History of Forestry in Sarawak

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Conservator of Forests

Introduction

Sarawak is on the north-west coast of Borneo and its area is 48,300 square miles.

Population. The population in June, 1960 consisted of

Sea Dayaks or Ibans	237,000
Chinese	229,000_
Malays	129,000
Others	149,000
	744,000

The Chinese have increased very rapidly since 1900 and will soon be the largest single group in the country. The development of timber industry is largely due to their mechanical ability and business acumen.

Communications. "The dominant feature of the Sarawak landscape is the multitude of rivers. The country has a heavy and constant rainfall and these waters drain away in a series of rivers of remarkable size considering the area of Sarawak.

They rise in the mountains and commence as mountain torrents which soon develop into beautiful clear streams rushing downwards over rocks and shingle banks. As they near the lowlands they become staid and more placid, acquiring a brownish tint from silt and peat stains, until they emerge as massive waterways building their deltas out to sea and nearly always a constantly shifting and shallow bar at the mouth.

Rivers have been and still are the main channels of communication in the country. The lowland rivers can be used by fair sized coasters and large launches. The Rajang is navigable by ocean going steamers of up to 1,000 tons as far as Kapit, 120 miles from the sea.

When the launches can go no further travel is by outboard-engined dugout canoe or *perahu* and these eventually give way to lighter boats which are poled and paddled. Up-river good water conditions are essential for travel. Droughts make travel difficult and floods render it impossible.

With few exceptions all settlement has been along the rivers. Nearly every longhouse has its landing place. Gradually with the building of roads and airfields dependence on the rivers is being reduced but they are still of overwhelming importance and the fact must be appreciated if the realities of Sarawak are to be understood."*

This pattern of multiplicity of rivers and paucity of roads means that even today most of Sarawak's forests are inaccessible and unproductive, except for hand-logging along river banks, because there is no way of getting mechanical equipment up to the forest --heavy tractors cannot be taken by water past the first rapids in each river. Forest development has been concentrated on the down-river areas. Compare Malaya, where most of the logs are brought to sawmills by :rail and road.

Climate. The climate of Sarawak is typical of the equatorial belt, with high rainfall (well over 100 inches) and humidity but moderate temperatures (mean maximum about 88°). It rains all the year round, but more heavily during the north-east monsoon November -March.

Forests. The forests are of the tropical evergreen type. Of special interest to the plant ecologist and forester, however, are the extensive areas of peatswamp forest along the coast, amounting to 5,000 square miles. Radio-carbon dating and pollen analysis have shown that these forests have developed from mangrove forest in the past 3,000 - **4,000 years,** building up peat to a depth of 15 feet or more (over 50 feet have been recorded in some areas). These forests are the home of the valuable *ramin* tree.

Borneo is the stronghold of the Dipterocarpaceae, and the forests are dominated by members of this family, totalling about 300 species (many new ones are in process of being described). The flora has close affinities with Malaya, having been connected to it by the Sunda shelf during periods of **the Pleistocene** glaciation.

Land tenure. The law in Sarawak is that all virgin forest belongs to the State, unless it has been leased under document of title. A licence is required to work timber even on leased land, but the consent of the lessee is required before a licence can be issued.

Under the current Land Code, premission has to be obtained in writing before virgin forest may,be felled for shifting cultivation. Owing to administrative difficulties however, much forest is cleared in the more remote areas without permission. Customary rights are established by felling the original jungle and, very roughly, give the feller and his descendants the right of usage only.

History. The history of forestry in Sarawak falls neatly into four periods:

Period1. 1841-1918.	Pre-Forest Department) One hundred
Period 11. 1919-1940.	Forest Department under) Years under the Third Rajah) the White Rajahs
Period 111.	1941-1945. The Japanese occupation
Period 1V. 1946-1960.	Forest Department under the Crown.

Prior to 1841 when James Brooke (as he then was) took over the Rajah of Sarawak, the great forests of Borneo are virtually without a history. For centuries there had been a small barter trade in minor forest produce with China: rhinoceros horns, kingfisher feathers, bezoar stones, damar, camphor from the Borneo camphor tree *(Dryobalanops* sp.) and casques of the Helmeted Hornbill (known as Hornbill ivory or *Ho-ting,* once more valuable than jade) were taken by Chinese traders in exchange for beads, iron, cash, crockery, and their enormous Ali Baba jars now found in every longhouse.

Two writers have left us descriptions of the Sarawak forest a century ago. Spenser St. John includes in his book a long and interesting account of a journey to the head-waters of the Limbang river (at that time under Brunei jurisdiction). Odoardo Beccari, one of great botanical explorers of the nineteenth century, spent over two years in Sarawak, 1865-1867 and eventually published one of the best and most accurate books ever written on this country. His magnificent collections, which include many type sheets of tree species, laid

the foundations for all future botanical work in Sarawak, and are of special interest to the forester (in one locality alone on Mt. Matang near Kuching he collected over **fifty** species of dipterocarps).

The gradual spread of law and order in Sarawak under the rule of the White Rajahs, and the rapid growth of Singapore, resulted in the building up of an export trade in various kinds of minor forest produce, which was stimulated towards the end of the century by the spectacular increase in the demand for rubber.

The natives of the interior (Land Dayaks, Sea Dayaks or Ibans, Kayans, Kenyahs) were subsistence farmers, growing hill rice by the method of shifting cultivation. Unless they happened to get a bumper crop of rice, so that they could sell the surplus, almost the only way in which they could earn some hard cash was by collecting jungle produce and trading it in the nearest market.

The Ibans have always been great travellers. It used to be the custom for ten or a dozen young men, under an experience leader, to go on a long journey lasting for months or even years. Hardly, self-reliant, perfectly at home in the forest, and adept at handling their dugouts up and down dangerous rapids, they would spend months in some remote forest, living on wild sago and what they could shoot with blowpipe or gun or cutch in the rivers, patiently collecting rattans, or gutta percha, or damar, or relentlessly pursuing some luckless rhinoceros. Young men were not considered to have attained manhood until they had completed such a journey and been liberally tottooed as evidence thereof. ('The custom continues, but nowadays the journey tends to be to the coast, to look for work with oil companies or timber firms) .

The earliest trade returns readily available (see Appendix V) are those for 1870 published in the

** Life in the Forest of the Far East.* Spencer St. John 1863.

Wanderings in the great forests of Borneo. 0. Beccari 1904

Sarawak Gazette. At this time the area of Sarawak extended only from Cape Datu to Cape Kedurong and the total revenue of the State was only £ 14,300. The two natural rubbers (gutta percha and india rubber) are easily top of the list, and timber at £ 25 has the inominy of being lower even than bezoar stones (which however were worth 14 times their own weight in silver dollars). Another item with a high value to weight ratio was camphor, priced after cleaning at £4,500 per ton.

Gutta percha. The end of the eighteenth century and the early years of the nineteenth saw the parabolic rise and fall of the gutta perch trade. It was originally in demand as an insulation material for cables, later superceded by balata. In 1870 "The rise in the price of gutta percha was so sudden and unprecedented that it did considerable injury by tempting the population away from their usual occupations, such as farming, gardening, etc . . . Although the quantity exported was larger (49,200 tons) and indicated the start of the gutta percha boom, the maximum price in that year (£, 69 per ton) was low compared with the peak of £ 320 per ton reached in 1902. By 1902 however the quantities exported were already dropping fast, and owing to competition from plantation-grown Para rubber the trade in gutta percha soon became negligible.

Jelutang. The fall of gutta percha was balanced by the spectacular rise of jelutong, which first appears in the trade returns in 1900 with a modest figure of 24 tons valued at £264 but by 1903 had risen to 4,900 tons valued at £ 68,000. Until after the 1914-18 war the price of natural rubber was still high, and jelutong found a market mainly because of its rubber content. Rubber manufacturers at that time used to "deresinate" jelutong, that is to extract the 70% resin content of the raw material leaving a rubber mixture. From this mixture, representing about 30% of the original quantity of jelutong, 10-15 % of pure rubber could be extracted. As natural rubber became more readily and more cheaply available, jelutong found an alternative use in the growing chewing-gum industry, as an extender to chicle and as a nucelus for chewing gum base.

Unlike the other wild rubbers, jelutong has continued as a major export throughout the present century. (details in Appendix V b).

The British Malaysian Corporation in 1910 put down a large installation for the refining of jelutong at Goebilt (Messrs. Goelet and Vanderbilt), a site near the mouth of the Kuching river, but the enterprise went bankrupt towards the end of the 1914-18 war.

Cutch. In 1910 the Island Trading Company obtained a long-term concession from the second Rajah to take mangrove bark for the manufacture of cutch from the mangrove forests, and built a factory at Selalang in the Rejang Delta.

Rattans. Malacca canes and rattans rose from a modest £ 87 in 1870 to £ 32,700 in 1900, and have been a substantial though fluctuating item ever since. Commenting on the 1899 trade returns, the *Sarawak* f *Gazette* notes:

1t is natural that there should be increases and decreases in the articles under jungle produce as the market value rises or falls. The prices of *rattan*
Sega, for instance, in Kuching, which has been as low as £ 5 per ton has within the past month risen to the unprecedented price of £ 39 per ton, and
consequently large quantities are now being collected."

Illipe nuts. These are the fruits of several species of Shorea, but principally *Shorea gysbertsiana. A* vegetable oil is obtained from the nuts, known in the trade as Borneo tallow or illipe butter, and is used as a substitude for cocoa butter in the manufacture of chocolates. Owing to the irregular intervals at which the trees fruit, a good crop is obtained only at intervals of several years. Details of exports from 1908 are given in the *Sarawak Gazette,* August, 1958, p.148.

Timber. Timber played but a minor role in the export trade throughout this period. Small shipments, mostly of belian and other heavy hardwoods, were made to Hong Kong and Singapore from time to time.

The Borneo Company Limited started timber operations at Rajang in 1886. The main interest was logs or rough-hewn logs, but the venture proved disastrous, the logs becoming infested with teredo owing to the infrequent arrival of the steamer. Towards the end the main activity was the export of adze-hewn *belian* sleepers to the Indian railways.

In 1904 another attempt was made on the same site, but again there was teredo trouble, and the foundations for the frame-saws becarne water-logged at high tide. This venture was also short-lived and after lying idle for two years the mill and buildings were disposed of in 1908.

Legislation. The working of timber and other forest produce was virtually uncontrolled by the Government, except that export duty was levied on more of the items exported. The second Rajah Sir Charles Brooke, issued three orders:

No. II of 1.3.10	regulating the tapping of jelutong trees
No. IX of 5.1.12,	amended by No. IX of 14.6.12, prohibiting the felling or damaging of *engkabang, ketio,* and *jelutong* trees.

No. XVI of 1918 regulating the taking of gutta leaves.

PERIOD 11: 1919-1940

FOREST DEPARTMENT UNDER THE

THIRD RAJAH

Forest Administration, Policy and Legislation

The first step in setting up a forest administration was the appointment of Mr. J. P. Mead, on transfer from Malaya, as Conservator of Forests. He arrived in Kuching on 15.8.19.

One of his first acts was the drafting of a code of rules, which were gazetted as the Forest Rules, 1919 and came into force on 1.1.20. 'They were based on the rules in force in Malaya. Under these rules the taking of timber, firewood, charcoal and certain other forest products was licensed and royalties fixed, minimum girths were established below which certain specified trees could not be felled, the method of tapping jelutong trees and the collection of gutta perch regulated, and penalties imposed for infractions.

These rules were followed by an Order, providing for the constitution and maintenance of reserve forests, which was gazetted as the Forest Reservation Order, 1920 and came into force on 17.5.20. 1 followed in its main principles parts I and II of the Forest Enactment of the Federated Malay States. Mr Mead in fact drafted a complete enactment but the Government would only accept part of it.

For the next few years the efforts of the department were concentrated on building up a small staff and of the exploration and demarcation of forests suitable for reservation. The first reserve constituted was the Semengoh forest reserve, 12 miles from Kuching, now a valuable research forest and arboretum.

A statement of policy, approved by the Government was published in the *Sarawak Gazette* of January 1924. This starts off as follows

"The primary aim is to insure permanent main tenance of a sufficient area of forest to supply al the needs of the inhabitants.

Some countries possess such extensive forests that they can afford to export a proportion of their produce.

To-day Sarawak is one of the latter but owing to wasteful methods of cultivation and primitive methods of extraction timber is already becoming scare in some districts. This however is a local scarcity only and can in time be corrected.

At present it may be said that all timber produced in the country is consumed within it and that an export trade is non-existent. There is however a large export of minor forest produce such as damar, jelutong, rubber, gutta percha, canes, illipe nuts and other products, only insignificant quantities of which are consumed within the country.

The secondary aim is therefore to encourage the export of timber which is surplus to internal requirements and to maintain and increase the export of minor forest products.

The area of reserved forests in Sarawak is still considerably less than one per cent of the country and reservation must continue for a long time to come . . . ."

Mr. Mead left Sarawak in February, 1928 after eight and a half years and later became Director of Forestry in Malaya. The following tribute was paid to his work by Mr. D. E. Calver in the annual report for 1929:

"Mr. Mead was appointed Conservator of Forests, Sarawak, in 1919, and was charged with the creation of a Forest Department *ab initio.* To him, therefore, fell the whole responsibility of drafting the Forest Law which governs the administration of the forests of the State; of recruiting and training the subordinate staff; of organizing the royalty collection system; of commencing exploration and reservation work; and of initiating experiment and research. The success of his work is reflected in the position which the Department occupies to-day in the general economy of the State; and he leaves behind him the soundest of foundations on which his successors may build, and a high example of personal energy and ability."

The earlier legislation was replaced in 1934 by Order F-1 (Forests), known as the Forest Order, which came into force on 2.7.34, This provided for an important new type of permanent forest, known as a protected forest, and the reason this type was introduced is best explained in Mr. Corson's words:-*

"Prior to 1934 forest land was dedicated to timber production by the constitution of Forest Reserves and at the end of 1932 the total area thus set aside was 356 square miles of which 89 square miles were mangrove swamps. The total area of reserves then represented 1.2% of the area of the State. Since that time the Forest Department has not been permitted to form any further reserves.

On unreserved State land the native may take, at his own free will, any produce he requires for his own use; in reserved forest he may not do so; and in a little developed country, the change from complete freedom to restriction is much felt. It has been thought that a transition stage would be helpful, and in 1934 a scheme was approved for constitution of protected forests. In these, the native may take what he rejuires for his own use, except in any area (not exceeding one-fourth of the total) which may be closed for silvicultural treatment. In other respect control is similar to that in reserved forest. By the end of 1934 roughly 100 square miles of forest had been proclaimed as proposed for protection under this scheme."

Subsequent minor amendments were made to the above Order under Orders F-lA of 1935, F-1B 1936, F-1C of 1936, F-1D of 1940. The last these was an important amendment because it provide for the constitution of a third type of permane forest, known as a Communal Forest. In the word of Mr. Corson in the 1940 Annual Report:

"An amendment to the, Forest Law provide machinery for the constitution of Communal Forests They will be constituted in the same way as othe demarcated forests but will not be under direc departmental control but will be maintained unde the District Officer with the advice of the Conservato in a form of trust for the commune. Several applications were made during the year for such forests but although some may be regarded as indicativ of the existence of a "forest-consciousness" other escape with difficulty the suggestion of providing means of evading royalty on domestic requiremen worked by paid labour." *Forest Reservation* Perhaps the major obstacle to

forest reservatio during these years was the lack of adequate base maps The topographic survey of Sarawak was still in it infancy, and the result was that the Forest Departmen had to carry out its own boundary surveys. Muc time was spent, for example, in surveying creeks i mangrove forests by rangefinder traverses, whereas today these creeks can be traced off aerial photographs in a matter of minutes. According to Mr. Corson* there was anothe reason:

"Progress in the formation of forest reserves had been exceedingly slow because of their unpopularity and if this unpopularity remained the forests would not. Experience had shown that what the native least understood and most resented was the objection to his hunting in the reserves (since he did n damage to the trees) and to his taking an occasional tree for a boat or a few sticks to repair his house Strangely enough nobody in authority suggested modified form of protection and like the oak tree i the fable the Forest Department stood unbending until it was uprooted by the anti-reservation hurricane. So it was not entirely surprising when instructions were received early in 1932 that no more reserves were to be proposed, to be followed later and in 1933 by the most drastic staff cuts which left the establishment at less than fifty per cent of its former strength. Although not repealed the Forest Law became a dead letter, and a perfect hotchpotch of local regulations, whose only authority was that of the Divisional Residents who sponsored them, supported by the general approval of the Government, came into being." Forestry was placed on a firm footing once more when the new Forest Order was passed in July, 1934, and thereafter progress in making protected forests was rapid. The area of permanent forest increased from 1.2% at the end of 1934 to 5.5% of the area of Sarawak at the end of 1940. Forest Departments in other territories find it difficult to understand why Sarawak need., two types of permanent forest-the forest reserve and the protected forest-and the latter is often confused with the protection forest of temperate regions. For this reason the history of the protected forest concept in Sarawak has been set down here in considerable detail. *Exploitation and utilisation* In 1923 (the first year for which details are available) there were seven sawmills in operation, namely:First Division: Kuching Steam Sawmill (erected before 1914)

* *Twenty Years of Forestry in Sarawak, T.* Corson. unpublished paper in files of Forest Department

Third Division:	Mills at Sibu, Rajang, Pulau
	Selalo and Binatang (the last two erected in 1921)
Fourth Division:	Sarawak Oilfields Ltd. sawmill at Bakong.
Fifth Division:	Vamco sawmill in Lawas District(erected 1920, detailed history in current Lawas peatswamp forest working plan).

By 1940 the number of sawmills had increased to 16 Most of the sawn timber produced during this period was for local consumption in Sarawak or for sale in - the neighbouring territories of Brunei and Labuan. By present day standards the export of timber was negligible. Mr. Corson writes:

> "The export trade . . . has had a rather variedcareer. At one time, exports to China were consider able but this trade fell away and has never revived,although at the present time some interest is beingshown in it. Practically all that remains at presentis the trade in *belian . . . which* amounts to only a few hundred tons annually. Until 1932 little had ever been done to foster a trade with the United Kingdom, but in that year,as a result of the new interest in Empire trade, local mills were persuaded to consider the possibilities with the result that in 1933 they shipped close on 400 tons of lumber, valued at roughly £,1,400 f.o.b..and .about the same amount in 1934."

The United Kingdom was a very selective market,and would buy only the best. The internal market forlower grade lumber was limited and this in turn limitedthe quantity the mills could afford to cut for export. 'The sawmills were supplemented by innumerable and sawing outfits, and considerable numbers of men also found employment in hewing hardwood posts and splitting belian shingles.
In 1936 the Borneo Company Limited turned their attention to the forests of the Upper Rejang above Kapit, and brought a German logging expert fromBangkok to report on the possibilities of tractor working in these forests. He wrote a lengthy report infavour of the project. Having obtained a licence over these forests the Company in 1938 imported two elephants from Siam complete with Siamese riders, and also a tractor. The elephants did remarkably well, but the tractor was before its time and achieved nothing.Unfortunately in 1939 or 1940 one elephant slipped down a bank and strangled itself in a creeper, but the other survived for many years. The Company were negotiating for another dozen elephants from Siam when the war intervened.

Exports of minor forest produce (Appendix V) during this period followed the general pattern established in 1920, with jelutong and cutch easily the most important items.

For years jelutong had been a considerable source of revenue to the State and of profit to the tappers, who numbered 4,000-5,000. The smaller trees yield very little latex and the larger succumb relatively easily to insect attack following bad tapping. Regulations to control tapping (Order No. II of 1910) had been in force before the advent of the Forest Department but, with a meagre staff' of inspectors were largely ineffective. The increased vigilance of the newly appointed Forest Guards brought to light a multitude of infringements; prosecutions were a commonplace and discontent a corollary, the tappers claiming that unless they went on tapping in the customary way they could not live. In 1930 the Government examined the problem and approved a rather ambitious scheme of control and improvement and even appointed an additional Assistant Conservator in connexion with it. As one of its essentials was a four and a half feet girth limit the old trouble broke out again almost at once, before any headway had been made with launching the scheme, which was abandoned. The girth limit was reduced to three feet as a preliminary to its total abolition (except in demarcated forests) not long afterwards.

As crude jelutong is liable to blue-stain, Gouddy and Co. (Manager Mr. Anvry) built a small refrinery at Bintulu, which was taken over by the Chicle Development Co. in 1936 and is still in operation today.

Management and silviculture

Mr. Corson in the 1940 report stated:

"No true working plans are in force in any of the forests but management is regulated by schemes where necessary."

The stock mapping of the Sarawak Mangrove forest reserve, which must have been a laborious operation in the absence of aerial photographs, was completed in 1939.

Shortage of staff and lack of funds inhibited silvicultural work except on an experimental scale.

Research

No special provision was made for research, except that one Forest Guard was detailed to collect botanical specimens for the Forest Department's herbarium. Research work was therefore done incidentally to ordinary routine. It included

(a) the laying out of girth-increment plots

(b) planting experiments with various species, exotic and indigenous

(c) nursery experiments with *belian, engkabang* and *jelutong*

(d) small scale tapping experiments on *Agathis alba* and *jelutong.*

Today the most valuable items carried over from this work are the plantations of *Casuarina sumatrana* in the Sixth Mile forest reserve, and the *belian* .and *engkabang* plantations in the Semengoh forest reserve.

Staff and training

By 1930 the strength of the Department had reached five European officers, five Eurasian officers trained in Malaya, and 101 Asians of other ranks.

In 1930 the Rajah gave E25,000 to the imperial Forestry Institute at Oxford, where there is now a "Brooke room".

The economic blizzard of the early 1930s cut back the growth of Forest Departments throughout the world, but Sarawak was harder hit than most. Mr. Mead, reviewing the annual report for 1933 (in the *Empire Forestry Journal* 1934, Vol. 13, No. 2) wrote:
"This report is, if possible, even more depressing than that for 1932, and it is probably not unduly pessimistic to describe it as the swan-song of organised forestry in Sarawak.

The drastic changes in the constitution of the department . . . promise to be disastrous to the cause of forestry in the State. Shortly, they consist of a reduction of the staff by 70 per cent of its 1931 strength, the abolition of the post of Conservator, and the reduction of the trained European personnel to two officers.

The report concludes with an enumeration of the strength of the department on 31.12.33, the total of all ranks, including clerks ,and office boys, being 32 . . . . This is a staff considered -adequate to protect the forests of a State of 46,000 square miles, practically devoid of modern communications. The Federated Malay States, with an area of only 27,000 square miles and with an excellent system of communications, considers a staff of 615 to be the minimum necessary to carry on its fort service with efficiency,

and this staff includes twenty trained European officers in territorial charges, and excludes seven officers engaged entirely in research and other work of a specialized character."

Mr. Mead was understandably pained to see the department he himself had spent eight years in building up from scratch being cut to ribbons in this manner. But the fates had in store a far worse disaster for the country, the Japanese invasion and occupation.

PERIOD 111: 1941-1945

JAPANESE OCCUPATION

The Japanese reached Kuching in December, 1941, and left in August, 1945. Thus there is no departmental annual report for these years 1941-1945.

All that need be said of this sad period (details of which are given in the report for 1946) is that local staff saved virtually all departmental records and equipment in Kuching and Sibu. Mr. Spurway commends the devotion to duty in this regard of Mr. F. J. Wright and Mr. John Chai Lakoo (Chief Clerk) in Kuching and of Yusop bin Rimau (Forest Ranger) in Sibu. The Miri and Bintulu offices were gutted with the loss of all records and equipment during the operations in 1945.

The Acting Conservator of Forests in 1941, Mr. D. B. Stewart, and Mr. B. J. C. Spurway (who was attached to the Agricultural Department at the time) were commissioned and served with the 2 /15th Punjab Regiment, which continued operations in southern Borneo after Kuching had fallen. Mr. Stewart was one of a party of six officers murdered there in March, 1942, after the capitulation of the Netherlands East Indies. Mr. Spurway was taken prisoner, and after internment in Java and Singapore he was one of fifteen hundred prisoners brought back to Kuching and interned there in the notorious Batu Lintang camp (of *Three Came Home* by Agnes Keith fame). For his work in this camp he was later awarded the M.B.E.

PERIOD IV: 1946-1960

FOREST DEPARTMENT UNDER THE CROWN

Under the Military Administration the Forest Department was administered by the Director of Lands and Surveys, and did not become a separate unit again until July, 1946, by which time the Third Rajah had ceded the territory to the Crown (1.7.46) . The subsequent history of the department is adequately documented in its annual reports and by the statements prepared for successive Commonwealth Forestry Conference. The story can therefore be summarised briefly here.

Forest Administration, Policy and Legislation

It fell to Mr. Spurway, the, only officer to return to duty after the Japanese occupation, to pick up the broken pieces and put them together again, assisted by the Chief Clerk Mr. Lakoo. He assumed charge on 22.7.46 and was joined by Mr. J. H. NelsonSmith, A.C.F.= on transfer from British Honduras, in July, 1948 and by the present writer, on transfer from Burma, in February, 1949.

In his 1948 report Mr. Spurway pays tribute to the excellent work or the three Assistant Forest Officers, Messrs. D. Carroll, F. J. Wright and L. P. Zehnder, who "shouldered the responsibilities of Senior Officers with credit in a critical year in the history of the Department."

No major change was made in policy, but in accordance with the recommendations of the Commonwealth Forestry Conference a full .and detailed statement of the Government's official policy was approved by the Governor in Council on 23.12.54 and issued as a printed paper.

This policy statement was subsequent to the enactment of a new Forests Ordinance and Forest Rules, which came into force on 1.1.54. An attempt was made to reach agreement with North Borneo on forest law for both territories, but this was found impracticable owing to the different conditions obtaining in each territory.

The Forest Department in Brunei was administered by an Assistant Conservator seconded from Malaya during the years 1933-48, but by arrangement with the Brunei Government an officer of the Sarawak establishment took over this duty during the years 1949-1959, From 1942 onwards the post was combined with that of officer-in-charge of the Fifth Division, the two Governments each contributing half the emoluments of the officer, but Brunei providing office facilities and clerical staff. This arrangement worked smoothly in practice and when the office moved from Kuala Belait to Brunei in 1954 it was conveniently situated for Visiting the Fifth Division. After 1959 Brunei reverted :o the earlier arrangement of obtaining an officer from Malaya.

The Forest Department is also concerned with the National Parks Ordinance (16.2.56), the Conservator being Chairman of the Board of Trustees for National Parks (one of which had been constituted by 1960); and with the Wild Life Protection Ordinance (1.1.58), the Conservator being the Chief Game Warden and a number of forest officers being Game Wardens. The Conservator was also appointed chairman of a comittee set up to try and find new land for resettlement of Dayaks who had exhausted their existing land in the Second Division by shifting cultivation methods and wanted to move to new areas. This required a :.great deal of work in the years 1956-1959.

Forest reservation

Two factors greatly speeded up the constitution of),-rmanent forests during the period 1950-1960: first and most important the availability of aerial photographs taken by the R.A.F. in 1947 onwards, which made it possible to pick out suitable areas on the photographs instead of having to carry out laborious and slow explorations on the ground; secondly the approval by the Secretary of State of a ten-year Forestry Development Plan 1950-1959 and the allocation of funds under a Colonial Development and Welfare Fund grant, which permitted a rapid increase in staff.

In 1960 a further five-year plan 1961-1965 was approved by the Government, which will more or less complete the constitution of permanent forests in the country. The main areas to be examined under this plan are swamp forests in the Second and Fourth Divisions.

Exploitation and utilisation

The spectacular rise of *gamin* as an export timber overshadowed all other developments in this field. It was found to be ideally suited for certain uses in Europe and Australia, timber-hungry after the second World War, and its extraction on a large scale became feasible after the Colonial Timber Company in 1948-49 had demonstrated the techique of using light railways in the swamp forests. Previously this species was held in such low esteem that as late as 1948 it was being poisoned in the Daro Forest Reserve in favour of jelutong.

The Borneo Company Limited made another determined effort to develop the forests ,above the Pelagus rapids in Kapit District. The surviving elephant from the pre-war era was joined by re-inforcements, some from Siam, others from circus, until a herd of 24 had been assembled. Much capital was expended on rebuilding the sawmill at Salim (above Sibu) and installing an enormous boiler and new machinery. We have already recorded how in 1886 and again in 1904 the Company were defeated by teredo. Now they fought another losing battle with borers, this time the ambrosia beetles that make pinholes in felled (and standing)

timber. Conditions in the forest were such as to make it impossible to get logs quickly down to Kapit. All sorts of chemicals were applied to the logs, and flamethrowers were specially made to char the surface of the logs, but in spite of all precautions too much of the timber became too perforated for high-class markets. After a long struggle the Company decided to shut down their hill operations and dispose of the elephants. A Chinese firm took them over and in 1960 eight animals were still at work, the rest having died for one reason or another. Owing to lack of natural fodder Sarawak is not ideal country for timber elephants, and the supplementary rations they require are expensive to transport to remote areas.

In minor forest produce the principal change has been the closing of the cutch factory at Selalang at the end of 1960, due to falling prices for cutch and the low tannin content of the mangrove bark as compared with North Borneo.

Management and silviculture

As stated above, the main effort in the 1950-1959 plan was directed at constituting permanent forests. Now that this objective has largely been attained, the main emphasis in the 1961-1965 plan is on management and silviculture. Working plans and felling schemes have been prepared for most sawmills. In 1960 the arrival of a silviculturist on a three-year contract, paid from C.D. & W. funds, enable an intensive programme of research into swamp forest silviculture to be started. Prior to 1960 treatment was confined to piosoning relicts and weed species left behind by the licensee.

Research

One Assistant Conservator of Forests has been detailed as Forest Research Officer. His duties include carrying out the 1959-1963 Research Programme approved by the Government, organising the Kuching forest school, and acting as warden of the Bako National Park. Considerable progress has been made in botanical work, which will be encouraged by the construction of a new herbarium building, built under C.D. & W. funds and completed early in 1961.

Staff and Training

A forest school was started in Kuching in 1950, and has been held annually since, under the supervision of the Forest Research Officer. It permits in-service training of forest guards in forest law, identification of trees and timbers, survey, etc. With no permanent instructor and no proper building or facilities the school (4 to 5 months course) has been run under great difficulties. A scheme for building a new school out at the Semengoh Forest Reserve was approved in 1960.

By courtesy of the Government and Forest Department of Malaya, two students have been sent annually since 1955 to the Forest School at Kepong for the ten months vernacular course. The students selected have been those who did best in the Kuching school.

The Government's policy is to train local boys up to full professional level, but up to 1960 owing to the low level of basic education of candidates, only one could be found to send abroad for training.

Finance

Appendix III shows that throughout the history of the department expenditure exceeded revenue on only two occasions, in 1920 the first full year of the department's existence, and in 1932 in the trough of the great depression. It also shows the great increase in revenue during the last decade 1950-1960, due largely to .the ramin industry.

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APPENDIX I

STATEMENT IN SQUARE MILES OF FORESTED AND OTHER LAND

Year	*Area of Sarawak*	FORESTED LAND *Permanent forest*	*Other forest*	*Total*	OTHER LAND	PERCENTAGES *Permanent forest*	*Other forest-*	*Other _ land*
1920	48,300	[3]	35,800	35,800	12,600*	[0.1%]	74%	26%
1930		400	35,300	35,700**	12,700	1%	73%	26%
1940		2,500.	33,100	35,600	12_800	5%	69%	26%
1950		3,400	32,100	35,500	12,900	7 %	67 %	26 %
1960		11,500	23,900	35,400	13,000	24%	49%	27%

*Nearly 9,000 sq. miles is bush fallow on land subjected to shifting cultivation.

**It has been assumed that forest has been cleared by shifting cultivation at the rate of 10 sq. miles per year during the period 1920 -1960. This is a guess.

APPENDIX II

OUTTURN OF TIMBER AND FUEL

Year	*1920*	*1930*	*1940*	*1950*	*1960*
Timber*, tons of 50 cu. ft. true measure	5,024	24,827	19,602	79,054	852,665
Mangrove Firewood, long tons	14,723	23,603	21,822	37,035	26,760
Mangrove Charcoal, long tons	4,067	3,322	4,537	4,138	5,146

*The figures are for logs, plus sawn timber and shingles converted to round equivalent by multiplying by 2.

APPENDIX III

REVENUE AND EXPENDITURE
(to nearest $100)

Year	*Revenue*	*Expenditure*	*Surplus or Deficit*	*Export duty on forest*	*Expenditure C.D. & W. producefunds*
1920	19,700	29,000	- 9,300	415,000	-
1930	112,900	108,600	+ 4,300	123,600	-
1940	81,100	59,500	+21,700	89,900	-
1950	389,100	141,300	+247,800	254,700	27,300
1960	5,207,900	647,900	+4,560,000	842,500	25,600