded in various parts of the Congo basin. The hartebeest belongs to the *Bubalinae*; the Cape hartebeest (*Bubalis cama*) penetrates to the south-western limits of the Congo basin, and it is just possible that the great hartebeest (*Bubalis major*) may exist in the north-western part of the country.

Several varieties of buffalo are found in the country. The most interesting is the red dwarf buffalo (*Bos nanus*), which lives in the Ituri forest, and some varieties of which occur in various parts of the Central Basin. The Cape buffalo (*Bos caffer*) extends over those parts of the South African plateau which lie within the Belgian Congo, and has apparently made its way north in the east of the country almost to the Semliki. In the north the buffalo of Central Africa (*Bos planiceros*) is found along the Ubangi.

The okapi (*Ocapia johnstoni*) is an inhabitant of the tropical forest. In the east it has been found as far south as the vicinity of Nyangwe and the Maniema country, while in the

north it extends at least as far west as the Lua. Giraffes of various species live on the savanna lands to the north and south of the tropical forest. The rhinoceros is widely distributed in the western, northern, and some of the eastern districts.

The elephant is a native of all the wooded districts of the Congo, but its numbers have diminished greatly owing to the way in which it has been killed for the sake of its ivory. The type which is most common throughout the whole region is *Elephas africanus cyclotis*. A dwarf variety, provisionally known as *E. africanus pumilio*, is said to exist in the western part of the equatorial region.

In the tropical forest the anthropoid apes and monkeys are widely distributed. The chimpanzee is found mainly to the north and east of the Congo-Lualaba, but it also appears to the west and south of that river. The variety found in the north and north-east is *Simia troglodytes schweinfurthi*, while farther to the south, between the Lualaba and the west coast of Tanganyika, *S. t. marungensis* is the predominant type. The chimpanzee of the Lower Congo and Mayumbe is probably *Simia pygmaeus*. The gorilla is reported to be widely distributed throughout the greater part of the forest region.

Throughout the forest there are many species of monkeys. The baboons, it is true, prefer the open country, and are not so well represented in the Congo as in other parts of West Africa. On the other hand the mangabeys are exceptionally well represented, and the *Cercopithecinae* contain several varieties which are believed to be indigenous to the country. Lemurs are found in the Ituri forest and elsewhere.

A few of the remaining animals of the Belgian Congo are worthy of mention. Bats are very numerous and include various varieties of the fruit-bat, in addition to large numbers which are insectivorous. Among the insectivores are shrews, moles, and hedgehogs. The rodents are represented by the flying anomalures, the squirrels, the porcupine, the ground-pig, the pouched rat, and others. Hares are found, but apparently not within the densely forested area, and hyraxes are chiefly arboreal forms of the sub-genus *Dendrohyrax*. The hippopotamus is found in the rivers.

Few of the birds of the Belgian Congo appear to be peculiar to the country, and most of them are similar to those found

in various other parts of Africa. The guinea-fowl, *Phasidus niger*, extends from the Gaboon right across the northern forest belt as far as the Ituri. One species of true vulture (*Neophron monachus*) and the fishing vulture (*Gypohierax*) are found over the greater part of the Congo basin. A flamingo, probably *Phoeniconais minor*, and three species of pelican—*Pelicanus rufescens*, *P. onocrotalus*, and *P. sharpei*—may be seen on the broad reaches of most navigable rivers, and the red-beaked, scissor-billed tern and two other species of the tern are common objects in the same and similar localities. The white egrets are *Herodias alba* and *H. garzetta*, and the crowned crane is of the West African variety. There are over twenty species of sunbirds. The parrot is represented by a love-bird, by three species of grey and green parrots (*Poecephalus*), and by the grey parrot, which is found everywhere except in the extreme south-east. Among other birds found generally over the whole region are starlings, cuckoos, hoopoes, ground-thrushes, eagle-owls, and various others.

The reptiles of the country include pythons, tree-cobras, tree-vipers, Cape vipers, and egg-laying vipers. The large monitor lizard is abundant wherever there is water. Tortoises and turtles are represented by various freshwater forms of *Pelomedusa*, *Sternothaerus*, and *Trionyx*. The common African form of the crocodile (*Crocodilus niloticus*) is found all over the Congo basin in rivers of any size. In the main Congo there also exists the slender-snouted crocodile (*C. cataphractus*), and in the Ubangi the short-headed crocodile (*Osteolaemus*). Among the frogs and toads may be mentioned the hairy frog, *Trichobatrachus*, and *Gampsosteonyx*, a frog with unwebbed toes ending in sharp, long claws, and various Ranine frogs of the genera *Chiromantis*. Of the true toads (*Bufo*) there are at least three species, and of the narrow-mouthed ant-eating toads three genera. One or more species of the *Xenopus* genus of the aquatic tongueless frogs may often be seen floating amongst the water vegetation on the surface of still pools and backwaters.

Insects in great variety are found in all parts of the Belgian Congo. Termites, the so-called white ants, often do great damage to houses and stores, but may be of some value in assimilating and turning into mould the fallen trees or rotten branches of the forest, and thus improving the surface soil.

The dwellings of these termites are a characteristic feature of the scenery in many parts of the country. In the north they are high, and not much broader at the base than at the top, but almost always capped by a roof of wide-spreading eaves. This type also prevails throughout the greater part of the forest belt. In the south, where the soil is derived from sandstone or red laterite, the ant-hills are of great size, and rise to a sharp pinnacle at the top without any roof or cap. In all the Kasai region this is the characteristic type.

Among the true ants several varieties are widespread throughout the Congo. Of these the 'driver ant' is the most troublesome, but among the others are a large reddish-yellow ant, *Oecophylla maragdina*, which builds its nest on the trees it frequents, small black ants, whose bite causes a serious swelling of the part affected, and another type of tree-ant, which dwells in the swampy forests, and builds round black nests in the forks of trees.

There are several kinds of bees. In various parts of the country, *Apis mellifica*, an African variety of the domestic honey-bee, is found. It is usually wild, but the natives are aware of its value, and in some districts take steps to attract it to the vicinity of their villages. Of wasps there are several species, the most common being the mason-wasp (*Sphegidae*), which is said to be one of the most prominent insects in the country.

The mosquito and the tsetse fly are described in the section on 'Health Conditions' (see pp. 312-14).

CHAPTER VI

NATIVE RACES

THE basin of the Congo is inhabited almost entirely by the negro species in more or less typical form, tinged in many parts by an alien element which appears to have made its way southward by way of the Nile. The principal elements in this negro population are the Batwa, or pygmy, the Bantu negro, and the Nilotic negro.

THE BATWA

The Batwa, or pygmies, are believed to form the aboriginal race of the Belgian Congo, and they are certainly the most backward. They are found in various parts of the country, and are probably most numerous between the Aruwimi and the Bomokandi, in the great Congo bend, and throughout the country lying between the upper Kasai and Lake Tanganyika. Their name varies according to the region in which they live. Between the Lopori and the Congo are the Bafoto, the Aka live on the upper Bomokandi, the Batembo between Lake Mweru and Lake Tanganyika, and the Bafete on the lower Lomami. Nor is it uncommon to find the same name borne by a Batwa tribe and a tribe of forest negroes. This may be due to the latter having displaced the former and taken its name, or it may be that the Batwa sometimes adopt the name of a Bantu community when they are attached to it, as is frequently the case, in the capacity of game-hunters.

The Batwa are considerably below normal height. The men seldom exceed 4 feet 7 inches, while the women are often under 4 feet. They have large brachycephalic heads, and a yellow or reddish-yellow skin, sometimes much lighter than that of the people among whom they dwell. Some of the men have long black beards, which grow freely, and the body is usually covered with much short 'felted' hair. The nose is flat and broad, the upper lip long, and the body well proportioned, though the neck is short and weak.

THE BANTUS

Over the greater part of the Belgian Congo the Bantu negroes predominate. This term, however, is philological rather than ethnical, and especially on the border-line does not correspond with variations of physical type. At the same time it is extremely convenient, and to a certain extent justifiable on physical and physiological grounds. The variation in type among the Bantus is due probably to a varying admixture of alien blood, which is most marked towards the north and east. This foreign element cannot be identified with certainty, but, since the Bantus appear to approach the Hamites in those respects in which they differ from the negro proper, it is probable that the Hamites have entered into the composition of the Bantu peoples. The following account of the Bantu peoples of the Belgian Congo is not intended to be comprehensive, as considerations of space forbid, but rather aims at giving an outline of the geographical distribution of the more important tribes, with some account of their physical characteristics. Concerning their ethnical relationship it will be well to speak with caution, as when all is said and done our knowledge of this subject is still of a very hypothetical character.

In the coastal region and in Mayumbe the principal tribes are the Bakongo, properly so called, and the Mússorongo, Kakongo, Mayumbe, Babwende, and Basundi, who are allied to them. The Kakongo, who are on the right bank of the Congo estuary, appear to be a much mixed community. In the hill country of Mayumbe live the people of the same name: physically they are rather slender, their average height is about 5 feet 8 inches, and their skin is very dark in colour. The Basundi and the Bakongo inhabit the region of the Crystal Mountains, the former living to the north of the river and the latter to the south. The Bakongo as a whole appear to be a degenerate race, the primitive type having been degraded by several centuries of contact with the worst forms of European civilization.

For the sake of convenience the Central Basin may be subdivided. Along the course of the Congo there are several important tribes. The Bateke are found mainly in the French possessions on the right bank of the river, but some branches

of this family are settled on the left bank to the north of Stanley Pool. They are very mixed in physical type, some of the chiefs being fine-looking men, while many of the poorer people are coarse, and have ugly, unintelligent faces. Allied to them are the Bambuno, who inhabit parts of the country between Stanley Pool and the lower Kwango. The Babuma of the lower Kasai are also connected with this group.

The Bangala occupy both banks of the Congo from its confluence with the Ruki to above the point at which it is entered by the Mongala. Their territory extends northwards and eastwards so as to include practically the whole of the Giri basin (apart from its most northern districts) and the lower parts of the basins of the Dolo and the Mongala. On the south the Bangala country includes the greater part of the basin of the Lulonga and a small part of the country drained by the Lopori and the Maringa above their confluence at Basankusu. Related to them are the Bayanzi, or Babingi, who formerly occupied the left bank of the river between the mouth of the Kasai and Irebu, but are now in a more restricted area, and the Bapoto, who dwell along the river above the Mongala confluence.

East of the Bangala and north of the Bapoto are a number of tribes classed under the general name of Gombe. It is questionable, however, whether they belong to the same group as the Bangala, or whether indeed the different tribes which bear the name ought to be regarded as closely related to one another. The term Gombe appears to be applied by the riverain tribes to all the inhabitants of the interior who provide them with manioc and other foodstuffs.

The principal tribes comprising the Gombe group are the Gombe proper, who live on both banks of the Mongala above the Bangala country and on the left bank of the Motima, the Bwela between the Gombe and the riverain Bapoto, the Maginza to the north of the Motima, the Mabali in the basin of the Dua, the Buja to the west of the Itimbiri, and the Mabinza farther to the east. To the south of the Congo a second group of Gombe people lie east of Nouvelle Anvers. In the north, in the basin of the upper Lua, a tributary of the Ubangi, there is a third group, who employ a Gombe form of speech, although they are apparently surrounded on all sides by people speaking Sudanian languages.

All these peoples are well spoken of as regards their physical appearance. Of the Bangala it is said that the faces of the men are nearly always agreeable and even handsome, exhibiting no marked prognathism. Their bodies are almost perfect in proportion, and from the sculptural point of view they sometimes reach the climax of negro beauty. The Bayanzi are generally above the medium height, and their bodies are well set up, their limbs wiry, though somewhat slight, their shoulders broad, and their chests well developed. The Gombe are also reported to be splendidly built, and to have an irreproachable frame.

Farther up the Congo, between the confluence with the Itimbiri and Stanley Falls, the Mongo occupy the left bank of the former river. They appear to extend far into the interior, and will be dealt with later. On the right bank are a number of tribes which will be treated along with those of the Aruwimi basin.

To the north of the Congo the most important Bantu-speaking people, and one of the most important in the whole country, are the Ababua. The exact limits of the country which they occupy appear to be still unsettled. It is agreed that it lies between the Welle on the north and the Bomo-kandi-Makonga on the east. On the west it certainly extends as far as the Bali, a tributary of the Rubi, but some authorities carry it as far as the Likati. The southern boundary, in the vicinity of the Rubi, is not well defined. As a whole the country occupied by the Ababua is traversed from south-east to north-west by the Bima, and is covered by extremely dense forests.

The Ababua are divided up into a number of tribes, and it is probable that a good deal of ethnic mixture prevails. Among the chief tribes are the Mondingima, the Mogongia, the Moganzulu, and the Moginita in the east of the country, and the Mobati, the Molissi, and the Boganga in the west. On the whole they appear to be a well-made race. They are neither tall nor heavily built, and the body is well proportioned, the head small and very round, the nose flat, the lips heavy, and the forehead low. The women are in general good-looking, but tend to be small in stature. Both sexes have brilliant eyes, and an agreeable expression, but appear to be wanting in intelligence. Activity rather than vigour appears to be

their chief physical characteristic ; the men make bad porters, and when taken from their own locality are of little value.

Belonging to the same linguistic group as the Ababua are the Bakongo and the Mobenge. The Bakongo, who are the fishermen of the Welle, live on the banks of that river to the north of the Ababua, but it is questionable whether they belong to the same ethnic group. The Mobenge are settled in the country between the Welle and the Likati. To the north of them along the banks of the former river are the Basango.

To the south-east of the regions just described Bantu-speaking peoples are continued along the Congo and up the valleys of the Aruwimi and Lindi. Among them are the Basoko, Babali, Turumbu, Bagunda, Lokele, Topoke, Bamboli, and Bakumu. They live in a forested region, and it is seldom that any one tribe covers a considerable area. Physically the people are inferior to the Ababua and various other tribes which have already been described. The body is well formed, but the legs are short, and the face often ugly and prognathous. Indeed it is said that the farther one goes from the Congo or the middle course of the Aruwimi the more these people tend to be short-legged, long-armed, and of ugly appearance.

East of the Congo and south of the Lindi there occurs a break in the Bantu-speaking peoples, as far at least as the Belgian Congo is concerned.

Within the great bend of the Congo the most important people are the Mongo or Balolo. They and various tribes connected with them are said to occupy much of the Central Casin as far south as the Lukenie. From the ethnological point of view, however, this region has not yet been carefully studied, and further information is necessary before any very definite statements can be made. The Mongo are of poor physical development, and one writer describes those between the Lomami and the Lopori as 'small of stature and meagre of build, a backward forest race'. Others appear to be more vigorous, and the Tumba tribes, on the north-eastern shores of Lake Tumba, are said to be a fine virile race.

In the southern part of the colony the Luba-Lunda group of peoples occupy all the country from the Kwango affluent of the Kasai to Lake Tanganyika. This group includes the Baluba and the Balunda, and probably the Warega and the Maniema

are connected with them. The Warega occupy the basins of the Ulindi and the Elila to the west of the rift-valley. They are a tall, well-made people, and are both muscular and hardy. To the south of them are the Maniema, also in all probability belonging to the Luba-Lunda group. But, as their country was during the nineteenth century a great centre of the Arab slave-dealers, it is likely that they have undergone a certain amount of intermixture with other people. They are not very tall, but their supple bodies are well formed and well proportioned. In colour they are light, their noses are somewhat less flattened than those of the average negro, and their lips are not so thick. The women are described as being singularly pretty and graceful.

The Baluba peoples occupy a large area to the south of the Lukuga and between Lakes Tanganyika, Mweru, and Bangweulu in the east, and the Kasai in the west. In the east, where they exist in the greatest racial purity, they founded the States of Katanga, Urua, and Uguha. West of the Lomami, where they have intermixed to some extent with the Bakete aborigines, they include the Basonge and the Bashilange. In the eastern region a large area bounded on the north by the Lukuga, on the east by the Nyemba and the Lukumbi, and on the west and south by the Luvua-Lualaba is occupied either by Baluba-hemba or by Bahemba. The most important families in the Baluba-hemba group are: the Bangoy, settled between the Luisi and the Lukusu; the Baluba between the Nyemba, which flows into the Luvua, and the Kibumba; the Bakitentu on both sides of the Lukulu near the Luvua; the Bamwika on the islands of the Luvua above Kiambi; and the Basonge in the districts between the Lualaba and the Lukuga. In the Bahemba group are: the Bakyombo between the Luisi and the Lukulu; the Bamwenge near Mount Kaomba; the Bamulenda along the course of the Kimbi between the Lukusuwi and the Lukulu; the Bakinsunkulu at the sources of the Lubile; the Bakiliba farther down the same river; and the Bakasanga south of the Lukuga. Neighbouring peoples outside the region just described, such as the Katanga, who live farther to the south, are also of Baluba stock. The Batabwa, to the south-west of Lake Tanganyika, seem to be of somewhat different origin. They are smaller than the Baluba, less well made, and somewhat shrunken in appearance.

The Basonge, who belong to the same ethnic stock as the Baluba, occupy a considerable part of the country between the Lualaba and the Sankuru from the fifth to the seventh parallel of south latitude. Among the more important tribes of this people are the Basanga, the Beneki, the Bena Kalebue, and the Mona Kialo. The men are tall and muscular, and are said to possess a certain natural dignity which gives them an air of superiority over neighbouring people. The women sometimes possess grace, and even beauty.

To the north of the Basonge are the Batetela. They are reported to be well above the average height, to possess considerable muscular strength, and on the whole to be good-looking. Though black is their prevailing colour, some are light yellow. The tribes which must be included under the general name of Batetela extend over a very large region: a number inhabit both banks of the Lubefu and adjoin the Basonge, while others live to the north of the Lukenie and are neighbours of the Akela. Considerable variety of civilization exists among these various tribes: those in the south have adopted a culture suitable to the plains, while those in the north exhibit to the full all the characteristics of a forest people. Some of the western Baluba are known as Bashilange. They are probably an intermixture between the real Baluba and an earlier Bantu people, the Bateke, who occupied the same region. Physically they are much inferior to the eastern Baluba and to the Batetela.

The Bushongo, to whom the name Bakuba has frequently been applied, inhabit a large extent of territory south of the Sankuru river and between the Kasai and the upper Sankuru. Their southern frontier runs from about $5^{\circ} 20'$ S. in the west to about 5° S. in the east. To the north of the Kasai-Sankuru the Bushongo Meno occupy the country from about the mouth of the Lubefu to about the region of the Swinburne rapids. They consist of a number of tribes, not altogether homogeneous, some of which have crossed the river and been incorporated in the great Bushongo empire.

The Bushongo proper are divided into a number of tribes. The Bambala, round whom the rest of the nation has grown up, inhabits the country about Mushenge. The Gwembi live to the north of them in the angle formed by the Sankuru and the Lubudi near their confluence, the Idinga to the west of

them, and the Bashoba to the south of the Idinga. In the extreme west, near the confluence of the Kasai and Sankuru, are the Bakele; to the south-west of them the Bienge occupy both banks of the lower Luchwadi, while the Gali Bushongo live along the right bank and the Bambali along the left bank of that river farther to the east. The Inyenye are south of the Bambala and north of the Yungu, and the Malongo occupy the district between the Langala and the Kasai. Farther south are the Mudi Langa and the Bakete. East of the Bambala are the Bamboy; the Bangendi inhabit the plains farther north; and the Bangongo dwell between the Lubudi and the Sankuru.

The Bushongo, particularly the Bambala, are a well-made, good-looking folk. They are remarkable for their relatively high standard of civilization and are not only in possession of a history and an organized system of government, but are distinguished by an artistic sense, which finds expression in the proficiency with which they pursue certain crafts, such as embroidery and wood-carving.

The Bushongo Meno, whose general position has already been described, are likewise divided into a number of tribes. The Dibele, the Bandunjeke, and the Tonkfishere follow in succession along the right bank of the Sankuru from Bena Dibele to below its confluence with the Sankuru. The Bohindu and the Bashui live to the north of the first two of these on the left bank of the Lukenie, while the Gelukenie occupy the country on the right bank. Two tribes have crossed to the left bank of the Sankuru—the Buluku, who hold a strip of land above the point at which the Lubefu joins the main stream, and the Bamingi, who hold a similar strip above the confluence of the Sankuru and the Lubudi.

Farther west, between the Kasai and the Loange, there are several tribes of some importance. The Bashilele, who are said to be connected with the Bashilange, occupy the country to the north. To the south of these in the east are the Badjok. They are small and ill-conditioned, and in appearance are dark and ugly. Their manners are in all respects bad, but they are reputed to be among the most active and enterprising of the trading peoples of Africa. To the west of them are the Bakongo, whose territory extends across the Loange as far as the Luana. Formerly they occupied the whole country between

the former river and the Lubue, but they sold the southern part of it to the Bapenda, who now inhabit a large area between the Lubue and the Kasai. The Bapenda appear to be an inferior race and are said to be too cowardly to attack big game except by means of automatic traps. South of the Bapenda are the Bapindi, to whom they are believed to be related.

In the basin of the Kwilu there are many tribes, only some of which have as yet been investigated. The Bambala, one of the most important, fall into two distinct groups. The southern group who appear to form the parent stem occupy the territory between the Kwilu and the Kwengo from the mouth of the latter as far south as a line drawn through the sources of the Luano. They are also found between the Djari and the Kwengo as far south as a line passing through Kisamba. The west bank of the Kwengo is also occupied by them, but they do not appear to extend far into the interior. The northern group of the Bambala is found on both sides of the Kwilu, but is cut in half by the Bayanzi, Basongo, Bahuana, and Bapindi, who occupy the banks of the river.

The Bambala are a comparatively tall people, and, although they are slenderly built, they are very wiry, and in powers of endurance are said to be quite equal to the Bakongo.

The Bahuana are also found in two districts separated from one another. One group occupies the territory between the Kwilu and the Inzia from the confluence of the two rivers as far south as the fourth parallel. The other is situated on the right bank of the Kwilu from the Lubuzi almost as far as Kikwit. There are also one or two small enclosures elsewhere. Though well built, the Bahuana are generally rather short in stature, and have not the same powers of endurance as the Bakongo and the Bambala.

The Babunda occupy a stretch of territory which lies between the Kwilu and the Kalembo, and extends roughly from 5° to $5^{\circ} 30'$ S. and from 19° to 20° E. Physically they are of much heavier build than other peoples dwelling in this part of the country. They are large-boned and tall, but their legs are rather short for symmetry. In colour they are very dark.

The main body of the Bapindi are found on the right bank of the Kwilu between the parallels of $5^{\circ} 30'$ S. and $6^{\circ} 30'$ S.,

while a smaller colony lives on the left bank of the Kwengo between the Bambala and the Bayaka. As far as is known the main group of the Bapindi extends eastward as far as the Kasai.

The Bayaka inhabit a somewhat ill-defined territory between the rivers Kwango and Inzia, and between the fifth and sixth parallels of south latitude. They are almost divided into two sections by some groups of Bambala people, with whom physically, physiologically, and culturally they show a considerable resemblance. The men are rather short, but they are generally well built and good-looking, and some of the women are even pretty.

The Bakwese, who live on the upper Kwilu about 6° S. are divided into three tribes, the Bagwa-ndala, the Bakwa-Mosinga, and the Bakwa-Samba. Of these the first is apparently the most important. To the south of the Bakwese are the Balua, whose territory between the Kwilu and the Kwengo extends as far south as latitude 6° 30' S.

The Bayanzi (including their sub-tribes, the Wanguli and the Makwa) live on the east bank of the Kwilu from its mouth to about 4° 30' S. and extend eastward as far as the Kancha and the Kasai. South of the fourth parallel they are separated from the Kwilu by Bahuana and Bambala peoples who live on the banks of the river. On the left bank of the Kwilu they are found from 4° to 4° 30' S. It is possible that the Bakonde on the left bank of the lower Kwilu and the Badinga between the Luela and the Kancha are also Bayanzi. Physically, the best specimens of the people are found in the up-country, the worst on the river banks.

So far little has been said of the tribes occupying the more southerly parts of the Kasai region, and indeed very little appears to be known regarding them. They belong to the Lunda group of the Bantu people, and their wild savagery has made travel in their country a matter of great difficulty. The men are said to be large and well made, more so indeed than their neighbours on the other side of the Angolan frontier. Their colour is also lighter, and the lips are not so thick.

Of the tribes to the north of the Kasai there is also little detailed information. The Bankutu inhabit a large stretch of territory which lies on both sides of the Lukenie between

the meridians $22^{\circ} 30'$ and $23^{\circ} 30'$. In the east their frontiers run off from the banks of the river towards the north-east and the south-east. They are essentially a forest people, and in general character they resemble other forest peoples farther to the north. Physically, however, they appear to be rather degenerate in type. Some distance to the north of them are the Akela, who also dwell in the forest but belong to a better type. They are tall, thin, and well-proportioned, and in physical appearance are superior to the Bankutu. West of the Bankutu are the Lukenie, who live along both banks of the river.

The Lesa occupy the country between the Kasai in the south and the Fini-Lukenie in the north from the confluence of these two rivers in the west to the Lekore, a tributary of the Lukenie, in the east. They are of average height and well made, but have little muscular development. They are a rather cowardly people, and at the first hint of danger take to flight. In temperament they are friendly, but of loyalty or good manners they know nothing.

THE SUDANIAN NEGROES

The people who live in the north of the Congo are distinguished from practically all the other inhabitants of the country by the fact that they speak one or other of the Sudanian languages. The line of demarcation between them and the Bantus has already been indicated, but it may now be more precisely stated. It starts on the Ubangi, in the west, in the neighbourhood of Ibenga, separating in a general way the basin of the Giri from that of the Lua. From the head-streams of the former river it bears east until it reaches the Mongala, and then north-east to the Dua, a short distance above the point at which it unites with the Ebola. Thence it runs almost due east to about the meridian which passes through Yakoma, after which it turns towards the north, and reaches the Welle some distance above its confluence with the Bomu. The banks of the Welle are occupied by the Bakango, who often speak the language of the people with whom they have dealings in the interior. It is probable, however, that the majority of the people between Jabbir and Bambili have originally come from Ababua families, and if this be the case the linguistic frontier may be drawn a little to the north

of the Welle as far east as Bambili. From Bambili the line marking off the Bantu-speaking peoples turns towards the south-east, and follows an irregular course across the Aruwimi, and as far as the Lindi, whence it runs west towards the Congo, north of Stanley Falls. To the south of this a great part of the basin of the Lindi, and its tributary the Chopu are occupied by people of non-Bantu speech.

To the north of the Congo the most important groups are the Azande and the Mangbetu in the east, and the various people who speak Bwaka and Banda in the west. In the Lindi basin, east of the Congo, are the Bamangu, the Bakumu, the Wapai, and various other tribes, whose ethnic relations are far from clear.

The Azande, who are also known as the Niam-Niam, occupy practically the whole of the country between the Welle and the Bomu, and extend as far east at least as the headstreams of the Yei, an affluent of the Nile. At one time they invaded the region which they now inhabit, and under different chiefs took possession of the land, driving out or absorbing the indigenous tribes. The subjects of these chiefs settled down in the country assigned to their leaders, and took the names by which they are now distinguished from one another. The Abanja are settled in the extreme west, near the confluence of the Bomu and the Welle, the Ambwaga stretch across the middle Were, while the Abali are between the upper Were and the Bomu; the Embili live to the west of the lower Gurba, the Avurn-ezo between the Gurba and the Duru, and the Adio in the east near the headstreams of the Yei. All these tribes, with the exception of the Abanja and the Adio, have as chiefs the Avurn-Gura, or descendants of Gura, the founder of the dynasty. They are considered as belonging to a superior race, and have certain privileges to which the simple Azande may not aspire.

Physically the Azande are a fine, well-built race. The men range from about 5 feet 6 inches to 6 feet in height, and the women are in proportion. The colour of the skin is a medium brown. Both men and women are very graceful in all their actions.

The Mangbetu appear at one time to have formed a more powerful people than they do at present. They are probably derived from an intermixture of two different races: the

conquered, including a whole number of more or less indigenous tribes, of which the most important were the Bangba, the Medje, the Makere, the Mangbellet, the Mobadi, and others; and the conquerors, who imposed their manners and customs upon them so successfully that the Azande name is claimed by all.

The region in which the Mangbetu are settled is situated on both sides of the middle Bomokandi. On the north it extends as far as the Welle from Dungu to below Niangara, on the east to the lands occupied by the Azande, south of the Kibali, and the territories of the Momvu north of the Nepoko river, and on the west to the Abarambo country between the Bomakandi and the Welle below Niangara. Farther east, and separated from the main body of the Mangbetu, are the Mobadi, Munvu and Mangbellet, who also appear to be ruled by Mangbetu chiefs.

The Mangbetu people hold a high place among the peoples of the Congo. Not only are they well built, strong, and muscular, but they are also agile and graceful. Their reputation for courage, intelligence, and devotion is not excelled by any other people in the country.

The neighbours of the Mangbetu are the Momvu on the east and the Abarambo on the west. The former are said to be short in stature, and to be darker in colour than the Mangbetu, to whom they are generally considered to be an inferior race. They are, however, robust, patient, and devoted to agriculture. The Abarambo men are strong and muscular, and the women well made. They are a savage people, suspicious, malicious, and full of superstition.

In the second region of non-Bantu speaking peoples, that of the Ubangi bend, the Banziri are one of the most important peoples. They live along the banks of the river in that part of the country where it begins to change its direction from west to south. They are a fine-looking race, and are probably allied to the Bwaka, who occupy the country lower down the river, between Libenge and Mokoange, and extend far into the interior. Still farther south between the Ubangi and the Lua are the Monjembo, who belong to the same linguistic group. The Banda group of Sudanese people is represented in the Belgian Congo by at least two tribes, the Banza and the Gobu. The latter occupy a stretch of country between

the Banziri and the Bwaka, while the Banza are farther to the east. The tribes which speak one or other of the Sango languages are: the Sango and the Yakoma, who live along the course of the Ubangi-Welle, the former in the region round Banzville, and the latter in that round Yakoma; the Bongo farther south, between the Ubangi and the Ebola; and the Mongwandi to the south of the Ebola.

Unlike most of the Bantu-speaking parts of the Congo, where considerable diversity of physical type is accompanied by some form or other of Bantu speech, the region which has just been described shows little variation in physical type, but very considerable differences in language. The inhabitants are as a rule of medium height and well proportioned. The head is usually long, though in the north there is sometimes a marked tendency to brachycephaly. The facial characteristics are hardly those of the true negro, and in the east especially an almost European cast of countenance is often seen. The colour of the skin varies: in most cases it is a dark chocolate brown, but in some places, as, for example, along the course of the Ubangi, it is a dark brownish black, and in others a light red or yellow brown. The hair is as a rule short and woolly, but among the Mongwandi and some other tribes it is longer and less curled. Everything points to the fact that very different ethnic strains have entered into the blood of these people.

In the region which lies in the basin of the Lindi, to the east of the Congo, several tribes may be noted. The Bamangu, who live near the Congo, are described as a very handsome people, noted for their extreme licentiousness. It is said that their bows resemble those of the Azande and of the Sudanese tribes to the north of the Congo basin. There also appears to be some resemblance between them and the Mangbetu. The Bakumu, who live farther east, belong to a less handsome physical type. The body is sometimes well formed, but the legs are often short like those of the forest negro, and the face is ugly and prognathous.

CHAPTER VII

CONDITIONS OF NATIVE LIFE

THE FAMILY

AMONG the negro peoples generally the family is the social unit. In its most elementary form it consists merely of the man, with his wife or wives, and those of their children who have not married and acquired homes of their own. It may, however, be extended so as to include not only others who are connected by ties of blood, but slaves, and even strangers. The size of the family group, and the relation of its different members to each other, accordingly varies considerably from one tribe to another.

Polygamy is practically universal. The most notable exception to this rule are the Bushongo, who appear to be monogamous, as far, at least, as women of legitimate Bushongo blood are concerned. As, however, they frequently have concubines whose parents have surrendered them as pledges for debt, the distinction is perhaps more apparent than real. Among those tribes which are openly polygamous the number of wives possessed by each man varies considerably. With the Baholoholo and the Lesa the average seems to be two, while the great chiefs do not have more than six. Other tribes, and more especially some of those who dwell outside of the limits of the tropical forest, practise polygamy to a much greater extent. The Basonge chiefs are said to have as many as 200 wives, and the Mangbetu chiefs have also large numbers. In these cases, however, it is probable that only a few are wives in the real sense of the word, while the remainder are merely servants. Among the forest tribes several wives are the rule, and only those men who are too poor to afford this content themselves with one. Indeed it seems to be the general practice of the native to invest his surplus capital in wives, as his more civilized brother invests his in real estate. They add to his importance, and bring him in a handsome return.

Nor do the women object. The single wife has to perform alone not only all the domestic work but no inconsiderable part of the field-work as well, whereas when there are several wives the field-work at least is divided among them, and the share of each is proportionately reduced. The additional tax levied by the Government on all wives after the first is said to be restricting the practice of polygamy in various parts of the country.

As a man is actuated at least partly by economic motives in his desire to possess more than one wife, so does the betrothal partake more or less of the nature of a bargain between him and the family — usually the father — of his future wife. Sentiment, however, is by no means absent. Beauty, or what the native considers to be beauty, is an important factor in regulating his choice. Among some tribes (the Warega, for example) moral qualities, of which chastity does not appear to be one, are said to be much sought after. With the Bangala again the social position of the woman is a consideration by no means negligible. Whether there is any affection between a man and his wife has been disputed, but the general consensus of opinion appears to be that it does exist in many cases; much of course depends upon the circumstances of the marriage.

The methods by which a marriage is arranged vary from tribe to tribe. In many cases the would-be bridegroom first assures himself of the consent of the woman whom he has chosen. This custom prevails, for example, among the Warega, the Ababua, and the Baholoholo. With the Basonge, the Mangbetu, and the Mayumbe on the other hand the consent of the woman appears to be taken for granted. Whatever be the prevailing custom, however, the subsequent procedure is usually much the same. The father—sometimes, it may be, the maternal uncle—of the woman is approached either directly by the man himself, by his father, or by his friends, and after long bargaining an arrangement is arrived at. The bridegroom either directly or through his father pays a certain dowry, and in return receives his bride. It is questionable, however, whether this system ought always to be regarded as marriage by purchase pure and simple. The Basonge, for example, protest energetically against the idea, and say that the father who gives his daughter in marriage always retains the right

to bring her home if her husband beats her without due cause. Among the Warega again the custom exists of transferring a woman from one husband to another even after marriage, if the latter offers better terms. The Baholoholo father does not make his demands till the marriage has been arranged, and then his future son-in-law is rather expected to pay up without demur. If the father refuses his consent it is not unusual for his daughter to elope. A modified form of marriage by capture appears to exist among the Ababua, the man sometimes carrying off the woman who consents to be his wife. But in whatever way the marriage is arranged the Ababua husband has to give presents to his wife's relations not only at the time of the marriage but at intervals thereafter. On the other hand when the parent accepts the first payment he in fact engages to give a second girl in place of the first if she dies or is otherwise lost to her husband.

On the whole then it would appear to be impossible to make any general statements in regard to the nature of the native marriage. Mutual affection undoubtedly exists in many cases, in many others the feelings of the woman are disregarded, frequently the marriage is based on economic considerations alone. But it seems to be generally considered that the parent who gives a daughter in marriage loses the service of a worker, and must be compensated for his loss. On the other hand a husband who loses a wife by divorce or flight is entitled to reclaim the dowry which he has given for her.

The age at which marriage takes place varies according to circumstances. Probably the great majority are arranged between young people of marriageable age, but there are important exceptions. The man is frequently the older of the two, as it is he who has to provide the necessary dowry, though for this he often obtains assistance from his father. In any subsequent marriage into which he may enter the difference in age is usually greater, and in those tribes where the chiefs have a large number of wives young girls are frequently married to old men. Child marriage also exists in some parts of the country. Among the Bangala, for example, girls are occasionally married when they are only three or four years old, and similar customs prevail with the Bushongo and the Baluba. In some cases the Bushongo mothers conclude a

marriage between their children while both boy and girl are of tender years. The Warega appear to have adopted the Arab custom of espousing girls who have not reached a marriageable age.

The number of children born of a native marriage is generally small, and the rate of infantile mortality is high. The woman has seldom more than two, or at most three, children, and the average number of births per union is still lower. For this there are various reasons, but the most important are probably the loose sexual morality prevalent throughout the country, and the large number of wives possessed by the chiefs in certain districts. Among some tribes abortion and infanticide are by no means uncommon. For the high rate of infant mortality ignorance and disease are mainly responsible. The mother, even when she is attached to her child, as indeed is usually the case, takes few precautions against changes of temperature, insanitary conditions, and other causes of illness and death among infants. Malaria also is prevalent in most parts of the country, and, although the adult negro appears to be immune, there is little doubt that many children fall victims to the disease. Diphtheria, scarlatina, and meningitis are all more or less common.

Family affection is by no means wanting. As a general rule parents seem to be attached to their children, and often play with them. The children on the other hand reciprocate these feelings, and are particularly devoted to their mother, with whom they are most brought into contact. Nor do parents and children cease to care for one another when the latter have grown up. The married woman who has been ill-treated by her husband can usually find a home with her father, a fact which indicates that the family tie is at least acknowledged. Again, contrary to a widely prevalent opinion, it is not true that old age is held in little respect by the natives of the forest region. Among the Warega the old and infirm are carefully provided for by their children, who take their advice and have great faith in their wisdom. The Ababua likewise care for the old people, and provide for them even if they are unable to work. The same appears to be true of the tribes who occupy the more open savanna lands. The influence of the old men is great among the Baholoholo,

and if they become infirm their children build huts for them near their own and provide for their wants.

As might be expected, however, little attention is paid to the education of the children. As they grow up they learn to take part in the work of the family. Boys are taught by their fathers to clear the forest, to hunt and fish, girls by their mother to cook and work in the fields. With some tribes a certain amount of moral training is also given to children; thieving and lying are severely punished, and respect for old people and the dead is inculcated. In the majority of cases, however, it would appear that there is no specific teaching, and that such rules of conduct as exist are learned almost unconsciously. Where initiation ceremonies are in vogue, as they are in some parts of the Kasai region, a more formal training is sometimes given. The Bushongo youth, for example, have detailed, if somewhat gross, rules of conduct laid down on these occasions for their future observance.

In the native family the husband and father holds the chief place. It is he who assigns their tasks to each member of the family, and it is he who gives his daughters in marriage and receives the dowry which is paid for them. With regard to the latter point some writers have maintained that it is not the father but the maternal uncle who is in this respect the head of the family. For this, however, there appears to be very little evidence, although it seems to be the case that the maternal uncle is one of the relatives whom children are taught to respect. Among the Ababua, for example, he has the right to correct his nephews and nieces if he finds them engaged in wrong-doing.

But if the powers of the father are great, they are by no means unlimited. As already mentioned, his father-in-law is often able to intervene if he ill-treats his wife. On the other hand a woman guilty of serious misconduct may be deemed fortunate if she escapes with a beating. As a rule the father retains the obedience of his sons only until they set up establishments of their own, though in some cases, as already indicated, his moral authority continues to be great over both his children and his grandchildren. His power over his daughters is more absolute, as they are often regarded as his personal property with whom he can do what he will.

The position of woman is more difficult to define. In some

cases she is regarded as little more than a slave who can be sold or transmitted from father to son with the family goods; in others she occupies a position of importance, and is able to exercise considerable influence. A few illustrations will serve to indicate how impossible it is to make any general statement on this subject. Among the Warega women are not only well treated but are admitted to the public assemblies, where they are allowed to take part in all discussions. With the Mangbetu their position both at home and in public is generally recognized as being an important one. On ceremonial occasions a Mangbetu chief is always accompanied by his principal wives, who may take part in the 'palaver', and otherwise use whatever influence they possess. The Baluba women again occupy a place in village life which more or less corresponds in importance to that of the family to which they belong. In many cases indeed they are able to hold the position of chief, and in general they are regarded both in public and in private as possessing almost equal rights with the men. The Baholoholo women do not appear to take part in public life to the same extent, but they are treated with respect and regarded as human beings who possess distinct rights of their own. In the Bushongo country also the position of the women is not without a certain dignity. The mother of the king is a person of considerable importance, and there are numerous women in the council, which consists of the older inhabitants of the region. In domestic matters also the relations of husband and wife are well defined. The duty of the husband is to hunt for game, and to defend the home if attacked, that of the wife to till the land and cook the food. Children, while young, are entirely under the control of the mother, and only when they begin to grow up does the father have the right to control their actions.

In other tribes, however, the position of women appears to be much less favourable than in the cases which have just been described. Thus among the Ababua the women, although well treated in a general way, occupy a very inferior place, and a wife may even be sold if it pleases her husband to do so. The same is true of the Bangala. Among the Basonge the woman also holds a very dependent position; she is considered mainly as an agricultural labourer, and may be sold or exchanged.

DOMESTIC SLAVERY

According to law slavery does not now exist in the Belgian Congo. The practice of domestic slavery, however, is so widespread in the country, and is so closely interwoven with the existing social system that any attempt to interfere with it would at present be inadvisable. Accordingly, while the State does not recognize the practice, it does not interfere with it, except in as far as is necessary to protect the slave against abuse, and to give him help when he appeals for it. The extent to which the State is able to intervene in such cases, however, is obviously limited, and in many parts of the country it is probable that conditions are much as they were before the annexation of the colony to Belgium. Nevertheless, it is necessary to recognize that the system is more or less in a state of transition, and that it is not always possible to make definite statements regarding the extent to which it is practised and the relations which now exist between masters and slaves.

A man may be reduced to a state of slavery for one or other of several reasons. Sometimes he is born into it, but it is by no means always the case that the children of a slave are themselves slaves. Among the Baholoholo, for example, the child of a female slave is free, and among the Ababua a slave who marries a free woman himself becomes free when his first child is born, while a female slave at once regains her liberty if she marries a free man. With the Bushongo the children of slaves belong to the master of their parents, and are unable to marry Bushongo girls, but in other respects they are considered as free. Formerly all prisoners taken in war became the property of their captors, and it is probable that in some parts of the country many people still lose their liberty in intertribal feuds. Poverty is also a frequent cause of slavery, and a man without resources of his own is often glad to attach himself as a slave to a master who will provide him with the necessaries of life. Thieves caught in the act, adulterers, and other criminals are with some tribes compelled to atone for their fault with their liberty.

As might be expected, the position of the slave varies greatly from tribe to tribe, but on the whole is not so unfavourable as is sometimes imagined. In most cases he is treated as a

member of the family, and like other members thereof has a well-defined position with corresponding rights and duties. Domestic slavery as practised among the Mangbetu, for example, imposes no great hardships. Although their social position is lower, the slaves live much as their masters do, and if they are unpaid they receive presents from time to time. Indeed it is not uncommon for a slave who regards himself as unfairly treated in this respect to transfer his services to a new master on the first opportunity. Moreover the Mangbetu do not appear to sell their slaves, at least to strangers, and do not ill-treat them. They may marry, but their masters possess certain rights over their offspring. Under the Ababua the position of the slave seems to be much less favourable. He cannot withdraw from the authority of his master, and can redeem himself only with his master's consent. His owner also seems able to sell him, exchange him, or even to kill him. On the other hand the customary usages of the tribe afford him a certain amount of protection. Public opinion, for example, would oppose the sale of a man out of the village in which he had lived for a number of years without serious cause. Among the Baluba again there is nothing, apart from Belgian law, to prevent a master from killing his slave, but public opinion would be much against him if he did so.

On the whole the relation in which a man stands to his slaves is determined by his position as head of the family of which the slaves are members, and, apart from the fact that the tie between them is in some respects more permanent, there is often little difference between the way in which he treats his slaves and the way in which he treats his wives and daughters. He exacts obedience from them, and in return gives them his protection. The slave has to be provided with a hut and food, and sooner or later with a wife or wives. In return he has to render certain services which vary from tribe to tribe, but the extent of which are all more or less clearly defined by custom which almost possesses the force of law. His right to have property of his own varies. Sometimes, as with the Bangala, he may even own slaves, sometimes everything which he possesses is his master's, and can be disposed of by him at his will. Very frequently there is some method by which he may ultimately regain his liberty. With

the gradual extension of Belgian rule the worst abuses of the system of domestic slavery will gradually disappear. And that such abuses did exist there can be little doubt. The Ababua and the Bangala were at one time accustomed on the death of the head of a family to kill and eat several of his slaves, and other tribes probably did the same.

HOUSES AND VILLAGES

The style of domestic architecture, though almost always of a primitive description, varies considerably from one part of the Belgian Congo to another. For this there are several reasons. Much depends upon the building materials which are available, and as a result the hut of the forest is often very different from that of the grass-land. Climatic conditions have also to be considered: in some districts it is necessary for the natives to take precautions against heavy rainfall and consequent flooding, while in others they have to protect themselves against the relatively cold weather which prevails at certain seasons of the year. The stage of civilization which has been reached by the native is also indicated by the type of house in which he lives, and the homes of the pygmies of the tropical forest are naturally very different from those of such relatively civilized people as the Mangbetu. That foreign influences must not be excluded from consideration is shown by the fact that the native hut in the neighbourhood of European settlements has frequently undergone considerable improvement.

The position, structure, and size of the native village are also subject to much variation. Position may be determined by one or other of several factors, of which the most important are a supply of good water, security against floods, the proximity of good arable or pastoral land, facilities for hunting and fishing, and suitable means of defence. The size of the village on the other hand is mainly dependent on social and political conditions, which in turn are at least partly determined by geographical environment. As a rule social and political units are larger on the savanna than in the forest, and consequently it is in the former region that the largest villages are generally found. The structure of the village is influenced by similar conditions. Where a low state of political development prevails it consists at most of

a double row of huts arranged more or less irregularly along the main path. Among more highly developed communities on the other hand the houses or groups of houses are often arranged symmetrically around the abode of the chief; defensive works, when they exist, are organized with care, and various communal buildings are provided.

The most primitive type of hut in the Congo is that constructed by the Batwa. As he spends his time mainly in hunting, and is constantly moving from place to place in pursuit of his game, a permanent habitation would be of little value to him. In many cases he merely constructs for himself a cage of boughs, which are stuck into the moist ground at their thick end and then bent over in a flattened semicircle and pressed into the soil by their tips at the slender end. Other withes are bound round horizontally, and when the skeleton thus formed has been covered with leaves the building is complete. The villages are little more than encampments hidden in the recesses of the forest, security and the proximity of game being usually the main factors which determine their position.

Among the other peoples of the Congo the villages are of a more permanent character. In the tropical forest they are generally small, and seldom contain more than 100 huts, while many consist of twenty, or even less. A few illustrations will serve to show the general conditions by which their sites are determined. On the lower Congo, and especially in Mayumbe, villages are found in the most diverse situations: some are concealed in the depths of the forest, while others are perched high up on the mountain-slopes. The proximity of drinking water and arable land are probably the most important factors nowadays in the choice of village sites, but formerly the places which were selected had in addition a good defensive position. Wherever it is found, however, the village is nearly always of the same type. The huts are arranged in two parallel rows on either side of a pathway or open space, those in each row being separated from one another by an interval of a few feet. The whole village is usually surrounded by banana plantations.

The Wangata, who occupy part of the region which lies near the equator between the left bank of the Congo and the Ruki, live on the low plateaus which rise above the surround-

ing inundated land. As a rule the huts are built on either side of a footpath which follows the axis of the plateau, those belonging to one family group being separated from those belonging to another by an open space. The Bosanga, who live to the south of the Wangata, and the Bombwandza, to the east of them, cut a series of re-entrant angles in the forest along the line of the path, and in each of these angles a family group is installed.

The Bangala live on both sides of the Congo above Coquilhatville, and devote much of their time to fishing. Their villages are accordingly situated in the vicinity of the river, and usually consist of several parallel rows of huts, the whole being surrounded by banana plantations.

The Lesa, on the left bank of the lower Lukenie, live on the marginal district between the forest and the savanna. Their villages, however, are often found just within the forest border, and their sites are carefully chosen, partly with a view to defence and partly with a view to access to good water and arable land. A village may contain several groups of houses separated from one another by small plantations, and in each group the huts are built on either side of the pathway, sometimes touching one another and sometimes a few yards apart. At either end of the village there are several huts occupied by the young men, to whom the safety of the community is entrusted. The chief's house is situated in the centre of the main group of buildings. Each village also contains a forge, and a sort of public hall, in which the inhabitants sit and talk.

Along the Aruwimi the villages are somewhat different in type. The Banghelima, who occupy both sides of the river between Basoko and Panga, and the Bapopoie, who live in the interior mainly to the south of the Aruwimi, build their huts without any order along the streams and along the principal routes. The Banghelima are fishers, and place their villages where easy access can be had to the rivers, while the Bapopoie choose sites near water and arable land. All the houses belonging to one family group are placed together.

The Warega, in the basins of the Elila and the upper Ulindi, east of the Lualaba, build their homes in more or less continuous rows along the main paths. One tribe, the Malinga, place their villages near the smaller rivers, while

another, the Ntata, live on the summits of the high mountains, where defence is easy. The Warega village is always simple in design, and a structure placed at one end of the single street is the only public building which it contains.

The Ababua, to the south of the Welle, live in small villages, which are carefully fortified. As a rule about twenty establishments are grouped together, the huts being placed symmetrically on either side of an open road, 30 to 70 feet in width. The whole is surrounded by an impenetrable defence of brushwood, in which there are one or two carefully guarded openings. In the centre of the village a small elevated post provides a suitable point from which to observe the approach of a stranger along the paths which lead to the village.

So much for the villages of the tropical forest. Several types of houses are found within the same region. The most common is that of which the ground plan is rectangular. In the Lower Congo, where this type prevails, the roof is gable-shaped, and as a rule overhangs the walls of the hut so as to provide a veranda on which the inhabitants may sit during the day. The hut is divided by a partition into two apartments, one of which is used as a kitchen and the other as a bedroom. The materials employed are poles and thatch, derived from a variety of palm widespread throughout the region.

The huts of the Wangata are somewhat similar in design. The framework is constructed of poles which are bound together with lianas. Formerly both the outside and the inside of this skeleton were covered over with bamboos, and the intervening space was filled with leaves. This method, however, was found to be objectionable, as it provided a refuge for all kinds of vermin, and in many cases the Wangata now content themselves with lining the interior of the hut with cork. The roof is generally constructed of plaited bamboo leaves, and when well made will last for years. The women's huts are frequently built in a single line under a continuous roof. Another building found in the Wangata village, and known as the *ingomba*, is merely a shed, which is open to all the winds that blow; it is the place where the natives sit, talk, and eat during the day.

The Ababua huts are also rectangular in plan, while the roof, which is gable-shaped, overhangs on the side facing the street in such a way as to form a veranda. The different huts

are placed close to one another facing the street in such a way as to form a continuous row. A variety of raphia palm known as *sese* provides most of the material which the native requires in the construction of his abode.

In the Aruwimi region a very different type of domestic architecture makes its appearance. The principal form of structure among the Bapopoie, for example, is a four-sided hut usually from 6 to 9 feet square. The walls, which are made of wood, are about 4 feet high, while the roofs, which rise in the shape of a pyramid to a considerable height, are constructed of large marantaceous leaves fastened in horizontal rows against a frame of basket-work. In some cases the base of the hut, instead of being square, is round. When finished, the building may have a height of 18 or 20 feet, and has the appearance of a gigantic candle-extinguisher. In the region occupied by the Ababua and allied tribes there appears to be more than one type of hut, but the most prevalent is that with a circular base and a conical roof. The diameter of the ground-plan varies from 10 to 12 feet; the walls, which are about 5 feet high, are formed of wooden stakes, the interstices being filled with mud, and the roof is made from the carefully arranged leaves of the *likungu*. Generally there are two doorways, one of which opens out into the open space round which the huts are built, while the other is at the back, and affords a means of retreat into the forest. The hut of the chief is often distinguished by the fact that the supports on either side of the principal doorway are carried upwards from 5 to 10 feet, and are decorated with the spoils of war.

On the savanna geographical conditions are less unfavourable than in the forest for the growth of large communities with a more or less developed system of government. As a result the villages are often larger and more complex in structure. The sites are mainly determined by the occupations of their inhabitants. The Banziri, for example, are traders and fishers, and their villages lie close to the river, the huts being arranged in two long lines forming a wide street. Some of these villages are over a mile in length, and appear to be well populated. Farther to the east, in the country between the Bomokandi and the Welle, the Mangbetu usually place their villages where there are good water, fuel, and fertile soil. Travellers have, however, noted that these people are not

without an aesthetic sense, and that they often select sites possessed of great natural beauty. The villages are sometimes of considerable size, and the huts are arranged around an open space, on which there is often a large hall used for public meetings and similar purposes. The plan of the village varies, and it may be circular, elliptical, square, or intermediate, but it is always well built and carefully looked after. Generally speaking, there are no fortifications, but this rule is not invariable, and the houses of the chiefs at least are sometimes surrounded by a zareba or palisade.

The Baluba occupy the country to the south of the Lukuga. Their villages are often carefully planned. The chief and his family occupy a number of huts, which form a rectangle at the end of the principal street. Around them, on the side remote from the village, are the dwellings of the chief personages with their families and clients. In the main street of the village are the huts of various other officials and their followers. The less important people live in streets running parallel to the main street.

Among the Basonge, who dwell on the borders of the equatorial forest between the Lubilash and the Lualaba, there are also many large villages. Kolomani, situated on the Lurimbi, a tributary of the Lomami, was said to have a population of 10,000 in 1897, and a few years later Pania Mutombo had one of 2,000. Many other Basonge villages appear to be well built and prosperous. The streets are long and broad, and the huts of the various family groups are surrounded by small gardens. Frequently each person of importance has his own quarter, varying in size from four to twenty huts, which runs at right angles to the main road, and is encompassed by a hedge. The largest of these is occupied by the family of the chief, and is built round a great rectangular court, in the centre of which stands the residence of the chief himself. Opposite the entrance to the quarter of the chief stands the hall which serves as a meeting-place and council chamber, and not far off is the forge, where the village gossips congregate. Basonge villages are sometimes fortified by a palissade of tree-trunks, but the practice is by no means common.

In the Kasai region conditions vary. The Bushongo villages, which are often found scattered on the savanna by

the side of running water, are generally small, and the houses are grouped in hamlets of a dozen or even less. The larger villages, however, may consist of several streets, each formed by a double line of huts. Behind each house there is usually a small granary about three feet high, while in the street there are often some open sheds, where people work or rest. A fetish house is also a common object. The villages are separated from the surrounding bush by a cleared space of varying width. The Bakongo villages are likewise small, and seldom contain more than fifty houses. In the centre there is an open space, except for the residence of the chief, and around it the other houses are built in the form of a square or a circle. The whole is surrounded by a palisade, beyond which are various sheds where the inhabitants meet to weave or to gossip.

On the savanna the native house is perhaps more varied in structure than it is in the forest, partly on account of the diversity of building material, and partly because of the influence exercised by foreign invaders. The Banziri huts are shaped like bee-hives, and have thick grass roofs which reach to the ground. As they have a diameter of about 12 feet they are fairly capacious. Occasionally in this region one comes across a square or oblong habitation built partly of mud, the owner of which has come under the influence of the European, and has, as far as possible, adopted his style of architecture.

The Mangbetu are probably the best builders in the whole of the Congo region. The ground-plan of their huts is either circular or rectangular, but the former predominates. The walls, which are between two and a half and three feet high, are made of clay, which sometimes becomes very hard, and is susceptible of acquiring a high degree of polish. The framework of the roof is made of poles, which in the circular hut form a cone-shaped structure; in the square and rectangular huts the roofs are sloping. As a rule straw is used as thatch, but its place is sometimes taken by leaves. The walls are often ornamented on the outside by geometrical designs, such as the interlacing of the rhombus and the circle, drawn in black, white, and red, or by the designs of various objects, such as men, animals, guns, and tools.

But it is in the construction of the *hangars* which they use

as public halls that the Mangbetu really excel. These are often of large dimensions, and are built with great care. The roof may be of varied architectural design, and the supporting pillars, of which there are sometimes as many as sixty, are often carved with designs which show considerable talent.

The Basonge hut is usually rectangular in form. Its walls, which are about three feet high, are constructed of logs planted one against another. At each corner instead of a log there is a long flexible pole, and when these are bent down and fastened to one another they give the skeleton of the roof a somewhat oval appearance. Various grasses and herbaceous plants are used for thatching purposes. The Baluba hut is constructed on somewhat similar principles; it is usually 10 to 12 feet square, and the walls have a height of about 4 feet. The stakes which form the skeleton of the roof, instead of being bent down as in the Basonge hut, are merely drawn together and fastened so as to give the roof a pyramidal form. Besides the principal hut there are similar but smaller ones for slaves and the older boys and girls.

Several types of dwellings are found in the Kasai region. Among the Bushongo the plan of the hut is rectangular, the dimensions being 18 feet by 14. The roof, which is gable-shaped rests upon walls about 6 feet high. The leaves of the palm are extensively used in the construction of both walls and roof. The Bangongo huts are similar but smaller. Quite another type is found in some parts of the middle Sankuru. There the walls of the huts, which are about 15 feet by 9, are made of poles about 12 feet in length fixed vertically in the ground at a distance of from 4 to 6 inches from one another. The frame of the dome is constructed of long flexible sticks, which are fastened to the top of these poles and bent over to meet in the centre so as to describe the arc of half a circle. The whole construction is covered with a thick thatching of dry grass. In the upper part of the house there is a rack of wattle, which serves as a loft for keeping provisions.

One or two other types of native hut, the structure of which is determined more or less by climatic conditions, may be described before concluding. The Baholoholo hut is small, the ground-plan forming a square of which the sides are about 8 to 10 feet. The walls are formed of canes planted

in the ground, and rising above it to a height of about 4 feet. Longer and more flexible canes are placed among these at intervals, and bent over so as to form the skeleton of a more or less dome-shaped roof. The inside walls are then plastered over with mud derived from the nearest ant-heap, while the roof is covered with reeds, herbs, and straw. The whole structure is very light, but on account of the materials of which it is constructed does not suffer much from the violent winds which are a characteristic feature of the Tanganyika region. Behind his own hut the head of each family has an enclosure in which are situated the dwellings occupied by his wives, together with a shelter for his live-stock. The buildings where he stores his sorghum are usually situated outside the enclosure.

In some of the eastern districts (as, for example, among the Warundi people, who dwell on the slopes of Ruwenzori) the villages are usually placed at the bottom of the valley, so that the inhabitants may be protected against cold. The huts, which are circular in plan, are large, their diameter being from 20 to 25 feet. The whole building is covered with grasses or herbs, and the interior is lined with reeds to afford a protection against the cold. Bamboos are also used to make partitions by which the hut is divided into two or three apartments. As a further protection against cold the entrance is often more elaborate than is usual with a native hut, and consists of a tunnel-like archway several feet in length.

CHAPTER VIII

POLITICAL ORGANIZATION

WITH the European occupation of the Congo the development of native political institutions was more or less arrested. In many parts of the country the advent of the white man seriously weakened the authority of the local chiefs, but it was not till 1910 that any attempt was made to regularize their position and to give them a place in the administrative system. In that year, however, the Belgian authorities decided to recognize various chiefdoms, and to invoke the aid of their chiefs in the government of the country. The chiefs so recognized were in general the customary heads of the tribes or subdivisions of tribes to which they belonged, but power was retained to remove any one who proved unsatisfactory, and to appoint another in his place. The authority allowed to these chiefs was in general that which they possessed by custom, and it was stipulated that it should be exercised in the customary manner, for example, with the aid of a council when that had hitherto been the practice. Considering the powers moreover which some chiefs had wielded in the past, it was only natural to provide that they should not do anything which was contrary to public order, and that they should not contravene any laws expressly designed to supersede native customs, as, for example, laws forbidding murder, cannibalism, &c. In addition certain new powers were conferred upon them. The working of this system will be discussed later (see 'Government', Chapter XV), the object of the present chapter being rather to describe the general character of such political institutions as grew up under native conditions. Although the authority of these institutions has in many cases been weakened, and their powers reduced, they still continue to exercise considerable influence upon native life in most parts of the country.

If the family is the social unit, the village is the political unit. In the forest region, as already indicated, it is generally

small, and on the whole political institutions are more rudimentary there than they are on the surrounding savannas, where as a general rule the larger states and the more highly organized societies are to be found. (This does not of course imply that large States alone exist in the latter region, and small States alone in the former, but it suggests the prevailing tendency.) Several villages may be grouped together under a local chief, who recognizes the authority of the chief of the tribe. Each village also has its own chief, who may be, but is not necessarily, the head of the family group composing the village. This system, which is fairly advanced for the forest region, appears to be that which the Ababua have developed. The various tribes grouped under this common name have no supreme chief, and each tribe is autonomous, and occupies a definite geographical area. Within the tribe there are a number of groups, each of which has collective ownership over part of the territory occupied by the whole tribe. These groups (called *etina* in the native tongue) are again subdivided into clans, or *makèré*, each of which consists of several village communities. At the head of each of the *makèré* there is a chief, and the chief of the oldest *makèré* is sometimes recognized as the chief of a certain number of cadet-clans, and sometimes as chief of the whole *etina*. The *etinas*, although they are autonomous, in their internal organization recognize a certain order of precedence, which is signified by the offering of the leopard. A man who kills one of these animals offers it to the chief of the elder *makèré* of the elder *etina* of the tribe to which he belongs.

A somewhat similar but less complex grouping is found in other parts of the forest region. The *Lesa*, who belong to it, although they live rather upon its margin, form a good example. With them the political unit is, as usual, the village, but the country which they occupy appears to be divided up into a number of districts, over each of which there is a chief, on whom the village chiefs are more or less dependent. The latter, however, are the real rulers, and, though they do not seem to exercise a very active authority, they are held in some respect by their subjects. The district chiefs at one time had considerable power, as they were usually the heads of the families to which the village chiefs belonged, but that power has greatly decreased, though it is still said to exist. In all

his decisions the chief of a village is assisted by an assembly, consisting of the older and more notable men of the community. When a chief dies he is succeeded by his eldest surviving brother, or in default of a brother, by his son.

The Mayumbe, another forest people, are organized on somewhat similar lines. Each village has its chief, who often possesses considerable authority. Before the arrival of the Europeans, for example, he had the power of life and death in his hands. In all matters of importance he is assisted by a council of notables, but the extent to which he is under its control probably varies from place to place and from time to time. Another official of the village who formerly exercised a good deal of authority was the *mambouc*. He commanded the army in time of war and took the place of the chief as president of the council when military matters of any kind were under discussion. In contrast with what occurs in most other parts of the Congo, a Mayumbe chief when he dies is usually succeeded by the son of his eldest sister.

Sometimes a group of villages, each with its own chief, are united under the general authority of a supreme chief, known as the *kulundu*. His authority, however, seems to be vague; and, although he is often held in considerable respect, it is questionable whether he has any real power.

As already said, the political organization of the various peoples who inhabit the savanna regions is often more highly developed. Perhaps the best illustration of this fact is the system of government which formerly prevailed among the Bushongo. Their empire, for such it was, was ruled by a hierarchy of officials more elaborate than has been recorded of any other African people. It was in the full possession of its powers when the white man first entered the country, but is now showing signs of decay. The supreme chief is the *nyimi*, who at one time bore the title of *Chembe Kanji* ('representative of God upon earth'). Under him are the chiefs of the vassal tribes and a great number of local chiefs, who owe allegiance either to the *nyimi* himself or to one or other of the vassal chiefs. Theoretically the *nyimi* was an absolute monarch, and in public and on all ceremonial occasions was treated as such. In fact, however, the government was controlled to a greater or less extent by the *kolomo*, or functionaries of the court. Of these functionaries there were a great

number, and the more important of them held sway, except when the *nyimi* happened to be a man of more than ordinary ability. As the representative of the people, all land was regarded as belonging to the *nyimi*, and he was able to give it to, or take it from, whomever he pleased. The subject tribes which were settled on Bushongo territory paid tribute to him, and upon all the villages over which his rule extended certain dues were levied. It was from these resources that the members of the *kolomo* derived their income.

When the *nyimi* died his throne passed to his brothers in order of age, and in default of brothers to the sons of his sisters in the same order. Such at least was the theory, but it was rarely put into practice, as the *nyimi* had and used the right to disinherit those of his relations whom he disliked. As a rule therefore he was able to designate his heir from among his brothers, nephews, and even cousins, but he was compelled to limit his choice to the descendants of his female ancestors.

The *kolomo* included various military, judicial, and administrative officials, together with representatives from all the subject tribes. In addition all those who were engaged in the more important industries and arts, such as weavers, blacksmiths, musicians, and dancers, had the right to be represented at the court of the *nyimi*. These various officials were not hereditary, and in theory the *nyimi* alone could appoint a successor to any one who died or became disqualified; in practice his choice was generally decided for him by public opinion.

Among the Basonge, who also dwell outside of the tropical forest, there is a somewhat similar tendency to the growth of large political units. The chief of the village community is as usual the real ruler, but in some cases this community has attained considerable proportions, and may number several thousand people. Under such conditions the power of the chief is often great, though much will depend upon his personal qualities. In all important matters he acts only after consultation with his council, which is composed of some of his older and presumably wiser subjects. Not until a man has acquired a reputation for considerable wisdom is he invited to take part in the deliberations of this august body. The court officials on the other hand are usually young and

vigorous, as upon them devolves the duty of carrying out the decisions arrived at by the chief in council.

The bonds which unite various villages together into groups appear to be somewhat loose. An important chief frequently exercises a certain authority over a number of smaller villages, whose local chiefs are to some extent subject to him, but his power over them is not as a rule very great. Each year they send him tribute in the form of slaves, cattle, or food, and in former times he was entitled to demand from them a contingent to his armed forces in the event of war breaking out. In return he had to afford them protection if their lands were invaded by strangers. Among some of the Basonge tribes the suzerainty of the supreme chief is even more illusory. The village chiefs meet at frequent intervals and elect one of their number as their overlord, but, as he holds office only for a short time, his authority is practically non-existent.

A chief when he dies is as a rule succeeded by his eldest son. Should the eldest son be notoriously stupid or cruel, the village council nominates another member of his family in his place. If on the other hand he is a minor, they appoint a regent, who is usually the brother of the dead chief.

The Baluba, who dwell in the open woodland of the south-east, have also a political organization which is more highly developed than that of the forest peoples. The country which they occupy appears to have been conquered for them by a great chief called Tumbwe, whose successor lives in the Marungu Mountains near Lake Tanganyika. Not being able to administer the whole of his vast area by himself, he entrusted it to the sons of his relative Kabalo. Shola, the elder, occupied the north-west of the country, while Kayua, the younger, occupied the south-east. Each, after he had fixed on a site for his own village, distributed at least part of the remainder of his land among his children, nephews, and those of his followers whom he specially wished to reward. The condition of the grant was that they too should establish villages, each with its own local chief. Around the various leaders thus designated the bulk of the people grouped themselves, each man according to his own inclination. The different chiefs and sub-chiefs are bound by custom to provide their overlord with part of the yearly crop, together with a share in the proceeds of the chase.

The whole political system is therefore a hierarchy, based upon a blood-relationship which is always determined through the female line. When a chief dies he is succeeded by his brothers, and on their decease the office passes to the eldest son of their eldest sister. If there is neither sister nor brother the chieftainship passes to a cadet branch of the same family. The chief is assisted in his administrative, judicial, and executive functions by a council of notables, who, in the first instance at least, are nominated by him. A right to be summoned to the council appears to belong to the successors of those who have once held a place upon it, but they cannot avail themselves of this right until it has been recognized by the chief. Occasionally the latter summons all the freemen of his village to a conference, but such an assembly does not have much real power, and the government remains in the hands of the chief and his council.

The Mangbetu also, as might be expected from the general state of their civilization, have a well-organized political system. At the head of each tribe is a chief, who places his sons, brothers, or notables as secondary chiefs in different parts of the country over which he rules. Each of these has several villages under his control, and, as he cannot be in all of them at once, he in his turn appoints local chiefs for each. The administration of justice is one of the most important matters with which these various officials have to deal. Cases of little importance are settled by the village chiefs, while others are taken either to the chief of the group of villages to which the litigants belong or to the chief of the tribe himself. It is said that Okondo, one of the greatest of the Mangbetu chiefs, was accustomed to spend four or five hours each day in the administration of justice. This system is rendered possible only by the fact that the country occupied by the Mangbetu is very fertile, and consequently densely populated. The villages are numerous, and few of them are far distant from the tribal head-quarters.

The tribal chiefs are assisted in the discharge of their duties by a council, which consists of the secondary chiefs, warriors of distinction, and old men who have gained a reputation for political wisdom. All give their advice freely, but the chief, at least when he is a man of some ability, has the final decision in his own hands. Formerly he had the power of life and

death over his subjects, but since the occupation of the country by the Belgians all matters of grave import are settled in European courts.

As a general rule a Mangbetu chief is succeeded by his son. In the event of his being without a direct heir, or for other special cause, his place is taken by his brother.

It has already been indicated that the powers of the chiefs, with or without their councils, were at one time much greater than they now are. They made war and peace, dispensed justice according to the tribal law such as it was, and controlled to a greater or less extent the economic and social life of their subjects. To-day in all the regions which are effectively occupied by the Belgians intertribal war is forbidden, and, although the administration of justice is often left to the local chiefs, they are compelled to observe the general laws of humanity. In some cases indeed the people seem to prefer to take their disputes to a European court when one is available. Such appears to be the practice in Mayumbe, where nearly everything is said to be tried before a European tribunal, and various other tribes regard such a tribunal as a final court of appeal.

It was rather custom with the force of law than laws that were consciously made which governed the daily life of the people. In the civil domain this system probably worked, and in many cases still works, indifferently well. If a man obtained a loan or entered into an agreement with another, he generally did so before witnesses who were conversant with all the facts. The chief and his council had therefore little difficulty in learning the truth or in coming to a decision in accordance with tribal or village custom. If the defendant himself was unable to repay his loan or fulfil his engagement, it became the duty of his family to do it for him. The collective responsibility of the family for the default of its individual members was probably the nearest approach made by these primitive peoples to a general principle of law in civil affairs.

The methods adopted in the pursuit and punishment of crime were open to much graver objection. The chief offences recognized were murder, theft, and adultery, and as a rule the criminal concealed his act, not because it was against the law, and not because it was morally wrong, but because its detection

would have brought swift retribution upon himself. Indeed in most parts of the country the custom was for the aggrieved party or his surviving relations to take the law into their own hands when the criminal was caught in the act, and to put him to death or to otherwise maltreat him. If on the other hand no one raised a complaint, there were generally no means by which an offender might be put upon his trial. A stranger, for example, might be murdered within the confines of a village, but, as no one was directly interested in him, his murderer generally escaped. Punishments, whether inflicted by the injured party or his family or by order of the chief and his council, were as a rule very severe. Whipping and mutilation, often of a most atrocious character, were common, and it was only among the more advanced tribes that the principle of compensation was admitted.

If the criminal were not caught *in flagrante delicto*, recourse was had to supernatural means for his discovery. The sorcerer was appealed to, lots were cast, and the person thus designated was compelled to submit to the ordeal by poison, which in one form or another was common throughout most parts of the Congo. Even in cases where a chief with his council honestly endeavoured to arrive at the truth with regard to a suspected person they resorted to this method if other means failed. For further details regarding the part played by the sorcerer in the administration of justice see page 151.

CHAPTER IX

CULTURAL CONDITIONS

THE BANTU AND SUDANIAN NEGROES

Mental Characteristics

It is difficult to obtain a clear idea of the mental characteristics of the natives of the Congo. All accounts which are available are liable to have been influenced either by the interests or the sentiments of those by whom they have been written, or by the special conditions which prevail among the people to whom they relate. Some statements of a general nature may, however, be made. The native child appears to be active and intelligent, but his mental development often ceases about the age of puberty. This fact has never been satisfactorily explained, but may be due to one or other of several causes. The loose state of sexual morality, and early and excessive sexual indulgence are believed to have a very prejudicial effect on the intellectual growth of the youth of the country. On the other hand it must also be remembered that by the time a boy has reached the age of eight or ten years he has learned everything that the village to which he belongs has to teach him, and that as a rule no further demand upon his intellectual faculties is made. Or it may be that the real cause of the early cessation of intellectual growth among these native peoples must be sought for among the conditions which determine racial differences.

The adult negro is, however, by no means devoid of intelligence. He has considerable powers of assimilation, and is easily taught to do manual labour of a kind to which he has hitherto been unaccustomed. The Mayumbe, for example, though by no means so alert as some of the other natives of the Congo, are said to learn in a fortnight all the work required of them in the cocoa plantations, and statements of a similar nature have been made of other forest tribes, such as the

Bangala and the Wanga. Of some an even better account is given. They are said to understand quickly, and to answer promptly, all questions put to them on matters of which they have cognisance, but to become fatigued if the interrogation is unduly prolonged. Sometimes they show no little linguistic capacity: it is said that an Ababua will easily learn in a fortnight the dialect of a tribe previously unknown to him.

The Congo negro is not devoid of reasoning power, but he has little conception of general ideas, and in argument he relies mainly upon illustration and comparison. He also makes frequent use of the *reductio ad absurdum*, and has a child-like delight in attempting to place his opponent on the horns of a dilemma. As a rule he is not logical in his methods of thought, and will frequently after accepting the major and minor premisses of an argument refuse to accept its conclusion. On the other hand the members of some tribes are full of good sense, and, if a course of action thought to be desirable is placed before them in a plain and simple fashion, they will agree to it without hesitation. Though native powers of generalization are, as has already been said, limited, different tribes appear to vary greatly from one another in this respect. Some have very few abstract words in their language, others a considerable number. The Baluba, who are said to be capable of seizing an abstraction when it is presented to them, may perhaps represent a state of negro development a little above the average. They have words in their language for such ideas as mankind, poverty, and health, but not for friendship, charity, tenderness, or chastity, which represent abstractions to which they are unaccustomed.

Within certain limits the native is a close observer of nature. Everything connected with matters which closely concern his daily life are carefully noted by him and stored in his memory for future use. His knowledge of plants and animals is often extensive, he makes a good guide, and he has an almost malicious joy in nicknaming people on account of any minor peculiarities which they may happen to possess. But as a rule he does not seek for an explanation of what he has seen. Often indeed he is too ignorant to discover it, but in any case he is mentally too lethargic to trouble himself further with matters which do not directly concern him.

The imagination of the native is well developed, but only within comparatively narrow limits, and it is sometimes difficult to distinguish it from conscious exaggeration or even deliberate mendacity. He cannot refrain, for example, from describing a small crowd of people as a multitude of men numerous as the trees. On the other hand it is questionable whether he is ever able to imagine conditions of life unlike those to which he himself has always been accustomed. To explain the sea to a forest negro is said to be an almost impossible task. In foresight also he is generally lacking. He acts on the impulse of the moment, and is as a rule too much occupied with the things of the present to pay much attention to those of the future. The luxuriance of vegetation by removing the fear of absolute starvation is no doubt partly responsible for this, and it is interesting to note that tribes (such as the Mangbetu and the Basonge) which live on the savannas with their recurring dry seasons are accustomed to take somewhat longer views. But it may be noted that even in the forest the cultivation of such plants as manioc implies that the native is able to look ahead for at least a year. The native is also under the control of custom to such an extent that his inventive faculties are not given much opportunity to develop. When he is faced with a difficulty he prefers to surmount it by means which are intellectually the more easy even if they ultimately involve him in a course which is physically more laborious. Thus if a tree stops his path he finds it easier to go round the obstruction than to plan for its removal. In some cases he has been known to adapt the methods of the European to his own requirements, but generally he takes everything for granted, and is seldom on the look-out to devise means to improve his position.

Intellectual Attainments

That the standard of civilization reached by the natives of the Belgian Congo is low goes without saying. No native system of writing has been devised, and, except in the relatively few cases in which a man has been trained in a mission school, he is unable either to read or write. The most important means of communication, apart from verbal statements, is the tam-tam, or drum, which is found in almost every

village. With the Congo people it takes the place of a national telephone, and among the more skilful tribes is used to a considerable extent.

In all matters involving arithmetical calculations very little progress has been made. Among many tribes the people are usually able to count up to 100, but beyond that they seldom seem able to go. Sometimes they have words for 200 and higher numbers, and sometimes, as with the Ababua, anything above 50 is expressed only in general terms. The decimal system of notation is employed, and both when they are actually counting or making calculations, and when they are stating numbers the natives use their fingers and toes very freely. As they are ignorant of all but the most obvious movements of the celestial bodies, they make little use of them in their division of time. As a rule they mark the progress of the year by the alternation of the dry and rainy seasons. The Bangala who inhabit a region where it is almost impossible to distinguish the one from the other appear to make their reckoning by reference to the rise and fall of the Congo. The phases of the moon enable most tribes to divide the year into lunar months. By the sun they can tell the time of day with remarkable accuracy.

The geographical knowledge possessed by the natives is usually very limited. As a rule they know only the country within a few miles of their own homes, but a certain amount of course depends upon the main occupations of the tribes to which they belong. Those who are engaged in trade, for example, not only possess a good deal of information about the region from which they obtain their staple commodities, but have some acquaintance with the main trade-routes and the more important rivers in their own part of the country. Tribes which have been accustomed to provide porters for Europeans also acquire in time a certain knowledge of the outside world. But with these and such exceptions the Congo native shows little interest in what lies beyond the limits assigned to his village. His practical skill as a traveller is by no means negligible. With the help of the sun he is usually able to orient himself, and he often shows considerable skill in locating himself when far from home. Some tribes are also able to make rough but accurate maps of the country around their homes. Among those who are able to do this

the Mangbetu are specially noted, but the Warega and the Basonge have also some skill in this respect.

Their knowledge of the past is very fragmentary. Most tribes possess traditions regarding the events which led to the occupation of the land of which they are in possession, but beyond that they are usually ignorant of everything of which they have not personal knowledge. But to this general statement the Bushongo form a notable exception, as the history of their tribe appears to go back in a more or less accurate form for several centuries. Among the Basonge also a considerable amount of local history is handed down from one generation to the next. Curiously enough it is regarded as secret, and is told only to the notables of the tribes.

Native medicine is a curious combination of sorcery and empirical skill, the former predominating among the more ignorant tribes, and the latter among the more advanced. For the most part the treatment of the sick is entrusted to the sorcerer, or to professional healers, whose secrets are handed down from father to son. Native herbs enter largely into their pharmacopoeia. Manioc leaves are much used because of the prussic acid which they contain, and charcoal, burned banana stems, decoctions of the bark of many different kinds of trees or of leaves steeped in boiling water, palm-oil, and the oils of certain nuts such as the kola, are all more or less rationally used, either externally or internally. Hot fomentations are applied to swellings, rheumatic pains, and strains. Massage is much in vogue among certain peoples for severe indigestion, lumbago, headache, and various other complaints. Broken limbs are straightened and set in rude splints. The application of all these remedies is usually accompanied by magic rites, chants, and other ceremonial acts.

Practical Skill

Even in matters which closely affect his daily life the native does not show any great ingenuity in devising, or skill in executing works of public utility. To his house alone does he appear to give much attention. The roads between different villages are usually tracks which in the course of time have been beaten into the semblance of paths. But

on their upkeep no labour is expended. If one should happen to become blocked by a falling tree, the native seldom thinks of removing the obstacle, he simply passes round about it. There are, it is true, exceptions to the rule. In the Mangbetu country some of the roads, especially those which lead to the villages of the chiefs, are well made, and the Baluba villagers unite to clear the paths which lead to their fields and wells. Rivers are bridged only when they are quite unfordable. To construct a bridge lianas are fastened to trees on either side of the river and swung across to the opposite side. By interlacing these with other lianas a structure is provided which, if it has been carefully made, will sometimes last for several years.

The canoe is almost everywhere the sole means, apart from human portage, which the native has devised for the transport of goods. However long and shapely it may be, it is nothing but a hollowed-out tree-trunk, and into its construction the skill of the carpenter does not enter. In size it varies: many are designed to carry from two to six men, but others are larger; and it is said that some of those used by the Mayumbe are capable of transporting three tons of coconuts. Apparently the natives are quite content with the canoe for purposes of navigation, and in many cases spend more time and labour in devising an appropriate figurehead for it than in seeking to improve the type to which it belongs. On the upper Ubangi and on its headstreams, the Bomu and the Welle, where the Sudanese have made their influence felt, the art of navigation is somewhat more advanced, and the canoes used there are practically boats. They are so constructed that they draw little water, and are therefore admirably adapted for these rivers and their tributaries, where they are required to glide on the surface, the depth of the rivers at some seasons of the year being measured only by inches. On the Welle and the Bomu these boats have very thick sides, and are also fitted in other ways for use on rivers whose courses abound in rocks and rapids. In some parts of the Congo, however, the natives have not even reached the canoe stage of navigation. When the Warega desire to cross a river which is too broad to be bridged they make use of very primitive rafts consisting of several tree-trunks rudely fastened to one another. The inhabitants of the district round

the lower Lomami use rafts for purposes of transport, and the Bakwese, one of the very backward tribes of the western Kasai region, do the same. Sometimes these rafts are made of bundles of papyri or reeds, and are similar to those employed on the upper Nile.

Agricultural methods are discussed elsewhere, but it may be noted here that even in those districts where there is a well-marked dry season the natives do not appear to practise the art of irrigation. On the other hand they are sometimes compelled by the necessities of the case to undertake the drainage of their lands, and this they do by constructing small channels. Some of the riverain tribes are accustomed to dam the rivers along which they live in order to obtain suitable fishing grounds.

On the whole then it would seem that the native is very much the creature of his environment. To obtain from it his daily needs he shows a certain amount of ability and even of ingenuity, but with him sufficient to the day are the needs thereof, and he takes little thought of the ways and means by which his position might be rendered more comfortable and more secure.

Art

Among the natives of the Congo the artistic faculties are not developed to any great extent, though some tribes show considerable skill in tattooing, weaving, and the manufacture of pottery. Their attempts at painting and drawing are with few exceptions either very simple or very crude. The Mangbetu, the Ababua, and various other peoples decorate the outsides of their houses with designs of one kind or another, mainly geometrical figures, representations of animals, and scenes from daily life. Articles of domestic use are frequently ornamented in a somewhat similar fashion. But all that they do is by way of imitation, and imagination seldom appears to enter into their art. Occasionally, however, there are exceptions. The Bushongo are distinguished by a remarkable artistic sense, which finds expression in the proficiency with which they pursue certain crafts, such as embroidery and wood-carving.

Sculpture is confined to working in wood, and occasionally in ivory. Among the objects most commonly made are fetishes

of various kinds, models of men and of animals, and articles of domestic use. The designs are usually crude and conventional, and give little evidence of artistic sense. An exception must, however, be made for certain tribes, such as the Mangbetu, who work in ivory. The objects made by these people, such as trumpets, knife-handles, goblets, and statues, often show considerable skill and a more developed sense of beauty than is to be found in most other parts of the country.

Although the natives of the Congo can hardly be called musical in the ordinary sense of the term, they have various musical instruments, some of which are much in use. Of these the simplest and probably the most primitive is the tam-tam; it is merely the segment of a tree-trunk, the inside of which has been scooped out through a narrow slit. The tam-tam is used for that drum-signalling which is, or at least was, so common in different parts of the country, and in which some native tribes had acquired a high degree of proficiency. An advance on it is the drum proper, which consists of a hollow wooden receptacle with its open end covered over with a stretched skin. The tambourine, made of a wooden hoop over which a skin is likewise stretched, and the friction drum, in which the noise is produced by rotating a stick passed through the centre of a leather drum-head, are also found in various parts of the country. Several types of wind instruments are also in use. Flutes and pan-pipes are made from reeds, and whistles and trumpets from the horns of various animals. The stringed instruments include primitive forms of the guitar and the zither. Of dances there are various kinds. The war dance, which is participated in by the men only, usually loses all idea of rhythm, and frequently degenerates into a sham fight, while those dances in which the women alone take part are probably connected with sexual phenomena. Dances in which there is only one performer, male or female, are as a rule connected with religion, witchcraft, or the practice of medicine. On these occasions the dancer sometimes whirls himself into a state of frenzy, in which he is supposed to be able to reveal the names of suspected persons, witches, and criminals, and to give other important evidence. But most common of all are the dances in which both sexes take part, as they provide one of the chief means of amuse-

ment at the command of the native. They may take place on any festive occasion, such as a marriage, the gathering in of the crops, or even a funeral.

Industry

Probably nothing throws a clearer light upon the present condition of the natives of the Congo than a survey of their industries. It shows that they have passed beyond the stage at which all their time, energy, or inclination is required to provide for the immediate necessities of their existence, but it also indicates that they have advanced but a comparatively short way towards providing themselves with the needs of even the poorest civilized community.

Weaving is carried on in almost all parts of the country, but notwithstanding the abundance of various fibres it has made comparatively little progress. In one or two regions, of which Mayumbe is probably the most important, cotton is spun and woven, but the product is said to have a texture little, if anything, finer than the better kinds of native basket-work. Elsewhere on the other hand the indigenous industry has disappeared owing to the importation of European goods. It is probable, however, that it will again develop, especially in those districts where cotton is now being grown under Belgian supervision. But the bulk of the material used for weaving is derived from the raphia and other palms. With the fibres of these plants the natives manufacture various fabrics, which differ in quality according to their skill. Some of the Basonge work is said to be remarkably fine and durable, though the pieces woven are not much larger than a pocket-handkerchief, and have to be sewn together in order to make clothes. But in a country where clothing is usually at a discount woven goods are frequently used for other and more necessary purposes. The Ababua, for example, chiefly employ them to make bands, with the aid of which the women are able to carry their children while at work. Among other fibres which are sometimes woven are those of the kapok and banana, with which the Bangala do a certain amount of crude weaving.

The manufacture of basket-work appears to be a more important industry than weaving in many parts of the country.

The raw materials employed vary according to locality, and reeds and rushes, the fibres of the *Borassus*, raphia, and oil-palms, and the leaves of the *Pandanus* are all used in the localities in which they grow. Among the articles more frequently made are baskets, mats, sieves, hats, fishing-nets, and shields. In quality of workmanship they range from rude vessels of interlaced reeds, such as those carried by the Lesa, to the skilfully made mats of the Mayumbe, which are often tinted in various designs.

Ropes are made from various plants. For rough work, and among the ruder peoples lianas from the forest are alone used. For articles of a finer quality, however, the fibres of the pine-apple, raphia-palm, banana, and other plants are utilized. The Mangbetu use hair for certain purposes.

Of all the industries of the country the working of metals is that which is held in highest repute. It is the only one indeed in which a certain amount of specialized skill is required, and those who are engaged in it may be regarded as practically the only craftsmen of the Congo. The raw material is obtained from various sources. Sometimes it is found at hand, and the Ababua and the Lesa obtain their supplies in the ground at a depth of from six to ten feet below the surface. The Basonge on the other hand look for theirs in the mountainous parts of their country, while the Baluba get it from the limonite on the banks of the Lukula, and in the vicinity of the Lualaba. The Mangbetu, who formerly obtained iron ore from the iron hills in their neighbourhood, now depend for the most part on imported European iron. The methods employed in smelting the ore are, as might be expected, of the most elementary description. It is heated by means of a charcoal fire, and then well hammered with a view to getting rid of all foreign substances.

A hammer and an anvil, along with rude bellows, usually made from the trunk of a tree, are the only implements at the disposal of the native smith, but with their aid he can fashion a great number of articles, such as arrow-heads, knives, hoes, rings, bracelets, bells, and hammers. The Basonge are said to be the best blacksmiths in the Congo, but the Mangbetu also have a high reputation. They can do much European work if they have a model; they make, for example, hinges,

bolts, and pincers, and it is said that they make them much better than a European could with the same means at his disposal. Their aim, however, is practical rather than artistic.

Although the Congo blacksmith works mainly in iron, some tribes make use of other materials. The Mangbetu employ copper and brass for the manufacture of articles of luxury, and the Basonge and Baluba make bracelets and similar articles from copper, which they apparently obtain from the Katanga in the form of crosses.

On account of their skill the native smiths are highly regarded by their fellows, and among some peoples rank next in importance to the local chief. In many cases they devote either all or the greater part of their time to their work, and depend upon it for their livelihood. But in some districts the industry seems to be declining in importance. It is said that as a result of the spread of European goods the Mayumbe have not only given up the smelting of iron ore, but have to some extent abandoned the use of home-made articles in favour of those imported from abroad.

Reference has already been made to woodwork in connexion with sculpture. The industry is not specialized to the same extent as iron-working, and each man is his own carpenter, though some are recognized as being more than usually skilful, and are employed on work demanding special care. The tools are of the simplest description, and consist of a hatchet, an adze, and sometimes, but by no means always, a knife. Dried leaves with a rough surface are occasionally used for polishing purposes, and take the place of the glass-paper of the European carpenter. The articles made are of the most varied description. Canoes probably rank first in importance in all the regions in which they can be used; after them come articles of domestic use, such as beds, stools, bowls, plates, and spoons, handles for such implements and weapons as the hoe, the hatchet, and the lance, and various objects used for social, religious, and ceremonial purposes, such as the tam-tam, the fetish, and the mask. The Mangbetu are said to be specially skilled in all work of this description, and many of the articles which they make have a finish which is almost entirely wanting in that of other tribes.

In most parts of the country the manufacture of pottery is carried on by the women. As the natives of the Congo

are ignorant of, and have evolved nothing similar to, the potter's wheel, the fashioning of the clay is done entirely by hand. The vessels when made are either placed in the sun to dry and harden, or burned over an open fire or in a closed oven. The articles produced in this way vary greatly in quality of workmanship. With most tribes the object is purely utilitarian, and little or no attention is paid to style and finish. With others, however, more care is taken. The Mangbetu not only make very elaborate vessels, but they polish them and ornament them on the outside with various designs. The Bushongo also have carried the art of pottery to a relatively high stage of perfection. The articles which they make are decorated with various designs, but they do not engage in the industry to any great extent, as they make considerable use of gourds for carrying water and for cooking purposes.

Other industries are of comparatively little importance. To prepare his manioc and maize the native pounds it in a mortar with a pestle, and sometimes passes the flour thus obtained through a sieve. No other process is known, nor indeed is one necessary, as each household provides its own supply just when it is required.

The skins of wild animals are used for various purposes, but no attempt is made to tan them. Throughout the whole country only one method appears to be followed. The skins are scraped and dried in the sun, after which they are put to the purpose for which they are intended.

Some knowledge exists regarding the use of paints and dyes among the more advanced tribes. The Mangbetu have various colours for the decoration of the body. Purple they obtain from the dust of a red wood, black from the juice of a certain fruit, and white from white earth. The Bangala also have a rudimentary acquaintance with the art. To colour cloth black they place it in stagnant water, while to make it red they use the sap of a plant somewhat akin to the myrtle. The Baholoholo and the Warega obtain red from the *Pterocarpus*. The Bushongo also make use of various colours. The red which they use is derived from the wood of the *tukula*, black from charcoal, yellow from the wood of the *boa*, and white from a mineral substance.

THE BATWA

The Batwa are a more or less nomadic people of the forest area. Their standard of civilization is much lower than that of the sedentary peoples of the Congo basin, and the conditions under which they live are very different.

Social Organization

The Batwa group themselves together in small communities varying in size from two to twenty families under the rule of one of their number, who by stronger will or greater ability has been able to assume the command. When several of these communities simultaneously desire to go on a big hunting expedition, or to move from one region to another, they sometimes unite themselves under a temporary chief whom they have chosen for the purpose. When their object has been attained the various groups separate, and the authority of their leader ceases to exist. If they have occasion to come together again they may choose some other person to command them.

As hunting is practically the sole occupation of these people, and as the sedentary negroes are often in want of animal food, certain relations have grown up between them. The Batwa take their surplus game to the Bantus, and exchange it for arms, pottery, and provisions, articles which they cannot, or which their mode of life does not permit them, to produce for themselves. If they do not obtain what they desire by friendly means they steal it, but always, it is said, leave a piece of smoked flesh in its place. Often, however, they place themselves under the protection of a powerful Bantu, and in return for game receive provisions and a disused hut, which serves as a temporary abode. The Bantu becomes the *kolu*, or patron, of the Batwa, and acquires a certain amount of prestige from the fact. So much so is this the case that, if a Batwa is captured by one of the sedentary negroes, his captor will endeavour to obtain a wife for him in the hope of establishing a Batwa family, who will be attached to him, and will provide him with animal food.

The Family

Polygamy is practised by some tribes, but not by others. The Batwa of the district round Lake Tanganyika, for example, are monogamous, and among them the husband enters the family group to which his wife belongs. Where polygamy prevails the reverse is the case, and the wife follows her husband. The first wife is not considered more legitimate, nor does she enjoy a higher rank, than the others. When a Batwa desires to marry he addresses himself to the father of the girl, and sometimes appeals to his *kolu* for the necessary dowry. As a rule, this is not excessive. With regard to the repayments which have to be made if the woman subsequently dies, the Batwa often conform to the customs prevailing among the settled tribes to which they are attached.

The division of labour among the different members of the family is very simple. The father with his grown-up sons engages in hunting, obtains the fruit of the oil-palm for the manufacture of wine, and constructs the rough huts which serve as temporary abodes. The women occupy themselves with the *ménage*, and sometimes do a little basket-work or fishing. But apart from hunting, work is not held in much honour, as the Batwa can get all that he wants by exchange.

Religion

The Batwa appear to have some idea of a future life, and they believe that after death a man is able to reappear to his relations in order to make his desires known to them. When such reappearances are thought to be taking place the Batwa construct in the neighbourhood of their camp a shelter in which they place victuals for the benefit of the deceased. They also believe in metempsychosis, and invoke their dreams as a proof that men are transformed into animals after their death. Some privileged people are thought to escape this fate, and to be replaced in the world of men by women of their tribe. Others are less fortunate and become *bokali*, or vagabond spirits, who roam the forest, wicked and dangerous.

Moral Ideas

The standard of morality among the Batwa is in general very low. Adultery is common, so common indeed that

it is considered murder to kill the guilty party. To thief from a stranger is considered rather a virtuous act, provided that the theft is condoned by a piece of meat being left in place of the article stolen. To steal from a Batwa on the other hand is regarded as a grave crime, and may lead to serious fighting unless the aggrieved one appeals to his *kolu*, who may endeavour to settle the dispute according to the laws of his own tribe. In all other matters it is the same. The only principle of justice for the Batwa is that of vengeance. Whoever does him an ill or causes him a loss is to be killed, whatever the cost. Hence the various Batwa communities are almost always at war with one another. The only factor which makes for a more orderly settlement of disputes is the influence of the *kolu*, which of course is moral rather than legal.

Property

The Batwa possess little property. They claim the right of hunting where they like, but if any one disputes their claim they go elsewhere, after having killed some one. They have no slaves, but if they find an unattached member of their own race they do not hesitate to sell him to the sedentary negroes. Their goods consist of women, dogs, lances, knives, arrows, an old hut in some neighbouring village, and poultry. The laws of inheritance vary. With the Batwa of the Busira the custom is for the father of a dead man to inherit if his son has no children. Round Lake Tanganyika on the other hand the father inherits all the property of his son even if he leaves children, with the exception of his wife, who marries one of her deceased husband's brothers. If the dead man's father is not alive he is succeeded by one of his brothers, or, failing brothers, by one of his children. Similarly, when the chief of a family group dies, his place is taken by his eldest surviving brother, and only on the death of the last of his brothers does his son succeed. Disputes are frequent, and as there is little law recourse is had to force. Sometimes the *kolu* intervenes, but as a rule the Batwa prefers to settle the matter for himself in his own way.

CHAPTER X

RELIGION AND CEREMONIAL

GENERALLY speaking, the natives of the Congo believe in the existence of a Supreme Being who is the creator of all things and is incapable of doing evil, but who is so high and distant that he pays no attention to the affairs of ordinary humanity. This Supreme Being is believed by at least some tribes to have created a number of other beings who act, as it were, as his vicars on earth, and to whom he has given great but not creative power. These have divided their authority, in whole or in part, with human beings, animals, and inanimate objects, such as stones, rocks, trees, and water. The spirits which inhabit these are generally conceived as harmful, treacherous, and wicked, ever ready to strike an evil blow when a suitable opportunity presents itself. One gives death, another defeat, a third bad crops, while others are supposed to specialize on different types of disease. In these evil spirits the native implicitly believes, however hazy may be his ideas regarding the higher orders of the hierarchy. To combat their evil power he attempts to conciliate them by gifts, and to protect himself by talismans. Of all talismans the fetish is the most common.

As a general rule the fetish is not regarded as an idol, and is not worshipped. Its power is not given it by the Supreme Being or by one of the secondary spirits, but has been attributed to it by the natives themselves, sometimes as the result of a disturbing and inexplicable circumstance, but more frequently as the result of special incantations which have been performed over it. Any object, it would appear, may become a fetish, if it has been consecrated by the proper ritual. Often it is made with a view to the purpose it is intended to serve, but frequently it happens that the native picks up a stone which appeals to his fancy, sees a tree which strikes him as peculiar, or selects one or other of innumerable objects for reasons which it would be hard to determine, and proceeds to make

it into a fetish. This he does either by his own power of incantation or through the village fetish-man, who acts as his intermediary. Thus the native has a great number of fetishes, to one or other of which he turns in every important act of his life. There is one for each malady from which he is liable to suffer, one which protects him against the spirit bringing peace, if he wants war, and one against the spirit bringing war, if he wants peace, one which protects his crops, another which renders his marriage fruitful, and so on in almost infinite variety. Few fetishes provide for all the desires of their owner, and most of them have only limited powers.

As fetishism plays so important a part in the daily life of the native, it may be considered still further. Several important subdivisions of the whole group of fetishes may be recognized. In the first subdivision are living animals such as the leopard, the hippopotamus, and other representatives of the indigenous fauna. The idea of fetish animals, probably originated in the belief of the people in metempsychosis. The spirits of the dead pass into certain animals, which the native therefore regards as sacred. Lest the spirits should become sad and therefore irascible in their new abode, he conciliates them with gifts of food and in other ways.

Secondly, there are fetishes which consist of the representatives of living objects. Among them are some which belong to chiefs, sorcerers, and other notable men, and which on that account are able to inflict injuries, or to interfere with the schemes of less important people. Others are domestic fetishes, and are the protectors of the house or person to which they belong. Again, there are those which are the property of the whole village community whose interests they are supposed to guard. These fetishes are nearly always made out of a block of wood. Though both men and animals are represented in this way, the former are by far the more common. A large number are concerned with the propagation of the race, and according to modern ideas are more or less obscene. They are often dressed up in gaudy clothes, but the magic does not reside in the clothes but in the objects themselves.

A third group of fetishes consists of inanimate objects, not representative of men and animals, to which incantation has

given a special virtue. These include fixed objects, such as stones and trees, and movable objects, such as bracelets, collars, teeth, and other articles which may be included under the general name of amulets. Among the Mangbetu, for example, amulets are much more common than other forms of fetish; in many parts of the Congo forest on the other hand it is the ordinary fetish which is generally found.

The position of the fetish varies. Those belonging to chiefs and notables remain in their possession. The domestic fetish is kept in some safe place in the native hut. Those which are the common property of the village community are placed in fetish-houses, which are often situated in the middle of the village street. The various amulets are sometimes worn on the person, and sometimes placed where it is believed that they will prove most serviceable; for example, those which protect the crops are hung round the plantations, while those which assure the safety of the canoe are safely concealed within it. Fixed objects, supposed to be fetish, such as trees and cross-roads, are either avoided by the native or approached with superstitious awe.

The fourth category of fetishes is that of fetish acts. In some tribes when a child is born, or it may be when he reaches puberty, the father, or in some cases the fetish-man, forbids him to do certain things. He may, for example, forbid him to eat the flesh of certain animals on the ground that his familiar spirit dwells in them. Some men again must not be seen eating, while others are forbidden to drink or to smoke in public.

The fetish is the object of ceremony but not of worship. Apart from his belief in a Supreme Being and his superstitions regarding spirits who always seek to do him harm, the native has no religious ideas. He thinks only of evil spirits which must be conciliated, and of evil influences which must be overcome. To calm the first he makes offerings not as a sacrifice, but as a bribe, in order that their neutrality may be assured; to protect himself against the second he has recourse to his fetish. But fetishism is not a religion. The native has little knowledge of right and wrong. With him sin is not an evil act committed against a good God, but a mistaken act which may arouse against the doer of it the anger of a spirit evilly disposed. In short what the

native fears is the material and not the spiritual result of sin. By doing wrong he believes that he will arouse the spirits or the fetishes of others, and in order to protect himself against them he has only one thought, and that is to have in his own possession a spirit which will neutralize the adverse powers. What makes him hesitate when he is about to commit a wrong act is the fear that his own fetish will not be able to protect him against the fetishes of others. He knows that it has no power of itself. But he believes that, as a result of the incantations which have been pronounced over it either by the sorcerer or by himself, the inert material has been endowed with an inferior soul, and has acquired a special and well-limited power by which it is able for a time at least to perform certain functions. When it fails him, as fail him it often must, he does not consider that his own misdeeds have caused it to deny him its protection, nor does he lose faith in it. The failure is simply due to the fact that it has ceased to be active, and to restore to it the virtue which it has lost he takes it to the sorcerer, who once more repeats his incantations over it. In fact the native regards his fetish in much the same way as the European regards the potato which he carries in his pocket as a protection against rheumatism.

There are several kinds of incantation—objurgation, the use of cabalistic words, and the repetition of phrases without any precise meaning. There is no idea of praying to the fetish when incantations are performed over it; on the contrary it is told what its duties are, and it is exhorted to act accordingly. Evil spirits likewise are not entreated, but are commanded and even threatened. As to the cabalistic words used on some occasions, they appear to be known only to the sorcerer, and perhaps to the native chiefs.

Belief in a future life is general, but there is much vagueness regarding the form which it is to take. A few tribes appear to believe in the existence of another world into which man will pass after death, but the majority hold in some form or other the idea of reincarnation. According to some of the Congo peoples not only are the souls of the dead reincarnated, but every man, whether he be a chief, a simple free-man, or a slave, is able in this life to select the animal into which he will pass after death. On no account will he eat

the flesh of that animal, and it is said that he even tries to conform to its customs, so that he may be certain of inhabiting it after death. It seems probable that this belief had much to do with the horrible practices which at one time took place in certain crocodile and leopard societies.

Among other tribes a somewhat different view is taken. Man is not considered as having the power of selecting the animal into which his soul will ultimately pass. That is settled for him by his conduct during life. The souls of good men take up their abode in the bodies of those animals which are reckoned noble, while the souls of wicked men are reincarnated in the bodies of those animals which are held to be unclean. Among many of the tribes dwelling in the north of the country the souls of the great chiefs reappear in the gazelle, the hippopotamus, and the leopard; in the south, where the cruelty of some of the old chiefs is still remembered, it is believed that they live again in the leopard and other bloodthirsty beasts.

The belief in a future life has probably had much to do with the practice of human sacrifices which formerly prevailed in many parts of the country. The natives believed that it was only fitting that when a great man died he should take with him into the new life all that had made him happy in the old. In many tribes wives, slaves, and even children were slain after the death of their lord and master.

As already indicated, the power of the fetish-man or sorcerer is very great. Among a people who believe in evil spirits it is only natural that there should be some one to whom they may turn for help and protection. Thus the sorcerer has become an essential factor in the maintenance of social order and of family life; he protects, he exorcizes, and he cures. Without him almost every act of the native would be either impossible or dangerous. He alone is able to wield the necessary powers to discover and to overcome hostile spirits, and therefore his services are required at almost every turn. He presides over the ceremonies by which the future is foretold, and, as crime and disease are believed to be due to evil spirits, he is frequently both judge and doctor to his village.

So ingrained is the belief in spirits in the mind of the native that he will do nothing while in ignorance of the attitude which they are likely to assume. If he is about

to create a new village, to nominate a successor to the departed chief, to clear a plantation, or to declare war, he has recourse to some ceremony by which the intentions of the spiritual world will be declared. One example of this type of ceremony may be given. When in the old days an Azande chief contemplated war, he took a young hen to the sorcerer, who placed before it some grains of maize along with a small piece of a poisonous tree which had been boiled with it. If the hen ate only of the maize it did not die, and it was therefore safe to assume that the expedition was one which could be undertaken with every prospect of success. If on the other hand the hen ate the root as well as the maize it died, and from that fact it was deduced that the expedition if undertaken would have a fatal termination. The sorcerer, on opening the body, was moreover able to declare the nature of the unfavourable influences which were at work.

Magic, it may be noted in passing, is practised in various other forms. A native will squat for days before an effigy which represents an enemy or a danger, pouring imprecations upon it, and driving nails into it until he has reached its heart, so that he may kill the person or exorcize the danger which it is intended to represent.

The power of the sorcerer is almost as great in political and social life as it is in the affairs of the supernatural world. In the administration of justice he plays an important part. Evil spirits frequently act through human beings, and the sorcerer alone is able to discover these spirits and to take the necessary measures of protection against them. Thus the search for criminals is often entrusted to the sorcerer, and in this capacity he wields considerable power, a power which is much abused. Abstract theories of justice do not as a rule trouble him, and most of what he does is done with a view to his own aggrandizement. Accordingly he seldom accuses a rich or powerful person, even if he has good reason for believing him guilty, and the rites which he performs usually end in an attack or some innocent but helpless individual.

The political power which the sorcerer derives from the fact that he has to be consulted before any decisive step can be taken by the community, together with his control over the administration of justice combine to make him a very impor-

tant person, and with many tribes his authority is greater than that of the chief.

For somewhat similar reasons the sorcerer is the medicine man of the native village. The people believe that all illness is caused by evil spirits, and accordingly medical treatment is always accompanied by magic and ritual. It frequently happens, however, that the sorcerer possesses a certain empirical skill. He knows and is able to make use of all the knowledge which the people have collected in the course of centuries regarding the treatment of disease. Sometimes also he possesses, perhaps without knowing it, certain special powers, such as that of hypnotism. Most sorcerers are, however, little more than charlatans who trade upon the ignorance of the people.

On the whole the sorcerers appear to have exercised an evil influence in the country. Their power was great, and they nearly always abused it. Whoever tried to resist their authority was pursued by their implacable vengeance, and was fortunate if he escaped with his life. The nature of their work tended to develop their mental capacity, and they were generally more intelligent than the people among whom they dwelt. They were, for example, clever enough to know how to increase their importance, and to trade better on native credulity they wore masks and surrounded themselves with all kinds of grotesque ceremonial. On the other hand they have always resisted any progressive movement, and since the arrival of the Europeans they have formed one of the chief obstacles to the progress of civilization. They quickly saw that their authority was threatened, and have done everything in their power to maintain it. In those parts of the country where Belgian rule is firmly established the power of the sorcerers has been broken, but it is probable that they still celebrate their bloody ceremonies in the depths of the forest and in the more remote parts of the country.

The power which the sorcerer exercised in one form or another over human life was very great, though it belongs to a period which is now rapidly passing away. At one time, however, human sacrifice played a very important part in the so-called religious life of the people, and competent observers have declared that more lives were lost in this way than through either pestilence or war. In order to complete this

review of the attitude of the native mind towards religious matters some notice must be taken of the purposes for which such sacrifices were made.

Reference has already been made to the custom which at one time prevailed among various tribes of slaying a man's wives and slaves when he himself died. In such cases the idea underlying the sacrifice seems to have been somewhat as follows. To ensure that a man should hold a position at least as important in the next life as that he had held in the life from which he had just departed, it was necessary that he should not appear unattended before the spirits. If he did so, they might consider him a mean person, and reincarnate him in the form of an unclean animal. On the other hand, if he went accompanied by a fitting retinue, they would be suitably impressed and would give him at least the body of a noble animal in which to dwell. Nor were the survivors unmindful of their own comfort. They feared that, if he were unhappy, their deceased relative might return either as an animal or a spirit to plague them, whereas, if he were happy, he would leave them alone.

Human sacrifices were also made with the direct intention of conciliating evil spirits. The sacrifices generally considered the most agreeable were those in which blood was shed, and for this reason animals were frequently killed. Their flesh was eaten, for 'the flesh is not the blood, and the blood alone counts'. Man also was sacrificed, for he was the noblest of the animals and therefore likely to prove most acceptable to the evil spirits. But a certain amount of discrimination was shown in the choice of victims. The least valuable members of the tribe were usually selected, slaves and prisoners of war being taken first. Women, on account of their value as labourers, were sacrificed only on the death of the men entitled to the fruit of their labour. The ceremonies at which those sacrifices took place were often of the most dreadful description, numbers of people often being slain on each occasion.

Trial by ordeal also led to the death of many people in the Congo. If a man died prematurely or otherwise, if a woman fell ill, if a misfortune overtook the tribe, or if any other untoward event occurred, it was considered that an evil spirit working through a member of the community was

responsible for the calamity. To the sorcerer was entrusted the task of discovering the guilty party, and this he proceeded to do by incantation and lot. Sometimes the person designated in this way was immediately put to death, but more frequently he was compelled to undergo the poison ordeal. This took various forms which need not be discussed here. As a rule, however, the sorcerer was able so to manage matters that the wealthier members of the tribe were able to escape from the fate which would otherwise have awaited them.

CHAPTER XI

AGRICULTURAL AND FOREST PRODUCTS

NOTWITHSTANDING the growing importance of the mineral industry in Katanga, the future progress of the Congo will depend very largely on the extent to which the agricultural and forest resources of the country can be developed. This chapter will therefore be devoted to an account of the products of the soil, and a consideration of the factors involved in any attempt to increase the yield to be obtained from it.

Such a study requires the consideration of a number of different but closely related problems. (1) First in importance, from the point of view of the colony as a whole, comes native agriculture, because upon it depends the livelihood of the greater part of the population. (2) But native agriculture, however important it may be for the inhabitants, contributes but little to export trade, in which Europeans are mainly interested, and upon which the material prosperity of the country largely depends. Hence the exploitation of the natural products of the forest has been undertaken with native labour, but mainly for the benefit of the white man. As neither party has any definite interest in the care of these products, such exploitation tends to become reckless and destructive, and eventually the natural resources of the forest become exhausted. (3) Plantations are then established either for the cultivation of plants indigenous to the country or for the cultivation of those introduced from abroad. (4) A further branch of agriculture is the attempt to improve native methods, partly at least with the object of providing an exportable surplus. (5) Lastly there may be noted the endeavours which have been made in the Katanga to introduce European agriculture properly so called.

This classification must not be too rigidly applied, but it affords a basis for a consideration of the economic resources of the country so far as these are dependent upon the productive qualities of the soil.

NATIVE AGRICULTURE

In the Belgian Congo the production of food is practically the only occupation of the native. Climatic conditions make it possible for him to reduce his clothing to a minimum, while from the natural products of the country he easily obtains all that he requires for the construction of his dwelling, and manufactured goods he has for the most part been able to do without. But with regard to food the position is different. The fruits of wild plants, though they sometimes form a valuable addition to his supplies, do not provide him with all that he requires for his maintenance, and the cultivation of the soil is therefore the one pursuit to which he seriously devotes himself.

The methods of native cultivation are usually of the most primitive description. They vary, however, from place to place, and the following account must therefore be regarded as somewhat generalized in character. When the forest native desires to create a new plantation he usually cuts down the trees to within three or four feet of the ground. The underwood, where it exists, is also cut down, and along with the trees is left to dry for several weeks, after which the whole is set on fire. The stumps and larger branches are as a rule only partially destroyed by this process, but that does not prevent the native from beginning cultivation, and it is only gradually that the land is cleared. After the ashes have been spread over the surface the first crop is frequently planted without anything further being done, but for certain crops, such as manioc, the soil is generally collected into small mounds. For subsequent crops it is customary to turn over the soil at least once. On the savanna somewhat similar methods are pursued. The bushes and herbs are cut down and burned, and the roots removed either with a hoe, a wooden fork, or by hand. The soil is then turned over, the clods broken up, and the loose roots collected. As a general rule clearing the land is done by the men, while the cultivation is entrusted to the women.

The implements used are of the simplest description. Every native possesses a hoe, with which he performs most of the labour required on the land. Rude hatchets and knives are

his principal tools when engaged in clearing the forest or savanna.

The natives are generally ignorant of all that concerns the fertilization of the soil. Among pastoral peoples it is occasionally the custom to collect farm-yard manure and to use it in the cultivation of vegetables, but in most parts of the country the land is cropped until its natural fertility is exhausted, and then abandoned. The impoverishment of the soil which results from this method of agriculture, and the steady destruction of the more valuable virgin forest in order to obtain fresh land, are matters of serious concern for the future welfare of the colony. It is difficult to see what remedies can be introduced while the natives remain in their present state of development, and the facts mentioned must be recognized as tending to limit the agricultural area and to reduce its value.

The plants cultivated by the inhabitants of the Congo vary according to the climatic conditions of different regions. On the whole it might be said, though the statement must not be construed too literally, that root-crops are characteristic of the forest areas and cereals of the savannas and steppes. Manioc and taro are almost entirely grown in the former region, while yams and sweet potatoes are also cultivated to some extent in the latter. Daso on the other hand is practically confined to the savannas. Of the cereals maize is cultivated to a slight extent in many parts of the forest region, and rice more extensively in those districts in which it is grown. Maize and rice, along with sorghum and eleusine, are the most important crops of the savanna. In the still drier steppes upland rice, sorghum, millet, and a little wheat are grown. Fruits are most important in the forest. The banana, the safo, and *Anona Mannii* are mainly found in that region, while the pine-apple and the papaw are more widely distributed. Oil is obtained from various sources. The natives of the forest get it from the oil-palm and the raphia-palm; those on the savanna cultivate the ground-nut and sesamum. Leguminous plants, such as beans and *Voandzeia*, are chiefly grown in the savanna and steppe regions.

Pastoral pursuits are most common in the savannas and on the steppes, where cattle and sheep are frequently kept. The characteristic animals of the forest on the other hand are the

pig and the goat. Fowls are found everywhere, bees mainly on the savanna.

It is a fact of considerable interest, as showing that agricultural conditions in the Congo are by no means as unchangeable as might have been expected, that the most important foodstuffs now cultivated have been introduced into the country only within comparatively recent times. Down to the end of the fifteenth century, at least, the indigenes probably relied mainly upon bananas, yams, millet, eleusine, and the products of the oil and raphia palms. Manioc, maize, sweet potatoes, rice, tobacco, sugar-cane, onions, and probably the ground-nut have all been introduced subsequently. Even millet and eleusine may have been much less widely distributed than they are at the present time. Whether new plants can be introduced into native agriculture, and the cultivation of indigenous plants extended and improved, is therefore a question of some importance which will have to be discussed later.

Root Crops

Manioc.—Manioc, or cassava, is one of the most important food-crops in the equatorial forest. Two main species of the plant are generally recognized, bitter manioc (*Manihot utilisima*) and sweet manioc (*Manihot Aypi*), but there seem to be several varieties of each. They are herbaceous or semi-shrubby perennials, with very large fleshy tapering tubers. These tubers, which are often 3 feet long, and 6 to 9 inches in diameter, are filled with milky juice. The sap of the bitter manioc contains hydrocyanic acid, and is therefore highly poisonous. To get rid of the poison the natives of the Congo place the tubers in a river or marsh, and leave them there to ferment for a period of three to eight days. When fermentation has ceased they are taken out and washed, and are then supposed to be safe. If the roots have been placed in stagnant water, however, they retain a disagreeable flavour, and are often dangerous to health. Sweet manioc on the other hand may be eaten raw, but, as hydrocyanic acid sometimes exists in the older plants, these are often subjected to the process of fermentation. In some districts where the natives ignore the differences between sweet and bitter manioc, as in the upper

Ituri, fermentation always takes place. As bitter manioc yields the larger crop it is more generally grown.

The methods of cultivation differ in details in different parts of the country, but the general principle is everywhere much the same. The land is cleared of the forest by which it is covered, and the soil collected into small heaps about a foot high and three feet apart. In each of these heaps four or five cuttings are placed, and with the exception of several weedings the land is often left till the crop is ready. In some cases, however, the natives prune the young plants in order to prevent them running to wood. The tubers of sweet manioc attain their full development in about twelve months' time, but for bitter manioc a period of twelve to twenty months is necessary.

Manioc enters into the food-supply of the natives in various forms. To make *chikwangue*, or native bread, the tubers are, after fermentation, washed and ground down into a kind of paste. A large handful of this is then wrapped up in a banana leaf and baked in an earthen pot. When carefully prepared, it is not unpalatable to Europeans. With some peoples fresh tubers are simply grated down into a paste and boiled, while with others fermented tubers are dried in the sun. In the latter case they do not deteriorate rapidly, and can stand transport without injury. The flour derived from them is sometimes mixed with palm-oil, and eaten in the form of porridge, seasoned with salt and condiments.

As a general rule the yield of manioc grown by the natives does not exceed six tons per acre, but in some cases it appears to be much greater. The crop is a particularly exhausting one for the soil, and after it the land often lies fallow for seven or eight years. The cultivation of manioc is therefore one of the factors tending to bring about the destruction of the primitive forest.

Yams.—Yams are grown both in the forest and on the savanna. Various species of the plant have been recognized, but some varieties of *Dioscorea alata* appear to be most generally cultivated by the native. A piece of virgin soil is selected, and on it cuttings are planted either on the flat surface or on small mounds, 16 to 20 inches high. Later on the land receives an occasional hoeing, and when the plants have reached a certain height stakes 10 to 12 feet in height

are provided, to which they may cling. The tubers may be lifted at the end of a year, but two years are generally allowed to elapse before this is done, in order that the crop may be fully developed. In the forest region planting takes place at all seasons, but on the savanna only at the beginning of the rains. Certain species, *Dioscorea bulbifera* (Linn.), and *Dioscorea anthropophagorum* (Chev.) also produce eatable, bulbous growths on their stems. These species, however, usually contain a toxic element, and have to be specially cooked before they can be eaten.

Although yams are not so important as manioc, they enter largely into the food-supply of the native population, and are specially valuable in times of scarcity. They are generally boiled before use.

Sweet Potatoes.—The sweet potato is also grown both in the forest and on the savanna. It belongs to the genus *Ipomoea Batatas*, and the natives distinguish several varieties according to the colour of the tubers, which may be white, red, or yellow. The plant requires a light and well-drained soil, and, in the earlier stages of its growth, a considerable amount of moisture. In the savanna regions therefore it is generally planted at the beginning of the rainy season. The method of cultivation is somewhat as follows. The soil is heaped up into little mounds or ridges about a foot in height and 2 to 3 feet apart. On each of these mounds three or four cuttings are placed at a distance of 20 to 24 inches from one another. Subsequent labour may be reduced to a minimum. One or two hoeings are necessary, but, provided the young plant succeeds in establishing itself at once, its further growth is sufficient to keep down all weeds. The crop varies according to the environment, but seldom exceeds four tons to the acre.

The tubers when exposed to the air deteriorate rapidly, and are therefore either taken from the ground only as required, or when lifted are cut up into small pieces and dried in the sun or by artificial means. To prepare them for consumption they are either boiled and seasoned in various ways, or grilled in the ashes of a gentle fire. The young shoots of the plant are sometimes gathered and cooked in place of other vegetables.

Taro.—Taro (*Colocasia antiquorum*), although not a plant of great importance, is found in many parts of the Congo,

especially in the damper regions. Several varieties have been recognized. As a rule the leaves are in more demand than the tubers, which are bitter and have to be cooked for five or six hours before they can be eaten. The leaf stalks can also be used as food after the outer layers have been removed. To propagate taro the natives take the stump of an old plant and place it in fresh soil. It may reach maturity at any time of the year, and is often used in place of sweet potatoes when these are not fit for consumption.

Caladium.—*Caladium*, a member of the Aroideae, or Arum family, resembles taro, but must be distinguished from it. The tubers are cooked in the same way as those of taro; the leaves on the other hand are used to a much less extent.

Daso.—*Daso* (*Coleus Daso*, Chev.) is a small plant of the savanna regions, where it is grown for the sake of its tubers.

Potatoes.—Potatoes have been introduced into the country, but do not appear to have spread far from the Government posts and mission stations where they were first cultivated. In the Katanga some good crops have been obtained.

Cereals

Maize.—Maize can be grown both in the forest and on the savanna; it is cultivated to some extent by most peoples in the Belgian Congo, though it seldom forms their chief article of diet. The native usually selects for this crop a piece of damp fertile soil, which he clears and burns over in the usual fashion. The ashes are then spread on the land, and the seed is sown. Small holes are made in the ground by means of a hoe at intervals varying from 1 to 3 feet, and a few grains are placed in each. Later on the land is weeded, and the young plants thinned out, only one or two being left in each clump. When the crop begins to approach maturity precautions have to be taken against the depredations of birds, which flock to it from all quarters. The harvest is a very simple affair. Women and children break off the ears by hand and carry them home to the village.

Notwithstanding this slovenly method of cultivation, the yield per acre sometimes amounts to eighteen bushels. It varies greatly, however, with the rainfall, the variety cultivated, and the fertility of the soil. In the forest the crop is generally heavier than on the savanna, as there each plant

usually carries several well-developed ears; on the savanna on the other hand one rather small ear is the rule. In some districts two crops are taken off the same piece of land in one year, but in such cases the second crop is always smaller than the first.

Maize is used by the native in various ways. While still green it is often eaten after being roasted among hot ashes or boiled. More frequently perhaps it is preserved for use in the dry season, sometimes in small granaries specially erected for the purpose, and sometimes in closed earthen vessels, which are kept inside the huts. When wanted it is ground down into flour by primitive methods, and converted into a thick dough. Frequently also it is used along with sorghum or eleusine in the manufacture of a native variety of beer.

Sorghum.—Sorghum is grown mainly on the savanna and steppe regions surrounding the equatorial forest; thus it is a crop of some importance in the Katanga, in the Eastern Highlands, and in the Welle and Kasai regions. It is cultivated in much the same way as maize, and reaches maturity from four to six months after the seed is sown. In the earlier period of its growth, more especially during the second month, the plant contains prussic acid, and is then a source of danger to domestic animals; later on this diminishes in quantity, and disappears entirely before the ripening of the grain.

The natives, after grinding sorghum into a coarse flour, make it into a kind of porridge, of which they are said to be very fond. They also mix it with other foodstuffs, such as haricots, ground-nuts, palm-oil, and pilipili. As mentioned above, it is used along with maize in the manufacture of a native beer, which is often drunk to excess. The straw is sometimes dried, and employed in the construction of small temporary shelters.

Millet.—The species of millet known as *Pennisetum typhoides* (Rich.) is an important cereal of the steppe lands of the Congo, and more especially of the Kasai region, where some of the natives have large areas under cultivation. For such lands it is well adapted, as a low rainfall is sufficient for its growth, it does not require a fertile soil, and it reaches maturity between three and five months after the seed is put in the ground. When the grain is ripe the ears are cut off, and the straw used for feeding live-stock. In some cases the

plants are left in the soil as they yield crops during three successive years.

Millet, after being converted into flour, is made into a thick paste, often with the addition of palm-oil or some indigenous condiment. In this form it is much relished by the native, and in some cases forms his chief article of food. From millet he also makes a kind of beer, which appears to be consumed in considerable quantities.

Eleusine.—*Eleusine* (*Eleusine coracana*) is grown by the native of the savanna regions in the east and south of the country. It thrives on relatively poor soil, and frequently yields a crop where other cereals cannot be cultivated. As it ripens in a comparatively short time, four or five months after sowing, it is often planted when it is seen that other crops are likely to result in failure.

When harvest arrives the ears of *eleusine* are collected by hand, and placed upon mats to dry in the sun. They are then rubbed between the hands and the grain detached. The coarse flour derived from *eleusine* is used much in the same way as that made from sorghum. As in the case of several other cereals which have been mentioned, *eleusine* is fermented and a native beer made from it.

Wheat.—Attempts to grow wheat have been made in several places, but chiefly in the neighbourhood of the missions of *Les Pères Blancs* at Badouinville and Kilo. At the former place the missionaries are said to have succeeded, in favourable years, in obtaining a crop of nearly 30 bushels to the acre, but the average yield is only about half that amount. At Kilo also encouraging experiments have been made. When the natives grow it they often use it in the manufacture of beer, which is said to be better than that obtained from *eleusine*.

Rice.—Rice is at the present time grown in different parts of the Congo, and its cultivation tends to spread. The chief producing area is in the country round Stanleyville, where it is an important article of native diet. Elsewhere, in the Welle region, Kivu, Katanga, and the north-eastern districts of the Kasai, it is regarded rather as a luxury. The upland variety of the plant, dry rice, is most generally cultivated, marsh (or wet) rice, though it yields a much larger crop, being practically unknown.

As there is no well-marked dry season in the country round Stanleyville, rice may be grown at all seasons of the year; it is, however, as a rule sown between January and July. A piece of suitable land is selected, and the trees are cut down by men, or, if trees be wanting, the grasses which take their place are uprooted by women. The men then go over the land, making with their hoes a number of small holes, may be seven to ten to the square yard, while the women who follow place a few grains of seed in each hole and cover them up. With the exception of an occasional weeding no further cultivation takes place until the crop is ripe, though, as it approaches maturity, it has often to be protected from birds. Irrigation is not necessary, as a rainfall of about 14 inches spread over three or four months appears to be sufficient to ensure an average crop.

When the harvest arrives the ears of rice are cut off with a knife or piece of sharpened wood, and placed in heaps. A few days later, when the grain has loosened in the ear, it is beaten out and conveyed to a granary, where it is usually stored for some time before being used. It is consumed in various forms: rice-biscuits, sweetened with honey or sugar-cane, are much eaten by the natives, and rice boiled in a little water and seasoned is also a favourite dish.

In the Kasai region the methods of cultivation are much the same, but the seed is sown at the beginning of the rainy season. Maize is sown along with it, and, as it ripens first, it provides the cultivator with a crop upon which to live until the rice is ready.

The cultivation of rice is capable of being extended in many parts of the Belgian Congo, and experiments which have been made at the agricultural station at Kitobola appear to indicate that with a little more care the native might obtain a considerably larger yield per acre (see p. 195).

Fruits

Banana.—In some parts of the forested region the banana constitutes the chief food of the native population. The plantain is the species mainly cultivated, and of it nearly every district has its special varieties. To make a plantation the land is cleared and planted with young shoots taken from old plants elsewhere. These produce fruit at the end of a

year and a half, and immediately thereafter die, their place being taken by two or three young shoots which appear at the foot of each plant. This process continues until the land is exhausted.

The forest peoples use the banana in a variety of ways. As it ripens at all times of the year, it provides a constant supply of food. The fruits may be roasted in hot ashes, or boiled in palm-oil or water and ground down into a paste. A nourishing flour may also be made from it, and in the north-east of the colony at least it is used in the manufacture of an alcoholic drink. The outer fibres of the stem of the plant are converted into ropes and cords, while the skins and dry leaves are used in the fabrication of native soap.

Other Fruits.—Of the other fruits of the Belgian Congo it is unnecessary to say much. The pine-apple is grown in many districts, both in the forest and on the savannas, and is often eaten by the natives while still in an unripe condition. The papaw is also widespread, but is seldom cultivated; its fruit is eaten raw. The mango is chiefly found in the Lower Congo and in the eastern part of the colony. The fruit of the native plant is mediocre in quality, and selected varieties have been introduced from the East Indies for propagation by the natives. The safo (*Canarium Saphu*, De Wild.) may be seen growing in the vicinity of nearly every village in the equatorial districts. It belongs to the same family as the nutmeg, and its fruit, of which the natives are very fond, is like a large violet-coloured prune. The safo spreads naturally, and is seldom cultivated. Two species of the Anonaceae may be mentioned. *Anona Mannii* is a native of the equatorial forest, and is found scattered throughout the greater part of it. *Anona senegalensis* on the other hand is an inhabitant of the savanna and steppe regions. Both produce fruits much sought after by the natives. The fruit of the lianas of plants belonging to the family of the Apocynaceae, such as *Landolphia owariensis* and *Clitandra Arnoldiana*, also form an occasional article of native diet.

Oil-producing Plants

Oil-Palms.—The distribution of the oil-palm (*Elaeis guineensis*) and the position of its products in European commerce will be discussed later (see p. 183). For the native, also, the tree is one of the most valuable of the forest region.

There are several varieties, the most useful for the production of oil being those with a relatively small stone and a relatively thick pericarp. The fruit of other varieties is cooked and eaten. The oil is obtained either by boiling and crushing the fruit or by allowing it to ferment before crushing. When fresh the oil is of a yellow orange colour, and has a consistency in the ordinary temperature of the Congo somewhat similar to that of butter in this country. It is much used in native cookery, and is freely rubbed on the body, probably to protect the skin against the rays of the sun. In many parts of the Upper Congo the stones are not used by the natives except at times of scarcity, when they are broken and the kernels eaten; elsewhere, however, as in some parts of the district of Equateur, the stones are crushed, and the oil which they contain is extracted.

The sap of the oil-palm provides the native with an alcoholic beverage of which he is very fond. To obtain it one of several methods may be adopted. In some cases the male flower-stalk is cut off just below the inflorescence, and on the part remaining attached to the tree a deep incision is made. A small calabash placed in a suitable position collects the escaping sap. Fermentation begins at once, and, if the natives desire a strong liquor, they allow it to continue for two days. The wine is then placed in closed vessels, where it remains in a good condition for several weeks.

The oil-palm also provides the native with some of the materials which he requires for the manufacture of soap. The flowers, stalks, and other refuse are burned, and the ashes, which are rich in alkalis, are put in water, mixed with palm-oil, and boiled for several hours. The pasty substance which results is then rolled into balls about the size of a potato, and is ready for use.

Among other products of the oil-palm serviceable to the native are: the leaves, which he uses as a thatch for his hut; the fibres, which he weaves into a rough cloth; and the heart, or terminal shoot, which he regards as a vegetable delicacy.

Raphia Palms.—Large areas in the forest region are covered with one or other of the different varieties of the raphia palm, some of which are of considerable value to the natives. Between the stone and the hard shell of the fruit there is a thin layer of oily matter, from which a reddish oil, more liquid than

palm-oil, may be extracted. The sap of *Raphia vinifera*, as is indicated by the name, furnishes a wine which is held in equal repute with that derived from the oil-palm. Some tribes obtain a similar drink from the sap of *Raphia Laurentii*. In both cases it is often collected by boring a hole in the centre of the palm-tree. Among other uses to which the raphia palm is put by the natives the following may be mentioned. The somewhat concave inner side of the stem, or midrib of the frond, has its transverse section very similar to a tile, and is much used for roofing purposes in some parts of the Congo. The petioles of the fronds of *Raphia Sese* are plaited and made into thatch. The fibrous parts of the young leaf may be used in the manufacture of native cloth. Poles, building-laths, ropes, fishing-lines, and various other articles may also be obtained from some part or other of the frond of the raphia.

For its distribution and place in European commerce see page 187.

Ground-Nuts.—The ground-nut (*Arachis hypogaea*) is an annual herbaceous plant belonging to the Papilionaceae, a sub-order of the Leguminosae. In the Belgian Congo it is cultivated mainly on the savanna lands, but it also grows well in the forested areas. Although it thrives on light and even poor soil, and reaches maturity four or five months after it is sown, it requires a good deal of attention. A fine covering of tilth has to be maintained on the surface in order that the peduncle of the flower may push the ovary several inches underground, where the seeds are developed. Hence it is usually grown in small quantities, very often close to the huts of the natives, who are in this way able to give it the care it requires. In the forested area, where it is sometimes grown in small plantations, its cultivation might profitably be extended, as it is one of the comparatively few plants suited to native agriculture for which there is an extensive foreign demand.

The ground-nut is not as a rule an important article of diet among the peoples of the Congo. It is eaten raw, boiled, or roasted, but rather as a delicacy than as a staple foodstuff. Some tribes extract the oil from the nuts for cooking or other purposes, but this practice is by no means general; others grind the nuts into flour and use it along with maize and sorghum.

Sesamum.—Sesamum is grown mainly on the savanna, but

not as a rule to any great extent. The land is cleared in the dry season, and the seed sown at the beginning of the rains. During the growth of the plant an occasional weeding is all the attention that the land requires. The crop matures in three or four months after sowing, when the plants are cut down or pulled up, and placed upon mats in the sun until the pods containing the seed burst open. A light beating is then sufficient to detach the grain from its covering. To obtain the oil the grain is roasted, pounded in an earthenware vessel, and thrown into hot water. The oil then collects on the surface, and is easily skimmed off. It is used for various purposes in native cookery.

Castor-Oil Plants.—The castor-oil plant (*Ricinus communis*) is grown in many parts of the Belgian Congo. In some regions (as, for example, in the Upper Ituru) it is the only source of oil known to the natives. To obtain the oil the seed is first dried and roughly pounded, and then placed in boiling water and stirred for some time. After this process the oil, which is dark in colour and very impure, may be skimmed off. It is used by the natives mainly to anoint the body and as a cosmetic, its value as a purgative being apparently unknown.

Gourds.—Gourds of various kinds are grown in the vicinity of most native villages. The uses to which they are put are various, but some varieties are grown especially for the sake of the oil which is contained in their seeds.

Miscellaneous Food-Crops

Beans.—Beans are grown to a much greater extent on the savanna than in the forest, as the climatic conditions are there more favourable to them. There are many varieties, differing from one another in size, colour, and flavour. As a rule they are interplanted with other crops, such as maize, manioc, or sweet potatoes. Beans seldom, if ever, form the staple food of the native, but in many places they constitute a not unimportant article of diet. They are either boiled in water or stewed along with a little oil or ground-nut.

Bambarra Ground-Nut.—This plant (*Voandzeia subterranea*) is only cultivated in the savanna regions, as it is more sensitive to damp than the ground-nut, to which it is allied. Like that plant, its fruits mature below the surface. They are sometimes roasted or boiled, and sometimes ground down into a flour,

from which a kind of pastry is made. Notwithstanding its value as a foodstuff, however, *Voandzeia* is cultivated only to a comparatively slight extent.

Cajanus Indicus.—This is a shrubby plant, growing to a height of from four and a half to six feet, and is found in the savanna regions. The 'beans' produced by it are cooked in the same way as ordinary beans.

Miscellaneous.—Certain varieties of capsicum are much sought after by the natives in order to give a flavouring to their ordinary food. One of these varieties, *Capsicum frutescens*, known as *pilipili*, is grown in many villages. A tomato, *Solanum Lycopersicum*, is also widespread throughout the country. The fruit is about the size of a greengage, but possesses a finer flavour than the European variety. *Solanum Melongena*, which flourishes in various parts of the savanna region, produces a fruit shaped somewhat like a cucumber. Several species of Amarantaceae are found in the vicinity of native villages, sometimes wild and at other times cultivated. The young shoots and leaves are cooked as vegetables. Purslane (*Portulaca oleracea*), *Hibiscus Sabdariffa*, sometimes known as 'Guinea sorrel', and a variety of native onion (*Allium angolense*) are among other vegetables cultivated to a greater or less extent by the inhabitants.

Stimulants

Tobacco.—Several varieties of tobacco are grown in the Congo, some being more suitable to the forest and others to the savanna. Comparatively little is known regarding them, but the following have been recognized: *Nicotiana rustica*, *Nicotiana Tabacum*, *Nicotiana Tabacum*, var. *brasiliensis*, and *Nicotiana Tabacum*, var. *virginica*. Tobacco is almost always cultivated by the natives in small patches either in their fields or around their huts. They appear to devote little attention to the plant while it is growing, but occasionally snip off the buds in order to develop the leaves. The methods of preparing the tobacco for use are also primitive in the extreme. In some cases the leaves after they have been cut are exposed to the sun on the roof of the hut or are hung up in the interior; in others they are bruised between two stones and rolled into balls, which are then dried in the sun. The product can seldom be smoked by Europeans, and the native himself, when he can

afford it, often buys factory-made tobacco. Among some tribes tobacco is used in the form of snuff. In such cases it is frequently mixed with other articles to give it greater strength, the clove being sometimes used for this purpose.

Hemp.—The cultivation of hemp still appears to be carried on in many parts of the country, but it is not grown for its fibre, which in tropical countries is of little value, but for its seed, which the natives desire on account of its narcotic properties. The evils resulting from the practice of smoking it are so great that the Government has prohibited its cultivation and sale.

Kola.—The kola-nut is the fruit of a tree belonging to the order Sterculiaceae. Several species have been recognized in the Congo. *Sterculia Ballayi* is found mainly in the Lower Congo, where it is sometimes cultivated, and *S. acuminata* is an inhabitant of the equatorial forest. The natives chew the nuts to allay thirst or even hunger.

Textile Plants

Cotton.—Recent attempts to induce the natives to cultivate cotton for export will be dealt with elsewhere. For a considerable time before these attempts were made, however, cotton appears to have been grown in certain districts, but the output was of little importance. In the Kasai region several native varieties are known, but the methods adopted by the tribes who grow it are of the most primitive description. The seed is sown before or during the rains, but the plant receives very little attention until the crop is ripe. Even then the fibre is often allowed to remain ungathered until it has deteriorated to a great extent. In order to dry it the natives expose the cotton to the sun or place it in front of a fire.

Domestic Animals

Cattle.—In certain parts of the savanna and steppe regions considerable numbers of cattle are kept by the natives. The districts in which they are most numerous are in the Lower Congo, the more elevated parts of the Welle country, the Eastern Highlands, and the Kasai region.

In the east of the country which lies north of the Welle there are cattle-raising districts near the summits which form the watershed between the Congo and the Nile. The cattle of

this region vary considerably. The Dinka breed, which appears to have originated in the basin of the Nile, has a well-developed body and large horns, and is said to be a good producer of milk. The Wadai breed, which is allied to the Dinka, is also well developed, but is much less valuable as a milk-producer, though it is said to be capable of considerable improvement. A third breed, kept by the Lugwaret tribe, is small, and gives little milk.

Various parts of the Eastern Highlands are also occupied by pastoral tribes. This is especially the case in the region of Wanyabongo, to the west of Lake Kivu and the Rusisi. There several distinct breeds are found. Cattle either without horns or with short horns appear to be numerous only to the west of the Rusisi. They are better milkers than the larger, long-horned breed to be found farther north. Throughout the whole region comparatively little seems to be done by the natives to improve their cattle. They have, it is true, a few crude ideas about selection, but their notions of what is desirable frequently vary from tribe to tribe and from time to time.

As a rule native cattle receive little attention. During the day they feed upon the natural pastures, and are guarded by the children of the tribe; at night they are driven into an open enclosure. The calves, however, are more carefully tended, and at night are sheltered by the natives either in their own huts or in special buildings. During the rains food is usually abundant, but in the dry season the cattle have frequently to be driven to better-watered districts.

As the native seldom drinks milk, he usually makes it into cheese, of which he is exceedingly fond. Butter is also made, but is mainly used to anoint the skin, and is never eaten except by those tribes who have been in contact with Europeans. In some districts, as in the Eastern Highlands, many tribes eat a considerable amount of meat, and large cattle-markets are held at fixed intervals in various parts of the latter region. There is also a considerable trade in hides, which are used for clothing, the covering of granaries, and various other purposes.

Sheep.—Sheep are most numerous in the savanna and steppe regions in the south-east of the Welle country, in the Eastern Highlands, and in the Kasai region, but they are also found within the forested area in the region round Stanleyville, in the

valleys of the Lova and Lomami, and elsewhere. They are generally woolless, and in those cases where they do have a little wool it is of poor quality. The flesh is eaten, but is much less appreciated than that of the goat.

Goats.—Goats are met with in all parts of the Congo. As a general rule they provide only a small amount of milk, though some varieties found in the Eastern Highlands and in the Kasai region are better in this respect. The flesh is much appreciated, and it is mainly for this reason that the animal is kept. It receives no special attention, and during the day wanders about the village in search of food; at night it is taken into the hut of its owner. In the Eastern Highlands the goat is of considerable importance, as there it forms the mainstay of the poor man, just as cattle form the mainstay of the richer members of the community.

Pigs.—The native pig is most common in the districts of Bas Congo, Kwango, Kasai, and Ubangi. Like the goat it receives little attention, and is allowed to pick up a living from the garbage lying about the village. Owing to the conditions in which it lives it is subject to disease, and at the best its flesh is much less desirable than that of the European pig.

Fowls.—In all parts of the Congo fowls are numerous, but they are generally small in size, and do not lay many eggs. In some districts (as, for example, in parts of the Eastern Highlands) they are regarded as a special perquisite of the women. They receive little attention, and appear as a rule to be reared for the sake of their flesh rather than for their eggs. The Barbary duck is also common throughout the country; it is easily raised, and its flesh is esteemed. In some villages a few pigeons are kept by the inhabitants.

Bees.—Bees are found in many parts of the Congo, but seem to be most numerous in the steppe and savanna regions. The natives are very fond of honey, and adopt various devices in order to obtain it. In some cases they simply search for the bees' nests, which are usually found in the hollows of trees or in cracks of the rocks, and proceed to smoke them out; in others they make a sort of primitive hive, which they hang in a tree after placing in it a small amount of honey in order to attract the bees. The wax is said to be of good quality, but hitherto the native has paid little attention to it; in some cases, however, it appears to have been collected and sold.

NATURAL PRODUCTS

The most important products derived from the natural vegetation of the country are rubber, palm-oil, and copal, but piassava, raffia, and other fibres are exported to a slight extent. With the exception of some varieties of rubber these products are mainly obtained from the forest region, and it is only occasionally that the savannas and steppes produce articles much sought after by Europeans. From the survey which follows, however, it will be seen that the natural resources of the country are by no means inexhaustible. The sole object of the natives who collect the raw material is to obtain as much as possible with the least expenditure of labour. This leads to wasteful methods of exploitation, which, on account of the size of the country, the Government is able to do little to prevent. Moreover in the case of some plants, such as those which produce rubber, the development of plantations in other parts of the globe where the climate is favourable and labour cheap and abundant has led to a fall in price which seriously affects the output of the natural product when it becomes more difficult to obtain. Hence there is a movement towards the establishment of plantations, and these have some special advantages in the Congo. The difficulties of transport, which are very great when the raw produce of the forest has to be collected from widely scattered areas, can be reduced, and the preliminary processes of manufacture, which are usually necessary before export, can be more efficiently undertaken. In the case of rubber and oil the movement towards plantation cultivation is well marked. Copal is in a somewhat different category, but it may be noted that much of that which is now collected represents the accumulation of past years, and it is impossible to say how long the present output can be maintained. The raphia palm has as yet only been exploited to a slight extent, and the question of cultivating it has not arisen.

Rubber

The production of rubber has played a very important part in the political and economic history of the Belgian Congo. In 1887, the first complete year for which export statistics exist, the total output of the country was about thirty metric

tons. During the following fourteen years the annual exports steadily increased, and in 1901 exceeded 6,000 metric tons. Since then, however, they have shown a gradual decrease, and in 1915 amounted to only about 2,200 tons. The decline in the value of rubber relatively to that of the other exports of the country is even more marked. In 1900 nearly 85 per cent. of the total value of the exports of the country was credited to it, but in 1915 it accounted for about 15 per cent. Nevertheless it still holds an important place in the trade of the Congo region, and its present position and future prospects are matters of considerable interest.

Until quite recently all the rubber exported from the Congo was derived from uncultivated plants indigenous to the region. These plants belong to the order Apocynaceae, and include trees, climbers or vines, shrubs, and herbs. The vines, which are by far the most important, belong to the three genera, *Landolphia*, *Clitandra*, and *Carpodinus*. The majority of them are woody climbers, and many of them attain a great size. In addition to the vines, a number of bushy plants belonging to the same genera furnish 'root rubber' from their underground stems (rhizomes). Some of these plants occur normally as vines in the forest, but develop a bushy habit when growing upon open ground, where there are no trees to serve as supports. The shrubs are therefore characteristic of the savanna, in contrast to the vines, which are inhabitants of the forest region. The only indigenous rubber-tree of any importance in the Congo is that known as *Funtumia elastica* (Stapf), or *Kickxia elastica* (Preuss).

Although the vines belong to the forest, their growth appears to be most satisfactory either upon its outskirts or in the more open spaces in the interior, where they have free access to light and air. In the densely wooded districts the stem of the vine remains slender until it has reached the top of the tree which affords it support, and is able to expose its leaves to the light. After this it increases in thickness, but vines growing under these conditions obviously develop slowly.

The number of rubber-producing vines belonging to the genus *Landolphia* is considerable, and only a few of the more important need be mentioned here. Among these *Landolphia owariensis* undoubtedly holds the first place. It is a climbing shrub which frequently attains a length of over 300 feet;

normally it is found as a vine, but on the savanna it sometimes occurs as a bush. *Landolphia owariensis* is one of the chief sources of Congo rubber, and the product is of excellent quality. *Landolphia Klainei* (Pierre) is likewise a climbing plant of considerable length; it has a vigorous growth, and provides part of the rubber obtained from the Congo forest. *Landolphia Thollonii* (Dewèvre) is a dwarf shrub from six to twelve feet high. Owing to its central tap-root it is able to grow in regions which have a long dry season, and hence it flourishes on the savanna and on some parts of the steppe. It is the principal source of root rubber, which is obtained from the bark of its underground stems, or rhizomes. Other species of *Landolphia* which occur in the Congo are *Landolphia Gentilii* (De Wild.) and *Landolphia Droogmansiana* (Dewèvre).

The genus *Clitandra* is poorer in rubber-producing plants. The most important species is *Clitandra Arnoldiana* (De Wild.), the lianas of which sometimes reach a length of 250 feet. It is found in various parts of the forest region. Other species of more or less value are *Clitandra Mannii* (Stapf) and *Clitandra robustior* (K. Schum). The genus *Carpodinus* is relatively poor in rubber-producing plants, and the only species which need be mentioned are *Carpodinus Gentilii* (De Wild.) and perhaps *Carpodinus ligustrifolia* (Stapf).

Funtumia elastica (Stapf), or *Kickxia elastica* (Preuss), is a large tree, sometimes attaining a height of 100 feet, with an erect, tapering, cylindrical trunk, usually covered with a mottled grey bark. It owes its name of 'silk rubber-tree' to the fact that its seeds have an attachment of silky hairs. It is essentially a forest tree, and in the Belgian Congo it thrives not only in the tropical forests of such districts as Bangala, but also in the savanna forests, where there is a more or less well-marked dry season. *Funtumia elastica*, in its indigenous condition, does not provide much of the Congo rubber, and it is rather as a cultivated tree that it has to be considered.

The collection of rubber from wild plants scattered throughout the country must necessarily be done by natives without European supervision, and the methods employed by them are primitive in the extreme. Incisions are made in the vine either as it hangs on its supporting tree, or after it has been pulled down and laid along the ground. In some cases the latex does not flow freely, but simply fills up the cuts which

have been made and there coagulates. The strips of rubber thus formed are then pulled off, and rolled into balls either at once or after they have been washed in warm water to remove fragments of bark. If the latex flows freely at first, as it sometimes does, the cut is not sufficient to hold it, and in such cases various devices are adopted. Sometimes the native collects it in his hand and smears it over his body, from which he afterwards peels it in long strips; at other times he catches it on a leaf and spreads it out in a thin layer so that it may coagulate rapidly.

In the case of certain vines the latex flows so freely that it has to be collected in cups made from leaves, or in other receptacles, and afterwards coagulated. In such cases incisions are either made in the stem as before, or the stem is cut up into short lengths, which are placed upright in a trough so that they may be drained as completely as possible. Coagulation of the latex thus collected is then brought about in one of several ways. The juice of two species of *Costus* (*C. afer* and *C. lucanusianus*), is employed to coagulate the latex of *Landolphia owariensis* while that of *Clitandra Arnoldiana* coagulates readily after a long boiling, provided the process is carefully performed. Some tribes pursue a more primitive method, and simply pour out the latex on the soil and wait till coagulation takes place. This process, however, as may readily be imagined, produces a rubber of very inferior quality.

To obtain and coagulate the latex from the small bushy forms of *Landolphia*, *Clitandra*, and *Carpodinus* a different procedure is necessary. The rhizomes are pulled up and exposed to the sun for some time, in order that the latex may be coagulated. They are then cut up and beaten with wooden mallets to remove the bark, which contains the latex. The further processes employed vary from one region to another, but in a general way it may be said that the bark is alternately pounded and washed until the vegetable fragments are removed from the crude rubber. In certain districts machinery was introduced by the European companies operating therein, but some of them have had to cease work on account of the want of sufficient raw material.

The native practice, already referred to, of cutting and pulling down the stems of the rubber vines in order to tap

them more easily and more effectively has given rise to considerable discussion. The obvious objection to the practice is that the stem is destroyed in the process of extracting the rubber, and this, of course, is true. But it is argued that not only is the yield of rubber much larger when the lianas are cut down, but that the plants are not killed, and soon throw out new shoots from the basal portions of their stems. These shoots, it is said, can be treated in a similar fashion in two or three years' time, as the quality of rubber which they yield is much superior to that given by seedling vines of the same age. Moreover in the depths of the forest there are innumerable vines, poor and of little value because of the want of light and air, but ready to take the place of more vigorous plants when these are removed. Tapping on the other hand is said not only to give an inferior yield of rubber, but to lead to the speedy death of the vine. The number of incisions made by the natives is excessive, and large slices of bark are sometimes removed, exposing the inner wood and rendering it liable to the attacks of insects and fungoid pests. When, as often happens, the lianas are torn from the trees to which they cling, but not cut, they do little more good, and only serve to cumber the ground. Those which are not torn down are tapped too frequently, the vitality of the plants is affected, and their death speedily follows.

The policy of the Government in regard to these different methods of obtaining rubber has changed more than once. At one time the system of exploitation by cutting down the vines was regarded as wasteful, and attempts were made to restrict it as much as possible. In 1910, however, partly as a result of the researches of De Wildeman, Chevalier, and others, a decree was issued which permitted the cutting of the lianas, providing that the main stem was left to a height of about five feet above the level of the ground. The matter, however, can hardly be regarded as settled. Native methods of tapping, it is true, usually end in the death of the plants, and it is probable that certain species of vines, even if carefully tapped, are liable to be killed. On the other hand Seret found that *Clitandra Arnoldiana* died after the stems had been cut. It is possible therefore that plants which will not stand careful tapping will also be killed by cutting.

The destruction of rubber-producing plants, which for one

reason or another was widespread about the end of the last century, led the State to take energetic measures to preserve what was then its chief source of wealth. These measures need not be recapitulated here, but their general character may be gathered from a decree published in 1904, which enacted that for every 100 kilogrammes of rubber collected in the State lands and forests a certain number of trees or vines were to be planted. In this and other ways a large number of rubber vines, especially *Landolphia owariensis*, *Landolphia Klainei*, and *Clitandra Arnoldiana* were established. But the experiment was far from being a success. The cost of planting the vines and tending them in the earlier stages of their growth was considerable, their growth was slow, and their yield was less than that obtained from wild vines. In 1909 the decree requiring replanting was abrogated, and in 1910 many of the plantations were abandoned.

Meanwhile various experiments had been made in the cultivation of rubber-trees, and the attempts to establish plantations received a new impetus from the gradual decline in the output of rubber, the success of plantations in Ceylon and Malaya, and the rise in price, which was to culminate in the boom of 1910. Progress has necessarily been slow, but the general principles governing the cultivation of plantation rubber are now fairly well known. Experiments have been made with *Funtumia elastica*, *Hevea brasiliensis*, and *Manihot Glaziovii*, and the relative merits and demerits of each have been carefully considered. As the question is one of considerable importance in relation to the future economic development of the Congo, a brief review of the work which has been accomplished is given here.

Funtumia elastica is indigenous to the Congo, the districts of Ubangi, Bangala, and Aruwimi being among those in which it is most frequently found. It was only natural therefore, when the idea of establishing rubber plantations was first entertained, that experiments should be made with this tree. A number had been planted as early as 1901, but it was not till 1906 that their cultivation was seriously undertaken, and not till after the abandonment of the compulsory planting of vines in 1909 that they became of prime importance in the attempts to grow plantation rubber. By the end of 1910 there were about 3,500,000 trees in various State plantations in

different parts of the country. Further progress, however, was checked by the fact that experiments in *Hevea brasiliensis* had apparently given much better results, and a number of *Funtumia* plantations have since been abandoned.

The view that *Hevea* is better adapted for cultivation than *Funtumia* is now generally accepted in the Congo. At the same time the latter tree has undoubtedly certain advantages. It grows quickly and easily even on soil of moderate fertility, and appears to be able to survive in districts too dry for *Hevea*. It is also less subject than that tree to attacks of insect pests. In addition it requires to be tapped only once or twice a year, and the latex, which is of good quality, is easily coagulated by means of boiling water.

On the other hand, as is now generally recognized, the yield from *Funtumia* is considerably less than that from *Hevea*. Its tapping also presents some difficulty at times, as it tends to throw out branches from an early stage of its growth, and, although these can be lopped off, the surface of the trunk is left rough and irregular. To overcome these difficulties it was suggested that *Funtumia* should be planted in coppice formation, the trees being placed at distances of only six feet from one another, instead of twelve feet, as is usually the case. As the trees increase in size the less vigorous are cleared out. By this method, it is claimed, the trunks of the young trees are drawn upwards towards the light, few branches are developed, and as the soil is always shaded the expense of keeping the land clean is reduced to a minimum. The investigations made with a view of testing this system of cultivation have, however, not given satisfactory results. Measurements taken at Gazi, in the district of Stanleyville, during the three seasons 1912-15, showed that the increase in circumference of trees grown in close formation was little more than half that of trees grown in open formation. Both lots had been planted in 1909, but, whereas those growing in open formation were about ready for tapping, those growing in close formation did not appear likely to yield rubber for four or five years. Though the question cannot yet be regarded as finally settled, it hardly seems probable that this method will regain for *Funtumia* the position which it has lost.

Whether the cultivation of *Funtumia* will be taken up by the natives in plantations of their own is also a matter on

which it would be hazardous to express a definite opinion. It is true that the tree grows easily, and does not require a great deal of attention, but much will depend upon the extent to which the native can be induced to undertake work for which there is no prospect of an immediate return. The land would have to be cleared, planted, and kept comparatively clean for a period of six or seven years before any return could be obtained from it. It is possible that the State might do something to encourage such plantations by remitting part of their taxes to natives who had a certain number of trees in good condition but not ready for tapping.

Hevea brasiliensis appears to have been first introduced into the Belgian Congo in 1899, when about fifty trees were planted in the neighbourhood of Coquilhatville. The number was gradually increased, and in 1904 there were about 3,000 trees in that district. For several years after this very little progress was made. At that time the proper methods of tapping *Hevea* had not been discovered, and the plantations in Malaya had so far not proved a success. The State moreover was then devoting all its energies to the cultivation of rubber vines. But, with the failure of these and the successful development of the plantations in Malaya, a new impetus was given to the cultivation of *Hevea*. By the end of 1911, 250,000 had been planted in the country, and since then the number has been largely increased.

Hevea brasiliensis is a large forest tree, which may reach a height of 100 feet. It has a well-developed trunk, sometimes measuring 10 to 12 feet in circumference, and the branches are high. Though an inhabitant of the Amazon lowlands, it possesses very considerable powers of adaptation, and is at present being grown successfully under very varied conditions of temperature, rainfall, and elevation. In the Belgian Congo it appears to thrive where there is a rainfall of at least 60 inches, though in Mayumbe it is grown with somewhat less than that amount. If the climate is satisfactory, *Hevea* will grow on relatively poor land, but the best results are obtained on good alluvial soils, as the growth of the tree is then most rapid. On the whole *Hevea* is a more difficult tree to cultivate than *Funtumia*. The seed has to be selected, and the young plant grown with some care. It is said that the best results are produced when the seedlings are left in the nursery till they are

several feet in height. The upper parts of the stems are then cut off, the plants lifted, and the roots trimmed, after which the 'stumps' thus obtained are carried in bundles to the place where they are to be planted. The great advantage of this method is that by it the best roots may be selected; the disadvantage is that the humidity of the air is not so great as in Malaya, where the method originated, and a number of plants have consequently suffered in transit. The use of seed-baskets is also practised on occasion. A single seed is sown in each basket, and the plants thus raised are kept under shade and well watered until required for planting out. The entire basket is then placed in the soil without disturbing the roots.

The first *Hevea* trees grown in the Congo were planted at a distance of about 16 feet from one another, but they were evidently too close, and a number of them died. The distance now observed is from 22 to 25 feet, or even more. To reduce the expense of keeping the land clear various catch crops have been attempted, but it is believed that they tend to retard the growth of the *Hevea* trees. The matter, however, is still the subject of experiment.

Hevea also presents greater difficulties from the point of view of tapping than does *Funtumia*. The method which has been evolved depends upon the fact that, if the initial incisions are reopened after a short interval by cutting off a thin slice of bark from one of the edges of the cuts, a further flow of latex takes place. This procedure may be repeated again and again with a similar result. To do it successfully, however, requires a certain amount of skill, as to get the best results shavings of one-twentieth of an inch in thickness, or even less, have to be taken from the bark.

The cultivation of *Hevea* in the Congo can as yet hardly be regarded as having passed far beyond the experimental stage, but so far the results have been satisfactory. The tree appears to find climate and soil well adapted to its growth. In the Malay region a plant three years old has an average circumference of about 14 inches at a height of 3 feet above the ground, and a plant ten years old one of about 54 inches. For the Congo corresponding measurements, made, however, on a much smaller number of trees, gave 12, and from 36 to over 54 inches respectively.

But it is by the amount of rubber which it yields that

Hevea must stand or fall, and here again the results which have been obtained do not pass beyond the experimental stage. On the Malayan rubber plantations it has been estimated that the average annual yield is between 396 lb. and 630 lb. per acre for trees between ten and eleven years old. The experiments made at Bakusa, Eala, Musa, and Kitu, on trees from ten to twelve years old, showed an annual yield per acre varying from 352 lb. to 528 lb. Some of the best results obtained from *Funtumia* of a similar age gave from 164 to 176 lb. per acre.

As yet only provisional conclusions can be drawn from the experiments made in regard to the cultivation of *Hevea* and *Funtumia* in the Congo. On the whole, however, it would appear that *Hevea* is well adapted to the conditions which prevail over a considerable part of the country, and that a larger yield may be expected from it than from *Funtumia*. On the other hand it is a more difficult plant both to grow and to tap, and for this reason it is suitable for cultivation only on plantations which are controlled by Europeans. Probably the latter statement is also true of *Funtumia*, but there is just a possibility that the natives may eventually be induced to grow it on small plantations of their own.

A third variety of rubber, known as Ceara, is obtained from *Manihot Glaziovii* (Müll. Arg.), which has had a somewhat varied history in the Belgian Congo. For some time it had a certain vogue in the country chiefly on account of its rapid growth and the small amount of care which it seemed to demand. In the equatorial forest, however, where there is great humidity at all seasons of the year, it began to suffer, when about four years old, from cryptogamic growths, and its cultivation had to be abandoned. Perhaps because of its failure there, it was also neglected elsewhere, and some plantations, which had been established in Mayumbe, were practically abandoned. Within the last few years its climatic requirements have been better understood, and it is once more being grown in certain regions. The most important plantations at present are situated at Bokala in the district of Moyen Congo.

Manihot appears to grow best when the trees, which are raised from 'stumps', are planted about 13 feet apart, as in that case their crowns are touching when they are about four years old. This is important, as trunks which are exposed to

the sun, give but little rubber. The methods of tapping are somewhat peculiar. The outer bark of the tree is removed from one-fourth or more of the circumference of the stem to a height of 6 feet, and the stripped surface is then moistened with the acid juice of a citrus fruit, or with some solution such as acetic acid, in order to facilitate the coagulation of the latex. A large number of small horizontal incisions are then made by stabbing the bark with a knife, care being taken that the cuts do not penetrate too deeply. The latex exudes from the cuts, and in contact with the acid solution quickly coagulates on the stem. A certain amount of skill is necessary in carrying out the work. If the incision be too slight, the yield of latex is feeble, while, if it be too deep, the tree speedily dies.

What place *Manihot* will eventually take in the production of rubber in the Congo it is as yet impossible to say. It has the advantage of growing well in dry situations, where other rubber trees will not survive, and the rubber produced is often of excellent quality. Little information is at present available regarding the yield which it may be expected to give; but the results of similar plantations in German East Africa leads to the conclusion that the return from *Manihot* will be greater than that from *Funtumia*, but less than that from *Hevea*. It is, however, a tree that is not likely to be grown outside of plantations controlled by Europeans.

The Oil-Palm

The oil-palm (*Elaeis guineensis*) is one of the most important trees of the Belgian Congo. It is placed by botanists in the tribe Coccoineae of the natural order Palmae, together with the one other genus *Cocos* to which the coco-nut palm belongs.

The oil-palm is essentially a tree of the tropical forest, but, though widely distributed therein, it is not found everywhere. It appears to prefer the more open spaces, and is most common in and around existing or abandoned native villages. There its abundance is probably due to seeds which have been scattered by chance, as the tree, being of slow growth, is seldom or never planted by the natives.

The best soil for the oil-palm is one rich in humus, moist, but well drained. It seldom grows in marshy districts, but it

flourishes on deforested lands at a slightly higher level. Provided, however, it receives a sufficiently heavy rainfall—50 to 70 inches are said to be necessary in the Congo—the quality of the soil is of comparatively little importance. A certain amount of light and air are also necessary in order to obtain the best results; when grown in the depths of the forest, it gives a comparatively poor yield.

The oil-palm requires a long period in order to reach maturity. In the district of Equateur, for example, the trees do not appear to give a normal yield before they are fifteen years of age, but after that they continue to bear abundant crops for at least another twenty years. Nevertheless it is unfortunate that in many cases the natives have been careless of the source of wealth provided for them by the oil-palm. Many trees have been destroyed in the process of clearing the forest for agricultural crops, and many more have been recklessly cut down in order the more easily to obtain their fruit. The Government has at various times tried to check this destruction, but apparently with little success.

The value of the oil-palm in native economy has already been discussed (see p. 165). In international trade it holds a position of considerable importance. Within recent years palm-oil and palm-kernels have been exported in increasing quantities to European markets, where they are chiefly employed in the manufacture of soap, candles, and glycerine; some qualities of palm-oil are also made use of in the manufacture of tin-plate. Until about 1911 these exports came almost entirely from the district of Mayumbe. The amount contributed by the interior was small, as the railway rates were high, and modern factories for the extraction of the oil were wanting. In 1911, however, a convention concluded between the Government and Lever Brothers, the makers of Sunlight Soap, prepared the way for the development of the palm-oil industry over large areas in the Central Basin.

By this convention, which was finally approved on April 24, 1911, Lever Brothers engaged to form a Belgian company (*Société anonyme des huileries du Congo belge*) with a minimum capital of 25,000,000 francs, and to build within six years a factory capable of treating 6,000 tons of fresh fruit per year in each of the districts in which they were given concessions. These districts consisted of the country lying around

and within 60 kilometres ($37\frac{1}{2}$ miles) of the following posts: Bumba and Burumbu on the Congo, Lusanga on the Kwilu, Basongo on the Kasai, and a place 25 miles south of Ingende on the Ruki. If within six years of the approval of the convention the company established a factory capable of extracting the oil from 6,000 tons of fresh fruit per year in any of these regions, it was to have the right, until April 24, 1921, of leasing within that region 75,000 hectares (185,336 acres) of land bearing oil-palms at an annual rent of 25 centimes per hectare (about one penny per acre). If on the other hand it built a factory in any district capable of using 15,000 tons of fresh fruit annually, it was to have the right of selecting 200,000 hectares (494,230 acres) of land in that district, provided that the total holding in the Congo did not exceed 750,000 hectares (1,853,360 acres). From January 1, 1945, the company is to obtain proprietary rights over parts of the lands which it has hitherto held on lease, the amount which it will receive being determined in the following way. In each of the districts already mentioned it may choose 40,000 hectares (98,846 acres), but not more than 150,000 hectares (370,670 acres) in all. In addition, however, it may select 4 hectares (9.8 acres) for every metric ton of oil, or its equivalent, that it has exported from these districts by a port of the colony during the preceding five years. The total amount of land which it may acquire must not exceed 750,000 hectares (1,853,360 acres). It will remain subject to an annual payment of 25 centimes per hectare, and may not be sold without the consent of the Government, which would be entitled to receive one-half of the purchase money.

According to the agreement the company is to undertake the development of existing plantations, and to establish new ones where necessary. All labour is to be free, and is to be paid for at the rate of at least 25 centimes per day, together with rations. Where contracts are made with the natives for the regular delivery of fruit the minimum price is to be fixed so that an equivalent wage will be secured to the labourer. In each of the districts one doctor at least is to be maintained, and a hospital and school are to be established. Half of the officials of the company are to be of Belgian nationality, and one-third of the material required, other than that manufactured at Port Sunlight, or according to the secret processes of

Lever Brothers, and one-half of the merchandise imported by the company into the colony are to come from Belgium. All roads, railways, telegraphs, telephones, &c., constructed by the company are as far as possible to be free to all.

Under the convention a good deal of preliminary work has already been accomplished. Factories have been built at Leverville on the Kwango, and at Alberta, near Bumba, on the Congo. Means of transport are being improved, and a railway has been laid down from Leverville. Measures are also being taken to clear the land around the palm-trees, and to protect them from unnecessary destruction by the natives.

Copal

Copal has within the last few years become one of the most important exports of the equatorial forest. It is a resin which is secreted in large drops by certain trees belonging to the family of the Leguminosae, and in the Belgian Congo is produced by *Copaifera Demeusei*, and perhaps by some other trees whose position has not yet been determined. Among the regions in which *Copaifera Demeusei* is most abundant are the districts of Equateur, Moyen Congo, Lac Leopold II, Bangala, Ubangi, and Stanleyville. In these districts it is usually found in the marshy places which occur in the vicinity of the rivers.

Copal is found under various forms. Green copal is obtained from the 'tears' which are spontaneously exuded in the fissures of the bark. In Guinea incisions are made in order to facilitate the collection of the resin, but, until recently at least, this method has not been employed in the Congo. In the marshy districts the natives prod for copal under water with a stick shod with iron, recognizing its presence by the sound it gives forth when struck; they also collect it in considerable quantities on the sandbanks, where it has been deposited by rivers during times of high water. In the district of Equateur, notably in Busira Manene, a variety of fossil copal called *dangi* is found in the soil; it has a very pure sound, and is lighter, yellower, and more brittle than that collected from the trees.

The natives who collect copal remove from it some of the grosser impurities, such as bark, earth, and insects, before they

dispose of it. Prior to being sent to Europe, the hard and soft gums are separated from one another. The former are plunged into a solution of caustic soda for half an hour, and are then washed in water and placed in the sun to dry. The pieces are then sorted out, and any impurities which remain are removed. The whole process is, however, carried out in a very crude manner. The softer gums, of more recent formation, are not able to stand this treatment, and are merely scraped and packed for export.

Copal is used in Europe for the manufacture of varnish, the most suitable kinds being hard, transparent, and brittle. The colour is also of importance, as upon it depends the colour of the varnish produced. The natives say that different kinds of copal trees yield copal of different colours, but how much truth there is in this statement still remains to be seen.

Until 1910 the annual export of copal from the Belgian Congo seldom exceeded 1,000 tons. Since then it has rapidly increased, and in 1916 amounted to 8,700 tons. The development of the export trade appears to have been due in part to the increasing demand for copal on the European market, and in part to the impetus given to its collection by the fall in the price of rubber. The Government seized the opportunity of fostering an industry which might eventually prove of great value to the colony, and to encourage the native collector established a market at Basankusu, the capital of the Lulonga district, where he might sell his copal at a fixed price instead of dealing with a trader, as had been his custom in the case of rubber.

The Raphia Palm

The raphia palm, whether considered from the native or the European point of view, is one of the more useful trees of the equatorial forest. It flourishes in marshy places, and some varieties thrive on land which is completely inundated. Among the more important species the following may be noted. *Raphia Laurentii* (De Wild.), often known as the bamboo palm, is very common in the district of Equateur, where it sometimes forms considerable forests. It is one of the largest of the raphia palms, and often rises to a height of 45 feet, the leaves being from 15 to 45 feet in length. *Raphia vinifera* also appears to be widely distributed, but differs from

R. Laurentii in the fact that it does not grow in the same close formation. It is usually found in clumps scattered here and there, and often at some distance from one another. Further, unlike *R. Laurentii*, it does not flourish on inundated lands, but prefers the more elevated districts in the middle of the marshes, and the denser parts of the tropical forest. It is a comparatively small tree, and is often not more than 10 or 12 feet in height. *Raphia sese* (De Wild.), another common species, is a large plant, but is less developed than *R. Laurentii*, and the leaves are much smaller. *Raphia Gentiliana* (De Wild.) and *Raphia monbuttorum* (Drude) may also be noted.

From the European point of view the most important products of these palms are piassava and raffia. Piassava, which is much used in Europe for the manufacture of stiff brooms, is produced by the sheath of the lower parts of the leaf-stems. These are cut down and steeped in water for a considerable time, after which the fibrous strands can easily be separated by beating. In order to get the best results some care is necessary in the preparation of piassava. The fibres should be well cleaned, and should have as nearly as possible the same diameter (1.5 to 2 mm.) for the whole of their length. Those which are thickest, most flexible, and darkest in colour command the best prices on the market. Raffia, which is obtained from the upper epidermis of the follicles of the young leaves, is much used in Europe by horticulturists, vine-growers, and others. The Congo product is apparently not so good as that which comes from Madagascar, and greater care requires to be taken in its preparation.

At present only small amounts of piassava and raffia are exported from the Congo.

PLANTATIONS

The cultivation of plants which either are not indigenous or, if indigenous, are of little or no economic value in their native state, is a matter of some difficulty, and an account of the attempts which have been made will show that so far comparatively little progress has been achieved. The obstacles to such progress are of course considerable. Plants, and more especially cultivated plants, when transferred to a new environment, require a good deal of attention, and in the

absence of expert attention are unlikely to succeed. But it is just in this respect that many attempts to introduce new crops into the Congo have been doomed to failure. The methods followed have often been wholly empirical, and it is only within the last few years that endeavours have been made to introduce a properly trained scientific staff. Further, apart from the production of rubber and oil, which have already been discussed, it has not yet been shown that the Congo possesses any special advantages in soil or climate for the cultivation of a crop of world-wide importance. Its climate does not seem so well adapted to the growth of cocoa as San Thomé, nor its soil so well adapted to the growth of coffee as Brazil. Whether any such crop will yet be discovered remains to be seen. The interest which has hitherto been shown in the production of rubber has no doubt diverted a certain amount of attention from the possibility of other crops, but no definite evidence has yet been adduced to show that the Congo possesses any great potentialities in this respect. On the other hand the question of a sufficient supply of labour presents some problems which it will not be altogether easy to solve. (See pp. 302-4).

Cocoa

The cultivation of cocoa was first attempted in the Belgian Congo in 1895, and for some years it was grown along with coffee on State plantations, where the better soils were reserved for it. But, partly owing to the want of proper scientific knowledge, these attempts did not prove a success, and the State plantations have almost entirely disappeared. On the other hand private enterprise has become increasingly active, and a number of important plantations have been established in Mayumbe and elsewhere.

In Mayumbe the principal plantations lie between Luki and Chela, on either side of the railway line which runs from Boma to Chela. Among the more important companies operating in this district the following may be noted: *Société anonyme d'agriculture et de plantations du Congo*, *Société de colonisation agricole du Mayumbe*, *Plantations coloniales (La Luki)*, *Société anonyme Urselia*, *Société Urselia secunda*, and *Compagnie sucrière européenne et coloniale*. Outside of Mayumbe cocoa is grown by *Plantations Lacourt* on their

property situated near the confluence of the Kondue and the Sankuru, not far from Lusambo. An important experimental station has been established by the State at Ganda-Sundi, some distance north of Chela, in order to investigate the best methods of cultivating the cocoa plant and preparing its products for the market. Another station at Barumbu, almost in the centre of the equatorial forest, is trying to discover whether the cultivation of cocoa can be advantageously pursued in this region. The results so far are distinctly promising. In 1907, 32,000 trees in bearing produced a crop of only 10 tons of dry cocoa, but under the more careful methods of cultivation afterwards adopted that amount had been increased to 41 tons in 1915. A number of young plantations are also expected to become productive before long.

In Mayumbe the plantations are generally situated between 500 and 1,200 feet above sea-level, but in some cases they are as high as 2,500 feet. The most suitable districts are in the valleys and on the lower slopes of the hills. Cocoa requires a deep and permeable soil, and this is usually, but not always, found in regions covered with virgin forest. In such regions also the soil is rich in humus, and the richer and deeper it is the greater the crop that it will produce.

The climatic conditions of Mayumbe differ somewhat from those which prevail in other parts of the world where cocoa is extensively grown. There is a well-marked dry season, but the relative humidity of the atmosphere is always high, and it is said to be owing to this that the plant is able to thrive. A certain amount of shade, however, appears to be necessary for cocoa during the first three or four years of its growth. When the land is cleared various trees, such as *Eriodendron*, mango, and kola, are for this reason sometimes left standing; but the practice is not without its drawbacks. Large trees take up a considerable amount of water during the dry season, and if they are blown over, as is often the case, they do a considerable amount of damage. In place of them the banana is frequently grown; it taxes the soil somewhat, but it provides a good shade, and also affords an opportunity for a catch crop. When bananas cannot be obtained the higher varieties of *pois cajou* are sometimes used.

The value of shade-trees is still a matter of some dispute. On the one hand they often give a much-needed protection

not only to young plants, but to older trees, which, if they are unshaded, yield a large return, but are rapidly exhausted. Moreover, they prevent the removal of the soil by erosion, or the loss of its fertility by intense solar radiation. On the other hand, if the plants are too much shaded, they have a vigorous growth, but do not produce fruit. It was formerly thought that in those parts of the tropical forest where there is rain at all seasons shade-trees were not so necessary as in Mayumbe, but recent experiences at Barumbu indicate that without them the yield of cocoa rapidly diminishes.

The cocoa plantations of the Congo appear to be subject to various insect and fungoid pests. Of the insects the most dangerous is a Hemiptera (*Sahlbergella singularis*), which attacks the pods and causes canker in the branches, rendering them sterile and sometimes bringing about the death of the tree. They are aided in their work of destruction by various fungi, which find an entrance into the plant by way of the punctures and lesions produced by the insects. The best way of meeting the attacks of these pests, which are capable of doing considerable damage, is to spray the trees with a solution containing petrol, soap, and Bordeaux mixture; all wounds ought at the same time to be closed up by a covering of vegetable tar.

The fermentation and drying of cocoa are a work of considerable difficulty, and in Mayumbe special buildings have been erected for the purpose. Evidently a good deal has still to be learned regarding the processes in question, as a recent report on cocoa exported from the Congo says that, while some of it is excellent, much of it suffers from want of proper care in its preparation.

The cultivation of cocoa is the only agricultural enterprise undertaken by Europeans in the Congo which has yet risen to a position of much importance. The progress which has been made is considerable, but the product still plays quite an unimportant part in the world's markets. For the last three years for which figures are available the annual exports averaged 726 metric tons. It is probable that, as the best methods of cultivating the plant and preparing the product for market become better known, the output will increase, but it is questionable whether it will ever rank high among the exports of the colony. So far Mayumbe has proved the most suitable

region in the Congo for the production of cocoa, but, while the rainfall there is sufficient in normal years, it is occasionally deficient, with the result that the crop may be reduced by as much as 30 per cent. or even more. If it should eventually prove to be the case that cocoa can be successfully cultivated in the equatorial districts of the interior, this difficulty would not arise, but others connected with labour and transport might prove to be serious.

Coffee

The history of the cultivation of coffee in the Belgian Congo is somewhat chequered. A number of varieties, some of which are said to be of considerable value, are indigenous to the country, others have been imported from Liberia, Arabia, and Brazil. Various experiments made between 1885 and 1892 induced the Government to undertake the cultivation of coffee on an extensive scale, and plantations were established at a number of posts, including Coquilhatville, Bikoro, Ikenge, Bombimba, Nouvelle Anvers, and Barumbu. By the end of the century these plantations contained over 2,000,000 plants, and by 1904 the annual export had risen to 160 tons. Since then the plantations have one by one been abandoned, and the exports have declined almost to vanishing point.

A variety of causes contributed to the failure of an industry, which for a moment seemed full of promise. The climatic conditions of the Congo are not unfavourable to the cultivation of coffee, but the soils of the country are not so admirably suited to it as are those of Brazil. The development of the Brazilian industry, partly at least as a result of its special advantages, led to a fall in the price of coffee on the European market to a figure which made its cultivation in the Congo unprofitable. Further the planters were handicapped by the fact that they were working without expert advice, and that they had little or no knowledge of the varieties on which to specialize, or the proper methods of cultivation to pursue.

In order to discover whether the cultivation of coffee on proper scientific principles can be successfully undertaken in the Congo, the agricultural service about 1912 established an experimental plantation near Stanleyville. In all probability the results obtained here will show whether there is any real future for coffee in the Congo.

Ramie

Ramie belongs to the genus *Boehmeria*, of the family of the Urticaceae. Two important species may be recognized, *B. tenacissima*, or China grass, and *B. nivea*, to which the name of ramie is often more particularly applied.

Various experiments have been made regarding both species in the Belgian Congo, and in some districts the results appear to have been satisfactory. At Eala, for example, a plantation on good soil produced four crops per year, and similar results have been obtained from some fertile valleys in the Lower Congo. There are probably many other districts scattered throughout the country where the conditions are at least as favourable. As the plants are grown without irrigation the shoots, and therefore the fibres, are shorter than those obtained from similar plantations in Malaya.

Agaves

Agave rigida, from which the fibre known as sisal hemp is obtained, has long been grown on the Lower Congo, where it was probably first introduced by traders or missionaries. Various experiments were made regarding its cultivation, but for a number of years very little progress was recorded. Eventually large plantations were established at Kalamu, near Boma, and in 1912 contained about 30,000 plants. A specimen of the products which was sent to London in 1916 was valued at £50 per ton at a time when fair Manilla hemp was selling at £53. The quality was reported to be good, but the fibre had been insufficiently washed. *Agave Cantula* is also grown on the Lower Congo. Its fibre is softer and finer than that derived from *Agave rigida*, and specimens of it were valued in London in 1916 at £53 per ton. Though insufficiently washed, it was said to be suitable for admixture with Manilla hemp. *Agave Azul* gives a fibre which is said to be as good as Mauritius hemp.

Furcraea gigantea, from which Mauritius hemp is obtained, has been grown in the Belgian Congo to a slight extent for a number of years. In 1910 a plantation of some size was established at Kalamu. The product seems to be somewhat inferior to the best qualities which appear on the market.

Kapok

Eriodendron anfractuosum, from which kapok is obtained, grows wild in various parts of the Belgian Congo. It is a tree which might ultimately prove of some value to the natives, as it not only furnishes a fibre which could be exported, but produces an oil which can be used in the manufacture of native soap and for other domestic purposes.

Within the last few years experimental plantations have been established at Kalamu, Congo da Lemba, and Eala. The seeds for these plantations were imported from Java, and came from a variety of the tree which is more productive than that which grows in the Congo. How far the experiment will be a success yet remains to be seen.

THE IMPROVEMENT OF NATIVE AGRICULTURE

At a first glance it might seem that the improvement of native methods of cultivation would lead to a large increase in the agricultural output of the country. But apart from the general effect which such an improvement would have in reducing the necessity which at present exists for destroying part of the virgin forest each year, and apart from the benefits it would confer on the native population by diminishing the danger of famine, it is questionable whether there is much that can be done. The root crops upon which the natives of the forest region mainly depend cannot be exported. Of the cereals which provide the bulk of the food of the inhabitants of the savannas maize is the only one which has a world market, and it could probably be cultivated on an extensive scale, but it is doubtful whether the heavy cost of transport would permit of its exportation. Hence it is that attention has been mainly concentrated on two or three crops which seemed well suited to the country, and for which there is a special demand abroad. Of these the most important are rice and cotton.

Rice

Rice is grown by the natives in different parts of the Congo (see p. 163), but important experiments have been conducted by the State in recent years with a view of extending and developing its cultivation. These experiments were made at

Kitobola, which is situated in the valley of the Lukunga in the Lower Congo. At first upland rice alone was grown, but recently some varieties of marsh rice introduced from Ceylon, Java, and Italy have been cultivated on irrigated lands. The results so far obtained have shown that irrigated land produces about twice as much as unirrigated land, and produces it at nearly half the cost. The quality of the rice does not appear to be so good, and much of it is used to feed animals, but this is a matter which can probably be remedied.

It is questionable, however, whether any development of irrigation on an extensive scale is to be looked for in the near future, and probably more attention will be paid to increasing the area under upland rice. In the valley of the Lukunga there are considerable stretches of land on which it might be successfully grown. Their soil is too damp for other crops, and they are at present uncultivated. The main difficulty seems to lie in the fact that all the agricultural operations of this region are performed by women, who are even less willing than men to abandon their old methods and experiment in new crops.

The world-scarcity of foodstuffs during the latter years of the war made it necessary to consider whether the output of the Belgian Congo could be increased. As about 80 per cent. of the total area under rice (25,000 to 30,000 acres) is situated in the region round Stanleyville, it was to that part of the colony that attention was directed. The chief obstacles to exportation at present are the colour of the grain, the fact that much of it is broken by the native methods of preparing it for the market, and the heavy cost of transport to Matadi. In the time at their disposal the Government could do little to improve the quality of the crop, but, in order to remedy the deficiencies of native milling, steam machinery was set up at Stanleyville.

The greater part of the surplus crop has of late been sent to the troops operating in East Africa, but when conditions again become normal an increased amount will probably be available for export. There seems no reason indeed why the cultivation of rice should not be greatly extended. In many parts of the Congo climate and soil are well suited to its growth, and in some districts at least the natives take readily to its cultivation. But an improvement in quality

and a reduction in freight rates are essential if it is to take a place of any importance in the world's markets.

Cotton

A little native cotton has always been grown in a few districts in various parts of the Belgian Congo, but some years ago, when it seemed likely that the world's supply of raw cotton would fall short of the world's demand, it was only natural that its cultivation on a more extensive scale should be considered by the Government. In 1909 it was decided that the best course was to induce the natives to grow it on their own account, and with that end in view they were provided with seed and a fixed price for the crop was guaranteed them. Experiments along these lines were continued for two years in the Lower Congo, the eastern districts, and the Kasai region, but were ultimately abandoned. The specimens of cotton obtained are said to have been of good quality, but they were very limited in amount; the native evidently preferred to devote himself either to the cultivation of foodstuffs or to the collection of forest products.

Within the last few years further experiments have been made. In 1915 small quantities of cotton were grown in the Kasai region at Luebo, Luluabourg, Mushenge, and elsewhere, but the results were only moderately successful. Egyptian varieties showed themselves liable to various diseases, and American ones were not much more resistant. Better results have been achieved at Nyangwe, where some experiments carried out under the supervision of an American expert show that cotton may be successfully cultivated in parts of the surrounding region.

In 1916-17 attempts were made to persuade the natives in the neighbourhood of Nyangwe and Kasongo to devote part of their land to it, and 177 small fields with a total area of about 125 acres were placed under that crop. A market was established at Nyangwe, and the unginned cotton was purchased at the rate of 20 centimes per kilo, which corresponded to about 60 centimes per kilo for ginned cotton. The product was sent to Europe, where it was classed as equivalent to American 'middling'. In the same year the State farm at Nyangwe had about 135 acres under cultivation. The cotton

which it produced is said to be of excellent quality, and the seed obtained has been distributed to the natives of Maniema and Sankuru. In 1917-18 the area cultivated by the natives was considerably extended. The exports so far have been as follows:

1915 . . .	2.9 metric tons
1916 . . .	11.2 „
1917 . . .	22.5 „

The natives are reported to have been greatly pleased with the results of their labour, some of them having received as much as 50, 75, and even 100 francs. It is probable therefore that, if nothing unforeseen occurs, a considerable extension of the area under cotton will take place in the region between Nyangwe and Kasongo. The population is denser than in many other parts of the Congo, and appears to take more readily to the cultivation of new crops.

As a result of the experiments which have been made, attention is at present being concentrated on two varieties of American cotton, *Triumph big boll* and *Simpkins early prolific*. The former, which is extensively grown in Texas, has a fibre of medium length, and produces a good crop. The latter has a shorter fibre but ripens early, and is particularly suitable for those regions which have only a short dry season. It is probably the best adapted for cultivation in the country round Nyangwe.

Those parts of the Kasai region which lie round Luebo, Luluabourg, and Lusambo also appear to be well adapted to the cultivation of cotton, as climate and soil are both reported to be favourable. An experimental station at Loukala, north-west of Sankuru, has already given some satisfactory results.

In the Lower Congo the demand for labour on the plantations will probably prevent much being done in regard to cotton. Little attention has so far been given to the Welle country, but it is a region which, given good means of transport, might well become of considerable importance.

It is questionable, however, whether any great progress will be made in any part of the Congo, at least for a long time to come. Native cotton is of little value, and the cultivation of exotic varieties, such as medium or short American, involves expert superintendence. So far the aim has been to improve native methods of cultivation rather than to establish planta-

tions on European lines, and, although agricultural experts and missionaries can give much help, progress in this direction must necessarily be slow. Nor can much be advantageously done until means of transport have been greatly improved. The native is not likely to demand cotton for his own use, except in small quantities, for a long time to come, and arrangements would have to be made for the rapid export of the crop, in order to prevent its deterioration. Existing facilities, in addition to being insufficient, are much too costly.

EUROPEAN AGRICULTURE

The High Katanga is the only region in which the cultivation of the soil by Europeans has as yet made much progress. It would be incorrect no doubt to think of it as a white man's country, but climatically it is better adapted to European settlement than any other part of the Belgian Congo. The reasons for attempting to develop its agriculture were strong. Until recently it was necessary to import into Katanga at high rates the greater part of the foodstuffs required by the mining population. There was therefore an urgent need of an agricultural community whose labours would supply the home demand. That comparatively little progress has yet been made is hardly surprising. The majority of the whites who have gone there have been attracted either by the high rate of wages in the mining centres or by the prospect of finding minerals on their own account. Concerning the land there was at first little information. Practically nothing was known of the character of the soil, of the crops most suited to it, and of the best methods of cultivating them.

The investigations which have since been made regarding the fertility of the soil are not yet numerous, and, though some reports are pessimistic, there appear to be large areas suitable for cultivation. The rainfall is greater than in Rhodesia, and is more certain. At the same time the plateaus appear to be healthy, if some necessary precautions are taken. On the whole it seems probable that a considerable amount of development is possible, though it is unlikely that the region will have a great agricultural future. In the course of a few years it may be able to supply the more important needs of

the mining community, and even to grow one or two crops for export, but beyond that it is unlikely to go.

The progress which has been made up to the present may be briefly recounted. Previous to 1909 a small number of farms had been established, chiefly by the British officials of the Tanganyika Concessions. As a rule they consisted of a few acres, and were cultivated by the native with his hoe. In that year, however, the *Compagnie foncière agricole et pastorale* (*La Pastorale*) was formed with the object of introducing European methods of agriculture into the Katanga, and for that purpose received a grant of about 375,000 acres from the *Comité spécial* (see p. 280). The task before it was one of considerable difficulty. Most of the land was forested, and there were neither roads nor rural habitations. Animals, implements, and seeds were alike wanting, while native labour was both costly and hard to obtain. In these circumstances the company set itself to investigate the nature of the country, clear suitable areas, settle colonists, and provide them with houses, outbuildings, and other necessaries. Unfortunately it was handicapped by want of funds, and its activities were limited, but it performed a useful service, as it succeeded in locating good agricultural land in several districts.

As Belgian settlers were not coming freely, and as there seemed a possibility that the best land would be occupied by colonists of other nationalities, the Government resolved in 1911 to establish an agricultural department of its own in the region. *La Pastorale* had started farms at various places, near Elisabethville, at Katentania, where it has bought cattle and buildings belonging to the Tanganyika Concessions, at Kapiri at the foot of the Bianco plateau, and elsewhere, but the *Mission agricole* decided to confine its labours to districts not too far distant from Elisabethville, which was the natural market for agricultural produce, and yet not too near it lest their native labour might be enticed away by the higher wages prevailing at the mines. Two villages were established as dépôts for mining wants, Nieuwdorp, 100 miles, and Bellefontaine, 78 miles distant from Elisabethville. Lands were deforested, rivers cleared, marshes drained, and roads provided. In addition, an experimental station was established at Munama, in order to study the best methods of cultivating plants which appeared suited to the Katanga. In the south of the country several farms were established without State aid.

In 1915 there were thirty farms and the total area under cultivation was estimated at 2,145 acres. Since then there has been little change. Maize is everywhere the chief crop, but potatoes, sweet potatoes, manioc, and vegetables are also grown. Vegetables appear to be the most profitable crop, as they can be grown at all seasons of the year.

The future development of the region must necessarily be slow. The cost of clearing the land and improving it is considerable, and must be undertaken with caution, as the really fertile districts are scattered. In some places drainage is necessary in order to minimize the danger of malaria, which in any case is frequent when the land is cleared for the first time; almost everywhere irrigation must be provided to ensure a supply of water for vegetable gardens during the dry season. The valleys of some of the rivers contain fertile soil, but they cannot be immediately utilized, as the regulation of the waters must first be undertaken. It is also difficult to obtain settlers of a desirable type, as the Belgian peasant does not take naturally to colonization. In his economical way he lives comfortably at home, and he shows no great desire to try his fortune in unknown lands. The few who do go abroad prefer the United States, Canada, or even the Argentine, where the difficulties to be overcome seem less formidable, and where they may have friends and relatives. Even if colonists were more numerous, the State could not afford to settle large numbers at once. In addition to the expenses already mentioned, which in any country would be considerable, and which are much greater in the Katanga on account of the cost of transport, the would-be farmers usually arrive without resources of their own. Houses have to be built for them, implements provided, and financial assistance given.

On the other hand the development of the mineral industry will provide the Katanga farmer with a growing market for many years to come. Even at the present time he is very far from being able to meet its needs. In 1912, and the mining population has grown rapidly since then, it was estimated that to meet the home demand 9,000 to 10,000 acres of maize, 500 acres of wheat, and a herd of 15,000 cattle would be necessary. Obviously then there is considerable scope for agricultural industry.

The only other region in which Europeans have settled to

cultivate the soil is in the north-east, where there are a few in the vicinity of the gold mines at Kilo.

The earliest attempts at stock-raising in the Congo were made by the missionaries, *Les Pères Blancs*, who had settlements at Baudouinville and Albertville (Toa). Their first experiments were unsuccessful, but they seem to have surmounted their difficulties, and they now have a flourishing herd of 150 head of cattle. Goats and sheep are also raised by them. Another important experiment was made when *La Pastorale* introduced a herd of 960 head of cattle from Rhodesia, and settled some at Katentania, on the Bianco plateau, and others in the district round Lulua. At the end of 1914 the herd at the station at Katentania numbered over 1,700. Most of the animals belong to the Barotse breed, and appear to thrive upon the plateau, if they are carefully treated. They would do better, however, if forage plants were to some extent at least substituted for steppe grasses during the dry season, as at that time the natural supply of food is scanty. The breed might also be improved by the introduction of good stock from Europe.

In several other districts experiments are also being made. At Miao, about 25 miles south of Luluabourg, a State station has been established. The Marungu plateau is also said to be suitable for stock-raising, and arrangements are being made to investigate its value.

The whole question of cattle-raising is complicated by the distribution of the tsetse fly.

CHAPTER XII

MINERALS

THE mineral wealth of the Congo is found almost entirely in the regions of older rock which surround the Central Basin. It includes copper, tin, iron, gold, coal, and diamonds. The extent to which each of these occurs is only partly known, and their value cannot yet be determined.

COPPER

The copper deposits of the Katanga have up to the present received most attention. The belt of country in which they occur begins a little to the west of the Lualaba, not far north of the eleventh parallel of south latitude, and runs first in an easterly and then in a south-easterly direction. In the west the breadth of the belt varies from 25 to 40 miles, but in the south-east it is considerably broader. Its total length is about 250 miles. The copper-bearing strata are harder as a rule than the rocks of the surrounding country, and in consequence the ore deposits are usually situated in the residual hills and ridges. One or two deposits, however, and notably Luishia, occur in low-lying districts. The hills which contain copper always form a strong contrast to the neighbouring lands because, unlike the latter, which are timbered, they are bare of trees and shrubs, while between them and the woodlands grows the misuka, or mahobohobo, bush (a variety of wild loquat), which is here an excellent indication of copper. The absence of trees, which is believed by various writers to be due to the presence of a solution of salts of copper in the subsoil, has facilitated the work of the prospector.

The copper deposits are situated in quartzose strata varying from incoherent sandstone to pure quartzite, and in schists, shales, and limestones. The more abundant copper minerals are malachite, chrysocolla, azurite, and melaconite. Finely divided chrysocolla, azurite, and malachite are found impregnating the country rocks, and also in the form of mammillary

masses, the three minerals also being frequently associated with one another. Melanconite, while often associated with these, occurs also in ores intimately mixed with limonite and manganese dioxide.

The ore-bodies vary in size from comparatively small ones scattered over the country to large ones like those at Elisabethville and Kambove, which are between 2,000 and 3,000 feet in length. These bodies, whatever their size, are very similar in general form, and probably all have a common origin. Near the centre of the deposit, and parallel to its extension, is a sugary sandy quartz, much fissured, in which copper carbonates and oxides occur in large masses. Away from this quartz the country rock is impregnated with malachite, chrysocolla, and azurite. The earlier investigators believed that the deposits were derived from copper sulphides, which probably occurred in fissure veins. According to their theory the ore-bodies in process of exploitation contained the copper derived from a considerable depth of sulphide veins, and it was expected that when the latter were reached they would prove to be much narrower than the out-cropping oxidized ores. More recently some doubt has been cast on this theory of the origin of the copper deposits, and it is said that the small quantity of sulphides found to date, notwithstanding the fact that exploitation has extended to depths at which, under existing climatic conditions, the zone of secondary enrichment should have been encountered, is rather against the idea that the deposits are vein-like bodies. Various experts seem inclined to support the view that they are of sedimentary origin, but the matter cannot be regarded as settled either one way or the other. When the problem is solved, however, it will probably enable a more accurate estimate to be made of the extent of the reserve of copper in the colony.

The mining and smelting of copper ore were followed for centuries by the natives living in the vicinity of the copper deposits, and the mines worked to-day by Europeans were originally native mines, which have been re-located. The want of good means of communication is a serious drawback, and the development of the copper-belt is at present confined to its south-eastern and central parts, which are connected with the Rhodesian railway system. The most important centres are at Elisabethville, Luishia, and Kambove, but new

mines are about to be opened up at Kamatanda and Fungurume near the main line from Kambove to Bukama.

The Star of the Congo mine, situated about six and a half miles from Elisabethville, was until recently the most important source of copper in the Katanga. The ore, which is almost entirely obtained from open-air workings, is washed on the spot before being sent to the smelters at Lubumbashi. For some years it was obtained almost entirely by hand labour, but in 1914 steam shovels were introduced to strip off surface formations and mine the soft ore.

The mine at Kambove was opened in 1913 on the completion of the railway from Elisabethville. It is reported to be enormously rich, and the *Union minière* now obtains the greater part of its ore from this source. The high-grade material is picked out, and sent to Lubumbashi by rail, while the low-grade is reserved for future treatment. Luishia, which is about 55 miles from Elisabethville, on the way to Kambove, produces a powdery ore containing quantities of cobalt and iron, and a considerable part of it has to be screened or briquetted before use. Operations here were for some time suspended, but have apparently been resumed.

Lubumbashi, which is situated close to Elisabethville, is the smelting centre for all the ore mined in the Katanga. By 1915 five furnaces had been erected there, and two others were completed in 1918. As a result the plant at Lubumbashi is able to produce 40,000 tons of copper per year. The flux is dolomitic limestone, which is obtained near the Star mine.

The provision of fuel for the blast furnaces is a problem of considerable difficulty. Originally coke was imported from Europe at a cost of £12 per ton, and later on from the Wankie coal-field in Rhodesia at a cost of £5 8s. In 1912 it was decided to build coke-ovens on the spot, and arrangements were made with the Wankie Company to supply, and with the Rhodesian railways to carry, coal at such rates as would permit the manufacture of coke at about £4 8s. per ton. Two batteries of coke-ovens, which were completed in March 1914, have now a considerable output, while the gases liberated in the process are used for heating purposes. In the spring of 1914 also a contract was made with the Wankie Company to provide the fuel necessary for the furnaces then in course of erection. The contract runs for fifteen years from July 1, 1915, and by it the

Union minière binds itself to take 100,000 tons of fuel per year, of which not less than 40,000 tons and not more than 60,000 tons shall be coke. The working of the coal deposits at Luano, about 50 miles south-east of Broken Hill, is also under consideration. The quality of the coal there varies, but as soon as a kind suitable for smelting is found operations will be begun. At the same time it may be noted that the Luano coal appears to lie in a somewhat inaccessible valley, and it may prove rather difficult to convey it from the mines to the main line. Wood, which is found abundantly in the vicinity of the smelting-works, is used for the production of steam-power.

At present only the high-grade ores of the Katanga are smelted. These amount to about 20 per cent. of the whole quantity mined, and contain as a rule from 14 to 16 per cent. of copper. The remainder of the ore is being reserved for future treatment, and its utilization depends mainly upon the extent to which it is possible to make use of the electrolytic process for the extraction of the copper. Extensive schemes are now under consideration for the establishment of hydro-electric works near the falls of the Lufira and on the Luabala, and for the erection of electrolytic plant at convenient centres. It is believed that by the leaching process low-grade ores down to those containing 4 per cent. of copper can be utilized, and that even high-grade ores can be treated by it more cheaply than by smelting.

As the treatment of the low-grade ores is urgent—about three-fourths of the copper contained in the high-grade direct-smelting ores of the mines at present worked has already been extracted—and, as it was impossible to purchase leaching plant during the war, it was decided to erect a concentrating plant, the material for which could be more easily obtained. This concentrating plant is now in course of erection and, when completed, will be capable of treating from 3,600 to 4,000 tons of low-grade ore daily for the production of concentrates. By the use of these concentrates it is hoped that the producing capacity of the existing smelting plant will be increased to 44,000 tons per year. The leaching plant it is proposed to proceed with later, when the necessary capital and labour are available.

The production of copper ingots has increased rapidly since 1911, partly owing to the natural development of the region,

and partly to the greatly increased demand for copper arising out of the war. In 1911 the total output of the *Union minière*, which controls the production, was 997 tons, in 1913 it had risen to 7,400 tons, and in 1917 to 27,460 tons. As a result of labour troubles in Rhodesia affecting the supply of coal, influenza, and other causes the output for 1918 fell to about 20,000 tons. In 1916 the average cost of production and transport to Europe worked out at £41 11s. 3d. per ton, while the average price for which the copper was sold was £102 per ton. In 1919 the cost of production had risen to £61·7 per ton. Previous to the outbreak of war the whole of the product was sold to Germany, but since then it has been sent to the United Kingdom.

At the present time the *Union minière* employs a staff of 470 Europeans and about 7,500 African natives. Until recently the company had little difficulty in getting all the labour it required, but there are indications that with the further development of the mines the labour problem will become one of considerable difficulty. In 1917 indeed, and still more in 1918, there appears to have been a decided scarcity. The native population in the south of the Katanga is small, and does not offer a sufficient surplus for working the mines. The *Union minière* has, it is true, been able to draw upon it to some extent, but the bulk of its labour it obtains from Rhodesia, while a certain amount comes from Nyassaland. Recently, also, negotiations have been entered into with Portugal to obtain a supply from Angola, but whether this can be depended upon is doubtful, as large demands are already made upon it by the cocoa plantations of San Thomé and Príncipe.

The labour hitherto obtained is fairly efficient, judged by African standards, and the chief difficulties rise from the fact that the native, who does not love continuous work, frequently deserts in order to return home. Wages vary according to circumstances. A few years ago mine natives began at 15s. a month, in addition to their food, and gradually increased their earnings. It was then estimated that on an average each native cost his employers £2 8s. per month. This was mainly due to the expense of foodstuffs, which had to be imported. As a result of the recent rise in prices the cost of labour is now considerably greater.

With regard to the future little can be said. The copper

resources of the Katanga are believed to be enormous, but at the present time no accurate data appear to be available for estimating their extent. The depth of the deposits actually worked is unknown, and throughout the copper-belt there are many other deposits capable of profitable exploitation. A few years ago Mr. F. E. Studt (the metallurgist of the Tanganyika Concessions) calculated that the total reserves of ore above water-level in the Katanga exceeded 40,000,000 tons, the average content of copper being about 8 per cent. If this estimate be approximately correct, the Katanga is likely to prove one of the chief copper-producing regions in the world for many years to come.

Deposits of copper have been found in other parts of the Congo, but so far they have proved of little importance. It is said that in many places copper sulphides occur in the practically flat Kundelungu rocks. The deposits are small and 'pockety', and have no known relation to igneous rocks; it is probable that they are of sedimentary origin. Near Siku M'Bidi, about seventy miles south-east of Kasongo, there is a quartz vein eight feet wide and traceable for about 100 feet, which contains a fair proportion of copper minerals. Cupriferous quartz-calcite veins occur in the same region (as, for example, at Kitala in the Lower Katanga). It is reported that the *Geomine* has recently discovered copper deposits at Baudouinville on Lake Tanganyika. In the Lower Congo cupriferous pyrites is abundant in the diabasic rocks. The Bamanga copper deposits, which lie on a small island in the Congo about seven miles below Ponthierville, were at one time worked, but now appear to be abandoned. The ore occurs in parallel fissure veins or in short lenticular bodies deposited in discontinuous fractures, some of which at least are faults. Along the Congo river copper placers (thin beds of pebbles of rich copper ore intermingled with recent river sands) are reported to exist. It is doubtful whether any of these deposits will prove of much value. Even in the island of Bamanga, where picked ores contain from 31 to 55 per cent. of copper, it has been found unprofitable to continue operations, and in the other places mentioned the conditions under which mining is possible are even less favourable.

TIN

Tin is the most important mineral of the northern part of the Katanga. The principle deposits occur in a belt of country which lies on the north-west slope of the Mitumba Mountains, and extends in a north-easterly direction from a point near Busanga on the Lualaba by way of Kiambi to the Niamba. The Cambrian or pre-Cambrian schists of which this belt is mainly composed enclose bands of granite, and it is in the vicinity of these that the cassiterite, or tinstone, is generally found. The conditions under which it occurs appear to vary. In the south-western part of the belt the veins, which range from almost pure quartz to rocks which are practically pegmatic, are situated in the metamorphic regions near the granite, but sometimes in the granite itself. They are vertical, and occur in two sets: one which is quite uniform in its contents of cassiterite runs from north-west to south-east, while the other is at right angles to it, and is sometimes richer, but on the whole less constant in value. The veins vary in length from 300 to 4,000 feet. Cassiterite occurs in good and often very large crystals embedded in the quartz and is frequently more abundant near the borders of the veins. Residual deposits, which economically are more important, are derived from the weathering of these veins.

In the north-eastern part of the belt, in the country round Muika, the schists are cut by granites in which there are intrusions of pegmatite, and it is in these intrusions that the cassiterite is found. Following the course of the lodes there are beds of detrital material, which are as a rule richer in cassiterite than the pegmatite from which they are derived, on account of the concentration which has taken place and the simultaneous abstraction of valueless constituents.

The chief deposits which have as yet been worked are at Muika, a little to the south-east of Kiambi. They are owned by the *Société de recherches minières du Bas-Katanga*, and are said to be the richest which have as yet been found. The mining so far has been little more than experimental, and has been undertaken mainly with a view to determining the position of the most suitable deposits. The monthly production in 1914 was about 10 tons of cassiterite, with a tin content of 65 to 72 per cent. For the further development of the

region it is proposed to build a hydro-electric plant upon the Luvua. When this is done it will be possible to erect stamping-mills and to begin working the mines in earnest. Just before the outbreak of war hopes were expressed that by 1917 the monthly output would be 200 tons. Owing to difficulties which have since arisen, however, the works have been temporarily closed down. One of the chief drawbacks of the region is the absence of proper means of communication. Before the war the ore which was mined was sent by river and rail to Boma, and the total cost of freight from Kiambi to Antwerp amounted to about £20 per ton. The various improvements suggested will be discussed later (see p. 234).

In addition to the mines at Muika, various others have been located. The *Bakat*, which owns those at Muika, has another promising block to the north-west of Kiambi. East of that place the *Geomine* has found tin, while to the north and south of it the *Minerkat* has also prospected successfully. At Mulongo all three companies have claims. The *Geomine* has also located tin at Kikonja, and on the Lukusi between Kikonja and Mulongo, while the *Minerkat* has discovered it between the Lukuga and the Niemba in the vicinity of the coal-field of the Lukuga. The mines on the Lukusi are at present the most important, and have hitherto produced about 300 tons of tin yearly, but a more extensive plant has now been laid down, and considerable developments are expected in the near future. In the south-west, where the *Union minière* has extensive holdings, there are deposits of considerable extent in the neighbourhood of Busanga and Kasonzo. Those at Busanga have already produced a large quantity of cassiterite.

GOLD

Gold is found in various geological formations in the Belgian Congo, but with the exception of the country round Kilo no great source of supply has as yet been located. Lode-prospecting so far has consisted mainly in tracing placer deposits to their source, and little success appears to have been achieved. The one lode which has been carefully examined is situated at Ruwe in the Katanga. The rock which contains the ore consists of a single indurated banded sandstone, which is said to be about 1,200 feet long and from 3 to 20 feet wide.

It varies in value, but according to one estimate made some years ago it is worth about £3 10s. per ton in gold, silver, platinum, and palladium. Below the point at which the lode crops out the *débris* derived from it contains nuggets of gold, some of which are two inches in diameter and weigh up to 300 grammes. The general opinion seems to be that the gold found in these nuggets was dissolved from the lode and deposited *in situ* in the detrital material. For a time these deposits were worked and a certain amount of gold obtained. Since then operations have ceased, but the *Union minière*, which has concessions there, intends when the Katanga railway reaches Ruwe to investigate them still further, and if possible to develop them.

Some quartz veins containing gold have also been discovered. One of these is situated about five miles from Kasama, near the confluence of the Lufonzo and the Lukala. It is owned by the *Geomine*, and is said to yield 30 grammes of gold per ton. Other veins have been found at Nhowa, upon the left bank of the Lualaba, north-west of Ruwe. The yield of gold obtained from them is small, but it is possible that richer ores exist. In the Katanga nearly all the rocks impregnated with malachite contain gold, but it always occurs in very small quantities. The sands and gravels in the beds of many of the rivers which originate in the copper deposits of Kambove and elsewhere also contain gold, which can be recovered by washing.

The most important placer deposits in the colony are found in the vicinity of Kilo, where they occur along the headstreams of the Ituri. The country rock is diorite, and it is probable that the gold is derived from pyritiferous quartz veins, which seem to be particularly numerous at the point of contact between the diorite and the granite. The auriferous deposits, which are generally superficial, are believed to cover a much wider area than has yet been investigated; they are known, however, to vary greatly in value. The gold itself occurs in the form of grains and nuggets, and has been worked at Kilo since 1905. No payable lode appears to have been discovered as yet, though rumours of rich finds are frequent.

In various parts of the world gold ores occur in or closely associated with banded quartzite or siliceous schists rich in haematite or magnetite. The Kanwa mine, situated on the Tele river—a tributary of the Itimbiri—is a placer of this

type. The region is a heavily wooded, sharply dissected plateau, formed principally of a gneiss-schist complex. Within this complex is an extensive band of quartzite, which is in part replaced by haematite. The gold is found in the beds of the streams which flow through the region, and appears to be most abundant in the vicinity of the iron-ore band and along the line of contact with the schist-gneiss complex. At Nebula, not far from Kanwa, there is another placer deposit of similar character, and gold has also been found in the haematite quartzite of Babeyru, farther to the east.

At Moto, which is about 85 miles north-west of Kilo, the country rock is reported to be granite, diorite, and haematitic schists, and gold of good quantity is found, though the grains are as a rule rather fine, and large nuggets are rare. Placers have also been found to the south-east of Moto along the courses of the Kibali and of its tributaries, the Lemba, Kadi, and Kira, and at the confluence of the Aru and Abu headstreams of the Kibali.

In the Lower Congo gold has been found in certain streams, the clayey alluvium of which is derived from diabase. It is probable that the only deposits likely to prove of commercial value are confined to a belt in which basic igneous intrusions are particularly abundant.

On the whole the Belgian Congo does not appear to be rich in gold. The mines at Kilo at present produce the greater part of the total output, which in 1917 was valued at 10,720,000 francs, and unless valuable lodes are discovered in the vicinity it is unlikely that they will seriously affect the world's supply.

DIAMONDS

Diamonds are known to exist in various parts of the Congo, but the only field which has yet proved of much importance is in the Kasai region. It belongs to the *Société internationale forestière et minière du Congo*, and lies within the area drained by the Kasai and its tributaries from the west, the most important of which are the Lovua, the Chikapa, the Longachimo, the Chiumbe, and the Luembe. As far as is at present known the diamond-bearing area is triangular in form, and measures 130 miles from north to south, while it is 65 miles wide at its southern base along the Angola frontier.

The first diamonds were discovered in 1907, but exploitation proper did not begin till 1913. The stones occur either in the present river gravel, particularly in the riffles and pot-holes of certain of the smaller streams and in the sand-bars of the larger ones, or in the alluvial deposits of the terraces which mark the former levels of the rivers. They are somewhat similar to those obtained in German South-West Africa, but on the whole are smaller. The average weight is probably about one-tenth of a carat, though at least one stone weighing about 15 carats has been found. A considerable percentage of the diamonds are water-white, while the rest are in part yellow and off-colour stones, and in part deep yellow, topaz, and apple-green. The output was estimated at 90,000 carats in 1917.

For some years it has been known that there are diamonds in the Katanga, and investigations regarding the extent to which they occur have been made in two regions. The first of these is in the Kundelungu, where there are a number of 'pipes' similar in geological character to those which produce the diamonds of Kimberley. The largest of these is on the eastern slope of the plateau in the basin of the Luanza, a small river which flows into the Luizi, a tributary of the Luapula, and here the chief workings have so far taken place. Other 'pipes' are known to exist in the basin of the Katme, a tributary of the Lualaba, in the basin of the Lashipuka, a tributary of the Luapula, and in the basin of the Kasanga on the western slope of the plateau.

The work at Luanza has been hindered by the hardness of the surface rock and the scarcity of labour, and, although a number of small diamonds have been found it is not yet known whether the enterprise will prove a commercial success. Before the outbreak of war it had been decided to open up another 'pipe' and to introduce more efficient machinery, but since 1914 operations generally appear to have been suspended.

The second region where diamonds are known to occur lies in the basin of the Lualaba, where they were first discovered in 1906 in the alluvium of that river and some of its tributaries, especially the Mutendola creek. The district within which they have been found lies between the confluence of the Gule, a little north of Ruwe, and the mouth of the Kalule, a short distance above Bukama. About one-half the stones obtained

are colourless, while the others are yellow, brown, and rose; all, however, appear to be small.

The exploitation of diamonds in the Katanga has so far been conducted by the *Comité d'exploitation des Kundelungu-Lualaba*. As other prospectors, however, claim to have made discoveries of importance, the Government has decided to withdraw its prohibition of diamond-mining in the Kundelungu by others than the *Comité*. But in order to regulate the output all stones which are found must be handed over to the Government, which fixes the price. In 1917 it was 3 francs 45 centimes per carat.

Diamonds, topazes, and other precious stones have also been discovered in the north-east of the colony in the concessions granted to the *Société forestière et minière* and the *Société minière de la Telé*. Regarding them very little is as yet known.

COAL

Up to the present time the most important deposits of coal which have been discovered are those which lie to the north of the Lukuga river near Lake Tanganyika. The geological conditions under which it occurs do not yet appear to have been determined. By some it is thought to be of Permo-Triassic age, while by others it is considered to be much older. The gently inclined bed-rock in which it is found contains five beds of coal from 2 to $6\frac{1}{2}$ feet thick, and with a total thickness of about 16 feet. These beds are separated from one another by less than 32 feet of barren material. The coal has been traced for some 20 miles, and underlies at least 12 square miles. The extent of the coal-field and its proximity to the Lukuga railway led to high hopes at the time of its discovery, hopes, however, which as yet remain unfulfilled. The coal, like that of some of the inferior qualities found in Rhodesia, is relatively poor in carbon, and contains large quantities of ash. For some time it was consumed on the Tanganyika steamers, but its use there appears to have been abandoned. Experiments made with it as fuel for the locomotives on the Kigoma-Dar-es-Salam railway have also failed, but will be renewed when deeper seams have been reached. A more recent report states that the coal mixed with timber is now used on the *Grands Lacs* railways and that the results are considered to be very

satisfactory. Suggestions have been made to treat the coal mechanically in order to prepare it for industrial purposes, but whether such attempts will succeed is as yet uncertain.

The coal discovered in other parts of the Congo appears to be even less promising. South of Bukama some seams have been found, but they are very impure, and contain much shale and pyrites. (It has recently been stated, however, that the coal is better than is here indicated, but definite information is still wanting.) Farther north, on Katanga Creek, a tributary of the Lubumba river, there are carbonaceous shales which contain coal, apparently of little value. Lower down the river, near Ponthierville, a few thin seams of coaly matter have been located.

IRON

Iron ore of various grades is widely distributed in the Belgian Congo, but owing to their relative inaccessibility they have been investigated only to a slight extent, and comparatively little is known about them. The deposits which may ultimately prove of commercial value occur in the older rocks surrounding the Central Basin. The most important are probably those lying in the Katanga to the south of the copper belt. They consist of haematite and magnetite, which are altered to limonite near the surface and along planes of free water circulation. As they are usually harder than the surrounding rocks, they often stand up as conical hills. In the vicinity of the Lualaba, in the west of this district, some of the ores are reported to contain 65 per cent. of iron. The want of fuel for smelting the ore, and the prohibitive cost of exporting it, have prevented any attempt to exploit it, and it would seem likely that, for a considerable time at least, the iron ores of the Katanga must remain among the undeveloped resources of the country.

The Kasai region consists of flat-lying sandstones and shales resting upon a surface of older rocks believed to be pre-Cambrian. The deeper river-valleys have cut through this blanket of younger rocks, exposing the older formations, which also rise up in places from among the sandstone. The predominant older rock within the area bounded by the Kasai, the Luebo, and the Lulua is an iron formation. It appears to

be a dark-grey, brown, or red-banded rock, closely resembling the banded iron ores in the Vermilion range in Michigan. Haematite and magnetite are its principal constituents.

In the Welle region there are also considerable deposits of iron ore, which form lines of conical hills running a little west of north parallel to the general strike of the ancient schists and gneisses. They consist of dense, rather fine-grained haematite, with some magnetite, and are often banded, the purer ore bands alternating with those of a more siliceous character.

In the east of the colony the mountains in the Maniema-Kivu region are also reported to be rich in iron ores. They usually occur in conical peaks and rounded mountains, and are of all gradations, from light-coloured impure quartzite, the rock replaced, to dense fine-grained specular haematite, with some magnetite.

Over a great part of the Congo there are also superficial deposits of iron ore. They include ferruginous clays and sandstones, and are in part detrital deposits, the ferruginous residuum of rocks which have weathered away, and in part chemical deposits laid down by surface waters heavily charged with iron. At one time they furnished the native with the greater part of the iron which he used, but it is questionable whether they would be regarded as worth exploitation by European methods.

As it is unlikely that the iron resources of the Congo will be developed for a considerable time to come, comparatively little attention has been paid to them, and few details regarding their character and value are obtainable. But that they constitute a valuable reserve of wealth for the colony can hardly be doubted.

BITUMINOUS SHALES

In the rocks of the Lualaba system some beds of bituminous shales have been found in the vicinity of Ponthierville, near Stanleyville, and at several points along the line between these towns. The beds have a maximum thickness of about 5 feet, and upon distillation yield from 70 to 170 litres of oil per ton. Associated with some of the outcrops are thin layers of lignite. A company has bored for oil without success, and

whether it will ultimately be found appears to be doubtful. Much depends upon the degree of folding which exists in the Lualaba rocks underlying the Central Basin, and the soundings which have so far been made are not particularly encouraging. Bituminous rocks have also been reported from various places along the Atlantic coast. In the vicinity of Chipanga there are folded sandstone and cavernous limestone of considerable thickness. These rocks are saturated with asphalt, and upon analysis show about 24 per cent. of asphaltic matter. Several small oil-seeps rise there, and the general geological formation is believed to be favourable for finding oil. Bitumen is from time to time said to be found floating on the surface of Lake Tanganyika.

MISCELLANEOUS MINERALS

Metallic. — Platinum and palladium occur in the gold-bearing veins, and platinum in the detrital deposits at Ruwe. A little native silver is associated with the copper ores at Bamanga, and the galena of the copper quartz vein at Kitale in the Lower Katanga is reported to be slightly argentiferous. A little galena has been found at several points along the railway in the Lower Congo, and to the east of the Lulua river, about 7° S. In the Katanga manganese ores are frequently associated with the iron deposits, but their value is unknown. Tungsten is said to occur in the granitic region of Mulongo, and traces of it are also found with the tin at Kiambi.

Non-Metallic. — Rock-salt is not known to exist, but in the eastern part of the colony there are a number of hot and cold springs, from which the natives of that district have long obtained salt. Many of these springs are situated along faults parallel to the Great Rift Valley. Near Nyangwe and on the shores of Lake Tanganyika there are other springs from which salt is occasionally obtained. In various parts of the Katanga saline springs, mostly thermal, are quite common. Among other non-metallic minerals may be mentioned monazite, zircon, and anatase, which have been found in concentrates in gold-prospecting. Barite occurs in large residual masses on the Lower Congo railway half-way between Thysville and Matadi. Asbestos is said to occur in the Katanga.

CHAPTER XIII

COMMUNICATIONS

RAILWAYS

THE Belgian Congo has at the present time 1,250 miles (2,012 kilometres) of railway. The first lines to be constructed were those which link up the navigable reaches of the Congo. Later on the mineral region of the Katanga was connected with the South African system, and the railway has since been continued to Bukama at the head of navigation on the Lualaba. A third important line is that which runs from Kabalo on the Lualaba to Albertville on Lake Tanganyika and, in conjunction with the Kigoma-Dar-es-Salam railway, opens up a route to the Indian Ocean. The most important development of the immediate future will be the completion of the line connecting the Katanga railway at Chilongo with Lobito Bay on the Atlantic.

As the great system of inland waterways afforded by the Congo and its tributaries was entirely cut off from access to the sea by the long series of falls and rapids which lie between Leopoldville on Stanley Pool and Matadi on the lower Congo, the necessity for a railway connecting these two places was felt from the moment that attempts were first made to develop the interior. In 1885 a group of British capitalists sought a concession for the construction of such a line, but they made conditions to which the Independent State was unable to agree, and the project fell through. In 1887, under the auspices of the *Compagnie du Congo pour le commerce et l'industrie*, a preliminary survey of the route of the proposed line was initiated, and in 1899 the *Compagnie du chemin de fer du Congo* was founded to undertake its construction. Work was actually begun in March 1890, and in March 1898 railhead reached Dolo on Stanley Pool.

The construction of the line involved very considerable engineering difficulties. The structure of the so-called Crystal Mountains in the part where they are crossed by the railway

is somewhat as follows. In the west there is the massif of Palabala, through which the Congo flows between Isangila and Matadi. Farther to the east is the massif of Bangu, or rather its prolongation to the south, in traversing which between Leopoldville and Manyanga the Congo has cut a rocky defile, where its waters descend in a series of falls over a succession of rocky barriers. Between these two massifs there lies a comparatively level country drained by several parallel rivers. The watersheds which separate their basins, though sometimes high, are much less difficult to cross than the massifs already mentioned.

These physical facts determine the general profile of the line. As soon as it leaves Matadi it becomes involved in hilly country and crosses the torrential Mpozo at a distance of 5 miles from the town. Then it begins to ascend the Palabala, and 9 miles from Matadi reaches an altitude of 918 feet, having risen 711 feet in 4 miles. After descending the eastern slope of the Palabala as far as there is one, the railway follows an up-and-down course for some distance, and then gradually rises to the watershed which separates the basin of the Mavutete from that of the Lufu. Here it is 1,295 feet above sea-level. About 46 miles from Matadi it enters the relatively level country which extends to the foot of the eastern massif, a distance of about 84 miles. In this part of the route the railway crosses the Lufu, the Kunkula, the Sansikua, the Kwilu, and the Gongo. Here the greatest difference in height is between the crossing of the Lufu, which is 961 feet above sea-level, and the pass at Zole over the watershed between the Sansikua and the Kwilu, which is 1,575 feet above sea-level. Each of the rivers crossed, however, means a descent on the one side and an ascent on the other.

Beyond the Gongo the railway meets its second great difficulty, the southerly prolongation of the massif of Bangu. The ascent begins at a point 139 miles from Matadi, and in the course of the next $5\frac{1}{2}$ miles the railway rises from 1,903 feet to 2,448 feet above sea-level. The latter altitude, which is the highest on the line, is reached at Thysville at the pass of Zona Gongo. From Zona Gongo to Tampa, a distance of 56 miles, the railway traverses mountainous country, the lowest heights being reached at the passage of the Inkisi, and the Lukusu, 1,739 feet and 1,706 feet respectively above sea-

level. Beyond Tampa the line follows the valley of the Lukaya for a considerable part of the way to Stanley Pool.

From the foregoing sketch it is obvious that the physical difficulties in the way of the construction of the railway were very great. To overcome them involved a heavy expenditure, and unfortunately it was necessary, in order that the line should be constructed at all, to cut down the outlay on the permanent way to the lowest possible amount. It was intended indeed that parts of it should be provisional only, and that various improvements should be introduced as opportunity might offer. So far, however, little has been done, and the railway is now quite inadequate for the demands made upon it. The gauge is only 2 feet $5\frac{1}{2}$ inches (.75 metre); the minimum radius of the curve was originally 164 feet (50 metres), but has since been increased to 196 feet 10 inches (60 metres); there are gradients of 1 in 22 on the straight line and of 1 in 35 to 1 in 43 on the curve. The steepest gradients occur in the ascent of Palabala; elsewhere they do not exceed 1 in 30 except in a few sections in the mountain districts round Thysville. Numerous steel bridges had to be constructed in order to cross the rivers of the region. That over the Inkisi has a length of 328 feet, and several others are between 164 and 328 feet. Many of the bridges are on a steep slope, sometimes as much as 1 in 32, while some are on a curve as well. The most remarkable is perhaps that which crosses the Shute ravine. It has a length of 131 feet, a gradient of 1 in 36, and a curve of 164 feet (50 metres) in radius.

The difficulties on the existing railway arise mainly from the steepness of its gradients and the sharpness of its curves. The narrowness of its gauge is less important as far as the economical working of the line is concerned. But the steepness of the gradients does not permit an engine to pull more than three or four loaded wagons at one time, and on an average a locomotive does not pull its own weight of goods. The sharpness of the curves on the other hand does not permit a high rate of speed to be attained. Further the number of sidings where trains going in opposite directions may pass one another is still limited. The general result is that the expense of working the line is considerable, and freights, notwithstanding the reductions made in 1910 and subsequently, are still high. Until something of a drastic nature has been done

to lower them the development of the communications of the interior of the country will be of comparatively little value.

As a matter of fact the reconstruction of the whole line is necessary, as any minor rectifications which might be made would do little to improve the existing state of affairs. A few years ago it was suggested by Colonel Thys that the road should in great part be rebuilt, that it should carry a double track, that the gauge should be 3·28 feet (1 metre), or 3·48 feet (1·06 metre), the gradients not more than 1 in 50, nor the radius of the curves less than 492 feet (150 metres). He also suggested the construction of a number of tunnels, some of which would be of considerable length, of larger and better bridges over the rivers, and of numerous embankments. The matter was still under consideration when war broke out, and since then nothing has been done.

At either terminus of the railway transshipment from rail to steamer or from steamer to rail is necessary for the bulk of the merchandise carried by it. But the facilities for this are still very unsatisfactory. After the line touches Stanley Pool at Dolo it turns westward and runs by way of Kinshasa to Leopoldville. The latter port, however, has few facilities for transshipping goods, and its proximity to the first falls of the lower Congo makes it rather a dangerous place for steamers to lie. Kinshasa, which is higher up and therefore safer, is still undeveloped as a port, though various companies have wharves and warehouses there. Proposals for the establishment of a satisfactory port on the Pool have been made from time to time, but up to the present nothing of much importance has been done. At the lower end of the line Matadi is also badly provided for receiving and despatching goods.

Notwithstanding the difficulties under which it labours, however, the railway from Matadi to Leopoldville has played an important part in the economic development of the colony. It not only carries on all the trade between the ports on the lower Congo and the whole of the interior, with the exception of the Katanga and some of the eastern districts, but it is the outlet for all the goods which collect at the French port of Brazzaville on the side of Stanley Pool opposite to that on which Leopoldville stands. Some of this trade comes by way of the Ubangi and the Congo, and some by way of the French railway from Minduli to Brazzaville. The high rates on the

Congo line are an additional inducement to the French to continue their own railway to the Atlantic at Pointe Noire.

The present rates for the carriage of goods from Matadi to Leopoldville are as follows (before 1912 they had been much higher and had the effect of adding anything from 30 to 50 per cent., and in some cases 100 per cent., to the cost of the goods at the ports of the lower Congo):

Class of goods	Rate per metric ton		
	£	s.	d.
Wines, copper, gold coin, and precious metals	38	0	0
Textiles	30	8	0
Silver coin	16	0	0
Provisions	6	4	0
Paint, varnish, oil	5	12	0
Building materials, ironwork, copper money, and flour	4	16	0
Salt, sugar and briquettes	4	0	0
Rice, steamers, agricultural or industrial material	3	4	0

The freight rates for the transport of Congo produce from Leopoldville to Matadi are as follows:

Class of goods	Rate per metric ton		
	£	s.	d.
Ivory	40	0	0
Rubber	5	12	0
Other goods	1	17	6

The following table shows the amount of traffic (passenger and goods) on the line during the years 1911-16:

	No. of passengers carried	Goods in metric tons		Total
		Matadi to Leopoldville	Leopoldville to Matadi	
1911-12	48,082	54,237	11,666	65,903
1912-13	72,388	60,176	13,760	73,939
1913-14	—	62,210	15,219	77,429
1914-15	75,517	22,709	17,739	40,448
1915-16	72,317	29,968	31,567	61,535

The Mayumbe railway, which runs from Boma almost due north, was begun by the *Société des chemins de fer vicinaux du Mayumbe* in 1898 with the object of developing the agricultural resources of the Mayumbe district. The original intention was that it should be carried to the French frontier at Dungu on the left bank of the Chiloango, about 124 miles from Boma, but the cost of construction was so great that in 1901 the company was permitted to stop operations when railhead reached the Lukula, 50 miles from the starting-point. In 1907, at the request of the company, whose financial position appears

to have been far from sound, the State took over the entire administration of the line. An attempt made in 1909 to reduce the freights which had been fixed by the company was unsuccessful, as that body refused its consent. In 1910 the State continued the line across the Lukula towards Chela, and on this section, where it had sole control, charged rates which were lower by 50 per cent. than those on the southern section. This state of affairs soon became very unsatisfactory, as the higher rates which prevailed in the south checked the development both of the line and the country through which it passed, and in 1914 the State decided to take over the whole line. The rates existing in 1918 were, however, still very high. It is said that in Africa the charge on ordinary merchandise ought not to exceed $1\frac{2}{3}d.$ per ton-mile (10 c. per tonne-kilometre), and on wood $\frac{1}{2}\frac{6}{5}d.$ to $\frac{1}{2}\frac{8}{5}d.$ (3 c. to 4 c. per tonne-kilometre). The rates actually levied on the Mayumbe railway are very much higher. For cocoa the tariff is $1s. \frac{1}{2}d.$ per ton-mile (78 c. per tonne-kilometre), for rubber $3s: 2d.$ (2 fr. 38 c.), and for timber $6\frac{1}{2}d.$ (38 c.).

The railway has now reached Chela on the Lubuzi. It consists of a single line with a gauge of 1.968 feet (.60 metre). There are no modern locomotives in use, and the rolling-stock is limited.

After the completion of the railway from Matadi to Leopoldville the next stage in the development of the communications of the country was obviously the construction of a line between Stanleyville and Ponthierville, where the Congo is again unnavigable. The work was undertaken by the State with the assistance of a limited liability company known as the *Compagnie des chemins de fer du Congo supérieur aux Grands Lacs africains*. This company was originally founded in 1902 to connect the Congo with the Nile and Lakes Tanganyika and Albert by a vast system of railways. It quickly realized, however, that such a grandiose scheme was quite beyond its powers for the time being, and adopted the much more practicable idea of turning by means of railways the unnavigable portions of the Congo above Stanley Falls and between Sendwe and the Porte d'Enfer.

The rapids between Ponthierville and Stanleyville are not caused, like those below Stanley Pool, by the passage of the river through a mountain region, but by a gradual fall in the level of the land. Between the first fall immediately below

Ponthierville and the last immediately above Stanleyville the river falls 131 feet. The railway forms the chord to the curve which the Congo describes between the two towns mentioned. It runs through forest country in which there are no great changes of altitude, and the chief physical obstacles to be overcome are the relatively deep valleys of a number of rivers following parallel courses to the Congo, which they join on its left bank.

The line starts on the left bank of the river opposite to Stanleyville, the initial height above sea-level being 1,404 feet. The track follows a course which rises with alternate ascents and descents to a point between the Usengwe and Bikubi rivers, where it is 361 feet higher than at the starting-point. From this point, which is 71 miles distant from Stanleyville and only 10 miles distant from Ponthierville, the line descends to the latter town situated at a height of 1,542 feet above sea-level.

In the construction of the railway attention was paid to the lessons taught by the working of the Matadi-Leopoldville line. The metre gauge (3.28 feet) was adopted, the minimum radius for the curves was fixed at 328 feet (100 metres), and the maximum gradient at 1 in 50. For purposes of traction these limits are slightly increased, owing to the fact that some of the steepest gradients occur on the curves. The sleepers are made of wood which was cut in the vicinity, *bombali*, a very hard close-grained red wood resembling cedar, giving the most satisfactory results. Of the fourteen bridges which were rendered necessary by the rivers the first to be constructed were made of wood and the remainder of steel. The longest are those over the Malinda and the Biaro; they do not exceed 210 feet in length. The additional expense involved in the more careful construction of the line has been fully repaid by the greater efficiency of the locomotives employed and by reduced running expenses.

The second line built by the *Compagnie des Grands Lacs* is that which runs from Kindu to Kongolo. The course which it follows is somewhat more difficult than that of the first line. The station at Kindu is situated on the left bank of the Congo a little below the village of Sendwe, where the river is obstructed by rapids. As far as the crossing of the Lufube, about 107 miles from Kindu, the railway follows the upstream course of the river, and is never more than 10 miles from its bank.

In this section the construction of the permanent way presented few difficulties. The country, except near Kindu, is generally flat, and the bridges which it was necessary to construct were neither numerous nor important. Beyond the Mulengoi the railway departs from the river, and more difficult country begins. One important obstacle which it was necessary to overcome was the range of heights which are continued across the Congo at the Porte d'Enfer.

The line, which is on the metre gauge, has a length of 217.5 miles. The details given with regard to the construction of the line from Stanleyville to Ponthierville apply in this case also, with the exception that wooden sleepers are replaced by metal ones.

The third railway built by the *Compagnie des Grands Lacs* is that which connects Kabalo with Albertville on Lake Tanganyika. The German line from Dar-es-Salaam to Kigoma by way of Tabora threatened to bring the western shores of Lake Tanganyika and some of the eastern districts of the Congo within the German sphere of influence, and the Belgian line was constructed partly at least with the object of providing an alternative route which would be confined to the colony. The railway was begun in 1911, but owing to the war its completion was delayed until the Germans were finally defeated on Lake Tanganyika.

The railway begins at Kabalo, situated on the Lualaba a short distance to the south of Kongolo, and takes advantage of the gap through which the Lukuga flows from Lake Tanganyika. It has a length of about 168 miles, and for the first part of its way runs on the left bank of the Lukuga, but at a considerable distance from the river itself. Here there are no engineering difficulties of any kind, but at about 103 miles from Kabalo a considerable amount of work was involved in carrying the track from the high ground which it had hitherto occupied down to the valley of the Lukuga, which it follows for the last 43 miles or so of its course. Farther on also some blasting was necessary in order to prepare the way through the gorge of Mitwanzi, in which the Lukuga flows shortly after it leaves the lake.

As regards gauge and methods of construction the line appears to be similar to the other sections of the *Grands Lacs* railway.

The following tables show the traffic (passenger and goods) carried on the different sections of the *Grands Lacs* railway since 1912:

STANLEYVILLE—PONTTHIERVILLE SECTION

Year	No. of passengers	Goods in metric tons		Total
		Stanleyville to Ponthierville	Ponthierville to Stanleyville	
1912	17,330	17,471	766	18,237
1913	21,750	22,002	1,970	23,972
1914	19,445	23,147	2,248	25,395
1915	26,107	12,022	2,450	14,472

KINDU—KONGOLO SECTION

Year	No. of passengers	Goods in metric tons		Total
		Kindu to Kongolo	Kongolo to Kindu	
1912	10,052	13,701	334	14,035
1913	12,652	15,343	365	15,708
1914	18,211	21,149	3,530	24,679
1915	11,196	4,779	230	5,009

The heavy traffic in an upstream direction on both sections, especially during the first three years, is to be explained in part by the fact that a considerable quantity of material was being imported at that time for the construction of the line from Kabalo to Albertville on Lake Tanganyika. On the Kindu-Kongolo section, for example, the *Grands Lacs* company carried the following traffic for its own account:

Year	Goods in metric tons		Total
	Kindu to Kongolo	Kongolo to Kindu	
1912	12,165	57	12,222
1913	13,290	159	13,449
1914	16,607	3,428	20,035
1915	2,365	90	2,455

A certain amount of railway material was also sent by this route to Bukama for the construction of the northern part of the Katanga railway.

The longest and in some respects the most important railway in the Belgian Congo is that which runs through the Katanga from Sakanian on the frontier, where it connects with the South African and Rhodesian system to Bukama at the head of steam navigation on the Congo. By it the valuable mineral region of the Katanga is brought into direct railway communication with the ports of East and South Africa, and is also connected by rail and river with the ports on the lower Congo.

From the time when the possibility of finding great stores of mineral wealth in the Katanga was first realized the question of connecting it with the outside world became of the first importance. In 1902 the *Compagnie du chemin de fer du Katanga* was founded with the object of studying the route and eventually constructing the line which would connect the Rhodesian frontier with the navigable Congo. At that time little could be done, as the railway from the south was still 500 miles distant from the frontier. By 1906 the position had sensibly improved. The Rhodesian railway had reached Broken Hill, which was only 140 miles from the frontier, and the Tanganyika Concessions had begun to prospect for minerals. Two things were, however, requisite for the development of the copper mines which they discovered, railways and coal. As the latter could be obtained from the Wankie field about 60 miles south of Victoria Falls, the case for the railway became very strong, and in 1908 an agreement was arrived at by which the Tanganyika Concessions agreed to furnish the money necessary for its construction from Broken Hill to the frontier at Sakania, while the *Compagnie du chemin de fer du Katanga* agreed to continue it to the copper mines at Elisabethville. Work was immediately begun; in November 1909 railhead reached the Belgo-Rhodesian frontier, and in October 1910 it arrived at Elisabethville. As far as the actual development of the Katanga mines was then concerned the most important part of the work was thus completed, as an inlet for coal and other mining requisites and an outlet for copper had been provided. But from the Belgian point of view much had still to be done. The Government viewed with considerable apprehension the way in which the Katanga appeared to be falling under the economic control of British and South African groups, and desired to link it up more closely with the remainder of the colony. The *Compagnie du chemin de fer du Congo* accordingly arranged to begin work at Bukama, notwithstanding the difficulties in the way of transporting the necessary material to that place, and to build a line southwards, while a Belgian company, the *Société coloniale de construction*, founded by the *Société commerciale et minière*, undertook the construction of the line from Elisabethville, which it was to continue until it should meet the line coming from Bukama. In June 1913

Elisabethville was linked up with Kambove, 96 miles distant, and the whole work seemed likely to be completed in 1915, when all plans were disarranged by the war. Progress became much slower, but in July 1915 railhead had advanced to Chilongo, 69 miles from Kambove. Shortly thereafter the financial position improved, work was energetically resumed on both sections of the line, and, notwithstanding the considerable engineering difficulties encountered in traversing the 'Biano country, the line was successfully completed in May 1918.

For the greater part of the way the railway runs across the plateau country of the Katanga, where the line is comparatively easy to build. Beyond Kambove the land rises, and the railway reaches its highest point on the Biano plateau. From there a steep descent leads to the valley of the Lualaba at Bukama, and it was on this section of the line that the construction of the permanent way presented most difficulties. The Katanga railway between the frontier and Bukama has a length of about 450 miles. Like other lines connecting with the South African system, it has a gauge of 3.48 feet (1.06 metre). Both rails and sleepers are of steel, the use of wood for the latter being rendered impossible by the white ant. The rolling-stock is modern. The engines, which weigh 70 tons each, are as powerful as the large goods engines used in Belgium, but they are so constructed that wood may be used as fuel. The wagons used for the transport of copper have a capacity of 35 tons, and are fitted with arrangements for the automatic unloading of their contents. Those which convey coal and coke from Wankie to the mineral districts have a capacity of 30 tons. For passenger traffic corridor cars are employed, and the mail trains, which run twice a week and provide direct communication with Cape Town, have restaurant cars attached. Carriages and wagons are provided with automatic couplings, and goods and passenger trains are alike equipped with vacuum brakes.

The principal stations between the frontier and Bukama, with their distances from the frontier, are as follows: Sakania, $7\frac{1}{2}$ miles, is the customs station for all goods coming from Rhodesia; Kasumbalesa, 95 miles, has iron deposits; Elisabethville, 158 miles, is the centre of the copper-smelting industry, and has a branch line to the Star mine; at Kamatanda,

242 miles, there is a branch line to the copper mines at Likasi, where the *Union minière* proposes to erect works for the concentration of the poorer ores; Kambove and Fungurume, 257 and 300 miles respectively, are the centres of important copper-mining districts; Chilongo, 325 miles, is the station at which the Katanga railway will eventually be linked up with the Benguella railway from Lobito Bay; Kamana, 344 miles, is a mission station of the *Pères Bénédictins* and the centre of their agricultural estates; Lubudi, 381 miles, is in the neighbourhood of the tin mines belonging to the *Union minière* and of the coal deposits recently discovered by the *Simkat*; Bukama, 450 miles, is at the head of steam navigation upon the Lualaba-Congo.

The traffic on the Katanga railway is already considerable, and with the development of the mineral industry will rapidly increase. In 1917 over 600,000 tons of goods were carried on the uncompleted line. This compares very favourably with the Matadi railway, where the annual movement amounts to only about 80,000 tons. The freights on the Katanga railway are also much lower. In 1915 they varied from $1\frac{3}{8}d.$ per ton-mile (10 c. per tonne-kilometre) to $8\frac{1}{4}d.$ per ton-mile (60 c. per tonne-kilometre), according to the nature of the goods carried. Train-loads of coal going through to the mining centres were charged at the rate of slightly less than $\frac{3}{4}d.$ per ton-mile (4.5 c. per tonne-kilometre).

Various extensions of the existing railway system have been suggested. The more important, partly because it has strong financial backing and is already in course of construction, is that which will eventually connect Katanga with the Atlantic coast at Lobito Bay. So far as it has yet been built it lies wholly within the Portuguese territory of Angola, and is the property of the *Companhia do Caminho de Ferro de Benguella*, 90 per cent. of the shares of which are owned by the Tanganyika Concessions. From Lobito Bay the railway runs southward to Benguella, after which it goes first in a south-easterly and then in a northerly direction to reach the high Angolan plateau. The construction of this part of the course was one of very considerable difficulty. Between Benguella and Mount Saha the line rises 1,115 feet in $13\frac{1}{2}$ miles and passes over high embankments and through numerous deep tunnels, which had to be made in the granitic rocks. On this section of the

line lies the Lengue Gorge, a narrow meandering defile, where it was found necessary to construct about one and a third mile of rack-rail. Beyond the Lengue Gorge the railway continues to cross very difficult country. Between Mount Saha and the watershed between the Coroteva and the Chicutucoto the line rises from 1,128 feet to 2,903 above sea-level, falls to 1,761 feet in the valley of the Catengue, and rises again to 2,930 between the Solo and the Sapa. On the section which lies between 200 and 225 miles from Lobito Bay the Lepi Mountains have to be crossed at a height of 4,651 feet, and here the gradients are often very steep. Farther on, at Lepi Portella, the highest point reached by the line is 6,082 feet above sea-level. At Huambo, which is 265 miles from Lobito Bay, the altitude is 5,413 feet. Beyond Huambo the country becomes much more level. The line crosses the Bulu-Vulu plateau, which constitutes the watershed between the Kubango and the Kwanza to reach Chinguar, 323 miles from Lobito, where railhead has for some years been stationary. The embankments have been constructed as far as Belmonte, 62 miles farther on, but the difficulty of obtaining rails during the war has delayed the completion of this section of the line. Beyond Belmonte the track of the line does not appear to have been finally settled, but its general direction after crossing the Kwanza is along the Congo-Zambezi watershed. Few engineering difficulties exist, and it is believed that the work of construction will be easy.

As part of the route has been only roughly surveyed, it is impossible at present to give exact figures regarding the length of the line. From Lobito Bay to the Belgian frontier the distance is estimated at about 790 miles, and from the frontier to Chilongo, the point of junction with the Katanga railway, about 385 miles. According to these figures Kambove, the present centre of the copper-mining district, would be about 1,245 miles from Lobito Bay, and Elisabethville 1,344 miles. These figures must, however, be regarded for the moment as approximate only, and for their accuracy much will depend upon the route finally taken by the railway.

The Lobito Bay railway will, when completed, enable the Atlantic port to enter into serious rivalry with Beira for the trade of the Katanga, and the main factors which will determine the routes taken by goods and passengers into or

out of that region may here be considered. At the present time the chief means of access into the Katanga is by the railway which runs from Beira by way of Salisbury, Bulawayo, Victoria Falls, Kafue, and Sakanian to Elisabethville, Kambove, and Bukama. By it the distance from Beira to Elisabethville is 1,619 miles, and to Kambove 1,718 miles. As, however, Salisbury, Bulawayo, Victoria Falls, and Kafue are approximately the angles of a four-sided figure it is proposed to shorten the route by constructing a line from Salisbury to Kafue. This would reduce the distance from Beira to Elisabethville to 1,032 miles, and from Beira to Kambove to 1,131 miles.

Under these circumstances it is difficult to determine the direction which the trade of the Katanga will ultimately take. Until the Beira line is shortened all the conditions are in favour of Lobito Bay becoming the port of the region. Assuming that the figures given above for the length of the line connecting it with Kambove and Elisabethville are approximately correct, the saving of distance by Lobito Bay would be about 275 miles in the case of Elisabethville and about 473 in the case of Kambove. But it is questionable whether competition will ever arise in this form. The survey for the shorter route between Salisbury and Kafue was completed just before war broke out, and it is not improbable that work may be begun on it in the not distant future. If and when it is completed the state of affairs will be somewhat different from that indicated above. Elisabethville will be about 312 miles and Kambove about 114 miles nearer to Beira than to Lobito Bay. But other factors have here to be taken into consideration. From Beira there are two sea routes to London, one by way of the Suez Canal, and the other by way of the Cape. The former is over 2,000 miles longer than the route from Lobito Bay, and is, in addition, burdened by the heavy dues at the Suez Canal, while the latter is nearly 3,000 miles longer than the route from Lobito Bay. It is true that freight rates are usually higher from western ports than from eastern, but with the development of trade that inequality will probably be reduced. On the other hand Lobito Bay is one of the best harbours on the coast of Africa, and facilities for the transshipment of goods can easily be provided. Lastly it may be noted that with the development of the Katanga

Kambove is likely to become more and more the centre of the producing area, and the relatively slight difference of distance in favour of Beira (about 114 miles) is hardly likely to outweigh the other advantages possessed by Lobito Bay. In this connexion it must be remembered that the Tanganyika Concessions are largely interested in the prosperity of the Benguella route, and will naturally do all in their power to advance it.

On the whole then it seems probable that in the future the copper industry of the Katanga will depend more and more on the Benguella railway for the carriage of its exports and imports (apart from coal). Still more likely is this to be the case in regard to the tin mines. The southern part of the concession granted to the Tanganyika Concessions for the exploitation of its tin deposits lies on either side of the railway south of Bukama, and the mines which are at present being worked are for the most part situated at no great distance from it. The alternative route here is that by way of the Lualaba-Congo and its connecting railways, but the numerous transshipments involved make it unlikely that it will be used for the southern part of the field at least. On the other hand when the northern districts round Lake Upemba are developed they will probably be served by it. Work on the Ruwe gold deposits, some of which are also owned by the Tanganyika Concessions, has been postponed until they are reached by the Benguella railway.

The Government of the Belgian Congo, however, cannot be expected to view with complete satisfaction the diversion to a foreign port of some of the most important elements in its export trade, and various schemes have been suggested to connect the Katanga with the lower Congo. The Transcongolais, that series of navigable reaches of river linked together by railways, which now connects Bukama with Matadi can, as already indicated, play but a small part in the trade of the mineral districts on account of the numerous transshipments involved and the length of time required for the journey. Another projected line, and one for which the route was partially surveyed before the outbreak of war, will, if completed, link up Bukama with some point on the Matadi-Leopoldville line, not far from the latter port. From Bukama it would probably run in a north-westerly direction to the

Sankuru at Mutombo Mukulu. Keeping to the south of the Kasai-Sankuru, it would then go by Luluabourg and Luebo to Joko Punda at the head of navigation on the Kasai. (Another suggestion is that the line should go by Kanda Kanda and Kakota to Joko Punda.) From that point it would run in a somewhat more easterly direction, and would cross the Kwilu at Leverville and the Kwango at Muene Kundi. With the exception of some hilly country northwest of Bukama, the suggested route is comparatively level, and the main engineering difficulties would be connected with the bridging of the numerous rivers which flow from the Angolan plateau to the Kasai-Sankuru. The total length of line to be constructed would probably be between 1,100 and 1,200 miles, while the total distance between Kambove and Matadi is estimated at 1,600 miles. As far as the Katanga alone is concerned it is difficult to see what advantages such a line would possess over the one from Lobito Bay, apart from the fact that it would be entirely confined to Belgian territory. The distance is greater, and, until the Leopoldville-Matadi line has been reconstructed, access to the coast is more difficult. Moreover Matadi as a port is not to be compared to Lobito Bay, and, although it offers a shorter route to Europe, it is very questionable whether the slight gain in this respect would compensate for the cost of the longer haulage overland. On the other hand there is no doubt that the projected line would be of considerable value to the development of the country through which it passed, much of which is distant from good lines of communication, and it is partly with this object in view that the surveys have been undertaken.

Another project which has been advocated in various quarters is the construction of a line from Kabalo on the Lualaba to Lusambo on the Sankuru. The distance between these two places is about 312 miles. Below Lusambo the Kasai-Sankuru provides about 600 miles of navigable waterway before its confluence with the Congo 122 miles above Leopoldville. For the southern Katanga at least this route would not prove very valuable. It is true that it is much shorter than the Transcongolais, and involves one transshipment less from steamer to rail and from rail to steamer, but these are comparatively slight advantages to set against the fact

that four transhipments would be necessary between Bukama and Matadi, and that the state of the river between Bukama and Kabalo is very unsatisfactory at certain seasons of the year. With regard to the north of the Katanga and some of the eastern districts of the colony the position is very different, as the completion of the lines from Dar-es-Salam to Kigoma and from Albertville to Kabalo tend to bring these regions within the hinterland of Dar-es-Salam. From Dar-es-Salam to Kabalo the distance is estimated at 1,008 miles, and it is not improbable that a good deal of the produce of the country round Kabalo, as, for example, the tin of Kiambi, may find its way to the eastern port if an alternative route to Matadi is not provided. Before the outbreak of war the Germans sought to attract such trade by low freight rates, and the prospect of their success caused alarm in Belgium, as it was evident that Hamburg and not Antwerp would be the ultimate destination of the tin and other articles exported. It was mainly with the object of countering the German move that the Kabalo-Lusambo line was suggested. To make the Kasai-Sankuru a really useful navigable way will involve considerable labour, but apart from that there are certain advantages in the proposed route. From Kabalo the railway haulage to Matadi would be little more than half that to Dar-es-Salam, while the number of transhipments would be the same. Steamer freights to Europe would of course be lower from the former port. A good deal will depend on the rates charged by the different railways, but it does not seem impossible that a considerable part of the trade of the northern Katanga may eventually be attracted to Matadi. At the same time, it may be noted, the coal-fields in the basin of the Lukuga are likely to find one of their most profitable markets to the east of Lake Tanganyika, and this will tend to encourage a return freight from Dar-es-Salam. An alternative to this line is one which would run from Ankoro to Lusambo instead of from Kabalo.

Two other routes which it is proposed to construct from Kabalo may here be mentioned. Navigation on the Lualaba between that port and Kongolo is not free from difficulty at certain seasons of the year, and the proposal is to link up the two places by a railway about 55 miles in length. A through route would thus be provided between Albertville and Kindu

which would facilitate trade between Lake Tanganyika and the lower Congo.

The second projected route from Kabalo is intended to connect that place with the tin mines of Kiambi and with Pweto on Lake Mweru. Its exact direction does not appear to have been finally settled, but it will either follow first the Lualaba as far as Ankoro, and then the Luvua for the whole of its course from Lake Mweru, or it will strike straight across from Kabalo to the valley of the Luvua, which it will reach at a point some distance from its confluence with the Lualaba. The whole line will be of considerable value, but the part most urgently needed is the section between Pweto and Kiambi. Below Kiambi the Luvua is navigable for at least part of the year.

As navigation on the Lualaba between Bukama and Kikonja also presents seasonal difficulties, it is now proposed to continue the Katanga railway northward to Kikonja. Such a line would be of considerable value to the tin-mining industry in the vicinity of that town.

At the present time the north-eastern districts of the Belgian Congo are without good means of communication with the ports on the lower Congo. The rivers, owing to the numerous rapids along their courses, are of comparatively little value, and the time taken for the transport of goods is excessive. Accordingly much of the produce exported from this region, and more particularly gold from the mines at Kilo, rubber, and ivory, finds its way to the coast of the Indian Ocean, at Mombasa. This route involves transport by porters overland, and by lake, river, and railway, and numerous transshipments are necessary. To overcome these difficulties a new line has been suggested which would start at Stanleyville and run to some point at the southern end of Lake Albert. From Boga one branch would run northward to Kilo, the centre of the important gold-mining area, while another would run south to Lake Edward. This line, when constructed, will prove of considerable value, but so far only preliminary surveys have been made. A railway from the Congo to the Welle is also under consideration. It is proposed that it should run from Bumba on the Congo by Buta, on the Rubi, and Niangara, on the Welle, to the gold mines at Moto. A further suggestion is that it should be continued from Moto to the Nile, probably

at Rejaf. The preliminary survey for the first part of the line has already been made.

Another projected line, but entirely outside of the Belgian Congo, might conceivably affect the direction taken by some of its trade. At the present time a French line runs from Brazzaville, on the opposite side of Stanley Pool, to Minduli, but as it is not connected with the coast it merely acts as feeder to the Belgian port at Leopoldville. The proposal is to continue this line from Minduli to the Atlantic coast at Pointe Noire. The total length would be about 365 miles, and according to the plans under consideration at the outbreak of war the gauge would be 3.28 feet (1 metre), the radius of the sharpest curves 328 feet (100 metres), and the maximum gradient 1 in 50. The main drawback appears to be the want of a good natural harbour at Pointe Noire. On the whole it is probably safe to conclude that the proposed railway would, if completed, carry a great part, if not the whole, of the French traffic. Whether the trade of the Belgian Congo would in part take the same route will depend very largely upon the condition of the Matadi-Leopoldville line. If nothing is done to render it more efficient than it at present is, a considerable amount of trade might easily be lost to it. On the other hand the Government of the Congo is now considering an extension of the Mayumbe railway to the mines at Minduli. This would provide a shorter route than at present, and would in addition overcome some of the other difficulties which have been mentioned.

INLAND WATERWAYS

The Belgian Congo possesses a remarkable system of inland waterways. The Congo itself rises in the extreme south-east, and flows in a great curve through the central part of the colony. One of its tributaries, the Ubangi, with its head-streams, the Bomu and the Welle, drains the peripheral regions of the north, while another, the Kasai-Sankuru, performs a like function for those of the south. In the Central Basin a number of rivers of less importance flow into the main stream. On the outside of the great bend are the Mongala, the Itimbiri, and the Aruwimi, which come from the north or east, while within the bend the Lulonga, formed by the Lopori and the

Maringa, and the Ruki, formed by the Busira and the Momboyo, flow in a westerly direction. Farther to the east the Lomami has a course parallel to that of the Congo south of Stanleyville. Thus the waterways of practically the whole colony east of the Crystal Mountains lead to the main stream, which is still the chief means of communication in the country.

This great system of rivers is, however, by no means so valuable as might at first sight appear. Its chief defect is of course the fact that as far as shipping is concerned it is unconnected with the sea, and inland navigation can only be said to begin at Leopoldville, the terminus of the railway which connects the upper and the lower Congo. The rivers themselves moreover vary greatly in value from one part of their course to another. Those which rise in the highland areas surrounding the Central Basin usually descend to it by falls or rapids, and these frequently form a complete barrier to navigation. In their rapid upper courses also they collect much sand, which is deposited when their gradients are reduced. Sandbanks which change their position more or less with every flood are therefore a common feature in many of the rivers. On the other hand the tributaries of the Congo which rise in the Central Basin have often failed to deepen their beds to any great extent, and their shallow courses are easily blocked by trees, sand, and other materials. The extent to which these various obstacles may be overcome will be discussed later. It must also be borne in mind that as a result of the annual movement of the belt of equatorial rainfall north and south of the equator the amount of water in most of the rivers varies considerably in the course of the year. The Congo, which benefits from the double rainy season to the south of the equator, is the chief exception to this rule.

As hydrographical work in the Belgian Congo is still in its infancy, it is impossible to describe in detail the extent to which its various rivers are navigable, and the following account must be regarded as more or less provisional.

The Congo.—From Stanley Pool to Stanleyville the Congo affords a navigable waterway 1,000 miles (1,600 kilometres) in length. In the Pool itself, the Belgian channel to the south of the island of Bamu has a depth varying from 6 to 20 feet (2 to 6 metres), while the French channel to the north is almost everywhere over 10 feet (3 metres). From Stanley

Pool to Chumbiri (some distance above the confluence of the Congo with the Kasai) the river flows between high banks, and varies in breadth from 1,100 to 3,000 yards (1,000 to 2,600 metres). This part of its course, which is over 125 miles (200 kilometres) long, is known by the Belgians as the *chenal*, and by the French as the *couloir*. Notwithstanding some dangerous rocks, navigation is everywhere comparatively easy, as the depth varies from 10 to 20 feet (3 to 6 metres). Above Chumbiri the Congo broadens, and its bed is occupied by many sandbanks and islands. Its average breadth is from 5 to 6 miles (8 to 10 kilometres), but at Bolobo, Lukolela, and Gombe (opposite Liranga), there are short stretches where it decreases to 2 miles or less. With the increase in the breadth of the river there is a reduction in its depth, but as far as Coquilhatville it is navigable by steamers drawing 10 feet (3 metres) or less, and by lighters carrying not more than 500 tons. The rate of the current varies. At Kimpoko, at the entrance to Stanley Pool, it is about 5 knots, while in the *chenal* it averages from 3-3½ near the banks (4 to 5 during high water) to 5 in the middle of the channel. A vessel steaming 6 knots would just manage to ascend the river, but most modern river-boats are much faster, and attain a speed of 15 or even 20 knots. The winds generally blow up-stream, usually between 9 a.m. and 4 p.m. Near the equator they diminish in intensity and duration, and north of it they are felt only between 1 and 3 in the afternoon.

Above Coquilhatville the river again contracts, and at Monkero it is less than 3 miles from bank to bank. Beyond that point it broadens out and attains its maximum breadth of 9 miles (14 kilometres) near the confluence with the Mongala. It narrows again near the hills of Bopoto, where some reefs of feldspar appear, and at Malela, above the mouth of the Itimbiri, but it remains a broad stream until the Aruwimi is passed. Between that river and the Lomami, however, it seldom exceeds 1,800 yards (1,650 metres), while beyond the Lomami it narrows to 1,300 yards (1,200 metres). From Bertha Island (20 miles below Stanleyville) to Coquilhatville the rate of the current is generally from 2 to 3 knots, and the bed of the river is much encumbered by sandbanks, which are constantly changing their position. As a result the navigable channels are sometimes not more than 6½ feet (2 metres) in depth.

Near Bertha Island the river is still shallower, and there are rocky ledges in its bed. As a result, ships drawing more than $3\frac{1}{4}$ feet (1 metre) have often difficulty in passing at times of low water. This period lasts for only a week or two, and for the remainder of the year the channel is open to vessels drawing from 4 to $4\frac{1}{2}$ feet (1.20 to 1.40 metre). Steamers intended for the run between Leopoldville and Stanleyville are therefore built so as to draw not more than $5\frac{1}{4}$ feet (1.60 metre) when loaded, and they never take a complete load over the last stretch of the river between Romee and Stanleyville.

Beyond Stanleyville a series of rapids interrupts navigation between that town and Ponthierville, a distance of about 80 miles (128 kilometres). It is believed, however, that the difficulties which these rapids present to steamers are not insuperable, and that they might be overcome either by a system of lateral canals or by a haulage arrangement somewhat similar to that which has been introduced on several European rivers. Even at present canoes are able to negotiate the greater part of this stretch.

Above Ponthierville the river is navigable as far as Kindu, a distance of about 200 miles (320 kilometres). It varies in breadth from 650 to 2,200 yards (600 to 2,000 metres), and is suitable for vessels drawing not more than $6\frac{1}{2}$ feet (2 metres). It is said that this stretch might be prolonged for another 112 miles (180 kilometres) by the construction of canals with locks at Sendwe and Kibombo. A little higher up, between Kasongo and Kongolo, there is a series of falls about which little as yet appears to be known.

Above Kongolo steam navigation is resumed, and is continued to Bukama on the Lualaba, a distance of 400 miles (640 kilometres). As far as the neighbourhood of Lake Kisale the river flows at a rate of 4 knots, and can be navigated by ships drawing less than $6\frac{1}{2}$ feet (2 metres) of water. It then becomes covered with papyrus, and navigation is obstructed to some extent; a fairway can, however, be maintained without great difficulty. In Lake Kisale, also, there is much floating vegetation, but the *Comité spécial* has constructed a kind of palisade on either side of the navigable channel which prevents it from being blocked. Papyrus ceases some distance above Lake Kisale, and the river broadens out, frequently to 220

yards (200 metres). The depth of the river, which in the papyrus region does not exceed 5 feet (1.5 metre), in the dry season falls still further, and at times of low water is often between 2 and $2\frac{1}{4}$ feet (60 and 70 cm.). This amount is sufficient for vessels carrying from 50 to 60 tons. Bukama, which is the head of steam navigation on the Congo-Lualaba system, is now connected by rail with Beira and Cape Town.

The Ubangi.—The course of the Ubangi is not so well known as that of the Congo, though considerable attention has been given to it within recent years. In its lower reaches the bed is much encumbered by islands and sandbanks, which render navigation difficult. Nevertheless large river steamers are able to make their way upstream as far as the French post of Imfondo at all seasons of the year. Between Imfondo and Betu the river is also navigable throughout the year by all vessels drawing not more than $6\frac{1}{2}$ feet (2 metres). Above the latter point difficulties commence, as there are occasionally rocks in the bed of the river which are dangerous at times of low water. The sill at Zinga is the most important of these obstructions, and at present prevents vessels going beyond Libenge for part of the year. But it is said that improvements might, with comparatively little expenditure, be carried out at this point which would enable steamers drawing not more than $3\frac{1}{4}$ feet (1 metre) to proceed to Zongo, about 375 miles (600 kilometres) from the confluence of the Ubangi and the Congo, at any time of the year.

Above Zongo there are many obstacles to continuous navigation. About a mile beyond the post there are rapids past which all goods have to be carried overland. They are then re-embarked on small steel steamboats, and taken to the foot of the rapids at Dunga, where land transport is again necessary. At the head of these rapids they are placed in steel boats or canoes, and carried to the foot of the Elephant rapids. Beyond that point light boats are used as far as the rapids at Buta, above which small steamers can ply for at least part of the year. These steamers go as far as Banzyville, which is about 620 miles (990 kilometres) from the mouth of the river. Here there are again rapids, and transshipment is necessary. During the dry season this stretch of the river is available only for steel boats or canoes. Between Banzyville

and Yakoma, at the confluence of the Bomu and the Welle, there are frequent rapids, and steam navigation is impossible.

The Bomu is the northern headstream of the Ubangi, and forms the frontier of the Belgian Congo from Yakoma to the point at which it rises near the Congo-Nile divide. Rapids are numerous, and increase in number as the river is ascended. Many of them can be navigated by canoes during the flood season, but every year a large number of men, boats, and loads are lost in the river. The Bomu is on the whole therefore of little value as a waterway.

The Welle, which is the southern headstream of the Ubangi, is probably more important than the Bomu, though its value is not great. It consists of stretches of good navigable water, broken here and there by rapids which are either unnavigable or can be navigated only with difficulty. The stretch between Yakoma and Jabbir is particularly bad, as it contains, among many others, the Voro rapids, the most powerful and formidable on the river. From Jabbir to Angu matters are not much better, but there are a few navigable stretches, 4 to 6 miles in length, where the current is not more than 2 miles an hour at times of low water. Between Angu and Niangara, with the exception of the section from the Angba Hills to Niangara, where the bed for the first time becomes sandy, the entire course of the river is cut up by rocky stretches with occasional intervals of navigable water varying from 2 to 8 miles in length, and in two or three places from 30 to 40 miles. Notwithstanding the difficulties of navigation on this part of the river, it is used for transport purposes by the Belgians between Niangara and Angu, from which place connexion with the Congo is made by a four days' trek to the Likati river. Above Niangara the Welle is seldom used by the Belgians, and communication is kept up by a good road which runs along the left bank. On the Kibali there is also good water in places, which is used by canoes as far as the old post of Vankerchovenville.

The Giri.—The Giri, a tributary of the Ubangi, rises in the swampy country between that river and the Congo. Boats appear to be able to ascend it as far as Bomana, 125 miles (200 kilometres) from its confluence.

Above the confluence of the Ubangi the chief right-bank

tributaries of the Congo are the Mongala, the Itimbiri, the Aruwimi, the Lukuga, and the Luvua.

The Mongala.—Small steamers can ascend the Mongala as far as the Likimi-Businga rapids and falls, about 50 miles (80 kilometres) from the mouth of the river. Farther up vessels of shallow draught can go at least as far as Bokula. On the Dua, one of the headstreams of the Mongala, canoes can sail upstream for about 120 miles (192 kilometres).

The Itimbiri.—This river, which is also known as the Rubi, is of considerable importance as an outlet for the trade of the Welle region, with which it is connected by two important routes. One of these runs from Buta on the Itimbiri to Bambili on the Welle, while the other leaves the Likati, a tributary of the Itimbiri, at no great distance from its source, and runs to Angu. The Itimbiri, which in its lower course is from 150 to 300 yards (137 to 274 metres) wide, can be ascended by steamers, at least during part of the year, for about 100 miles (160 kilometres). Above Ibembo various rapids render navigation difficult as far as Jamba, but from there light steamers, or canoes in the low-water season, can go up the main stream as far as Buta, and up the Likati to the post of the same name.

The Aruwimi. The Aruwimi between its confluence with the Congo at Basoko and Avakubi, about 350 miles (560 kilometres) distant, is an important means of communication for the region through which it flows. During the period of high water it is navigable as far as Yambuya for steamers up to 30 tons burden which draw not more than 3 feet when loaded. At low water navigation is impeded by sandbanks and other obstacles in the bed of the river. At Yambuya there are rapids which necessitate a portage of about a mile, and beyond it all goods have to be transferred to dug-out canoes for their long journey to Avakubi. On this part of the river there are many rapids; some may be safely ascended at times of high water, while at others goods have to be unloaded, and the canoes taken through empty. At Panga the river dashes down with terrific force, but even there canoes can be poled up by special crews of villagers, whose homes are situated on the high bank overlooking the cataract.

The Lukuga. The Lukuga, which flows from Lake Tangan-

yika, falls 770 feet (235 metres) in its journey of 188 miles (300 kilometres) to the Congo. Owing to its slight depth and numerous rapids it is of little use for navigation.

The Luvua.—The Luvua, which flows from Lake Mweru, is navigable for part of the year by light steamers from its confluence with the Congo at Ankoro to Kiambi, a distance of about 90 miles (145 kilometres). While the tin mines at Muika were in operation it was of some value as offering a means by which the product might be exported.

Within the great bend the principal tributaries of the Congo are the Lulonga, the Ruki, and the Lomami. Their courses are all confined to the Central Basin, and they flow for the most part through comparatively level country.

The Lulonga.—The Lulonga is formed by the confluence of the Lopori and Maringa. From the point at which it enters the Congo to the confluence of these two rivers at Basankusu it has a length of about 125 miles (200 kilometres), and is navigable throughout by small river steamers. The Lopori can be ascended by small steamers as far as Ekuchi, and at certain times as far as Bosow, 280 miles (450 kilometres) from the confluence. The Maringa is open for an even greater distance, and small vessels go as far as Befori, which is over 300 miles (480 kilometres) from Basankusu. The importance of this river, as that of the Busira-Chuapa, farther to the south, is due to the fact that it is navigable to within 100 miles (160 kilometres) of the Lomami, and thus serves an important stretch of country in which other means of communication are almost impossible.

The Ruki.—As far as its value for navigation is concerned the Ruki system is only imperfectly known, but there are probably from 1,000 to 1,250 miles (1,500 to 2,000 kilometres) or more of water suitable for the smaller types of steamers throughout the year. The Ruki itself has a length of about 56 miles (90 kilometres) from its confluence with the Congo at Eala to Ingende, where it is formed by the junction of the Busira and the Momboyo. The Busira and its headstream, the Chuapa, may be ascended as far as Ikela, while two tributaries of the Busira, the Lomela and the Salonga, are reported to be navigable, the one to Itoko and the other to Donkankwa. The Momboyo, known above Waka as the Lui-laka, can be used as far as Monkote, and probably to the

neighbourhood of Bombomba. Its tributary, the Lokolo, is navigable for some distance from its mouth.

Between the Lulonga and the Ruki the Ikelemba can be ascended to Bombimba, 88 miles (140 kilometres) from its mouth, while to the south of the Ruki there is a good waterway from Irebu on the Congo to Bikoro on Lake Tumba.

The Lomami.—The attention given to the development of communications on the upper Congo has led to the relative neglect of the Lomami. The river, however, flows through a considerable stretch of forest country, for which it is the sole means of transport. Small steamers run on it to Obenge Benge, situated about 225 miles (360 kilometres) from its confluence with the Congo at Isangi, but it is said to be navigable as far as Goma Vula, some distance higher up. Above that point it appears to be suitable only for canoes.

The Kasai-Sankuru.—This river system is the most important in the southern part of the Congo basin, but it is only within the last few years that any systematic investigation has been made of its suitability for navigation. Above its confluence with the Congo at Kwamouth it passes through a narrow gorge, and there are rocks in its bed, but as far as Mushie it is navigable by vessels drawing not more than $6\frac{1}{2}$ feet (2 metres) at the least. Above Mushie the river widens out into Wissmann Pool. Here there are no rocks, but sandbanks are numerous, and the channels between them often contain little water in the dry season. A fairway, however, always exists, though it is sometimes difficult to find as it changes its course from year to year. From Wissmann Pool to Swinburne rapids navigation is relatively easy, but the rocky bottom in the rapids themselves is encumbered with loose blocks which sometimes present difficulties. Between Swinburne rapids and Mondana there is generally sufficient water, and this part of the river can be ascended without much trouble. Sandbanks are numerous between Mondana and Eolo, and between Isaka and Bena Bendi, and sometimes impede navigation. Above the confluence of the Kasai and Sankuru the former river is navigable as far as Joko Punda below Wissmann Falls.

On the Sankuru between the confluence and Lusambo there are few rocks, but the course is rendered sinuous by the large number of sandbanks which exist. One in particular, formed by the waters of the Lubi, sometimes prevents all traffic.

Between Lusambo and Pania Mutombo the river is narrower, and the rocks which it contains render navigation difficult in July and August. Less is known of the section between Pania Mutombo and the Wolff Falls, but it appears to be similar to the preceding one.

The length of the navigable waterway on the Kasai-Sankuru has been estimated at 841 miles (1,354 kilometres), made up as follows: Kwamouth to Lusambo 764 miles (1,230 kilometres), Lusambo to Pania Mutombo 56 miles (90 kilometres), Pania Mutombo to Wolff Falls 21 miles (34 kilometres). The distance from the confluence of the Kasai and Sankuru to Joko Punda is about 116 miles (186 kilometres).

In a report made a few years ago it was stated that the Kasai-Sankuru might be navigated throughout the year by vessels 130 to 148 feet (40 to 45 metres) long. During high water the draught must not exceed 5 feet (1.5 metre), and during low water $3\frac{1}{2}$ feet (1.10 metre). Above Lusambo the river appears to be navigable for only about six months in the year. In order, however, to maintain a good channel along the whole course of the river it would be necessary to dredge and buoy it at various points.

Various tributaries of the Kasai-Sankuru are also navigable to a greater or less extent. The Fini, which drains Lake Leopold, and Lake Leopold itself are regularly used, and small steamers can ascend the Lukenie as far as Loja. The latter river, however, seems to present many difficulties, and the estimates made of the length of the waterways on the Fini system varies from 435 to 652 miles (700 to 1,150 kilometres). On the left bank of the Kasai the Kwango is the most important tributary; it is navigable from its confluence to Kingunshi, a distance of about 160 miles (260 kilometres), and by small steamers from above the falls at Kingunshi to the François Joseph Falls, another 170 miles (272 kilometres). Still higher up short reaches of the river are traversed by very small steamers. An affluent of the Kwango, the Wamba, may be ascended as far as Kapanga. The Kwilu, which also flows into the Kwango, provides over 200 miles (320 kilometres) of waterway, and some of its tributaries are used by small steamers. Farther east the Kancha is navigable to Nadisma, about 87 miles (140 kilometres), the Loange to Chitombe, 124 miles (200 kilometres), and the Lubudi for about 50 miles

(8) kilometres). The Lubue is said to be available as far as Dumba, about 100 miles (160 kilometres) from its confluence, and the Lubefu to a post of the same name 124 miles (200 kilometres) upstream.

On Lake Tanganyika there are at least 373 miles (600 kilometres) of good waterway, and on Lake Albert 93 miles (150 kilometres).

From the above survey of the rivers of the Belgian Congo it appears that the colony has over 8,000 miles of waterway, the greater part of which is navigable by steamers. In order, however, to develop and extend the system a more complete hydrographic survey than has yet been made is necessary. Until this has been done navigation will continue to be carried on under difficulties. Probably the most pressing need is for the improvement of those channels which are obstructed by sandbanks. At present only a few dredgers are at work in the country, and most of the rivers are unbuoyed throughout almost their whole extent. Owing to the shifting character of the sandbanks moreover the maintenance of a fairway is likely to involve considerable trouble and expense, as much of the work will have to be done over again each year. Other improvements, more costly perhaps, but of a more permanent nature, will consist in the removal of rocks which at present render navigation dangerous in places, and the regularization of the less important rapids so that the transshipment of goods may be avoided. Later on it may be possible to construct canals so as to connect the navigable reaches of rivers which are separated from one another by rapids or falls too great to be overcome in any other way. It has even been suggested that Leopoldville might thus be linked up with Matadi, but it is questionable whether a canal about 125 miles long, and with a difference of level little short of 1,000 feet between its upper and its lower end can ever give an adequate return for the vast outlay which its construction would entail. Probably the best solution in this case would be to improve the railways connecting the upper and lower reaches of the river, and to arrange proper facilities for the easy transshipment of goods. At the present time the Matadi-Leopoldville line is unable to provide for the prompt transport of goods coming from the interior, and the terminal facilities are of a somewhat primitive description.

But if the river system of the Belgian Congo is capable of considerable development the same is true to an even greater extent of the shipping upon it. At the present time this appears to be inadequate and badly adapted for the work which it has to perform. According to a recent report, which, although it does not pretend to be accurate in all details, is obviously well informed, there are on the Congo and Kasai seventeen steamers and sixteen large barges capable of carrying goods for considerable distances. In addition to these there are a number of small steamers, barges, steel boats, and canoes which are of considerable value upon the smaller tributaries, but which, if they are to be economically used, ought not to convey their cargoes beyond suitable points of transshipment on the main streams. Of the large steamers referred to, five can carry 500 tons, three from 250 to 300 tons, and nine from 150 to 200 tons. The barges include four with a capacity ranging from 250 to 300 tons, and twelve with one of 100 to 200 tons. Some of these boats belong to the State, while others are the property of trading concerns such as the *Compagnie Citas*, the *Société de huileries du Congo belge*, and the *Compagnie des Grands Lacs*.

An estimate made by the writer already referred to of the relative cost of transport by ships of different types works out somewhat as follows. A steamer able to carry 500 tons can convey goods at a rate of about one farthing per ton-mile (1.7 centime per tonne-kilometre), while on one carrying only 20 tons the lowest remunerative rate is about three-farthings per ton-mile (5 centimes per tonne-kilometre). A tug with a train of five barges in tow on the other hand could do the same work for one-twentieth of a penny per ton-mile (one-third of a centime per tonne-kilometre). These figures are probably only approximate, and do not represent existing freight charges, but they indicate the direction in which development might most profitably take place. As much of the export trade of the Congo consists of commodities for which rapid transport is not essential, there seems no reason why the use of barges should not be greatly extended. Whatever type of boat is used, however, it would appear to be most economical to have it of such a draught that it can be navigated on the river for which it is designed throughout the whole year, and not during the season

of high water only. At present some steamers are laid up for several months at a time.

On the whole river transport appears destined to play a great part in the economic development of the Belgian Congo. As already mentioned, the colony has over 8,000 miles of waterway, and when the courses of various rivers have been investigated and regularized the total length of inland navigation will probably not fall far short of 10,000 miles. To construct anything like a corresponding network of railways would involve a vast outlay, for which, notwithstanding the higher rates that would be charged, it is almost inconceivable that there would be anything like an adequate return. Moreover the rivers are on the whole well distributed, and pass through districts which are either now, or are in the future likely to prove, among the most productive in the country. Certain regions, it is true, are less well-endowed than others. Southern Katanga, for example, must always depend more or less upon its railway system, while the Welle region, one of the most promising in the Congo, can never be adequately served by its rivers. But for the Central Basin, and for the districts more closely connected with it, the waterways ought to be regarded as the main lines of communication. Transport upon them, if slow, is relatively cheap, and they can easily be connected with their hinterlands by light railways and roads upon which motor traffic would be possible.

ROADS

Most places in the Belgian Congo are connected by native tracks on which it is only possible to go in single file. In the dense equatorial forest and wherever the population is scanty progress on the march becomes very difficult on account of the tangled vegetation. Near the villages some attempt is usually made to broaden the path and to keep it clear. The streams are sometimes forded and sometimes crossed by means of a bridge more or less skilfully constructed by felling a tree. Occasionally the more energetic villagers construct wooden bridges.

A certain number of roads have been constructed by the Belgians. As a rule they have been somewhat hastily and cheaply made. To attempt to construct them on the European plan is practically impossible, as the cost would be excessive

in a country where stone is usually difficult to obtain. Two routes of such a kind were indeed attempted, one from Kitobola in the Lower Congo, and the other from Kapende in the Katanga. They cost about £1,500 per mile, and even now are of little value. To meet the demands of local traffic in regions which are being developed under European control, all that is generally necessary is a fairly level track which follows the watersheds between the rivers and avoids the damp and marshy lowlands. Such roads would only require an expenditure of about £30 per mile for their construction, and would be of considerable value to the country, as motor traffic would be possible on them, and they would act as feeders to the railways.

One of the most important roads in the country is that which runs from Buta, situated on the Rubi, a tributary of the Itimbiri, by way of Bambili, Niangara, and Dungu to Rejaf on the Nile. It forms part of a great through route from the Congo to the Nile, and some sections of it play an important part in the collection and export of the produce of the Welle region. From Buta the road runs in a north-easterly direction, crosses the Itimbiri-Welle watershed and descends to the Welle at Bambili. It is about 16 feet in breadth, and is not macadamized except in places where there is much clay. In consequence motors cannot be used during the rainy season except in places. From Bambili to Dungu the road appears to be a mere track, and the river is generally used for the transport of goods, although portage around the rapids is often necessary. Beyond Dungu the road runs along the Welle for some distance, and then branches off in a north-easterly direction by way of Faraje, Abo, and Yei to the Congo-Nile divide. In this region it again becomes suitable for wheeled traffic, but is not macadamized, and is not suitable for heavy motor traffic. Wagons drawn by oxen, donkeys, or mules are used, and horses can be employed on the section between Faraje and Rejaf which lies beyond the tsetse belt.

From Stanleyville there is a route to Lake Albert and the gold-mining region round Kilo. It runs by way of Bafwaboli, Bafwasendi, Avakubi, and Irumu to Mahagi. Much of it is through forests, and the track, though it is a main highway, is bad, and quite unsuitable for wheeled traffic. From Stanley-

ville to the Ituri at Avakubi alone takes twenty-five days' hard marching. At Irumu roads suitable for wheeled traffic run north to the gold mines at Kilo and south to Boga. The latter is continued across the frontier to Fort Portal in Uganda. From Kilo a good road now runs north-west to Moto and south-east to Kasenie, which is situated on Lake Albert. It is along this road that much of the gold from Moto and Kilo is sent to Mombasa.

Another route which connects the Congo-Lualaba with more remote districts is that which runs from Ankoro to Pweto on Lake Mweru. It follows the right bank of the Luvua, and is over 200 miles in length. The prevalence of the tsetse fly makes the road unsuitable for animal traction, but it is said that it could be made fit for motor traffic without any great alteration. On the other hand it is proposed to build a railway line along what is practically the same route. A good road from Ankoro runs to Pania Mutombo on the Sankuru, and provides communication between that river and the Lualaba. It goes by way of Kisengwa and Chofa. This road is well constructed and is suitable for motor traffic in the dry season.

In the Katanga rivers are usually of little value as means of communication, and various roads have been built. Some of these are suitable for motor traffic. One from Elisabethville to Kasenga on the Luapula, north of Fort Rosebery in Northern Rhodesia, has a length of about 130 miles. As far as Shifumanzi it has a breadth of about 22 feet, but beyond that post it is only 10 feet wide. The surface is rounded, and in dry weather is excellent for motoring; in the rains heavy motors would find difficulty in using the road, but light motors could run on it at all seasons. Kasenga, where the road terminates, is in communication with Lake Mweru by the Luapula. Another important road is that which links Elisabethville with Bukama. It runs parallel to the railway from Elisabethville, passes a little to the north of Kambove, traverses the entire length of the Kapiri valley, climbs the high Bianco plateau, and then descends to Bukama. South of Elisabethville a motor-road runs as far as Chinsenda on the Sakania-Elisabethville section of the railway. Beyond Chinsenda it is continued by an old road which was at one time used for the conveyance of machinery to the copper mines.

Among other roads in this part of the country may be mentioned the branch of the Elisabethville-Kasenga route, which runs towards the Kundelungu plateau, a road begun in 1913 to connect Bukama with Pande, and a proposed route which would run from Pweto to Baudouinville in order to connect the healthy and fertile Marungu plateau with Lakes Tanganyika and Mweru. Around Elisabethville itself there is a network of roads connecting the various farms with one another and with the town. Between Kambove and Ruwe over 300 miles of tracks, suitable for cycling from one mine to another, have been constructed by the Tanganyika Concessions.

PIPE-LINE

By a decree issued in 1910 the construction of a pipe-line between Matadi and Leopoldville was entrusted to the *Société anonyme des pétroles au Congo*. The line was completed in 1913 and placed in operation at the beginning of the following year. It begins at Ango-Ango, a few miles below Matadi, and follows the railway for the greater part of the way to Leopoldville, a distance of about 248 miles. At Ango-Ango eight large reservoirs have been constructed, each capable of holding 1,000 tons of oil. In order to facilitate pumping the line has been divided into eight sections, and pumping-stations established for each section.

As the port of Matadi is difficult of approach by large vessels, arrangements have been made for lightening oil-ships lower down the river. The procedure adopted in the case of the *British Sun*, which was the first oil-ship to arrive in 1914, was as follows. At Kisanga a small 'tanker' came alongside and took off 700 tons of oil. The steamer then proceeded upstream as far as Fetish Rock Pass, where another 1,400 tons was pumped into a large stationary barge. The *British Sun*, after this second reduction, took the remainder of its total load of 7,200 tons to Matadi, where it was pumped into the reservoirs.

TELEGRAPHS AND TELEPHONES

With one or two exceptions the telegraph and telephone system of the Belgian Congo follows the more important routes of the country. In 1894 a telegraph line was begun which it

was intended to carry from Boma to Tanganyika; it reached Coquilhatville in 1899, and beyond that place it has not yet been continued. From Boma to Matadi it follows the river, which it crosses just above the Devil's Caldron, and then runs alongside of the railway line to Leopoldville. Above Leopoldville the wire again follows the Congo, and has consequently to cross many tributaries of that river, the most important being the Kasai, which at that point has a breadth of 3,280 feet. A rocky bank in mid-stream, however, renders the task of crossing it easier than would otherwise be the case. Beyond Yumbi the line is carried across country which is inundated during the rainy season, and beyond Lukolela it enters forest country where a strip of land 150 feet wide had to be cleared of trees in order to prevent damage to the wire. Notwithstanding these precautions interruptions are frequent.

The line from Boma to Coquilhatville has a total length of about $732\frac{1}{2}$ miles. The chief offices for the receipt and dispatch of messages are Boma, Matadi, Thysville, Madimba, Leopoldville, Kinshasa, Kwamouth, Bolobo, Lukolela, Irebu, and Coquilhatville. The wire is also used for telephone purposes, and telephone messages can be sent from the above-mentioned places.

Two other lines run from Boma, and are used both for telegraphing and telephoning. One follows the Mayumbe railway to the north, but has not advanced beyond Lukula, about 50 miles distant from Boma. The chief stations on this line are at Boma, Luki, and Lukula. The other runs downstream to Banana, and was completed in 1912. There do not appear to be any intermediate offices between the terminal points of this line:

The telegraphic system radiating from Boma is connected with European cables at various points. The *Société anonyme belge de câbles télégraphiques* has a cable from Matadi which links up with the West African Telegraph Company's cable between Loando and Bonny. From Leopoldville there is also a connexion with the French system. In 1905 two sub-fluvial cables were laid between that town and Brazzaville on the opposite side of the Congo. Owing to the strong current, however, they were worn by the rocks in the bed of the river and did not last for more than a few years. Since then communication between the two places appears to have been

maintained by heliograph, though in 1911 a scheme was proposed for the construction of an overhead cable at a point about eight miles below Leopoldville. In order to provide quicker communication with Europe than was afforded by these means, the Belgian Government in 1914 made an agreement with the Eastern Telegraph Company by which the latter undertook to lay a cable between Boma and Loando. This is an improvement on the method arranged in 1912, by which Matadi was to be connected with Noki and in this way linked up with Loando by the Portuguese line in Angola.

Elisabethville may be regarded as the second important telegraphic centre in the Belgian Congo. One line which runs by way of Baya, Chinsenda, and Sakania connects it with the South African system, and so with Europe by the Eastern Telegraph Company's cables. Another follows the railway line in the opposite direction, and has been carried at least as far as Chilongo. A third connects Elisabethville with the Star of the Congo mine.

Of the remaining lines in the country used for telegraphic and telephonic purposes one, laid in 1917, runs from Kongolo by way of Kabalo to Albertville. Private telegraph lines run alongside the railway from Stanleyville to Ponthierville, and from Kindu to Kongolo. A telephone line runs from Kasongo by Kabambare, Niembo, Kalembelembe, and Baraka to Uvira at the head of Lake Tanganyika.

There are at least fourteen wireless stations in the Belgian Congo. Of these the greater number are strung along the line of the Congo-Lualaba, and link up the Lower Congo with the Katanga. They are situated at Banana, Boma, Kinshasa, Coquilhatville, Basankusu (south of the Congo at the confluence of the Lopori and Maringa), Umangi, Basoko, Stanleyville, Kindu, Kongolo, Kabalo, and Kikonja. Of the other two one is at Elisabethville in the Katanga and the other at Lusambo on the Sankuru. The station at Banana has a range of from 400 to 1,000 nautical miles, the others one of 300, with the exception of that of Kabalo, the range of which is limited to 100 miles. Stanleyville and Umangi can communicate with Brazzaville, Kindu with Mwanza on Lake Victoria, and Banana with Swakopmund in the former German possessions in South-West Africa.

It is said, however, that atmospheric conditions in the

Congo are unfavourable for wireless telegraphy, the air often being highly charged with electricity, while the strong sunlight affects the passage of the ether waves. Stations with wave lengths under 1,200 yards fail after 6 a.m., and succeed only at night. As the number of messages which have to be received or dispatched in the course of the twenty-four hours is not very large, this disadvantage is not so great as might at first sight appear. For a country like the Belgian Congo a combination of wireless with the older method will probably prove most effective. The great advantage of the ordinary telegraph is that communication can be established with any number of intermediate points, but its construction in the Congo is slow and costly, the cost of upkeep is very great, and there are numerous interruptions caused by fires, falling trees, floods, and wild animals. Wireless stations on the other hand provide a system of communication which can be more rapidly constructed and is less costly both in respect to initial outlay and upkeep. But it is handicapped by the fact that the number of stations must necessarily be few, and that it does not provide for communication to intermediate points. For a country circumstanced as the Congo the best plan is probably to establish wireless stations at important centres and to connect them with the surrounding districts by telegraphs and telephones.

PORTS

The ports of the Belgian Congo fall into three groups—sea ports, river ports, and lake ports. The sea ports and lake ports are almost entirely engaged in the foreign trade of the colony, while the river ports, though engaged to some extent in purely internal trade, are mainly used in connexion with the export of the products of the country and the import of the commodities which it requires from abroad.

Sea Ports

In proportion to its area the coast-line of the Belgian Congo is extremely short. Its frontage to the Atlantic lies between the Portuguese territory of Kabinda and the estuary of the Congo, and is little over 20 miles in length. For shipping purposes its value is small. The coast is generally low and sandy, and the shoal by which it is fringed makes it unsafe

for vessels to approach too close. This shoal, which begins a few miles south of Red Point ($5^{\circ} 44' S.$), carries the 3-fathom line three and a half and the 5-fathom line six and a half miles from the shore. In addition the Atlantic rollers have been known to break in seven fathoms of water.

For its direct communication with the sea therefore the colony has to depend upon the lower Congo and its estuary. This waterway can as a rule be navigated without much difficulty, though the conditions are not ideal. The current is both strong and irregular. Below Boma its average rate is 2.5 knots, but during the period of high water it is about 4 knots. Above Boma it is somewhat greater, and when the river is high is probably about 5 knots. In the part known as the Devil's Caldron above Noki a rate of 10 knots has been reported, and vessels steaming not more than 10 knots have at times been unable to make the port of Matadi.

Banana, which is situated on Banana creek at the mouth of the estuary, is a pilot station and port of call where ships may be lightened, if necessary, before proceeding upstream. Good anchorage can be obtained in the creek by vessels drawing up to 19 feet of water, but it is doubtful whether the port can be developed. Fresh water cannot be obtained, and ships in need of a supply must proceed upstream and take it in from the river.

About 20 miles upstream and opposite the Portuguese port of Kisanga on the left bank the river divides into two channels. The old passage along the north bank known as the Mateva Pass route has not been used for a number of years on account of the insufficiency of water. That along the southern bank, formerly called the Congo-Yella route but now known as the Fetish Rock or Portuguese route, is taken by practically all vessels going to Boma. The depths on this route vary from 10 to 4 fathoms, except in the parts south-east of Bird Island and south of Fetish Rock, where a depth of 20 feet is maintained by dredging. The two channels unite at Fetish Rock, which is $28\frac{1}{2}$ miles from Kisanga by the Mateva Pass route and $31\frac{1}{2}$ miles by the Congo-Yella route.

Boma, $7\frac{1}{2}$ miles from Fetish Rock and 60 miles from Banana, is the capital of the Belgian Congo. The port facilities are not on an extensive scale. There are two iron piers, a small one with a depth of 23 feet of water at its extremity and a larger one, alongside which the larger vessels lie with a depth of

17 feet at low water. The latter, however, is difficult of access, being close to a bank formed by deposits from the Crocodile river.

Above Boma there appears to be a considerable depth of water all the way to Matadi, a distance of 30 miles, though navigation, as already mentioned, is sometimes hindered by the strength of the current in the Devil's Caldron. But provided the vessel has good speed, neither the current nor the rocks which lie in the river prove serious obstacles. Ango-Ango, 3 miles below Matadi, is the terminus of the pipe-line which conveys oil to Leopoldville. It has large oil-tanks and a pumping-station, and is connected by rail with Matadi. Matadi, 90 miles above Banana, is the principal port in the Belgian Congo. It is situated on the left bank of the river and is at the head of navigation for ocean-going vessels, as the rapids commence at Vivi almost immediately above it. As a port Matadi is still in the early stages of development. There are two large iron piers opposite the railway station, alongside which steamers lie to load or unload. The piers have T heads, which lie parallel with the river-bank and the stream, each head being 110 yards long. The depth alongside the upper pier is from 30 to 33 feet, and alongside the lower pier from 17 to 20 feet. In 1913 the two T heads were connected by a wharf, so that three large vessels can now lie alongside at once. The *Compagnie du chemin de fer du Congo* is carrying the wharf downstream so as to give it a total length of about 1,000 yards. In addition to increased wharfage, however, the port, if it is to handle efficiently the increasing quantity of goods from the interior, will require to be almost entirely remodelled, warehouses will have to be extended, and proper facilities for loading and unloading vessels provided.

The main difficulties presented to navigation on the lower Congo and its estuary are insufficient depth of water at certain seasons of the year, the sinuous course which has to be followed between Kisanga and Boma, and the strength of the currents, more especially in the Devil's Caldron. For relatively small steamers with high engine-power the ascent is possible at all seasons of the year, though great care has to be exercised. But the general tendency is towards larger vessels being employed in maritime commerce, and in any case the growing trade of the Congo renders the use of the

smaller ones unprofitable. The *Compagnie belge maritime du Congo* has some boats of 7,500 tons, drawing from $23\frac{1}{2}$ to 24 feet of water, and these have at low water to be lightened before they can proceed upstream. Very few oil-tanks draw less than 20 feet, and those which have a carrying capacity of between 5,000 and 6,000 tons—that is, the greater number—draw between 23 and 24 feet. They have accordingly to be lightened before they are able to ascend the river.

The difficulty of navigating parts of the river presents a considerable obstacle to the use of the port of Matadi, and if this cannot be overcome will undoubtedly retard the commercial development of the country. Various suggestions have been made to remedy the existing state of affairs. In 1912 it was suggested that the present route should be abandoned and that a return should be made to the one which was in use about fifteen years ago. As already indicated, the lower Congo may be divided into three sections. In those between Banana and Kisanga and between Boma and Matadi the depth of the water is considerable, and the contour of the bed shows little change from year to year. Between these two sections, however, there is a third in which the bed of the river has a considerable expansion, is generally shallow, and undergoes considerable change from year to year. The Mateva Pass route, which kept to the north of Bulikoko and Hippopotamus Islands, had to be abandoned because of silting, but it was said that with proper dredging it might be kept open for vessels drawing 23 to 24 feet of water. Since the time at which this suggestion was made, however, further silting has undoubtedly taken place, and it is thought that dredging a channel would now prove an almost impossible task. On the other hand the constant dredging which has been carried on in the Fetish Pass route during the last few years has deepened the river there, and even at low water a depth of $22\frac{1}{2}$ feet (6.80 metres) can now be obtained. Unfortunately the current is attacking the banks of the river, with the result that the amount of material which has to be removed from its bed is unduly increased, while the channel itself is rendered more tortuous and difficult to navigate. To prevent this continuing until the danger point is reached, it may become necessary to strengthen artificially the banks of the river—a work which would be both long and costly.

Quite recently a further suggestion has been made. It is said that the river shows a marked tendency to deepen the channel to the west of the existing route. At present the main current bifurcates near Fetish Rock, and the principal branch follows the Fetish Pass route, while another branch flows between Penfold Island and Bird Island. It is the latter branch which is believed to be deepening its bed at the present time, and if the process continues for a few years at the same rate as it is thought to have done so during the last twenty years it will form the main channel of the river. The route by it would be much more suitable for large vessels than that which is now followed.

The only alternative would appear to be an extension of the present system of lightening ships before they ascend above Kisanga, a process which involves both delay and expense. It is this which gives significance to the French proposal to construct a port at Pointe Noire. Costly harbour works would no doubt be necessary there, but if completed they would enable large ships to load and unload alongside. Such a port connected with Stanley Pool by a much better railway than that which runs from Matadi to Leopoldville would not only take the French trade away from the Congo ports, but might possibly take part of that of the Belgian Congo as well.

The following table shows the number of vessels and the aggregate tonnage entered and cleared at the ports of Banana, Boma, and Matadi during the year 1913.

STEAMERS				
Nationality	Ocean Vessels		Coasting Vessels	
	No.	Tonnage	No.	Tonnage
	<i>Port of Banana</i>			
	<i>Entered</i>			
Belgian . . .	32	153,537	6	1,210
British . . .	36	68,639	—	—
German . . .	32	73,814	—	—
French . . .	26	70,312	1	3
Dutch . . .	—	—	36	1,032
	<i>Cleared</i>			
Belgian . . .	33	158,301	6	1,210
British . . .	36	68,639	1	3
German . . .	31	71,374	—	—
French . . .	26	70,312	—	—
Dutch . . .	—	—	35	880

<i>Nationality</i>	<i>Ocean Vessels</i>		<i>Coasting Vessels</i>	
	<i>No.</i>	<i>Tonnage</i>	<i>No.</i>	<i>Tonnage</i>
		<i>Port of Boma</i>		
		<i>Entered</i>		
Belgian . . .	35	161,939	126	2,393
British . . .	34	63,886	—	—
French . . .	25	69,494	—	—
German . . .	27	60,748	—	—
Dutch . . .	—	—	11	409
Portuguese . .	38	10,225	4	464
		<i>Cleared</i>		
Belgian . . .	34	154,078	124	2,359
British . . .	34	63,926	—	—
French . . .	25	69,494	—	—
German . . .	28	62,343	—	—
Dutch . . .	—	—	13	441
Portuguese . .	40	10,931	4	464
		<i>Port of Matadi</i>		
		<i>Entered</i>		
Belgian . . .	17	81,117	36	2,769
British . . .	18	33,105	—	—
French . . .	13	35,102	—	—
German . . .	15	33,357	—	—
Portuguese . .	23	4,526	1	116
		<i>Cleared</i>		
Belgian . . .	18	85,963	36	2,769
British . . .	19	37,010	—	—
French . . .	13	35,002	—	—
German . . .	15	33,233	—	—
Portuguese . .	22	4,526	1	116
		SAILING SHIPS		
		<i>Port of Banana</i>		
		<i>Entered</i>		
Dutch . . .	—	—	45	1,072
Portuguese . .	—	—	111	1,772
		<i>Cleared</i>		
Dutch . . .	—	—	49	1,182
Portuguese . .	—	—	102	1,602
		<i>Port of Boma</i>		
		<i>Entered</i>		
Dutch . . .	—	—	2	40
Portuguese . .	—	—	31	965
		<i>Cleared</i>		
Dutch . . .	—	—	2	40
Portuguese . .	—	—	31	915
		<i>Port of Matadi</i>		
		<i>Entered</i>		
Dutch . . .	—	—	1	15
		<i>Cleared</i>		
Dutch . . .	—	—	1	15

Prior to the war the ports on the lower Congo were served by four steamship lines, the *Compagnie belge maritime du Congo* (flying the Belgian flag), the *Chargeurs réunis* (a French company), the Woermann Line (a German company), and the Elder Dempster line (a British company). For some time the Belgian line and the French line gave three-weekly and monthly services respectively, but about 1912 they arranged a schedule, whereby a mail steamer was to arrive at Boma every ten days. These two companies carried practically all the passengers to the Belgian Congo, as the Woermann and Elder Dempster lines ran only cargo boats. Portuguese ships occasionally called, and a certain amount of trade was also done by Dutch coasting vessels.

During the war the trade of the Congo (apart from the Katanga) was practically carried on by four ships which sailed from Hull and called at Bordeaux on the return voyage.

Lake Ports

The lakes which lie in the Great Rift Valley are all accessible from the Belgian Congo. Lake Albert, the most northerly, provides the chief outlet for the gold mines at Kilo, and for part of the rubber and ivory from the north-eastern districts of the Congo. A good road leads from Kilo to Kasenie, situated on the lake, and from there exports are shipped to Butiabwa on the British side of the lake. There is, however, no organized navigation on the lake, and all goods are carried by canoe. Mahagi, towards the north, is the only other Belgian anchorage on the lake. Lakes Edward and Kivu are of less importance, but a certain amount of trade is carried on by means of canoes. On Lake Kivu the Belgian stations are Nya Lukemba in the south, Bobandana in the north-west, and Goma in the north-east. A few years ago the Belgians had an iron boat on the lake.

Lake Tanganyika is much more important from the point of view of trade. The chief Belgian port on the lake is now the modern Albertville, at the terminus of the Kabalo-Tanganyika line. A breakwater has recently been constructed there. It is possible that a considerable transshipment trade may eventually develop between Albertville and Kigoma, the former German port on the other side of the lake and the western terminus of

the railway to Dar-es-Salam. Much, however, will depend upon the political settlement which is eventually reached regarding the territories to the east of the lake, and the extent to which the Belgians develop their railway system to the west of it. The only other ports of any note are Uvira, at the northern end of the lake and the terminus of a route which leads north by way of the Rusisi valley, and Toa, to the north of the mouth of the Lukuga and an important centre for native navigation by means of canoes.

On Lake Mweru the principal Belgian stations are Kilwa, Pweto, and Lukonzolwa. Kilwa is the terminus of an important portage route to the Katanga, and from Pweto a road suitable for wheeled traffic leads to Kiambi, whence there is communication by river with the Lualaba.

River Ports

The river ports in the Congo fall into two classes: those at which goods are transhipped from river to rail or from rail to river, and those which are merely used for loading or unloading goods conveyed by the river steamers. To the first class belong places like Leopoldville, Kinshasa, Stanleyville, and Ponthierville. Leopoldville, as already mentioned, is not well situated to be a good port, but it has useful repair and construction works, which render it of some importance for this part of the river. A new floating dock was constructed about 1912. At Kinshasa the *Citas* (an important shipping company on the upper river) owns large houses with railway connexion along the water's edge and an iron pier 200 feet in length. It also possesses slipways on which most of the French and Belgian Congo steamers have been assembled. Other firms at Kinshasa have their arrangements for loading and unloading steamers, but there is as yet nothing in the way of a port in the proper sense of the word. At Stanleyville there is a wharf and an inclined plane running down to the river. Kongolo has no wharf, and loading and unloading is done either by means of barges or at the jetty. Similar arrangements seem to prevail at most other river ports. In some cases the concessionary companies have constructed small wharves for their own use.

CHAPTER XIV

FOREIGN TRADE

THE real development of foreign trade in the Belgian Congo did not begin till 1885, but previous to that there had been some tentative efforts. In 1858 a French house, *Régis et Cie*, had established a branch upon Banana Point, which was consequently long known as French Point. Two years later a Dutch company, the *Afrikaansche Handelsverleniging* of Rotterdam, installed themselves at Boma, where they were joined a few years later by the agents of an English firm, Hatton and Cookson, and by some Portuguese traders. When Stanley arrived at Boma in 1877, after his great journey across Africa, he found sixteen Europeans there, the representatives of six factories, French, English, Portuguese, and Dutch. In 1882 the British Congo Company made its appearance; it was followed in 1884 by a Portuguese concern, the *Companhia portugueza de Zaïre*. Such was the general state of affairs when the Independent State was founded in 1885. The trade which was carried on was limited in extent, and was confined in the main to the districts round the lower Congo.

After 1885 a marked change took place, and before the end of 1886 three Belgian companies had been formed for the development of trade in the Congo. Of these the most important was the *Compagnie du Congo pour le commerce et l'industrie*, which for a number of years was to play an important part in discovering and exploiting the economic resources of the country. As its activities extended, affiliated companies were founded, and by 1891 it had a capital of 35,000,000 francs, ran 25 establishments, employed 250 white men, and owned 11 steamers. At the same time elaborate measures had been taken to provide an effective service of porters until such times as the Matadi-Leopoldville railway was completed. The future history of this and other companies is dealt with elsewhere. It suffices for the moment

to indicate the conditions under which foreign trade between Europe and the Congo was first established.

The following table shows the rate at which the special trade of the country has since developed. (Statistics of imports were not collected until May 9, 1892, the date at which duties were first levied.)

<i>Year</i>	<i>Value of Exports</i> (in thousands of francs)	<i>Value of Imports</i> (in thousands of francs)
1886 (six months)	886	
1887	1,980	
1888	2,609	
1889	4,297	
1890	8,242	
1891	5,353	
1892	5,487	4,984 (from May 9)
1893	6,206	9,175
1894	8,761	11,194
1895	10,943	10,685
1896	12,389	15,227
1897	15,146	22,181
1898	22,163	23,084
1899	36,067	22,325
1900	47,377	24,724
1901	50,488	23,102
1902	50,069	18,080
1903	54,597	20,896
1904	51,890	23,344
1905	53,032	20,075
1906	58,277	21,477
1907	58,894	25,181
1908	43,371	26,586
1909	56,167	22,126
1910	66,602	36,846
1911	54,052	48,632
1912	59,926	54,232
1913	55,187*	71,590*
1914	52,874	44,492
1915	71,994	23,453
1916	129,203	53,765

The figures for 1917 and 1918 have not yet been published, but they are believed to show a large increase in exports.

* The figures for 1913 are only approximate. War broke out before the official returns for that year were published and Brussels was cut off from the Congo.

EXPORTS

The chief articles of export in the special trade of the Belgian Congo are rubber, copal, palm-nuts and palm-oil, copper, ivory, and gold. The relative importance of these has, however, varied very considerably during the period under consideration.

Rubber

The following table shows the annual export of rubber from the Belgian Congo during the years 1887-1916, the value of the exports, and the relation between rubber and all other commodities exported :

<i>Year</i>	<i>Metric tons</i>	<i>Value in thousands of francs</i>	<i>Percentage of total value of exports</i>
1887	30	117	6
1888	74	260	10
1889	131	459	11
1890	134	556	7
1891	82	327	6
1892	156	625	11
1893	241	963	16
1894	338	1,473	17
1895	576	2,883	26
1896	1,317	6,587	53
1897	1,662	8,312	55
1898	2,113	15,850	72
1899	3,747	28,101	80
1900	5,317	39,874	84
1901	6,023	43,966	87
1902	5,350	41,734	83
1903	5,918	47,344	86
1904	4,831	43,478	84
1905	4,862	43,756	83
1906	4,849	48,489	83
1907		43,982	74
1908	4,559	30,779	71
1909	3,751	42,569	76
1910	3,417	51,016	77
1911	3,401	34,426	64
1912	3,510	34,769	58
1913	3,624	17,698	32
1914	2,249	10,630	20
1915	2,179	11,107	15
1916	3,017	17,742	14

The rise and decline in the importance of rubber as an export are very remarkable, and can be explained only by taking into consideration a number of facts widely different from one another. In the early days of the Independent State, before railway communication had been established with the interior, the cost and difficulty of transport were too great to encourage any considerable expansion of trade in this direction. The products of the oil-palm, which could be obtained in the Lower Congo, and ivory, which bulk for

bulk was much more valuable than rubber, and could therefore stand the cost of transport better, constituted at this time the chief exports of the colony. With the completion of the railway from Matadi to Leopoldville the situation entirely changed. The growing demand for rubber in Europe provided a market for a commodity which could be cheaply collected by means of forced labour, and required neither a heavy initial outlay nor a long period of waiting for a return on that outlay. The output accordingly went up by leaps and bounds, and reached its maximum in the years 1900-6, though the most profitable period did not occur till the great boom of 1910. By that time, however, the exports had begun to decline. The old methods of gathering rubber by means of forced labour were being abolished, the most accessible districts had probably suffered from reckless exploitation, and, above all, the plantations of Ceylon and Malaya had reached the productive stage. The fall in the price of rubber after 1910 only accelerated a movement which had already begun, and which would have proceeded more rapidly than it did had measures not been taken to check it. Of these measures the most important were, first, a very considerable reduction in the railway rate from Leopoldville to Matadi, and, second, the suspension of the tax on rubber while its price in Europe remained below a certain figure. The future of rubber production in the Congo and the prospects of the plantations there have already been discussed (see Chapter XI).

The decline in the relative importance of rubber among the exports is due of course not only to the decreased amount produced, and to the fall in price, but to the increased output of other commodities, such as copper, palm-oil products, and copal. Both from the commercial and from the fiscal standpoint this is an advantage, as it tends to give greater stability to the trade and finance of the colony.

Palm-Nuts and Palm-Oil

The following two tables show the general character of the exports of the kernels of *Elaeis guineensis* and of palm-oil during the years 1887-1916.

EXPORTS

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PALM-KERNELS

<i>Year</i>	<i>Metric tons</i>	<i>Value in thousands of francs</i>	<i>Percentage of total value of exports</i>
1887	2,138		
1888	2,577		
1889	3,019		
1890	6,617		
1891	4,715	1,320	25
1892	3,065	677	12
1893	4,055	896	14
1894	5,332	1,333	15
1895	4,972	1,243	11
1896	4,754	1,114	9
1897	4,396	1,099	7
1898	4,740	1,280	5
1899	4,703	1,293	4
1900	4,884	1,319	3
1901	4,225	1,373	3
1902	5,212	1,694	3
1903	4,958	1,487	3
1904	4,596	1,379	3
1905	5,047	1,514	3
1906	4,896	1,469	3
1907	5,192	2,088	3
1908	5,628	1,745	4
1909	5,213	1,835	3
1910	6,141	2,657	4
1911	6,746	2,879	5
1912	5,895	2,770	5
1913	7,205	3,963	7
1914	8,052	3,623	7
1915	11,024	5,181	7
1916	22,391	12,763	10

PALM-OIL

<i>Year</i>	<i>Metric tons</i>	<i>Value in thousands of francs</i>	<i>Percentage of total value of exports</i>
1887	738		
1888	1,042		
1889	1,142		
1890	2,204		
1891	1,573	846	16
1892	906	432	8
1893	1,287	614	10
1894	1,710	889	10
1895	1,799	936	9
1896	1,482	771	6
1897	1,250	650	4
1898	1,419	667	3
1899	1,469	735	2
1900	1,627	813	2
1901	1,500	802	2
1902	1,777	951	2

Year	Metric tons	Value in thousands of francs	Percentage of total value of exports
1903	1,647	972	2
1904	1,784	1,053	2
1905	1,922	1,153	2
1906	1,995	1,197	2
1907	2,052	1,508	2
1908	2,104	1,220	3
1909	1,712	984	2
1910	2,160	1,796	3
1911	2,273	1,732	3
1912	1,989	1,253	2
1913	1,974	1,244	2
1914	2,498	1,574	3
1915	3,408	2,130	3
1916	3,852	3,351	3

The most remarkable feature in the above tables relating to the export of palm-kernels and palm-oil is the great increase in the output which has taken place within recent years. This is due in the main to the development of the concessions granted to the *Société anonyme des huileries du Congo belge* (Messrs. Lever). Up to the present time the export of palm-kernels has increased more rapidly than that of palm-oil, but, as the machinery necessary for the extraction of oil is now being installed in the country, there will probably be a large increase in its output during the next few years. The policy of crushing the kernels locally has several advantages: more oil is obtained from the nuts, the cost of carriage, particularly heavy if the kernels have to be brought by way of the Leopoldville-Matadi railway, is reduced, and the question of making full use of the waste products becomes of less importance.

As a result of the war, more attention has been paid in the United Kingdom to the products of the oil-palm than was formerly the case, and it is not unlikely that the demand for them will be permanently increased. The oil obtained from the kernels is by various processes converted into a liquid portion (olein) and into a hard white fat (stearin). From various admixtures of these margarine, vegetable butter, and cooking fats can be produced on the one hand, and soap and candles on the other. In this country, to which palm-oil alone was hitherto sent in large quantities, it was used either for soap and candles or in the tin-plate industry. But it is not improbable that the consumption of margarine, which, if it has not exactly come into favour in this country during

the war, has at least lost much of its old disrepute, may be permanently increased. The residual matter, after the oil has been extracted, has been for a long time used on the Continent as a food for young pigs, mileh-cows, and other stock, and it is said that recent efforts to induce British farmers to experiment with it have met with some degree of success. On the whole then it would appear that the demand for both palm-kernels and palm-oil will increase in this country, while on the Continent, where they have hitherto been used to a much greater extent, the demand is not likely to decrease.

Ivory

The exports of ivory since 1887 are shown in the following table :

<i>Year</i>	<i>Metric tons</i>	<i>Value in thousands of francs</i>	<i>Percentage of total value of exports</i>
1887	36		
1888	45		
1889	85		
1890	168		
1891	142	2,835	53
1892	187	3,730	68
1893	186	3,718	60
1894	252	5,042	58
1895	292	5,845	53
1896	191	3,826	31
1897	246	4,916	32
1898	216	4,319	19
1899	292	5,835	16
1900	263	5,253	11
1901	198	3,965	8
1902	249	4,986	9
1903	185	3,792	7
1904	167	3,840	7
1905	210	4,838	9
1906	178	4,455	8
1907	204	6,414	10
1908	229	5,936	13
1909	244	6,583	12
1910	237	6,056	9
1911	226	5,693	10
1912	234	6,076	10
1913	276	7,762	13
1914	295	7,092	13
1915	215	4,589	6
1916	351	7,732	6

Although fears have frequently been expressed that the exports of ivory from the Congo would decline owing to the

reckless slaughter of elephants, the above table affords little indication that that stage has yet been reached. The fluctuations in the output which may be observed are due, at least in part, to the restrictions imposed by the Government at various times. Regulations which came into force in the early part of 1913 made the registration of ivory a much more simple matter than it had formerly been, and allowed the native to pay a tax on his ivory instead of surrendering one-half of it. At the same time the minimum weight of a tusk allowed to be exported was reduced from 10 kilogrammes to 6. Though at first sight this latter provision might seem to encourage the slaughter of immature animals, it will probably have little real effect. For years a considerable contraband trade had been carried on across the Portuguese frontier both in large and small tusks. This trade has been checked to a very great extent by the new regulations, and the increased output of ivory since they came into effect is probably due in the main to the fact that much less is now smuggled into Angola than was formerly the case.

Gold

The figures for the export of gold since 1904, the first year in which it appeared in the official statistics, are as follows :

<i>Year</i>	<i>Kilogrammes</i>	<i>Value in thousands of francs</i>	<i>Percentage of total value of exports less than 1</i>
1903	5	15	
1904	72.9	219	
1905	146.3	468	"
1906	274.7	851	"
1907	534	1,571	3
1908	215	704	2
1909	749.3	2,280	4
1910	756	2,515	4
1911	907.4	3,119	6
1912	967	3,222	5
1913	1,476	5,071	9
1914	1,930	5,552	10
1915	3,935	13,558	19
1916	2,852	—	

The export of gold will probably continue to increase for some time. The auriferous regions in the north-east of the colony have not yet been fully developed, while deposits believed to exist in the Katanga and elsewhere are still unworked.

Copal

The export of copal on an extensive scale did not begin till about 1896. Since then the annual output has been as follows:

<i>Year</i>	<i>Metric tons</i>	<i>Value in thousands of francs</i>	<i>Percentage of total value of exports</i>
1896	9	16	less than 1
1897	39	67	"
1898			"
1899	1	1	"
1900	21	27	"
1901	212	297	"
1902	340	475	1
1903	342	650	1
1904	950	1,426	3
1905	845	845	2
1906	869	1,086	2
1907	1,220	2,038	3
1908	1,661	1,793	4
1909	827	868	2
1910	976	1,314	2
1911	2,139	3,348	6
1912	3,776	6,385	11
1913	4,698	8,926	16
1914	6,993	6,294	12
1915	4,266	2,815	4
1916	8,719	5,380	4

While rubber was plentiful and obtained a good price comparatively little attention was paid to the collection of copal. But the increased demand for it in Europe, where it is used as a varnish, came at a time when rubber was less easy to find than before, and when to this was added the great fall in price of the latter commodity many traders turned to copal as a substitute. As will be seen from the above table, it had advanced by 1914 to an important place among the exports of the country. The market appears, however, to have been upset by the war, and, although the total amount exported is practically the same as before (allowance being made for shipping difficulties), the price has fallen very considerably. It is not improbable that when normal conditions are restored copal may become a more important article of export than rubber.

Copper

Copper first appeared among the exports of the Belgian Congo in 1905. Since 1909 the exports have been as follows:

<i>Year</i>	<i>Metric tons</i>	<i>Value in thousands of francs</i>	<i>Percentage of total value of exports less than 1</i>
1909	11	17	
1910	153	90	„
1911	1,015	1,834	3
1912	2,463	4,112	7
1913	5,412	8,605	16
1914	10,343	15,515	29
1915	14,274	23,548	40
1916	21,882	63,896	49

During the last few years copper has advanced with almost phenomenal rapidity to the first place among the exports of the Congo. This is entirely due to the development of the copper mines of the Katanga by the *Union minière*. After a long period of preparation these mines were just getting into full working order when war broke out, and, though their progress was at first rather checked by that event, the subsequent demand for copper gave a further impetus to their development.

From the fiscal point of view the greatly increased output of copper is of considerable advantage to the colony. Its influence on the commercial development of the country is much less direct. Apart from the coal and machinery used in the mines and smelters, the material required in the construction of the railways and the rolling-stock employed on them, and the foodstuffs imported for the benefit of those engaged in the mining industry, the export of copper leads to no great return trade, and gives employment to only a relatively small number of people (about 10,000). On the other hand it has led to the extension of railways, and may eventually lead to a certain amount of European settlement.

Summary

The changes which have taken place in the character of the export trade of the Belgian Congo since the foundation of the Independent State to the present time may be summarized in the following table, which shows the total value (in francs) of the exports in certain years and the percentage contributed to that total by each of the principal commodities already considered:

Year	Total value	Ivory	Palm-nuts	Palm-oil	Rubber	Gold	Copal	Copper	Other commodities	Total
1891		53.0	25.0	16.0	6.0					100
1895	10,943,000	53.4	11.4	8.5	26.3				.4	100
1900	47,377,400	11.1	2.8	1.7	84.3	—		—	.1	100
1905	53,032,260	9.1	2.8	2.1	82.5	.8	1.5		1.2	100
1910	66,602,300	9.0	3.9	2.7	76.6	3.7	1.9	.1	2.1	100
1914	52,874,000	13.4	6.8	2.7	20.1	10.5	11.8	29.3	5.4	100
1915	71,994,000	6.3	7.2	2.9	15.4	18.8	3.9	39.6	5.9	100

A most remarkable feature in the trade of the Congo up to the present time is the way in which one or two articles have almost always provided a high percentage of the total value of the exports. Ivory and the products of the oil-palm gave place to rubber, and just when rubber was declining both relatively and absolutely the output of copper began to increase rapidly. At the same time it must be noted that the export trade of the colony is now on a much more stable foundation than formerly, and is much less likely to be seriously disturbed by fluctuations in the output of any one commodity.

Another feature of the export trade shown by the above table is the growing importance of articles other than those which have been specifically mentioned. In 1915 they accounted for about 6 per cent. of the total value of the goods exported. Among them are cocoa, rice, cotton, raw hides, and timber. Of these cocoa and rice are at the present time the most important, but the output of cotton is on the increase.

As stocks of certain commodities such as palm-kernels have to some extent been held up as a result of the war, the figures for 1915 are the last which can be regarded as at all satisfactory for purposes of comparison.

IMPORTS

The figures for the special import trade since 1892 are given on page 262. The considerable fluctuations between one year and another are to be explained in the main by the irregular importation of railway material and machinery. The following figures, based on the returns for the four years 1909-12, show approximately the percentage to the total value of exports of each of the more important classes of articles imported:

Cotton and textile goods	20	per cent.
Provisions	16	„ „
Machinery	10	„ „
Metals	10	„ „
Clothing	6	„ „
Steamers, &c.	4	„ „

Cotton and textile goods are imported very largely for sale to the native population, who also buy considerable quantities of old clothing and ready-made goods. Provisions consist of European foodstuffs for the use of the European population and agricultural produce required by the natives engaged in the exploitation of the mines in the Katanga. Metals include much of the material imported by the railway companies for the construction of the permanent way, while machinery consists of locomotives and the plant required by the mining companies, the palm-oil industry, &c. The steamers are in the main for use on the middle and upper Congo and its tributaries.

Among other articles coal, coke, and oil are increasing in importance. Coal and coke come from the Wankie coal-field for the smelters in the Katanga, and oil is now used on some of the river steamers. The importation of rum for the native population is prohibited, but a considerable quantity of alcoholic liquor is imported for consumption by Europeans. Tobacco, hardware, and a variety of articles, sometimes designated by the expressive term 'trumpery', are imported for sale to the natives.

The bulk of the imports came before the war from Belgium, the United Kingdom, Germany, France, Rhodesia, and the Union of South Africa. The percentage of the total supplied by each of these countries in 1911 and 1912 was approximately as follows:

<i>Year</i>	<i>Belgium</i>	<i>United Kingdom</i>	<i>France</i>	<i>Germany</i>	<i>Rhodesia and South Africa</i>
1911	65	12	4.5	5	3
1912	66	10	2	8	6

Cotton and textile goods were very largely supplied by Belgium (68 per cent. in 1911) and by the United Kingdom, which countries also provided the greater part of the ready-made clothing, shirts, &c., sold in the colony. Provisions came from various quarters. Preserved meats were largely of Belgian

and French origin. Denmark sent butter, and Switzerland milk. Flour was imported from Britain and various European countries, and Rhodesia was developing a considerable trade with the Katanga in beans, oatmeal, lentils, and barley. Norway and Angola supplied fish.

Metals were almost entirely imported from Belgium before the war, although a large amount of corrugated iron was taken from the United Kingdom. Locomotives were partly of British and partly of Belgian make, but wagons and carriages were practically all of Belgian manufacture.

About 1912 Germany was making a big effort to obtain a larger share in the import trade of the Congo. Commercial travellers were visiting the country, displaying their samples, and offering long credit on easy terms to would-be purchasers. In that year their share of the imports advanced from 5 to 8 per cent.

As a result of the war, of course, Belgian trade with the colony was entirely suspended, and the greater part of the imports was obtained from the United Kingdom and her colonies. In 1915, for example, the special imports amounted in value to 23,453,000 francs, and of that sum the share of the United Kingdom was 11,319,000 francs, of Rhodesia and South Africa 6,388,000 francs, of France 1,288,000 francs, and of Angola 1,075,000 francs.

TRANSIT TRADE

In the early days of the Independent State its transit trade was relatively of great importance. During the five years 1888-92, for example, about 45 per cent. of the total value of the exports from the country was credited to goods which came from beyond its frontiers. In the five years 1909-13 which preceded the outbreak of war this figure had fallen to 28 per cent. The following tables give in millions of francs the details for the years 1911, 1912, and 1913, and for the years 1914, 1915, and 1916:

TABLE I

Exports

<i>Year</i>	<i>General</i>	<i>Special</i>	<i>Transit</i>
1911	78.9	54.0	24.9
1912	84.2	59.9	24.3
1913	71.7	55.2	16.5

FOREIGN TRADE

<i>Year</i>	<i>Imports</i>		<i>Transit</i>
	<i>General</i>	<i>Special</i>	
1911	58.3	48.6	9.7
1912	62.2	54.2	8.0
1913	87.1	71.6	15.5

TABLE II

<i>Year</i>	<i>Exports</i>		<i>Transit</i>
	<i>General</i>	<i>Special</i>	
1914	61.2	52.9	8.3
1915	82.5	72.0	10.5
1916	147.2	129.2	18.0

<i>Year</i>	<i>Imports</i>		<i>Transit</i>
	<i>General</i>	<i>Special</i>	
1914	51.6	44.5	7.1
1915	29.6	23.4	6.2
1916	79.1	67.6	11.5

These tables show the relation of the transit trade to the general and special trade. The decline of the transit trade both actually and relatively during the latter period is due to several factors. The greater part of it comes from the French and former German possessions which border the Congo, and the exploitation of the latter districts at least must have been seriously disturbed by the war. On the other hand the greatly increased exports of copper and palm-nuts from the Belgian Congo have given it a much larger proportion of the general trade.

The principal commodities which enter into the transit export trade of the Congo are rubber and ivory. The following tables show, in millions of francs, the general, special, and transit trade in each of these articles during the years 1911-13 and 1914-16:

TABLE I

<i>Year</i>	<i>Rubber</i>		<i>Transit</i>
	<i>General</i>	<i>Special</i>	
1911	50.4	34.4	16.0
1912	53.5	34.7	18.8
1913	27.8	17.7	10.1

<i>Year</i>	<i>Ivory</i>		<i>Transit</i>
	<i>General</i>	<i>Special</i>	
1911	9.2	5.7	3.5
1912	9.3	6.1	3.2
1913	11.8	7.7	4.1

TABLE II

<i>Year</i>	<i>Rubber</i>		<i>Transit</i>
	<i>General</i>	<i>Special</i>	
1914	14.6	10.6	4.0
1915	18.8	11.1	7.7
1916	29.3	17.5	11.8
	<i>Ivory</i>		
1914	9.8	7.1	2.7
1915	6.3	4.6	1.7
1916	9.6	7.7	1.9

Comparing these tables with those already given, it is seen that during the first period, 1911-13, rubber and ivory accounted for 85 per cent. of the total transit export trade and during the second period for about 81 per cent. of it.

CHAPTER XV

GOVERNMENT AND ADMINISTRATION

As a result of the international situation created by the charges of misgovernment against the Congo Free State, the Belgian Congo was annexed by Belgium in 1908, the annexation becoming effective from November 15 of that year. The government of the country is now carried on according to the Constitution finally approved by King Leopold on October 18, 1908, modified to some extent by subsequent Acts of the Belgian Parliament, of which the more important are those of March 29, 1911, March 5, 1912, and December 9, 1912. The effect of these various enactments may be briefly summarized as follows.

CENTRAL GOVERNMENT

The Belgian Congo is placed under the legislative control of the king, but he must act on the advice of the Colonial Minister, who is responsible to Parliament. His legislative power he exercises by decree, and his executive power by regulations, subject, however, to any laws passed by the Belgian Parliament. In the government of the country the king is aided by a Colonial Council consisting of the Colonial Minister, who presides, and fourteen members, eight of whom are nominated by the king, three by the Senate, and three by the Chamber. One of the councillors nominated by the king and alternately one of those nominated by the Senate or by the Chamber retire each year, but may be reappointed. Members of the Senate or of the Chamber are not themselves eligible for election. The powers of this Council are advisory, and except in cases of urgency it must be consulted before any decree is issued. Parliament retains in its own hands the control of the Colonial Budget. In dealing with the foreign relations of the colony the king acts on the advice of the Minister for Foreign Affairs. In practice therefore it works out that the Congo is under

the control of the Belgian Parliament, and so under the control of the Belgian people.

In addition to the Colonial Council, there are two other bodies of a consultative character at Brussels. One is the *Conseil supérieur du Congo*, which was created in 1899, and now acts as a court of appeal. The other is the *Commission des terres*, which was created in 1910, and consists of five members, all Government officials. Its duty is to examine all questions relative to the concession or sale of land.

LOCAL GOVERNMENT

The Governor-General and Chief Officials

Previous to the royal decree of July 28, 1914, which reorganized the administration of the Belgian Congo, the Governor-General was the head of the executive in the colony, where he was the representative of the king. As a rule he had no legislative power, and his duty was to administer the colony in the way decided for him by the central government. He appointed and dismissed all the less important officials, controlled the general administration of the country, and was responsible for the maintenance of public order. But his powers were much limited by the authorities at home. In the preparation of the budget he had only a consultative voice; the prerogative of mercy could not be exercised by him; even for the establishment of a new post-office a ministerial decree was necessary.

The Governor-General was assisted in his work by several vice-governors and inspectors, the secretary-general, and the directors of the public services. One of the vice-governors was in charge of the Katanga; the others were attached to the central administration at Boma, or were sent as inspectors into the various districts of the colony as circumstances might direct. The inspectors had no definitely specified duties, and were used in the public service as the needs of the administration might require. The directors of the public services were at the head respectively of the departments of Justice and Public Instruction, the Interior, Finance, Industry and Commerce, Agriculture, Marine and Public Works, and Army and Police. These and various others formed a consultative council which

the Governor-General might ask to advise him if he judged necessary. As a matter of fact he made little use of it.

The difficulties of administering so large an area as the Belgian Congo from Boma soon made themselves apparent, and the royal decree of July 28, 1914, prepared the way for the division of the colony into four provinces, Congo-Kasai, Equateur, Orientale, and Katanga. Their capitals are respectively Kinshasa, Coquilhatville, Stanleyville, and Elisabethville. Each of these provinces is administered by a vice-Governor-General, to whom is entrusted the care of its internal affairs. He is assisted by the directors of the various public services established in the province, and by a *Comité consultatif* consisting of these directors, together with the commissioners of the various districts in the province, and some of the more prominent European inhabitants. The *Comité* considers all matters relating to public works, and the collection and expenditure of the revenue.

The Governor-General has full executive authority in the colony except in so far as he is restrained by laws and royal decrees. He cannot, for example, interfere with the vice-Governors-General in their discharge of the powers assigned to them, and he deals mainly with matters which affect the interests of the colony as a whole. The preparation of the annual budget is entrusted to him, but in this work he receives help from the provincial authorities. He is assisted in his various duties by the heads of the public services, and by the *Conseil du Gouvernement*, in which they sit along with the vice-Governors-General and various European notables.

Districts and Territories

By a royal decree of 1912 the territorial divisions of the colony were reorganized. The districts were increased in number from twelve to twenty-two, and the old subdivisions of the district, the zones, the sectors, and the posts, were replaced by a new subdivision, the territory, the extent of which varies according to circumstances. The twenty-two are as follows: Bas Congo, Moyen Congo, Lac Léopold II, Equateur, Lulonga, Bangala, Ubangi, Haut Uele, Bas Uele, Aruwimi, Stanleyville, Lowa, Ituri, Maniema, Kivu, Sankuru, Kasai, Kwango, Lomami, Tanganika-Moero, Haut Luapula, Lulua.

The last four of these form the province of the Katanga. Bas Congo, Moyen Congo, Kasai, and Sankuru belong to that of Congo-Kasai. Equateur consists of Lac Leopold II, Equateur, Lulonga, Bangala, and Ubangi. The remainder are included in the Province Orientale.

Each district is administered by a commissioner, who represents the government within it. He is in charge of the military and police, and if force is necessary decides when and how it is to be employed. It is he also who 'recognizes' the native chiefs (according to the decree of 1910, see p. 282), or withdraws for just cause a recognition already accorded. In other respects his powers have recently been increased. Formerly he had little control over his subordinate officials, but now the central government does not intervene directly in the organization of the district, while the Governor-General confines himself to placing at the disposition of the commissioner the personnel of which he has need.

The administrators of the territories have less authority than the officials whom they have displaced. In particular they are forbidden to order military operations or to transform a police operation into a military one, to order the displacement of native villages, and to forbid or subject to conditions the recruitment of labourers.

Government of the Katanga

By its more temperate climate and rich mineral resources, no less than by its great distance from Boma, the Katanga is cut off to some extent from the remainder of the Belgian Congo, and this fact finds an acknowledgement both in the history of the region and in the special arrangements which have been made for its government. In order to understand these arrangements a brief account of the history of the region is necessary. Livingstone, Cameron, and Gambier had called attention to its mineral wealth, but it was not till 1883 that Böhm and Reichard, agents of the German section of the International Association, visited the native copper mines, and entered into relations with Msiri, the chief of the country. In 1885 two Portuguese officers entered the region, and in 1890 they were followed by some British travellers, including Thompson, Grant, and Sharp. The latter, who were connected

with the British South Africa Company, sought to obtain territorial concessions from the native chiefs. Considerable alarm was caused in the Independent State by this action, and steps were immediately taken to render effective the claims to the region which had already been made in the Declaration of Neutrality. The *Compagnie du Congo*, which some time before had sent a commercial expedition to the Katanga, came to the aid of the Independent State in this emergency. On April 15, 1890, a new company was created, the *Compagnie du Katanga*, which took over the expedition sent out by the *Compagnie du Congo* and organized two others. The three expeditions traversed the country, asserted the authority of the State among the native chiefs, and collected a considerable amount of information regarding the economic resources of the region.

The Independent State in the Convention of March 12, 1891, recognized the services which the *Compagnie du Katanga* had rendered it by granting it in full ownership one-third of the domain lands in the basin of the Lualaba above Riba-Riba, and in the basin of the upper Lomami. (In 1896 the *Compagnie* surrendered the lands which it held to the north of the 5th parallel, and received in exchange full ownership of an equivalent area in the lower Lomami.) It ceded to it also for ninety years the right of exploiting the mineral wealth of these lands, and accorded to it for twenty years preferential rights over all mineral deposits which it discovered in the territories belonging to the State. The distances from the more settled parts of the State, however, the Arab troubles, and the difficulties of delimiting the ceded lands were all obstacles to progress, and nothing of importance was done till 1900. In that year an agreement was reached between the State and the *Compagnie du Katanga* by which a new organization was established, the *Comité spécial du Katanga*. This body, which consists of six members, four, including the president, nominated by the State, and two by the *Compagnie du Katanga*, was entrusted with the exploitation of the mineral resources of the country. All income and expenditure were to be divided in the proportion of one-third to the *Compagnie* and two-thirds to the State. At the end of the ninety-nine years for which the agreement was made its property is to be divided in the same proportion,

and the non-alienated lands according to the terms of the Convention of 1891.

The State, having such a preponderance on the *Comité spécial*, also entrusted it with political powers, and by another decree, issued in 1900, granted it the administration of the Katanga, with the exception of justice, export and import duties, and postal arrangements. In annexing the Congo, in 1908, Belgium undertook to respect the engagements which had been made by the Independent State. The *Comité spécial*, therefore remained in the position in which it had been placed as far as the economic development of the Katanga was concerned. On the other hand the State remained free to withdraw the political powers which had been granted. By the Constitution it was arranged that this should take place before January 1, 1912; it was actually done on March 22, 1910. The *Comité* is now the administrator and manager of the common patrimony of the State and of the *Compagnie du Katanga*. Since the annexation it does not possess the same liberty as before. It has to respect the terms of the Constitution regarding the sale or concession of domain lands, and certain contracts which it formerly made on its own authority must now be submitted for sanction to the Belgian Parliament. Nevertheless its position remains very important. No part of the common patrimony of the State and the *Compagnie du Katanga* can be disposed of without its intervention, and, as the majority of its members are nominated by the Government, it is in reality a great public administration.

When the territorial reorganization of the colony took place, in 1912, the four districts of Lomami, Tanganika-Moero, Haut Luapula, and Lulua were, as already mentioned, formed into one vice-government. It includes not only the Katanga in the strict geographical sense, but parts of the old districts, of Kasai, Aruwimi, and Stanleyville.

By a decree of 1910 the vice-Governor-General of the Katanga represents the Government there and exercises all the executive powers delegated to the Governor-General. He has the right of corresponding direct with Brussels, and has no obligation towards the Governor-General other than that of sending him a report once in three months. The powers of the latter official are indeed practically non-existent,

and if the Katanga had a budget of its own it would be for all intents and purposes a separate colony. The vice-Governor-General is assisted by officials in the same way as the Governor-General with the exception that vice-governors are replaced by inspectors or commissioners-general.

Native Chiefdoms

In 1910 the State undertook the task of associating the native chiefs in the administration of the country. According to the plan adopted every native is to be attached to a chiefdom, the limits of which are to be determined by the Commissioner conformably to custom. Where custom also demands it sub-chiefdoms are to be recognized as well. The chief is as a rule the customary head of a tribe, and in such cases the Commissioner confines himself to giving that individual legal recognition. Where there are no customary rules, the Commissioner invites the members of the chiefdom to suggest a candidate for the vacant office, and, if they fail to do so, he makes the appointment himself. If the chief shows himself unfit, he may be removed and another appointed in his place. Every chiefdom is attached to one or other of the territories in a district, and every chief owes a certain obedience to the official in charge of the territory to which he is attached. But he is not to be regarded as a subordinate of that official, and his chiefdom is not an administrative subdivision of the territory. His position in fact is rather that of a former ruler who has been placed in tutelage.

The authority which the chiefs are allowed to exercise is considerable, and embraces the political, judicial, and administrative affairs of the districts over which they rule. In all that they do they must conform to customary native law, except in so far as that is contrary to public order as it exists in modern civilized States, or conflicts with laws and regulations made expressly with the intention of overriding customary law. In addition, however, to the powers prescribed by custom, certain other duties have been given to the chiefs by the Belgian authorities. They must, for example, assist in the collection of the revenue, in the construction of works of public utility, and in the administration of certain regulations for the maintenance of public health. For works of

a public character the chief is entitled to demand two days' or six hours' work per month from his subjects, and more if it is absolutely necessary.

How this system will work out in practice it is yet too early to say. But it has been suggested that the final result will be to transform the chiefs into mere officials of the Government. In as far as they exercise powers which have been conferred upon them by the State and do not belong to them by customary law, they will be compelled to depend upon the State for their authority; and to that extent at least they will be little more than its subordinates. With regard to their customary powers, the policy of the State is avowedly to interfere with them as little as possible. But many of the chiefs are but ill-fitted to govern, and it is probable that, as time goes on, the State will be driven to interfere more and more with their activities. Even at the present time it is not clear that some of them do not abuse their position.

JUDICIARY

The administration of justice in the Belgian Congo is carried out partly by European courts and partly by native chiefs. The European courts are of varying degree of importance. There are seven tribunals of first instance with unlimited civil and criminal jurisdiction, and they alone are competent to hear capital criminal cases against Europeans. These courts are situated at the following places: Boma for the district of the Bas Congo; Leopoldville for the districts of Moyen Congo, Lac Leopold, and Kwango; Coquilhatville for the districts of Equateur, Lulonga, Ubangi, and Bangali; Niagara for Haut and Bas Uele; Stanleyville for the districts of Stanleyville, Aruwimi, Ituri, Lowa, Mamiema, and Kivu; Lusambo for the districts of Kasai and Sankuru; and Elisabethville for the four districts which now form the Katanga. These courts may also sit at other places when necessary.

The territorial tribunals have power to hear any criminal case against natives, and against non-natives when the punishment cannot exceed five years' penal servitude or is a fine. They are created by ordinance of the procurator-general, who determines the places where they shall sit.

As these courts are, however, insufficient for the require-

ments of justice in so large a country as the Belgian Congo, the State has given judicial powers to various officials in the public service. Where no other tribunal is available any official who holds the degree of Doctor of Laws may hear charges against either natives or non-natives when the maximum punishment does not exceed seven days' imprisonment or a fine of 200 francs, certain specified classes of other offences by natives, and civil cases where the matter in dispute does not exceed 100 francs in value. There are appeal courts at Boma and Elisabethville. In civil matters they deal with cases where the subject in dispute is over 200 francs in value or a question of competence arises; in criminal matters they hear appeals in all cases except where the accused person is a native and the maximum penalty does not exceed seven days' imprisonment or a fine of 200 francs. They also act as criminal courts of first instance when criminal charges are brought against the inferior judges.

The *Conseil supérieur du Congo*, which sits at Brussels, acts as a court of cassation and as a court of appeal. In civil matters it hears appeals from Boma and Elisabethville when the subject in dispute exceeds 25,000 francs in value; in criminal affairs it acts as a court of appeal in cases affecting judges of the courts of first instance and as a criminal court in cases affecting the judges of the courts of appeal.

The native courts are presided over by the local chiefs. In civil matters where both parties are natives the case is decided according to customary law. Either party may, however, demand that the case should be carried before a European tribunal. The extent to which this is done of course varies in different parts of the country, but as a rule the native court is usually resorted to by natives who are not matriculated. In criminal matters the chiefs and under-chiefs decide according to customary law, but in two respects their powers are limited. Flogging is the only corporal punishment which they may inflict, and that must not exceed twelve strokes. Old men, invalids, women, and children are not to be punished in this way. Further the chiefs must report to the European authorities all cases of serious crime, more especially cases of ordeal by poison, human sacrifice, cannibalism, slave-dealing, and the cultivation and sale of hemp. According to native law these are seldom considered to be crimes, and those who engage in

them would escape punishment if the European authorities were not informed. Further, if an official in the public service judges fit, he may withdraw any case from the native courts and send it to a European court for trial.

Sentences pronounced by the native courts are not subject to appeal except in so far as native custom permits. This perhaps does not matter very much, as in civil matters the native may always demand that his trial should take place in a European court. In criminal matters on the other hand the European courts can always initiate a new trial before themselves, and they do this if a native can show just cause. It must always be remembered, however, that the powers of the chiefs are still very considerable, and that the native will necessarily hesitate before he incurs their disapprobation by removing his case from their purview. As a native cannot migrate from one part of the colony to another without first receiving the permission of his chief, the latter has an additional hold upon him.

LAND

From the administrative point of view lands are classed under the following heads: (1) registered lands which form the private property of the non-native population, (2) lands occupied by the native population, (3) the State lands, which include unoccupied lands and those occupied or exploited by the State. The registered lands alone can be held in private property. They include lands which were acquired by non-natives before July 1, 1885, and lands which have been ceded to private individuals by the natives or by the State, according to prescribed forms, since that date. The lands occupied by the natives are held to include not only those which they inhabit or cultivate, but all those which they exploit in any manner whatever. In order to allow for native methods of agriculture it is understood that each village should have an area at least three times as great as that actually inhabited or cultivated. The exact nature of the rights of the natives over these lands does not appear to have been precisely determined, but they are not able to dispose of them to a third party without the consent of the Governor-General. This provision is considered necessary in the interests of the natives themselves.

The domain of the State includes, in addition to lands

acquired for specific purposes, all the vacant lands of the colony which have not been registered and are not occupied by natives. Part of it is known as *le domaine public* and consists of all navigable and floatable rivers and streams and the banks thereof to a depth inland of 10 metres from high-water level. The remainder of the State lands constitute *le domaine privé*, which may be exploited in the ordinary way and even alienated by the State.

The annexation of the Congo by Belgium led to a new era in the methods by which the domain lands were worked. Instead of all exploitation being for the benefit of the State alone, as had hitherto been the case, it was now recognized that the collection of the natural products of these lands should be in private hands, and that the State should content itself with certain levies. Further the establishment of agricultural, commercial, and industrial concerns was to be encouraged by selling or leasing State lands at a moderate rate.

In order to carry out these principles a decree of March 22, 1910, put an end to the State monopoly of vegetable products on the domain lands. The transition from State to private exploitation was carried out in three stages, and was complete by July 1, 1912. Five forest reserves of an extent of 600,000 hectares (2,500 square miles) were alone exempted from the provisions of this decree. As a result forest produce can now be collected by any person who obtains a permit from the Government, which is given free of charge except in the case of rubber or copal, when a payment of 250 francs annually has to be made for each factory. A native of the Congo can collect without a permit, provided that he does not export directly. Traders without a fixed establishment in the country pay 500 francs for a *patente des trafiquants* in addition to the 250 francs already mentioned. The Governor-General may suspend the right thus granted on account of the exhaustion of the products, or for any other reason.

In order to make these provisions effective, agreements were made with the *Abir* and the *Société anversoise*, by which they surrendered the privileges of an exclusive character accorded to them in 1906, and in return received definite limited areas (see p. 305), together with the cancelling of the share in their capital held by the Government. At the same time the Government withdrew from its partnership in the Kasai Company.

In 1910 and 1911 regulations were also made for the sale of land. Any person who wants from 1 to 10 hectares applies to the Governor-General; those who desire more have their applications submitted to Brussels. The price varies according to the situation of the land and the use to which it is to be put. For trading establishments it is 1,000 francs per hectare, and in towns 1 franc per square metre. For agricultural purposes the Governor-General has fixed the price at from 10 to 25 francs per hectare, according to the distance from towns, railways, rivers, &c. Further those who demand plots exceeding 10 hectares in extent are granted only a provisional occupation for the first five years, during which time they pay a rent equivalent to 5 per cent. on the price of the land. At the end of this period they must show that they have improved the land either by building upon it, cultivating it, or placing stock upon it. For large concessions such as that granted a few years ago to Lever Brothers special arrangements have of course to be made. All such concessions have to be approved by the Belgian Parliament.

In the Katanga the conditions affecting the sale of land are somewhat different. The concessions are made by the *Comité spécial*, and have to be approved by Parliament, but, whereas that body has the power to alter the terms of any agreement made for other parts of the Congo, it can only accept or reject the proposals of the *Comité spécial*. In other respects land is sold on much the same terms, but the *Comité* reserves the right to enter any land to prospect, delimit and exploit mines, and even to retake it if they indemnify the proprietor of it.

MINING

The mining legislation of the Congo is based upon the general principle that the minerals belong to the State and not to the owner of the land. Accordingly no one can work a mine without a concession from the State. Except in the Katanga, the concessions of mining rights are regulated by a decree of March 20, 1893. The Government determines the regions where prospecting is to be permitted, and grants licences to those desirous of undertaking it. If the prospector succeeds in locating a mine he has for ten years a preferential right of obtaining a concession to work it. The concession,

when granted, is confined to an area of not more than 10,000 hectares, and is valid for a period of 99 years only. A royalty of 5 per cent. has to be paid on the net profit received, together with a tax of 2,500 francs for the concession, and one of 10 francs per hectare on mines of precious metals and stones, or of 5 francs on other mines.

In the Katanga the Government was obliged to respect to some extent the clauses of the Convention of 1900, between the Independent State and the *Compagnie du Katanga*, which gave to the *Comité spécial* the right to exploit for 90 years the mines discovered on one-third of the State lands. Hence the decree of December 16, 1910, which opened up the Katanga to the prospector, is limited in its application. It does not apply when the right of prospecting or exploiting is granted by particular conventions concluded with the *Comité spécial*, and accordingly the *Comité* may still withdraw certain areas from the application of the decree. Parliament also has the right to forbid prospecting in certain parts of the Katanga, even if these districts have not been made the subject of special conventions on the part of the *Comité*. Whatever the date at which they have been granted, all concessions expire on March 11, 1990, when the period of 90 years, during which the *Compagnie du Katanga* has the exclusive right to exploit all the mines over one-third of the domain lands of the Katanga, comes to an end. Thereafter the Belgian Congo comes into full possession of the mines and the material used in their exploitation.

Two further stipulations in the decree already referred to increase the control of the *Comité* over mining concerns conducted by companies, that is, over all important works, since few individuals possess sufficient resources to undertake large enterprises in Africa. The first requires that the *Comité* shall receive 33 per cent. of all shares issued by the company which holds the concession, while the second reserves to the *Comité* the right of subscribing 20 per cent. of the capital. The *Comité* thus has considerable control over the policy of the companies.

In order to prospect and exploit mines permits from the *Comité* are required. The *permis général de recherches* is issued on payment of 100 francs, and gives the holder the right to prospect in all parts of the Katanga open to ex-

exploitation provided the rights of third parties are respected, and especially those of the natives. If the holder of a *permis général* discovers a mine he is entitled to apply for a *permis spécial et exclusif de recherches*, which secures to him for two years the exclusive right of prospecting within a circle the radius of which in the case of precious metals, diamonds, and precious stones is 500 metres, and in the case of other minerals 2,500 metres. The *permis spécial* costs 200 francs, and may be renewed for a second term of two years. It gives the owner not only the sole right of prospecting within the area prescribed, but the right to demand later on a *permis d'exploitation* on condition that he has sufficient capital to work the mine properly. The latter permit applies not to the circle within which prospecting was allowed, but to a square within that circle. Within the area thus prescribed the holder has the right to mine until March 11, 1990, and he has also the right to construct means of communication outside of his concession in order to connect it with smelting works, roads, rivers, or railways. In return he has to put the mine in working order within two years' time, and from the end of the first year pay a royalty of 5 per cent. on the raw material extracted from it, with a minimum of 50 francs per hectare, if precious metals, diamonds, or precious stones are extracted, and 1 per cent., with a minimum of 50 centimes per hectare, if other minerals are being worked. In addition when a single individual holds the permit he pays 33 per cent. of his profits to the *Comité*; companies are exempted from this latter, as the *Comité* has received 33 per cent. of their shares without payment.

FINANCE

By the constitution of the Belgian Congo the finances of the colony are separated from those of the mother country. The former has its own resources, from which it is expected to meet its own expenses, and only in exceptional circumstances would the latter be called upon to give it financial aid. The separation, however, is not quite complete. The salary of the Colonial Minister and the expenses of the central administration are paid for by Belgium, and figure in the budget of the colonies. All other charges appear in the budget of the

Belgian Congo, which has to be submitted to and approved by the Belgian Parliament.

The income of the Congo is derived from various sources. As proprietor of the greater part of the land of the colony, and of all its mineral wealth, the State draws considerable sums from them. The Independent State did not distinguish between what it received as sovereign from that which it received as monopolist, and in 1908, the last year in which it presented a budget, the 'products of the domain, tributes, and imposts paid in kind by the natives' provided 16,000,000 francs out of a total revenue of 35,000,000 francs. The abandonment of its monopolies by the State has led to the disappearance of a great part of this revenue since 1910.

The domain is, however, still a source of considerable profit to the State. The products of sales and leases, the licences for the collection of rubber, the tax on ivory, which is roughly about one-half its value, the dues on cutting timber in the forests, which are not exacted from natives or people cutting for domestic purposes, and the taxes of 40 centimes per kilo on tree or vine rubber, and 20 centimes on grass rubber, are in the aggregate an important source of revenue.

From certain monopolies still in its hands the State also derives an income. These include the administration of posts, telegraphs, and telephones, which is, however, far from being a paying concern, the exploitation of the gold mines at Moto and Kilo, the State plantations (rubber, coffee, and cocoa) and pastoral farms, and various other public services. A small amount is also obtained from certain fees and other charges levied by the State. They include fines, legal charges, port dues, and pilotage charges, survey and land registration fees, and gun-licences. A new tax, first levied in 1913, was assigned to meet the expenses of collecting commercial statistics. It amounts to 15 centimes per package, metric ton, cubic metre, or head, according as it deals with merchandise in bale or in bulk, or with living animals. The tax is levied upon imports and exports.

Direct taxation is levied on both Europeans and natives. In the case of the former it is levied upon the size of their houses, the number of employees engaged by them, and the number of boats used in their business. The total amount which it produces is not great.

A much more important tax is that which is levied on the natives. All male adults are taxed at a rate varying from 5 francs to 12 francs per annum. Each year the Governor-General fixes the amount payable by the inhabitants of the different parts of the country, after taking into account the resources of the region and the extent to which they have been developed. In 1912, for example, the male adult of Mayumbe, the Middle Congo, and the southern Katanga, and of one or two smaller districts, such as that round Stanleyville, paid 12 francs. In the greater part of the southern regions of the interior the rate was from 8 to 10 francs, while in the northern districts it was generally between 5 and 6 francs. In addition there is a supplementary tax of 2 francs on each wife beyond the first. The Governor-General may, however, if he sees fit, lower or even dispense with these taxes, if it appears that the natives are too poor to pay them. The native tax must be paid in money; under the old régime it varied from 6 to 24 francs, and was levied in produce, upon which was placed a value so arbitrary and so low that the native was often compelled to work for at least, and often much more than, fifteen days per month. The chief or sub-chief may be authorized to collect the tax, but in that case precautions must be taken to prevent injustice. If the tax is not paid the chief enforces it under native law; if the native has no chief and declines to pay he may be imprisoned for two months. The yield of the tax will probably increase considerably as the tribes are brought under control and as the economic resources of the country are developed. It appears destined to become one of the principal resources of the budget.

All traders who do not pay the personal tax have to take out a licence, which costs them 200 francs, and 500 francs if they deal in rubber, copal, and ivory. The natives pay this tax only when they trade with or for the account of foreigners who are not subject to the personal tax and have not taken out a licence. The tax was introduced not so much for fiscal purposes as for the discouragement of nomad traders, who were believed to be frequently engaged in undesirable enterprises such as slave-dealing.

The old taxes of the Independent State on rubber were replaced in 1910 by a single tax of 75 centimes per kilogramme on rubber obtained from trees or lianas, and 50 cen-

times on grass rubber. In order to encourage the establishment of plantations their produce is at present exempt. The tax is levied at the time that the rubber is exported, and thus it is in appearance, though not in reality, an export duty.

All limited liability companies established in the Congo have to pay to the State a tax of 2 per cent. on their profits. All foreign companies with a branch or office in the Congo pay 1 per cent. on the profits derived from their business in the colony.

The export and import dues now form a considerable source of revenue. Import duties are fixed at 3 per cent. *ad valorem* on ships, boats, machinery, agricultural implements, and material for railways in working order, and at 10 per cent. *ad valorem* on all other merchandize. Material for railways in course of construction, scientific instruments, live-stock, and seeds are exempt. In 1913 the Government of the Congo was authorized to convert these *ad valorem* dues into fixed taxes. The export duties are also arranged upon an *ad valorem* basis, but for convenience of collection they have also been converted into fixed charges, and are levied upon the quintal of 100 kilogrammes. For rubber and ivory they work out at a rate of 10 per cent. *ad valorem*. For other products, such as ground-nuts, palm-oil, and palm-nuts, the duty is equivalent to 5 per cent. Special taxes levied upon alcohol appear to have succeeded in reducing the consumption of that article even before 1913, when its sale to the natives was finally prohibited.

An excess profits tax passed by the Belgian Parliament at the beginning of 1919 affects to some extent the finances of the Congo. The tax is to be levied on all excess profits realized beyond a sum of 2,000 francs. For the first 10,000 francs on which the tax is chargeable the assessment is to be at the rate of 10 per cent., and it is to increase by 1 per cent. for each additional 1,000 francs or part thereof, but is not to be more than 80 per cent. on that part of the excess profits which exceed 600,000 francs. This tax is, however, reduced to one-fourth on profits derived from the Belgian Congo or from foreign countries, and seven-eighths of the amount derived from profits made in the former region are to be handed over to the colonial treasury.

For the year 1914 the revenue of the colony was estimated at 30,439,276 francs made up as follows :

<i>Heads of Revenue</i>	<i>Total Receipts</i>
Land taxes	221,100
Sale and letting of Crown lands and property	556,000
Licences to collect vegetable produce	140,000
Tax on ivory levied in money or kind	1,643,500
Licences to hunt elephants and carry arms	160,000
Wood-cutting in State forests	19,000
Customs	6,031,156
Direct and personal taxes	9,605,000
Postal, telegraph, and telephone receipts	876,000
Shipping dues	60,000
Judicial fees	97,000
Stamp duties	18,120
Freights and proceeds of special arrangements with companies and individuals	3,656,000
Recruiting and engaging workmen	10,400
Sale of agricultural produce	321,000
Interest on shares	35,000
Interest on funds held by the colonial treasury	8,000
Interest on loans	590,000
Proceeds on the sale of goods warehoused in Congo	100,000
Proceeds on the sale of the stock of ivory warehoused at Antwerp on January 1, 1914	564,000
Exploitation of mines	4,320,000
Tax for statistics	500,000
Miscellaneous	908,000
Grand Total	30,439,276

The expenditure of the State is grouped under two heads, ordinary and extraordinary. In 1914 these were estimated at 51,936,000 francs, and 11,139,582 francs respectively.

The ordinary expenditure was arrived at as follows:

<i>Heads of Expenditure</i>	<i>Total expenditure per item</i>
Administrative service	29,192,396
Working of posts, telegraphs, and telephones	1,723,766
Government hospitals	214,450
Exploitation of mines	1,834,993
Collection of native taxes	219,111
Restrictions on hunting	148,500
Coinage, &c.	150,000
Religious purposes	783,860
Public instruction	593,750
Charitable purposes	10,000
Museum of Terveuren	227,175
Colonial School	72,194
School of tropical medicine	63,787
Sundry expenses	2,491,173
Public debt	13,972,845
Repayments, &c.	74,000
Unforeseen expenses	64,000
Insurances	100,000
Grand Total	51,936,000

For 1914, the extraordinary expenditure was distributed in the following way:

<i>Heads of Expenditure</i>	<i>Total expenditure per item</i>
Museum of the Belgian Congo	250,000
Sundry annuities	276,897
Sixth annuity to be paid on the special fund of 50,000,000 francs created under § 3 of Article 4 of the Act supplementary to the Treaty of Cession	3,300,000
Equipment of agricultural and pastoral stations	640,100
Agricultural colonization	607,525
Botanical and zoological research	42,500
Marine and hydrographical work	1,323,350
Telegraphs and telephones	20,000
Health—Precautions against sleeping sickness	804,200
Miscellaneous public works	2,500,000
Advances to the <i>Comité spécial du Katanga</i> in accord- ance with Art. 1 of the Convention of June 25, 1903	900,000
Delimitation of the Katanga-Rhodesia frontier	400,000
Labour bureau in the Katanga	50,000
Immigration	25,000
Grand Total	11,139,582

Since the annexation of the Congo by Belgium the annual budgets have been as follows (the extraordinary expenditure, which was much increased by the war, is omitted after 1914):

<i>Year</i>	<i>Revenue</i>	<i>Ordinary Expenditure</i>	<i>Extraordinary Expenditure</i>
1909	36,094,036	36,094,036	8,423,000
1910	39,745,304	40,370,814	33,516,775
1911	40,145,305	40,847,814	33,356,775
1912	45,367,639	51,065,310	16,818,660
1913	40,418,100	50,933,064	15,024,020
1914	30,441,276	51,936,000	11,139,572
1915	30,441,276	51,936,000	
1916	32,049,082	54,755,912	
1917	43,348,930	59,570,727	
1918	57,937,630	64,988,327	

ne great fall in the revenue in 1913 and subsequent years was due to several causes. The State had abandoned its monopolies, and the rubber crisis necessitated a reduction of the taxes on that commodity. The trade of the colony was also adversely affected by the war. In 1917 matters began to improve; the increased revenue since then, though no doubt due in part to the general rise in the level of prices, is also accounted for in part by the development in the resources of the colony. The increase has been particularly marked in the yield obtained from customs and mines, the estimates for

1918 being 11,000,000 francs and 14,500,000 francs respectively. The rise in expenditure during the last few years may be attributed to various causes, of which the general rise in prices, the increase of salaries to meet the higher cost of living, the larger personnel involved in the development of the colony, and the heavier charges caused by the growth of the public debt are among the most important.

At a first glance the figures given above incline one to take a serious view of the financial position of the Congo, and no doubt they are far from satisfactory. On the other hand account must be taken of all the difficulties involved in the transition from the old régime to the new. Former sources of revenue had to be abandoned before existing ones had become productive, and hence the series of deficits which form so marked a feature of the Congo budgets. The fact that the estimated deficit of 1918 had fallen to 7,000,000 francs, and that a slight surplus is expected in 1919, may perhaps be taken to indicate that the worst days are over. If nothing intervenes to check progress an increasing revenue may be anticipated from the taxes on land, mining royalties and the gold mines at Kilo, native taxation, and customs-port duties. As the position of the native improves he may legitimately be asked to pay a higher personal tax, and he will certainly demand more European goods.

In 1912 the public debt of the Belgian Congo amounted to 278,747,200 francs. It consists in the first place of loans which were issued by the Independent State, and which were taken over by the colony when it was ceded to Belgium. These amounted in 1908 to over 105,000,000 francs. Secondly the Act additional to the Treaty of Cession created a special debt of 50,000,000 francs, which was to be debited to the colony. This sum was to be given to the king *en témoignage de gratitude* and was to be paid in fifteen annuities, the first of 3,800,000 francs and the remainder of 3,300,000 francs each. These sums are indirectly returned to the Congo, as they are expended on matters affecting its welfare. Lastly since the annexation the colony has each year borrowed money to meet the extraordinary expenditure estimated for in the budget and the deficit between revenue and ordinary expenditure.

RELIGION

Freedom of worship has theoretically at least always existed in the Belgian Congo, but it appears to be admitted that, under the old régime, at least Belgian missionaries were favoured at the expense of those from other countries. This was probably in part due to the fact that the former, in addition to religious teaching, gave their converts an occupational training, while the latter confined themselves in the main to religious and educational work. Within the last few years some of the difficulties formerly experienced by the Protestant missions seem to have been removed.

A decree of December 28, 1888, permits all private associations whose object is of a religious, scientific, or philanthropic nature to acquire a civil personality and to obtain grants for land which shall not exceed 50 hectares in extent in any one locality, at least without a special decree. In the case of the Roman Catholics, however, a convention concluded with the Holy See in 1906 enables missions established with the consent of the State to receive 100 or even 200 hectares of agricultural land free of charge. In return the missionaries bind themselves to engage in educational work of a prescribed form.

Among other privileges enjoyed by religious bodies are exemption from the personal tax on employees, a modified tax on buildings, and reduced rates for the transport of goods on the boats of the State. They may also receive grants from the State for their participation in work of interest to the colony.

The Roman Catholic organization of the colony is divided into three Apostolic Vicarages (Haut Congo belge, Congo belge, and Stanley Falls), eight Apostolic Prefectures (Kwango, Matadi, Haut Kasai, Ubangi, Eastern Welle, Western Welle, Katanga, and Northern Katanga), and several independent missions.

EDUCATION

So far comparatively little has been done for native education. The first schools founded by the State were charity schools in which orphans, children abandoned by their parents, and the children freed by the dispersal of slave convoys were cared for. These schools were situated at Boma and Nouvelle Anvers, and their management was entrusted to Roman

Catholic priests. The course of training which was given had as its object the preparation of the pupils for service as subordinate officers in the military or civil service of the colony. For other natives there are professional schools attached to the workshops which the State possesses at Boma, Leopoldville, and Stanleyville. These are open to youths from 12 to 20 years of age, who have the consent of their parents and have been recommended by their chiefs to the Commissioner of their district. In addition there are primary schools, where the education is given by members of religious orders, and a school for the sons of chiefs, which was opened at Stanleyville in 1913.

The missions, both Protestant and Catholic, have also started a number of schools. Some of these are completely free and have no obligation to the State, while others are under a certain amount of control. In the latter category are: (1) those which have been organized like the State schools, already mentioned, for the care of abandoned children; they are under the general control of the Governor-General; (2) the schools instituted by the Catholic missions which have obtained additional grants of land. Each of these has to follow the programme arranged for it by the head of the mission in consultation with the Governor-General. In them the teaching of the national language of Belgium and various handicrafts is obligatory.

Several scientific establishments are probably destined to play an important part in the study of questions connected with the Congo. The colonial museum at Terveuren in Belgium was reorganized in 1910, and has been charged with the duty of studying and publishing the results of observations made in the Congo. To the section which deals with natural science another relating to moral and political science has more recently been added. Much of the published work of the museum is of considerable value.

In the Congo itself the only scientific establishments of importance are the medical laboratory at Leopoldville and the botanic gardens at Eala. The Agricultural Service has recently taken over the work of collecting and co-ordinating the meteorological observations made in the colony. In addition various public bodies are engaged to a greater or less extent in work of a scientific nature.

PROTECTION OF THE NATIVES

The measures which have been taken since the annexation of the Congo by Belgium for the protection of the natives assume various forms. Compulsory work for Government purposes still remains legal, but the period of service has been reduced from five years to three. The policy of relying upon paid labour for such work appears to be gradually coming into force. The Decree of August 17, 1910, lays down the conditions to be observed in the recruiting of native labour and in the contracts made with the natives. The term of service may not exceed three years, whereas formerly the limit was seven years; wages must be paid in money, and the labourer has the right to be repatriated to the district where the contract was made. Every contract for a term exceeding three months must be viséd, and the magistrate must see that the labourer clearly understands the terms of the agreement.

It is obvious that with regard to both of those measures much will depend upon the spirit in which they are worked and the extent to which supervision is possible. As the same applies to many other regulations affecting the native, a permanent commission has been appointed to watch over all matters affecting his interests and the improvement of the material and moral conditions of his existence. This commission is presided over by the Procurator-General of the Court of Appeal at Boma, and the other members are appointed by the king from among the people residing in the colony 'who by reason of their duties or occupations appear most qualified to undertake this protective work'. In 1912 it was decreed that the commission should consist of ten members, in addition to the president, that it should meet at least once a year, and that it should draw up an annual report. As the members are not only drawn from various parts of the colony, but are representative of all classes of the European population within it, the commission may almost be regarded as an advisory council competent to confer with the Government on all matters affecting the welfare of the natives.

CHAPTER XVI

CONDITIONS AFFECTING THE DEVELOPMENT OF THE CONGO

IN any attempt to estimate the future value of the Belgian Congo as a colonial possession account must be taken of various factors which at present appear likely to check rapid progress being made in the development of the resources of the country. Of these, the most important are the difficulties connected with obtaining a sufficient supply of suitable labour, the large areas still without means of communication, the want of capital, and the necessity for relying upon countries other than Belgium to obtain at least part of the European personnel necessary for administrative and economic development. An examination of these matters will show that the problems which they present, though by no means insoluble, are nevertheless of a serious nature and are likely to take many years for their solution.

POPULATION AND LABOUR

A number of estimates of the population of the Belgian Congo have been made since the foundation of the Independent State, but most of them are of little or no value. Prior to 1910 one of the most careful was that made by Sir H. H. Johnston, who placed the total number of inhabitants at 15,500,000. More recent investigations, based on the number of adults in each district liable to the personal tax, and, later, on the number of people in each chiefdom, seem to indicate that this figure was considerably in excess of the actual population. In 1910, for example, a census of the taxable inhabitants provided the figures from which the table given below was compiled. At the best, however, it offers but a rough estimate, as it was reckoned that a proportion of the natives escaped the observation of the officials who took the census, while some districts were then far from being completely

occupied. Hence it was considered necessary to add 20 per cent. to the number of taxable natives over the whole country, and 50 per cent. in the Kasai and Kwango districts and in the Dungu (Upper Welle) zone. Moreover the proportion of taxable to non-taxable natives had also to be calculated, so that the final result may be far from accurate.

(As the table was drawn up while the old territorial divisions were still in existence, the present districts which more or less roughly correspond to them have been placed within parentheses.)

<i>District</i>	<i>Population in thousands</i>
Lower Congo	411
Middle Congo	168
Kwango	150
Kasai (Kasai, Sankuru)	912
Lac Leopold	221
Ubangi	165
Equateur (Equateur, Lulonga)	1,017
Bangala	997
Aruwimi	413
Province Orientale (Ituri, Stanleyville, Lova, Kivu, Maniema)	1,336
Katanga (Lomami, Tanganika-Moero, Lulua, Haut Luapula)	269
Uele (Haut Uele, Bas Uele)	1,189
Total in thousands	7,248

Estimated total population of the Congo, 7,248,000.

Since this estimate was made, further light has been thrown upon the population of the country by the enumeration of the inhabitants in each of the native chiefdoms recognized by the Government. In 1917 the following table was prepared.

<i>District</i>	<i>Number of Chiefdoms</i>	<i>Men</i>	<i>Women</i>	<i>Children</i>	<i>Total</i>
Bas Congo	240	83,483	84,442	94,921	262,846
Moyen Congo	162	35,940	33,683	33,731	103,359
Kwango	61	14,667	14,302	14,712	143,681
Kasai	161	125,667	162,672	171,283	459,622
Sankuru	375	151,460	156,237	143,441	451,138
Lac Leopold	201	42,066	46,995	49,798	138,859
Ubangi	81	26,568	33,943	21,054	81,565
Equateur	927	161,467	203,969	114,435	479,871
Lulonga	466	85,236	75,929	59,282	220,447
Bangala	422	102,425	111,924	122,857	338,206
Aruwimi	367	78,496	76,430	82,359	237,285
Bas Uele	265	139,921	157,875	132,414	440,210
Haut Uele	217	216,439	236,643	200,893	653,977
Stanleyville	731	84,850	77,206	91,120	253,176

<i>District</i>	<i>Number of Chiefdoms</i>	<i>Men</i>	<i>Women</i>	<i>Children</i>	<i>Total</i>
Lowa	275	83,842	84,585	83,023	251,450
Ituri	316	135,043	93,768	85,938	314,749
Maniema	530	61,459	65,553	57,630	184,642
Kivu	75	228,786	188,628	307,448	707,867
Lulua	18	17,725	17,486	17,499	52,710
Lomami	69	36,996	46,991	37,072	11,059
Haut Luapula	58	20,133	22,159	27,951	70,243
Tanganika-Moero	78	40,389	47,401	33,714	121,504
Totals	6,095	1,954,058	2,038,826	1,982,577	5,975,461

Comparing the above table with the previous one (though bearing in mind the fact that the limits of the districts are not the same in all cases), certain conclusions may be drawn. In 1916 the work of reorganizing the chiefdoms and enumerating the inhabitants had been practically completed in the districts of Bas and Moyen Congo, Bangala, Lac Leopold, Lulonga, Sankuru, and Bas Uele. In the first five of these districts the population is less than the estimate of 1910 (the figures for the last two cannot yet be taken into account, as they represent only part of the regions to which the 1910 estimate applies). On the other hand in the old Eastern Province the population enumerated up to the present time considerably exceeds the estimate, and it may also be exceeded in Kasai and Sankuru and perhaps in Haut and Bas Uele. Of the other districts where the enumeration is not yet complete it is impossible with the information available to say anything; in practically all of them the figures yet reached are below those of 1910. No indication is furnished in the official reports of the amount of work still to be done, but taking into account the facts that the population of seven districts is now known, that in the four districts of the Katanga which are scantily populated no great increase over the figures for 1910 appears to be possible, and that in the five districts into which the old Eastern Province is now divided a great number of the chiefdoms have already been recognized, it is difficult to see how the total population of the Congo can much exceed the official estimate of 7,000,000. Indeed, if an estimate that half a million people have died as a result of the recent influenza epidemic be even approximately correct, it may at the present time fall below that figure.

An average population of less than eight to the square mile is

much below what one might have expected in a country which contains as much productive land as the Congo, and there is little doubt that a much larger population might be supported even under the existing system of cultivation. Within the last fifty years it has suffered greatly from a variety of causes. The disastrous raids of Tippoo-Tib and the Arabs resulted in the practical annihilation of the indigenous population along the river-bank of the Congo between Stanley Falls and the mouth of the Aruwimi, and they also caused much loss of life among the natives up and down the Lomami river. According to Grenfell the inhabitants of the upper Aruwimi and Ituri were almost exterminated in a similar fashion. The Central Basin, again, was much depopulated by the foolish or criminal policy of the *cessionnaire* companies and the administration of the Crown Domain during the period of absolute rule in the Congo. The spread of sleeping sickness within recent years moreover has decimated the population of certain regions, while much loss of life has at all times been caused by the cruelties of native rulers, the ceremonial sacrifices and trials by ordeal conducted by the priests, and perhaps by cannibalism. With the exception of sleeping sickness, which will be more fully discussed later, these causes of depopulation have either been removed or are in the process of being removed, and the probability is that unless disease spreads there will be a gradual increase in the population. The progress of civilization in the Congo will in all likelihood operate in a similar way, but much more slowly. As the people become acquainted with the elementary principles of sanitation, hygiene, and the general care of the health, there will probably be a considerable decrease in the death-rate, especially among children, with whom it is at present very high. Perhaps also a decrease in polygamy, especially in those regions where the chiefs have large numbers of wives, might result in an increased birth-rate.

One of the great drawbacks of the relatively small population of the Congo is that those seeking to develop the country find it very difficult to obtain a supply of native labour, and in any case the economic polity of the people does not provide any surplus from which such a supply might be freely drawn. It is true no doubt that the native as a rule leaves the cultivation of the land to his wives, but he himself has to take some share

in providing for his family by clearing the land, hunting, or fishing, and with these pursuits regular employment would seriously interfere. Moreover the general conditions of life are such that he has no incentive to depart from the practices to which he is accustomed. Indeed his instincts all lead him in the opposite direction. The arduous labour which he was compelled to perform for little or no recompense under the old régime has in many cases left him with a profound dislike for work under European control, while the relief from oppressive tasks under the new régime has to some extent bred a spirit of contempt for the wishes of the white population. Any improvement in these respects will naturally be slow. The introduction of money payments for work done and the requirement that the native tax shall likewise be paid in money indicate the lines on which progress may most profitably be made. If the native is guaranteed by law a fixed and just remuneration for his labour, and if when he has paid his tax he is enabled to expend his surplus on goods, the price of which is not unduly enhanced, he will gradually acquire some idea of relative values and will work for what he wants. Hence it is necessary to encourage him to become anxious to attain a higher standard of comfort and to advance in the scale of civilization. The advantage of providing for his needs rather than of pandering to his desires has already been recognized by the suppression of the trade in liquor, and the best market, and therefore the best supply of labour, will eventually be established by creating a demand for useful articles rather than for the trinkets so often sold to native peoples.

In those regions where native labour is not directly required for European enterprises the development of the resources of the country must depend upon persuading the inhabitants to increase their output beyond what is necessary for their subsistence. To this end both the Government and private companies can contribute much help. The natives must not only have some assurance of a fair and regular market for their surplus produce, but they must in many cases have assistance in setting up machinery to deal with that produce and to prepare it for export. The development of communications is also an essential part of such a programme.

Under the conditions which have been indicated there will

probably be a gradual increase in the amount of labour available in the Congo, but such increase will naturally be slow, and for many years to come the supply will not be equal to the demands made upon it. The situation will be relieved only by an increase in the population together with an increase in the work actually done by the individual members of it.

In the south of the Katanga the problem is no less difficult, but is somewhat different in character. Owing to the high altitude of the region its climate is less congenial to the negro than the lowlands, and the native population is small. As a result there is not a sufficient surplus for working the mines, and the *Union minière* has been compelled to obtain its labour from other regions (see p. 206). In the north of the Katanga on the other hand conditions appear to be more favourable. In the valleys of the various rivers by which it is cut up there is often a fairly dense population. So far the demands made upon it have not been very great, but it seems probable that the development of the mines of the region can be provided for without the needs of native agriculture being seriously affected. In the tin mines of Kiambi, which were worked till after the outbreak of war, difficulties arising from the desertion of the native do not appear to have arisen. In 1914 there were 750 names on the books of the mines, but the average daily attendance of workmen was 450. Wages averaged 7 francs for 30 days' labour, plus half a franc per day for rations. In addition a bonus was given for more than a certain amount of work.

The development, actual and prospective, of mines, railways, and other industrial enterprises in the Katanga has naturally given prominence to the labour question within recent years, and various suggestions have been made with a view to finding a reserve of labour. A proposal much agitated before the outbreak of war was the introduction of Chinese, but no definite conclusion was arrived at.

CAPITAL: COMMERCIAL COMPANIES

For the further economic development of the Congo a large amount of capital will be required, and at the present time it is not clear where that capital will be obtained. It is questionable whether Belgium will be able to make any con-

siderable advances for a long time to come, and the same doubtless holds true for the Belgian investor. On the other hand the risks of large enterprises in the Congo are so considerable that few private firms are in a position to take them. Foreign capital will no doubt be available to a greater or less extent, but the Belgian Government may well feel that it would be inadvisable to allow economic penetration by the capitalists of other countries to take place if it were at all likely to lead to loss of full political control. Indeed a period of slow development may ultimately prove beneficial to the Congo. If the best results are to be obtained, much will depend upon the European personnel engaged in the administration of the colony. And no sudden increase in that is possible without some sacrifice of efficiency. But even if a policy of slow development be decided upon, much money will be required for the extension of railways, the improvement of rivers, scientific research on the economic resources of the country, and various other objects of a similar nature; and, if money is not forthcoming for these, the progress of the colony will be unduly retarded.

At the present time the bulk of the capital invested in the Congo belongs to companies which have been founded at various times and under varying conditions. Reference has already been made (see p. 261) to the *Compagnie du Congo pour le commerce et l'industrie*, which was founded in 1886 with the object of constructing railways, improving waterways, and developing trade. One of the concerns affiliated with it was the *Société anonyme belge pour le commerce du Haut-Congo*, founded in 1888 to carry on trade in the Upper Congo. Later on arose the great concessionary companies which played an important, if not always a creditable, part in the history of the Independent State. Several of these were concerned with the exploitation of parts of the Central Basin. The *Abir*, which was founded in 1898 to take over the affairs of the old Anglo-Belgian India-Rubber Company, was given the right of exploiting the basins of the Maringa and Lopori. To the *Société anversoise du commerce au Congo* was conceded the basin of the Mongalla. The *Société des chemins de fer des Grands Lacs* received a block of land, over 15,000 square miles in extent, to the south of the projected line from Stanleyville to Mahagi. In 1898 the *Compagnie du Katanga* ceded to the

Compagnie du Lomami the lands which it held in full ownership in the basin of the Lomami, between Bena Kamba and the confluence of the Lomami and the Congo. The American Congo Company, founded in 1905, was given the right to collect rubber and other vegetable produce over an area of nearly 4,000 square miles, situated on the left bank of the Congo from the confluence of the Alima in the north to Kimpoko on Stanley Pool in the south. The last and one of the most important of the concessionary companies in the Central Basin was the *Société internationale forestière et minière*, which was founded in 1906. Its object was to search for minerals and more generally to develop the resources of a wide stretch of country in the *domaine de la couronne*, and in part of the unoccupied lands of the *Comité spécial du Katanga*, and for this purpose it was given large grants of land within the areas mentioned.

In the Kasai region several important companies have been established. The *Compagnie du Kasai*, founded in 1902, received the right to operate over a vast extent of territory, the limits of which were approximately the divide between the basins of the Lukenie and the Kasai-Sankuru in the north, the Inzia in the west, and the western limits of the Katanga in the east. The *Comptoir commercial congolais*, founded in 1898 and reconstructed in 1904, operates in the basin of the Wamba, a tributary of the Kwango. Reference has already been made (see p. 184) to the concessions granted to the *Société anonyme des huileries du Congo belge* (Messrs. Lever) in 1911.

In the various companies established before the annexation of the Congo by Belgium the Independent State was usually interested to a greater or less extent, and derived no inconsiderable part of its revenue from its connexion with them. This system came to an end in the years which followed the assumption by Belgium of the responsibility for the good government of the Congo. In 1911 arrangements were approved for opening the lands held by the *Abir* and the *Société anversoise du commerce au Congo* to free exploitation; and in 1912 an agreement was concluded with the *Société internationale forestière et minière* by which it received nearly 600 square miles of land in forty separate blocks in exchange for the rights which had been granted it in 1906 over 4,000 square miles of land in the Crown Domain and elsewhere. In 1911,

also, the State cancelled its agreement with the *Compagnie du Kasai* and resumed its liberty of action in all the vast region which had been conceded to that concern. The arrangement by which it was bound to exploit the lands granted to the *Compagnie du chemin de fer des Grands Lacs* was also cancelled.

The various companies which have been mentioned above were primarily concerned with the exploitation of the natural resources of the country. Most of them have in addition established plantations of one kind or another in the regions where their activities principally lay. With one or two exceptions, however, the companies which are mainly engaged in the cultivation of the soil have their sphere of operations in Mayumbe. The exceptions include the *Plantations Lacourt*, whose property is situated at the confluence of the Sankuru and the Kondue, not far from Lusambo; the *Belgika*, which has plantations on Bertha Island, near Stanleyville; and the *Société équatoriale congolaise Lulonga-Ikelemba*, whose property is situated at Boso Libwa. In Mayumbe the plantations are mainly devoted to the cultivation of cocoa and rubber. Among the more important are the *Plantations coloniales (La Luki)*, the *Compagnie sucrière européenne et coloniale*, the *Société anonyme Urselia*, the *Société Urselia secunda*, the *Société agricole du Mayumbe*, the *Plantations du Bas-Congo*, and the *Société anonyme d'agriculture et plantations au Congo*.

The principal mining companies in the Congo are engaged in developing the mineral resources of the Katanga. The circumstances which led to the formation of the *Compagnie du Katanga* and the *Comité spécial du Katanga* have already been described (see p. 280). One of the first acts of the latter body was to cede to a British company, the Tanganyika Concessions, whose agents had already visited the country, the sole right of prospecting for minerals in the High Katanga. For the development of the mines which were discovered each body was to contribute 50 per cent. of the necessary funds, while of the profits the *Comité spécial* was to receive 60 per cent. and the company 40 per cent. The administrative posts were to be divided between the two bodies, and at least one-half of the subsidiary companies formed to work the mines were to have their seat in London. It was as a result of this agreement, which was modified in some respects by a convention in 1905, that the exploitation of the Katanga was vigorously undertaken

by the Tanganyika Concessions and a number of mines located.

In 1906, in consequence of a desire to regulate mining enterprise throughout the Congo, the *Société générale de Belgique* was formed, and in the same year the *Union minière du Haut-Katanga* was constituted. It received the right to work all the mines in an area of about 55,000 square miles until March 11, 1990. The *Comité spécial*, which granted the concession, surrendered its right of subscribing one-half of the capital to the *Société générale*, the other half being found by the Tanganyika Concessions. The *Union minière* has, since that date, played the chief part in the economic development of the High Katanga, but several other companies may be noted.

When the *Union minière* was formed, all mines which had up to that time been discovered by the Tanganyika Concessions were ceded by it to the new company. But between then and December 9, 1909, the date at which the rights granted to the Tanganyika Concessions in 1900 and 1905 expired, several significant discoveries had been made. These included some small diamonds in the alluvial soils of the Lualaba and some formations similar to the diamond-bearing pipes of Kimberley in the Kundelungu region. To investigate these and to work them, if it were eventually found profitable to do so, the *Comité d'exploitation des Kundelungu-Lualaba* was formed, three members being designated by the *Comité spécial* and two by the Tanganyika Concessions.

In 1910 and 1911 certain conventions were approved with the object of further developing the Katanga. The first was made between the *Comité spécial* and a group of financial establishments represented by Colonel Thys and M. I. Jadot. The latter received the right to prospect for minerals in the region delimited by the parallel of latitude of 10° S., the left bank of the Lualaba, the west, north, and east banks of Lake Kisale, the right bank of the Lufira, and the parallel of latitude 9° 30' S. Within this region it was to be permitted to select seven blocks with a total area of not more than 3,500 square miles, where for two years it would have the sole right of prospecting for minerals. All mines which were discovered were to be exploited by the concessionaires or by companies established by them till the year 1990. As a result of this

convention the *Société de recherches minières du Bas-Katanga* was founded and began operations.

The *Société géologique et minière des ingénieurs et industriels belges* took over the concessions granted to M. Adolphe Grenier and others. Its field of action was to extend over the same area as that of the *Société de recherches minières du Bas-Katanga*, where it was to have the right of selecting seven blocks of land with a total area of about 3,500 square miles. In these blocks it was given the sole right of prospecting for minerals till 1914, and of working any mines which might be discovered until 1990.

Another convention between the *Comité spécial* and MM. *Nagelmaekers et fils* led in a similar way to the formation of the *Société minière congolaise*, whose prospecting rights extended over the lands situated to the south of a continuous line formed by the parallel of 10° S., the right bank of the Lualaba, the south bank of Lake Kisale, the left bank of the Lufira, and the parallel of Lofoi. Within this area the company received the sole right, subject to the rights of other parties already acquired, of delimiting within two years an area of nearly 800 square miles, in not more than five blocks, in which they might exercise the exclusive right of prospecting for minerals until 1914.

A similar concession over the same area, which was granted to M. Jules Mabillon, led to the formation of the *Société minière et industrielle du Katanga*.

The *Société Belgo-Katanga* was established to work the concessions granted to MM. Thiery, Briart, and others. Its sphere of action lay to the south of the tenth parallel, and there it had, subject to rights already acquired by others, power to delimit an area of nearly 800 square miles, in not more than five blocks, in which till December 1914 it was to have the sole right of prospecting.

A concession granted to another financial group (Van Gile, Daenen, and others) was taken over by the *Société de recherches minières Lufira-Katanga*, which has the right to seek for mines in a region bounded approximately by the southern and eastern frontiers of the Katanga, the Lufira, the Lualaba, and the Luvua.

Lastly there was the *Société anversoise pour la recherche des mines au Katanga*, which took over the concessions granted

to the Bary group of financiers. It was given the right to prospect in all parts of the Katanga where third parties had not already delimited their claims.

In 1912 two new concessions were granted. One was to the Brussels branch of the Deutsche Bank and the other was to Benard and Jarislowsky's Bank in Paris and other financial houses. Since then various others have been sanctioned, but owing to the war little further progress has been made.

The advantages accruing to large companies when operating in so extensive an area and under the difficult conditions prevailing in the country soon began to make themselves evident, and in 1913 amalgamations were arranged between the *Société industrielle et minière du Katanga* (the *Simkat*), the *Société Belgo-Katanga*, and the *Société des recherches minières du Bas-Katanga* (the *Bakat*).

In order to work the gold discovered in the basin of the Tele, a tributary of the Itimbiri, the *Société forestière et minière* founded in 1913 the *Société minière de la Télé*. The concession granted to it embraces the country bounded by the right bank of the Tele between the Dinda and the Zambe, the right bank of the latter river to its source, the parallel of its source to the watershed between the Tele and the Aruwimi, the watershed until it meets the parallel of the source of the Dinda, this parallel as far as the source of the Dinda, and the Dinda from its source to its confluence with the Tele.

The various companies concerned with transport have already been mentioned in connexion with the communications of the colony. The railways are owned by the *Société de chemins de fer vicinaux du Mayumbe*, the *Compagnie du chemin de fer du Congo*, the *Société de chemins de fer du Congo supérieur aux Grands Lacs africains*, the *Compagnie du chemin de fer du Bas-Congo au Katanga*, and the *Compagnie du chemin de fer du Katanga*. The railway from Lobito Bay to the Katanga is owned by the *Companhia do Caminho de Ferro de Benguela* (see pp. 228-9). The *Société anonyme Citas* runs a number of the river-boats above Leopoldville. Oil for consumption by suitable craft is provided by the *Société anonyme des pétroles au Congo*. Communication with Belgium is maintained by the *Compagnie belge maritime du Congo*. The financial establishments in the Congo include the *Banque commerciale du Congo* and the *Banque du Congo belge*, both of

which have offices at Boma, Matadi, Kinshasa, Stanleyville, and Elisabethville.

The following table shows the capital of the more important concerns operating in the Belgian Congo (capital 2,000,000 francs and upwards):

<i>Name</i>	<i>Share Capital.</i> <i>Frs.</i>	<i>Debenture Stock.</i> <i>Frs.</i>
<i>Transport</i>		
Cie. du chemin de fer du Congo	30,000,000	67,000,000
Cie. des chemins de fer du Congo supérieur aux Grands Lacs africains	75,000,000	
Cie. du chemin de fer du Katanga	80,000,000	
Cie. du chemin de fer du Bas-Congo au Katanga	2,000,000	
Société des chemins de fer vicinaux du Mayumbe	4,500,000	
Société anonyme Citas	3,000,000	
Cie. belge maritime du Congo	12,000,000	2,187,160
<i>Mining</i>		
Union minière du Haut-Katanga	12,500,000	20,000,000
Société anversoise pour la recherche des mines au Katanga	3,000,000	
Société des recherches minières du Bas- Katanga	2,000,000	
Société de recherches minières Lufira-Katanga	3,000,000	
Société belge industrielle et minière du Katanga	6,000,000	
Société internationale forestière et minière.	8,000,000	
Société minière de la Télé	4,500,000	
Cie. géologique minière des ingénieurs et industriels belges	3,510,000	
<i>Plantations and Agriculture</i>		
Société agricole du Mayumbe	3,500,000	
Cie. sucrière européenne et coloniale	3,500,000	328,751
Société de plantations coloniales (La Luki) .	2,000,000	
Société de cultures au Congo	3,000,000	
La Luinha	3,400,000	
Plantations Lacourt		
<i>Miscellaneous</i>		
Banque du Congo belge	5,000,000	
Société commerciale et minière du Congo .	3,000,000	
Cie. du Kasai	2,000,000	7,000,000
Société anonyme belge pour le commerce du Haut-Congo	5,050,000	
Cie. du Congo pour le commerce et l'industrie	2,092,295	
Société anonyme des huileries du Congo belge	30,000,000	
Société forestière et commerciale du Congo belge	3,000,000	
Cie. de Lomami	3,000,000	
Société des pétroles au Congo	6,000,000	
Société Belgo-Katanga	5,000,000	
Société Belgika	3,000,000	

In addition to these there are a number of companies with capital varying from 200,000 to 2,000,000 francs. There are also numerous small concerns conducted by people of various nationalities engaged in the purchase of raw materials of various kinds and in the sale of European goods to the natives. It is calculated that at the end of 1917 there were in all 1,750 commercial establishments of one kind or another in the Belgian Congo. The greater number of these were of course either branches of large concerns or small 'one-man' businesses engaged in retail trade.

HEALTH CONDITIONS

The climatic conditions of the Belgian Congo are in many ways unfavourable to its development. Various diseases have in the past levied a heavy toll on the native populations, and, although their devastations appear to have been temporarily stayed, it is by no means certain that they have been finally overcome. Of these sleeping sickness and malaria are the most serious, but influenza has recently made its appearance, and according to a recent report has committed great havoc among the natives.

Sleeping sickness had for long been endemic in the Lower Congo, but during the latter part of the nineteenth century it began to spread rapidly through all parts of the Congo basin with a virulence much greater than it had hitherto shown. The disease is caused by the presence in the blood of minute animal parasites called trypanosomes, which once established in the system may end the patient's life in six months, three years, or even later. The trypanosomes are conveyed by the tsetse or biting-fly, *Glossina palpalis* (sometimes also by *Glossina morsitans*), which sucks them in from the blood of infected persons, and perhaps from that of infected animals. After a short time these parasites multiply to such an extent that some of them are injected into every man or animal thereafter bitten by the fly. The illness begins with attacks of fever, alternating with periods of good health. Later on the patient may have enlargement of the glands of the neck, and, in the last stage, the drowsiness from which the disease is named. If the malady be detected in time, however, he can be treated and has some chance of recovery.

Glossina palpalis is found only where there are both water and shade, and its favourite breeding-places are in the vicinity of lakes and rivers. From such localities it seldom departs more than half a mile, and the European therefore may do much to avoid the risk of infection. All camps or settlements should be situated outside the danger zone, and where that is impossible the vegetation should be cut down in order to deprive the tsetse of the shade which it requires. For the native, however, this is rather a counsel of perfection (though the banks of various rivers are being cleared), and the segregation and medical treatment of those who are affected by the disease appear to be the chief means by which the disease can be kept under control at the present time.

Sleeping sickness has probably caused a great reduction in the population of the Belgian Congo. A few years ago it was reported to be very prevalent in the vicinity of Lakes Leopold II, Albert, and Edward, in the Bangala country, in the district of Aruwimi, between the mouths of the Itimbiri and Aruwimi, and in parts of the Kasai region, more particularly in the basin of the Kwango. Since then it has abated in some of these districts, but there have been violent outbreaks in others. In 1917 the areas where the disease was most prevalent were the following: Mayumbe, the districts of Kwilu and Kikwit in the basin of the Kwango, parts of the Kasai region, the district of Lumbale on the lower Welle, the basin of the Itimbiri, and Banzyville and various other places in the district of Ubangi. In Mayumbe and Ubangi there was a decrease in the number of cases, but a recrudescence of the disease was reported in the Katanga, in the Lomami (Kabinda and Pania Antombo), in Tanganika-Moero (Kiambi and Pweto), and in the environs of Sampwe. In 1916, 7,376 natives were treated for sleeping sickness, of whom 813 died, while in 1917 the number of those treated had fallen to 4438. (These figures of course relate only to cases which occurred within the radius of the medical stations. It is questionable whether the decrease in the disease is as great as they indicate, owing to the fact that the medical staff was reduced by the war.)

Malaria is transmitted by several species of the *Anopheles* mosquito, which breeds in slow-moving streams, pools, and marshes, and as a rule does not wander far from these places.

If this mosquito bites a person with malarial parasites in his blood, it becomes infected, and soon begins to transmit the disease to every person on whom it feeds. In the Belgian Congo malaria takes many forms, but it is usually accompanied by a chilly feeling, with lassitude and pain in the limbs. It is, however, difficult to distinguish malaria from fevers due to other causes.

Both natives and Europeans are liable to malaria in the Congo. In the case of the native, children are most subject to attack, and those who survive appear to become more or less immune in later life, so long at least as they remain within the area or climatic conditions to which their tribe has become habituated. If, however, they move to parts of the country to which they are not physically accustomed, they are more liable to be attacked. Even in Europeans malaria does not appear to lead to many fatalities, if proper precautions are taken. Out of a white population of about 6,000 the number of deaths recorded as due to it was 14 in 1916 and 6 in 1917. For the same two years the deaths among the natives treated for the disease numbered 36 and 35 respectively.

To stamp out malaria it would be necessary to destroy the breeding-places of the mosquito, from the nature of things an almost impossible task in the Belgian Congo. As, even under the most favourable conditions, it is almost impossible to avoid a few mosquito bites, Europeans ought to take occasional doses of quinine, which either kills or prevents the development of the parasite in the blood.

Blackwater fever is generally recognized to be a sequel of neglected malaria, and is seldom seen in tropical Africa except in persons who have suffered from that disease. Neglect of the general precautions against malaria and want of care during the progress of that illness when once contracted, and during convalescence, are the chief causes of blackwater fever. The disease is rarely met with among negroes residing in their native land, but they are liable to suffer from it if they are moved rapidly from one part of the country to another. The attacks, however, do not appear to be as severe as in the case of Europeans.

Small-pox, which appears to have entered the Congo from Angola, caused much havoc in the country during the nine-

teenth century, and was probably a potent factor in keeping down the population throughout that period. It is still endemic in the Congo, but according to recent reports is much less virulent and deadly than was formerly the case. The native takes readily to vaccination, and this is probably one important reason why the disease has decreased in intensity.

Pulmonary diseases, and especially pneumonia, cause many deaths among the natives, who are unaccustomed to wear clothing, and take few precautions against the low temperatures of the night and early morning. Pleurisy has been recorded among the natives in the south-west of the country.

Tick fever is caused by *Ornithodoros monbata*, one of the many varieties of tick found in the Belgian Congo. It causes a relapsing fever, which, if not taken in time, may eventually lead to paralysis of the face or inflammation of the eyes. With proper medical advice the course of the disease may be cut short.

The embryos of a filarial worm are sometimes introduced into the blood by the bite of several species of mosquito. Some kinds of mosquito are harmless, but others are the cause of elephantiasis. Europeans are rarely infected.

Jigger lesions are caused by minute sand-fleas, which are found in great numbers on the unpaved floors of places frequented by natives. The jigger, or chigoe, bores its way under the skin, where it lays its eggs. If it is not picked out it comes away by ulceration, leaving small wounds which frequently become septic and inflamed. The danger from jiggers may be avoided to a great extent by not walking about with bare feet.

Beri-beri, which is medically described as 'a specific form of multiple peripheral neuritis', is said to have been introduced into the Lower Congo about 1892. Between that year and 1896 it developed into a serious plague in the region of the Cataracts. Since then it appears to have crossed the country, and at the present time is most severe along the routes of the *Chemins de fer du Congo supérieur aux Grands Lacs africains*.

Amoebic dysentery is common in all parts of the Congo except in the Katanga, where it appears to be rare. The proportion of deaths is decreasing, a result attributed to the use of emetics

in treating the disease. In the Katanga other forms of dysentery are rather common.

Among other diseases which are found to a greater or less extent in the Congo are leprosy, which exists in all parts of the country but is not very common, typhoid fever, which sometimes becomes an epidemic as at Kamboye and Likasi in 1917, and various illnesses which are common to all mankind. Venereal troubles appear to be widespread.

The recent outbreak of influenza (1919) did not spare the colony, and a great many deaths were caused by it, one report placing the number as high as half a million. This is probably an exaggeration, but it indicates that the epidemic was of the most serious description.

Native methods of treatment have already been described (see p. 135). The personnel of the European medical staff is quite insufficient for the needs of the colony; in 1915 there were only eighty medical men in the country, and this number has since been reduced by the exigencies of war.

EUROPEAN POPULATION

For the economic development of the Congo, no less than for its political administration, a considerable European population is necessary. But to obtain such a population is a task by no means without difficulty. The conditions of life in the country are far from attractive, and Belgium itself is not able to provide the white personnel necessary for the work to be done. At the present time about 40 per cent. of the white population are not of Belgian nationality, and, although the majority of these are engaged in commerce and not employed in the administrative service, the position is one which naturally does not appeal to the Government. The fears to which it led in regard to the Katanga have already been mentioned, and the development of the Kilo and Moto gold mines also seems to have been retarded by the want of Belgians capable of undertaking their management. Now that the causes of distrust between Belgium and certain other Powers have been removed, it seems probable that a more liberal attitude will be adopted by the State.

The last figures available, those for 1917, show that in that year the white population was 6,295. The number in each

province and the nationality to which they belonged are shown in the following table.

<i>Nationality</i>	<i>Province du Congo-Kasai</i>	<i>Province de l'Equateur</i>	<i>Province Orientale</i>	<i>Province du Katanga</i>	<i>Total</i>
Belgian . . .	1,270	351	571	1,071	3,263
British . . .	132	33	67	588	820
Swiss . . .	342	71	86	76	575
Portuguese . . .	47	6	32	228	313
Italian . . .	6	—	31	238	275
Norwegian . . .	87	42	34	38	201
American . . .	111	5	18	54	188
Dutch . . .	50	17	23	19	109
Greek . . .	49	14	22	18	103
Luxemburg . . .	62	7	9	11	89
Spanish . . .	3	—	2	65	70
Swedish . . .	33	—	1	2	36
Russian . . .	16	4	6	4	30
Danish . . .	11	3	2	7	23
French . . .	7	—	1	1	9
Others . . .	46	10	88	47	191
Total . . .	2,272	563	993	2,467	6,295

The Belgians are engaged in practically every kind of administrative and commercial activity in the Congo. British interests are confined in the main to the mineral industry of the Katanga. The Swiss have few trading establishments of any kind in the country and appear to be mainly employed as clerks in Government or business offices. The Portuguese and Greeks carry on much local trade among the natives, and Portuguese and Italians are also engaged in the mining industry of the Katanga. Americans work some of the diamond mines in the Kasai region, and a certain number are employed in the Katanga and elsewhere. The Luxemburgers are probably Germans who were engaged in business houses before the war. A number of Indians have penetrated inland from the coast of East Africa and have settled in the eastern part of the colony, where they carry on retail trade among the natives. A few Chinese are similarly employed.

The financial difficulties in which the Congo has been involved have made it difficult for it to remunerate its officials on a sufficiently liberal scale, account being taken of the conditions which prevail in the Congo, the necessity for frequent leave, and the risk to life and health. The salaries of all members of the administrative staff were fixed by a decree in

1912 (though a bonus has since been added to meet the higher prices caused by the war), and an indication of their general level may be obtained from the following illustration. The Governor-General receives an initial salary of 50,000 francs, and the Vice-Governors one of 40,000 francs each, the State Inspectors 35,000, District Commissioners 16,000-17,000, and Territorial Administrators 10,000 to 12,000. Judicial salaries vary from 11,000 to 25,000 francs according to grade and length of service. A chief medical officer begins at 20,000 francs, and a doctor just entering the service, 12,000. The captain of a first-class steamer receives 14,000 francs, others considerably less. Artisans, typists, and clerks begin at 6,000 or 6,500 francs. After two years' service in his grade an official is entitled to an increase of 10 per cent., and subsequent increases may raise his initial salary by 20 per cent. in all.

Government officials receive only 85 per cent. of their nominal salary, the remainder being placed in a reserve fund from which pensions are ultimately drawn. At the end of ten years' service (not including leave) the official may draw his pension whether he has retired or still remains in the service. In the latter case a second pension begins to accumulate. The amount payable at the end of each period depends upon the salary received by the official at the time his pension becomes due. When it is between 6,000 francs and 10,000 the pension is 900 francs per year, between 10,000 and 15,000 francs it is 1,100 francs, between 15,000 and 20,000 francs 1,500, between 20,000 and 25,000 francs 1,800, between 25,000 and 35,000 francs 2,300, between 35,000 and 40,000 francs 2,600, between 40,000 and 50,000 francs 2,800, and over 50,000 francs 3,000. These payments are certainly not excessive. An official whose final salary was 24,000 francs, and comparatively few receive more, would at the end of twenty-five years' service, including leave, receive a pension of not more than 3,600 francs (£144) per year.

After each period of two years' active service in the colony every official is entitled to six months' leave, during which he draws one-third of his salary if it is below 20,000 francs and one-fourth if it is above that amount.

Few regulations have so far been made regarding the selection of members of the public service in the Congo. The Governor-General and the vice-Governors-General must be of

Belgian nationality, and no member of either Chamber may be appointed to any post until at least a year has elapsed since his resignation of his seat. (The latter regulation does not apply to the Governor-General or to the vice-Governors-General.) Otherwise few restrictions are imposed on candidates, and the official policy of the Government is that each application should be decided on its merits. In April 1919 a special appeal was made to young officers demobilized after the war to consider service in the Congo, and it is probable that for some years to come these will form the chief source from which the official class will be drawn. That the supply of efficient candidates is not too plentiful, however, is rather indicated by the fact that the upper age limit has been fixed at thirty-five years. Apart from the professional qualifications of those who intend to be doctors, engineers, surveyors, &c., no examination test is applied, but all selected candidates have to attend courses at the Colonial School for three months before proceeding to the Congo.

Whatever be the cause, there is no doubt that the administrative staff in the Congo is still much too small for the demands which are made upon it. In almost all branches of Government activity this is undeniably the case. A considerable part of the colony is but imperfectly known, and the tribes which occupy it have not yet been brought under control; the economic resources of the country have only been partially investigated; for the improvement and full utilization of the waterways the Hydrographical Service must be largely increased. The Medical Service is inadequate for the heavy demands made upon it, little is being done for education, and the scientific staff requires to be strengthened in order to deal with various important problems affecting the colony which still await solution.

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