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ANNUAL REPORT
1961**

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DEPARTMENT ANNUAL REPORT, 1961

CHAPTER I—MAIN FEATURES OF THE YEAR

F.A.O. Survey of present wood consumption and future timber requirements of Kenya.—This was completed in June and has provided valuable information against which to plan future development of the Forest Estate.

Botanical text-book.—The revised and expanded edition of *Trees and Shrubs of Kenya* the work of Mr. I. R. Dale and Dr. P. J. Greenway became available towards the end of the year. Messrs. Buchanan's Kenya Estates Ltd., were responsible for publication of this excellent book, which is filling a long-felt want.

Scheme for Relief of Unemployment.—930 resident labourers with their families, were engaged and settled into forest villages during the year. These are supernumerary to those absorbed into the Forest Estate under the Supplementary Forest Development Scheme which was completed in 1960.

Planting.—New planting covered 15,928 acres which is only 58 acres short of the total for 1960 and some 400 acres less than the record total achieved in 1959.

Training.—In addition to the annual Ranger training course, 20 serving Forest Rangers were given advanced training at the Londiani Forest School, with the prospect of promotion to Forester.

Promotions.—Three Forest Rangers, selected from the advanced Ranger training course, were promoted to Forester posts during the year. Two others were serving as acting Foresters at the end of the year.

Training within Industry.—A Forester was selected for, and completed successfully, the full range of T.W.I. courses, with the object that the basic principles of this training should be disseminated throughout the Department.

Timber Industry.—The internal demand for timber showed a further decline. However, there was some expansion in exports of timber, including pencil slats. The most encouraging feature of the year was the increasing interest shown in the possibilities of impregnated softwood sleepers replacing steel sleepers.

Forest Advisory Committee

2. This Committee met three times under the chairmanship of the Rt. Hon. the Earl of Portsmouth. It is with great regret that the death of Mr. H. S. Fisher, a member of the Committee, on 15th December has to be reported. The Committee also suffered the loss, through resignation, of the services of Mr. B. R. Hoddinott, who, together with the late Mr. Fisher, gave valuable and unstinted help to it over a great many years. The Ministry wishes to express deep appreciation of their services.

The Committee now consists of the following, in addition to the Chairman:—

- J. L. Riddoch, Esq., C.B.E., *Vice-Chairman.*
- Major H. B. Sharpe, C.B.E.
- Hon. Mr. Zafrud Deen, M.L.C.
- W. M. Murton, Esq.
- The Chief Conservator of Forests.
- T. G. D. Burgess, Esq.
- Chief Willie Kipto arap Chirchir.

The last two were nominated to the Committee towards the end of the year and did not attend any meeting.

East African Timber Advisory Board

3. The annual meeting of the Board was held in Nairobi in March. In the afternoon a visit was paid by the delegates to the E.A. Railways and Harbours' Sawmill and Workshops through the courtesy of the General Manager.

CHAPTER II—THE FOREST ESTATE

The following is a list of additions to and excisions from the Forest Estate during the year:—

Additions

Legal Notice No.	Date	Forest Area	District	Acreage
185	29-3-61	Kangure	Fort Hall	465
		Karua	Fort Hall	519
		Kiamuti	Fort Hall	450
		Kiambicho	Fort Hall	930
303	26-5-61	Ngamba	Kitui	2,645
		Nuu	Kitui	8,730
		Makongo	Kitui	8,430
304		Mrima	Digo	931
		Gonja	Digo	2,080

The 2,364 acres gazetted under Legal Notice 185 are African District Council forests in Fort Hall District; the 19,805 acres gazetted under Legal Notice 303 are African District Council forests in the Kitui District; and the 3,011 acres gazetted under Legal Notice 304 are forest areas at the Coast.

Excisions

Legal Notice No.	Date	Forest Area	Acreage
222	12-4-61	Kiganjo	3 (approx.)

This refers to a small area of Kiganjo Forest Reserve near Nyeri.

The recorded area of the Forest Estate as on 31st December, 1961 was as follows:—

	<i>Square Miles</i>
Crown Forests (Land)	5,065·6
Crown Forests (Mangrove)	209·4
African District Council Forests (Land)	1,401·0
	<u>6,676·0</u>

The two Royal National Mountain Parks, which comprise the moorland areas of Mt. Kenya and the Aberdares, and which together total 456 square miles, should correctly be added to this total of 6,676 square miles. The Forest Department retains responsibility for fire protection and fire fighting in these National Parks and they form part of the vital montane catchment areas of the country.

CHAPTER III—SURVEYS AND BOUNDARIES

J. D. Bald, Staff Surveyor, remained in charge of the Department's Survey assisted by J. Rutherford, Assistant Surveyor, and a staff of six.

The mapping of forest boundaries from aerial photographs was largely suspended because of unsuitable weather for flying and no new photographs of forest boundaries could be obtained.

The survey of the boundaries of additions to the forest estate by ground methods was given top priority during the year in an effort to clear all outstanding areas. Boundary surveys for seven forest areas totalling 8,950 acres in Kiambu, Kilifi, Elgeyo and Kipsigis districts were completed. In addition the field work was completed for boundary surveys of five forest areas covering 22,000 acres in Kitui and work was started on the survey of five forests totalling 1,500 acres in Taita district.

It was the intention to revise from aerial photographs the plantation and district maps of some 149,000 acres of forest under development, but because of unsuitable flying conditions only one area of 27,000 acres was flown. Ground work has been done in the remaining areas in preparation for flying early in 1962.

Boundaries

The length of forest boundaries was decreased by 23 miles, bringing the total length of boundaries to 4,891 miles made up as follows:—

	<i>Miles</i>
Natural boundaries (rivers, roads, etc.)	719
Artificial boundaries	4,172

During the year 147.6 miles of new boundaries were demarcated at an average cost of Sh. 237/10 per mile.

CHAPTER IV—TERRITORIAL CHANGES

The Forest Estate continued to be divided into two Conservancies, east and west of the Rift, and 11 Forest Divisions.

The officers in charge were:—

(1) EAST CONSERVANCY

Conservator	M. C. Argyle—January to July.
	J. P. W. Logie—August to mid-November.
	J. B. Smart—November to end of year.

Divisions (in charge of Assistant Conservators).

1. Nyeri	J. E. Cobby throughout the year.
2. Fort Hall/Embu	T. J. Wormald—January to July. E. W. Chapman—September to end of year.
3. Nairobi	J. B. Smart—January to November. T. R. Cutler—November to end of year.
4. Thomson's Falls	J. S. Lightbody—January to July. T. A. M. Gardner—July to end of year.

5. Southern J. S. Spears—January.
G. H. Brister—January to end of year.
6. Coast G. Fry throughout the year.

(2) WEST CONSERVANCY

- Conservator (acting) M. F. H. Abraham—January to December.
B. E. St. L. Stuart—December.

Divisions (in charge of Assistant Conservators)

1. Londiani P. J. Pearman—January to April.
B. E. St. L. Stuart—April to December.
R. D. H. Rowe—December.
2. Eldoret E. W. Chapman—January to May.
P. J. Pearman—May to end of year.
3. Nyanza C. C. Plumb—January to June.
R. D. H. Rowe—July to December.
D. L. Mallinson—December.
4. Elburgon A. D. Mather throughout the year.
5. Kitale P. St. J. Matthews throughout the year.

J. P. W. Logie held the post of Research and Planning Officer from January to March and again from mid-November to the end of the year.

CHAPTER V—WORKING PLANS

Mr. T. A. R. Choate held the post of Working Plans Officer throughout the year.

This year was again largely devoted to dealing with the backlog of management plans prepared by field officers and little original work was done.

Management Plans for the following districts were approved during the year:—

Baringo, Lambwe, Londiani, Bahati, Menengai, Ol Bolossat.

Plans for the following districts are completed and await approval and are, in the meantime, generally being acted upon with certain provisos:—

Castle, Kiandongoro, Ragati, Nanyuki, Nyeri, Nandi, Kipkabus, Elgeyo, Kabarnet, Lembus.

Plans in course of preparation:—

Taita, Kinale, North Kinangop, West Suk.

The following table shows the forest areas at present under approved management plans:—

Forest Area	Area in square miles	Date of expiry of Plan
CROWN FOREST AREAS		
Mariashoni	101	1964
Elburgon	33	1964
Nessuit	161	1965
Kimakia and Gatara	97	1966
Embakasi	2	1967
Kaptagat	48	1967
Maji Mazuri, including Narasha, Sabatia and Esageri	96	1967
Uplands	23	1967
Marmamet	95	1967
Kamae	20	1967
Kieni	26	1967
Olulua	3	1968
South Kinangop	26	1968
Nabkoi	75	1968
Timboroa	56	1968
Molo	39	1969
Londiani	132	1969
Oi Bolossat	13	1969
Bahati	39	1970
Karura	5	1972
	1,090	
AFRICAN DISTRICT COUNCIL FOREST AREAS		
Kakamega	100	1963
Meru	158	1970
Fort Hall	4	1970
Kitui	144	1970
Machakos	47	1971
Lambwe Experimental Area	(250 acres)	1971
Baringo	147	1972
	600	

No further progress was made with the inventory of the natural forest in the South Mount Kenya area but about 80 square miles of forest between Thuchi and Kathendeni rivers, for which the existing photography was particularly bad, was refflown on contract early in the year.

A simple preliminary type map was prepared from the 1:50,000 aerial photographs of the natural forest in South Mount Elgon, and the 1:50,000 photographs (1961) were also used to bring a number of management maps up to date.

It has now become the usual practice to use aerial photographs for planning the general routes of new road alignments, and so save much tedious trial and error in the field. A number of such suggested routes were prepared during the year following requests from field officers.

CHAPTER VI—PROTECTION

Protection Against Fire

The drought conditions of the past two years continued into the first half of 1961 causing a very high fire hazard in many areas. In spite of this fire damage to plantations was generally low.

Southern Division experienced the most serious drought conditions and a number of serious fires occurred in the Machakos District. 210 acres of young *Pinus patula* plantations were destroyed on Makuli hill; virtually the whole of Kyawea hill, including all the young plantations, was burnt out; and 1,500 acres of grass and bush were burnt over at Kibwezi. The programme of making wide internal firelines in the Machakos district continued, and 67 miles of new firelines were put in and 151 miles of existing firelines maintained. In some cases the fires were the result of arson, and without the co-operation of the local population no fire protection programme, no matter how costly, is likely to be effective. Fire protection work and losses on this scale put up the costs of dry country forestry very considerably and may render such afforestation on a large scale economically impracticable.

In Thomson's Falls Division about 16,000 acres of grassland and bush were burnt over in the Matthews Range and in the Ndotos and Nyiru Hills. In Nyeri Division a fire, started by a camping party at about 12,000 feet up on the Sirimon track on the northern slope of Mount Kenya, burnt over some 5,000 acres of moorland to the west of the Sirimon river and was only extinguished on the third day with the help of a providential rainstorm.

A network of fire towers connected by field telephones to district offices is being established in main plantation areas and a number of such towers are already in operation.

Protection Against Wild Animals

The new post of Forester, Game Control, was held by J. P. Drury throughout the year.

The policy of "educational control" of game by means of strategically placed moats and barriers, combined with control shooting and the use of thunder flashes, continues. By these means it is hoped to instil into the game a distaste for venturing near plantation areas. Control shooting alone without the use of barriers appears to be ineffective unless carried out on a massive scale. In certain areas it is desirable to leave "corridors" between plantation areas to permit passage of game.

The main areas where game control work has to be done are on Mount Kenya and the Aberdares, where there are extensive plantation areas in the process of development and where the game population is high. In many such areas field and tree crops regularly suffer damage from the larger game. It has been found that heavy post and log barriers are highly effective against buffalo, but that periodic repairs are necessary to replace gaps made by elephant. A system of a moat combined with a log and post barrier has been found most effective against buffalo and elephant providing it is regularly patrolled and any animals in the vicinity driven off by thunder flashes.

Protection Against Insects and Fungal Disease

The fungus *Actinothyrium marginatum* put in an appearance during the year and threatens to become a serious threat to young *Pinus radiata* plantations. It has already caused severe defoliation in a number of areas in the southern and eastern Aberdares.

Investigations into *Armillaria mellea* root disease were brought to a close.

Research into methods of control of the Cerambycid bark borer *Oemida gahani* continues.

More detailed accounts of the work done during the year under the headings of pathology and entomology will be found in Chapter IX.

A summary of offences dealt with under the Forest Ordinance is given in Standard Form V.

CHAPTER VII—SILVICULTURE

Rainfall

The exceptionally dry weather continued during the first half of the year producing severe drought conditions throughout the country, the "long rains" in eastern Kenya once again being very poor and well below average. Rainfall in July and August in western Kenya was up to average. This was followed by unseasonable rain in September not only in western Kenya but in the Coast Province as well where floods were experienced. 16 inches of rain fell in two days on one occasion. By October exceptionally heavy rain was occurring throughout most of the country, the falls being most severe on the eastern slopes of Mount Kenya where some places received over ten times their normal October rainfall; Meru, for example, having over 50 inches during this month which is not far short of the mean annual rainfall. By the time the "short rains" were due in November, many areas had become flooded and communications disrupted. Conditions were particularly severe in the Tana River valley which drains southern and eastern Mount Kenya and the eastern Aberdares. During November the Northern Province received more than fifteen times its normal rainfall, and heavy falls continued elsewhere, particularly on east Mount Kenya.

New Planting

A total of 15,928 acres of new planting was attained, although much of the effort and planting stock that would otherwise have gone into establishing new plantations had to be expended on repairs to the previous year's planting, much of which had failed because of the drought. The following table shows the acreage of new planting attained over the past five years:—

Year	Total New Planting	Average cost per acre
	<i>Acres</i>	<i>Sh.</i>
1957	9,735	39/64
1958	12,949	36/36
1959	16,325	30/03
1960	15,986	29/73
1961	15,928	33/80

Of the new planting this year 95 per cent consisted of exotic softwoods, 76 per cent of the exotic softwoods planted being pines, 23 per cent cypress and 1 per cent other genera.

Repairs, Maintenance and Progress of Plantations

Statistics for the past five years are as follows:—

Year	Repairs		Maintenance	
	Acres	Cost per acre	Acres	Cost per acre
		<i>Sh.</i>		<i>Sh.</i>
1957.. .. .	10,332	11	66,257	5/09
1958.. .. .	6,474	11/33	78,512	5/85
1959.. .. .	8,526	6/55	75,140	6/60
1960.. .. .	7,639	11/67	77,685	8/15
1961.. .. .	7,922	7/55	75,179	8/40

The bulk of the planting this year was, as usual, done in the "long rains" and the failure of these rains killed off many of the young trees and made extensive replacements necessary later in the year. This was responsible for the increase from 1960 in the average cost of establishment. Thanks to the heavy rains towards the end of the year the establishment of this year's planting is now exceptionally good. In many districts approximately a quarter of last year's planting also had to be replaced as the prolonged drought had caused many deaths. In the Southern Division advantage was taken of the exceptional rains to plant out stock which had been held back in the nurseries since 1959 on account of the past two years' drought.

Pinus halepensis appears to have weathered the drought better than any other exotic softwood species especially on rocky and stony sites in the dry areas, while recently planted stocks of *Pinus patula* have suffered the most severely.

Two surveys of plantations throughout the Colony were conducted during the year, one to assess the losses due to the prolonged drought and the second to assess the losses due to windthrow and waterlogging of the soil during the torrential rains and floods during the latter part of the year. The result of both surveys were most encouraging. Losses were generally found to be confined to small areas with locally unfavourable soil conditions within otherwise healthy plantations. No widespread damage was found to have occurred from either cause.

A survey to study disease incidence and to obtain growth and yield data of *Pinus radiata* plantations was started in April and continued intermittently for the rest of the year. By December all plantations over six years old in the East Conservancy had been surveyed. The volume table data have been plotted graphically and were undergoing statistical analysis at the end of the year. The survey has shown a much wider occurrence of damage from hail and *Armillaria* than was expected, though such damage is seldom severe enough to cause appreciable loss of increment. One of the most striking features brought to light is the remarkable uniformity of growth of the largest hundred trees per acre. These grow to about the same height and diameter at any given age, almost irrespective of site, rainfall or plantation density.

A survey was also made to assess damage done to plantations by big game, particularly in the Mount Kenya and Aberdare forests. The results of this have still to be evaluated.

Pruning schedules are now up to date in most Divisions but there are still considerable backlogs of thinnings in many areas due mainly to the difficulty in disposing of the younger thinnings.

Nurseries and Plants

On account of the wet conditions prevailing towards the end of the year "damping off" in seedbeds has been unusually severe, particularly among pine seedlings. Some Districts are now using seedbeds composed of pure sand as a germinating medium and report a considerable decrease in "damping off" and an increased germination percentage.

The use of "Swaziland" beds for the raising of seedlings has been extended further, and is likely to become the general practice in all districts except those where planting conditions are invariably undependable. In such districts the use of polythene containers for individual plants has given encouraging results.

The number of tree seedlings raised during the year totalled 15,769,600. Of these 14,404,100 were used in the Department's programme of new planting and repairs to the previous year's planting.

1,220,952 seedlings were sold to the public compared with 1,422,000 in 1960, 1,601,613 in 1959 and 1,869,697 in 1958. The steady decline in sales is regrettable.

Purchase and Collection of Seed

Local collections of seed for sale or distribution from headquarters amounted to 1,545 lb., the main items being:—

	lb.
<i>Araucaria cunninghamii</i>	733
<i>Cupressus lusitanica</i>	270
<i>Acacia mollissima</i>	203
<i>Pinus patula</i>	134
<i>Eucalyptus saligna</i>	90

These figures do not include local collections of seed for use within districts and divisions, and which do not pass through the central seed store.

Importations of seed totalled 1,455 lb., of which the main items were:—

<i>Pinus radiata</i>	1,000 lb. from New Zealand.
<i>Pinus radiata</i>	200 lb. from Australia.
<i>Pinus elliottii</i>	100 lb. from South Africa.
<i>Cupressus arizonica</i>	25 lb. from South Africa.
<i>Pinus pinaster</i>	10 lb. from South Africa.
<i>Callitris hugelii</i>	7 lb. from Australia.

All seed required for cypress and *Pinus patula* plantations was collected locally from selected stands. Seed of other species was collected either from selected seed stands, maintained and treated for the purpose, or from selected individual trees.

Exports of seeds totalled 234 lb. in 25 batches. The majority of these were small experimental quantities but commercial quantities of cypress seed were exported to Nigeria, Fiji, Sudan Republic, Uganda and Tanganyika. 100 lb. of *Borassus Palm* nuts were exported to the United Kingdom.

The more elaborate methods of seed documentation and testing, introduced in the central seed store in 1960, worked well during the year. All incoming batches of seed of plantation species are now subjected to routine germination tests by the Forest Pathology Section. It is proposed to retest seeds at regular intervals when a batch has to be held in the store for a considerable period.

The intensified testing programme has yielded valuable information on the useful store life of commonly planted species.

Nairobi Arboretum

In July, the Nairobi Arboretum, which had formerly been run by the Forester, Karura Forest Station, was handed over to the Forester, Headquarters, who also runs the Central Seed Store. Supervisory charge of both was allocated to the Silviculturist who had previously been only partly responsible for their management.

The following species were introduced into the arboretum for the first time:—

- Ginko biloba.*
- Thuja occidentalis.*

In addition the following species were added to the collection: *Picea morinda*, *Sequoia sempervirens*, *Robinia pseudacacia*, *Pinus radiata*, *Widdringtonia whyteii*, *Cryptomeria japonica*, *Acacia lahai*, *Acacia xanthophloea*. These had been introduced in the past but had died out.

The policy was continued of clearing, opening up and converting overgrown areas to lawn to make the arboretum more attractive to the public.

CHAPTER VIII—SWYNNERTON AND A.L.D.E.V. FORESTRY PROJECTS

A number of new projects and extensions to existing schemes were started under the African Lands Development Board.

Machakos

Approximately 750 acres of new planting was achieved during the year, in addition to repairs to some 200 acres of previous planting to replace losses due to drought. The better lands have now largely been planted up, and it is intended to reduce the annual planting programme to about 180 acres in future to enable available funds to be devoted mainly to maintenance and protection of those plantations already established.

The cutting of wide internal firebreaks continues and some 86 miles of new firelines were made and 62 miles of existing firelines maintained. The firebreak systems on Katende and Nzau are now complete and a 50 ft. wide boundary firebreak has been cut on Mutula.

The drought conditions during the first half of the year caused a high fire hazard and a number of fires occurred. 210 acres of young plantations and 125 acres of bush on Makuli were burned over when a fire from an adjoining farm jumped the forest boundary. In a number of other cases fires were either brought under control or stopped by firebreaks.

The drought took heavy toll of the 1960 planting and, of the exotics so far tried, *Callitris* spp. seems to be the most capable of withstanding such prolonged periods of drought.

Kitui

The demarcation and survey of 13 out of the 14 forests in this district is now complete and three of the forests have been gazetted. Planting has proceeded according to plan and some 200 acres of new plantations were established during the year. Work continues on the cutting of firelines in plantation areas and on clearing firelines along forest boundaries to prevent incursion of fires from outside.

Taita

Survey of four of the ten forest areas is complete but gazettelement has been held up because of difficulty in defining local rights regarding cultivation, for inclusion in the local Forest Rules. The acreage of plantations so far established in these areas has been more accurately assessed at approximately 1,000 acres instead of about 1,500 acres as previously estimated. Planting of suitable land is now virtually complete and future effort will be concerned mainly with the maintenance and protection of plantations already established.

Embu

The survey of the nine forest areas concerned has been completed and gazettelement should take place in 1962. Two nurseries have been made and 80 acres of planting, spread over five forest areas, was attained this year. It is intended to increase the area planted annually to 570 acres in 1962.

Kilifi

It has been decided to abandon this scheme.

South Nyanza Forest Advisory Scheme

Fifteen nurseries have now been established to supply tree seedlings to local councils, farmers and the Administration, and numerous lectures and demonstrations illustrating the importance of forestry have been given to schools, local councils and

farmers' institutes. These activities have, in general, been well received and a number of locational nurseries, previously moribund, have been started up again and training is given to local nurserymen at the Departmental nursery at Lambwe. Apart from encouraging local farmers to grow their own timber, plant windbreaks and shade-trees, the scheme is also helping local African District Councils to run their forests on sound silvicultural principles. Some 75 acres of new planting was established on Kodera and heavy repairs to the previous year's planting were undertaken at Nyangweta.

Lambwe

The Lambwe experimental area of 250 acres is run in conjunction with the South Nyanza and Kisii Forest Advisory Scheme. The purpose is to discover the most suitable species and techniques for afforestation in South Nyanza and Kisii. Experiments on depth of planting and methods of raising seedlings have so far yielded valuable information and future experiments will be concerned mainly with species trials. A further 80 acres of field trials were established.

Maragoli and Maseno

The objective of planting up some 800 acres of the Maragoli hills with exotic conifers to supply forest produce for this densely populated area has almost been achieved in spite of strong opposition from some of the local people. Attempts at arson caused heavy expenditure to be incurred on fire protection during the first half of the year. In spite of these measures, however, some 250 acres of the previous year's planting was burned over but this was replanted by the end of the year in addition to 150 acres of new planting. After the 1962 planting season it is intended that the nursery at Maseno will be used mainly for the production of tree seedlings for sale to local farmers and greater emphasis will be given to advisory work.

Baringo

Perkerra Catchment.—The Perkerra Irrigation Scheme at Marigat depends upon the catchment area of the Perkerra river and its tributaries in the Kamasia hills, much of which was in a deplorable state. A large-scale scheme for the protection of the Perkerra catchment under the control of the Forest Department and launched under the aegis of ALDEV has resulted in the selection, demarcation and survey of 19,741 acres in the catchment and this area is about to be gazetted under the Forest Ordinance. The scheme is essentially concerned with the protection and restoration of natural vegetative cover, but a small-scale experimental programme of some 80 acres per year is being carried out to ascertain suitable tree species for introduction into the area. The results of these experiments have, so far, been encouraging and a number of species, notably *Callitris* spp., show promise.

A scheme to extend this work to cover the Kerio catchment and other catchments in the Kamasia hills has been halted on account of opposition from the local people and no funds were spent on it during the year.

West Suk

Schemes in this area are mainly concerned with the protection of catchment areas on Lelan, Kamatira, Sekerr and Sondang mountains in conjunction with a system of controlled grazing and a small softwood afforestation plan.

Interest is being stimulated by local authorities in the development of permanent holdings in the interior grasslands on Lelan as part of an integrated land use scheme. 140 acres of new plantations were established at Kamatira in addition to 160 acres of the previous year's programme, which had suffered severely from drought, being largely replanted.

CHAPTER IX—RESEARCH

A—General

In silviculture the main emphasis was on growth and yield studies of existing plantations, tree breeding and species trials. The Entomology branch continued with the study of *Oemida gahani*, while the most striking event pathologically was the discovery of *Actinothyrium marginatum* occurring as a defoliator of young *Pinus radiata* plantations.

The Department continued to co-operate with the East African Agriculture and Forestry Research Organization in the long-term water catchment experiments in the Aberdares and in the South-West Mau. The object of these experiments is to ascertain the effects on stream flow produced by the replacement of natural bamboo forest by exotic conifer plantations, and the replacement of indigenous tree forest by tea plantations.

In addition a joint experiment was set up to determine the amount of occult precipitation produced by conifer plantations in areas where mists are prevalent.

B—Silvicultural Research

BY W. G. DYSON, SILVICULTURIST

The post of Silviculturist was held by W. G. Dyson throughout the year assisted by D. M. Rendle, Forester (Silviculture). The headquarters of the branch continued to be at Muguga where a small research nursery is also maintained. The Forester assistant occupied an office at Conservancy headquarters at Londiani.

A summary of the principal research projects in hand is as follows:—

Soil Structure

Further preliminary examinations for a joint experiment on the effects on soil structure of replacing indigenous forest with repeated crops of exotic conifers (separated by intervening "taungya" cultivations) were made during the year. Various unforeseen difficulties arose and a start on the main experiment was not possible.

Herbarium specimens

Small collections of botanical material were submitted to the East African Herbarium for authoritative determination in connexion with the Game Damage Survey. Also started were an inquiry concerning local shrubs, the twigs of which are used for cleaning the teeth, and the preparation of authenticated timber specimens, from which an enlarged punched card key for identification was to be produced.

Treatment of Natural Forest

Small-scale experiments conducted by territorial staff on the natural regeneration, tending and improvement of semi-tropical forest continued during the year. At Kakamega refining of high forest with arboricides, by methods developed in Uganda is being pursued with some success.

PLANTATION RESEARCH

Species Trials

Seed of 19 species of Latin American pines and four strains of *Pinus insularis*, obtained during the F.A.O. Latin American Conifer Seminar in 1960, have been successfully raised in the nursery and, with two exceptions, have produced planting stock of good quality for planting out in 1962. The trials will be established in four sets of arboretum plots in different parts of the country. Surplus stock from these seeds is being distributed for district field trials and to the Tanganyika Forest Department, who were unable to send a representative to the Seminar.

Tree Breeding

Progeny from a further 41 *Pinus patula* mother trees and 34 *Cupressus lusitanica* mother trees was planted out in replicated trial plots at Muguga during the year. Planting stock was raised from seed of 10 selected trees of *Cupressus benthamii* during the year in readiness for planting in 1962.

One plus tree of *Pinus radiata* was discovered during the year, and seed and grafting material were collected from it in early 1962. The finding of this tree and the examination of a very large mass of individual tree data derived from the survey of *Pinus radiata* plantations enabled a specification for plus trees of this species to be drawn up to assist territorial officers in their selection of seed trees.

Scion material of 25 elite trees of *Pinus radiata* was imported (in collaboration with the East African Plant Quarantine Station) from Australia. Fifteen of these strains survived quarantine and are being bulked up at E.A.A.F.R.O. by further grafting in readiness for distribution to the three mainland East African territories. Scion material of four other elite trees, imported in previous years by Kenya, was distributed from E.A.A.F.R.O. for further bulking and the establishment of seed orchards.

Scion material from Kenya from plus trees of *Pinus patula* was distributed to Tanganyika and Uganda.

Controlled artificial pollination of *Pinus patula*, begun in 1961, was repeated amongst selected progenies of plus trees at Muguga. Pollinations made in 1960 have produced apparently fertile cones but these have not yet ripened and F.I. planting stock will not be available for trial before 1964.

Seed—Pre-sowing treatments

Experiments at Ragati Forest Station on the germination of *Vitex keniensis* seed (reported in 1960) demonstrated the advantage of sowing freshly collected seed, unwashed and without pretreatment. Because it is not always practicable to use freshly collected seed, experiments were undertaken to find suitable methods of storage of seed of this species. The experiments continue but it has been shown that seed from which the pulp has been washed may be safely stored for at least six months in dry, cool conditions.

Transplant Quality and grading of Planting Stock

A small experiment on methods of assessing transplant quality confirmed the general finding in East Africa that large plants survive transplanting to the field better than small ones. Measuring oven dry weight of a sample of the stock was the best method of gauging the size of the plants, but it is clearly unsuitable for field use. Measurements of the root collar diameter with a simple caliper were found to be closely related to the dry weight of the plants, and were a more reliable guide to the size and robustness of the stock than were height measurements or visual assessments of size.

Transport of Planting Stock

The experiments, reported in 1960, on the lifting and transport of transplants, raised in undercut beds, to the planting site in polythene bags were widely repeated in 1961. Results confirmed the previous year's findings despite unfavourable planting conditions at some Forest Stations. A number of different methods of raising the stock and different periods of storage in the polythene bags, were compared with methods of raising and transporting to the planting site in standard seed boxes. As in 1960, boxed stock showed a slight advantage over naked rooted stock in unfavourable conditions. However, even the most severe polythene bag treatment gave over 80 per cent survival on planting out under difficult transplanting conditions, which is adequate for practical purposes. Under favourable conditions deaths never exceeded 5 per cent and there were no significant differences between any of the treatments tried.

Transplanting from individual containers

Transplants raised in a widely repeated experiment in 1960 to test the efficiency of large-sized polythene bags for plant rearing were planted out in 1961. While, under normal Kenya nursery conditions, the use of polythene containers as large as seventy-five cubic inches capacity did not produce a worthwhile improvement in the size of the stock in the nursery, the expected better survival on transplanting was found this year. As with the transport of stock experiments reported above, survival percentages were all very high but the advantage of individually potted stock was of little practical significance in the conditions tested.

Initial Planting Espacements

In 1951, at the request of the annual Foresters' Conference, a series of sets of four initial espacement plots were laid down at 6 ft. x 6 ft., 7 ft. x 7 ft., 8 ft. x 8 ft., and 9 ft. x 9 ft. square espacement with several species of cypress and of pines. These plots were to be left for ten years unthinned and unpruned, which treatment it was hoped would produce crops of tall, self-pruned trees of good form. The assessment at 10 years old of the surviving sets of plots was undertaken during the year under review. While detailed analysis of the results has not been completed the general conclusions are already clear.

Self-pruning.—The growing of exotic softwood species commonly planted in Kenya at 6 ft. x 6 ft. espacement for ten years does not result in self-pruning. The lowest living branches in the plots were usually less than 6 ft. from ground level. Maximum branch size was not smaller in the 6 ft. x 6 ft. plots than in the wider espacements, but mean branch size is depressed by the closer espacement.

Height Growth.—The mean height of the hundred largest trees per acre is slightly greater in the 6 ft. x 6 ft. plots than at the wider espacements, but the mean height of all trees is depressed by the closer espacements. The differences between plots were very small, less than two feet in all cases, and are unlikely to be statistically significant.

Diameter Growth.—Mean diameter growth is definitely depressed in the 6 ft. x 6 ft. plots and generally improves with the wider spacings. If, however, only the largest 100 trees per acre are considered, there is little to choose between the three wider espacements.

A disadvantage of the 9 ft. x 9 ft. espacement was revealed when the plots were thinned, when the mean diameter of the remaining crop frequently fell below that of the 8 ft. x 8 ft. and 7 ft. x 7 ft. espacements. This is due to the removal as thinnings of certain large diameter trees of poor form which develop in some 9 ft. x 9 ft. planted crops.

Publications

Papers

Logie, J. P. W. and Dyson, W. G.—“Forestry in Kenya”—An Historical Account of the Development of Forest Management in the Colony. (In Press).

Reports

Dyson, W. G.—National Progress on Eucalyptus Growing in Kenya. *F.A.O. Second Eucalyptus Conference, Brazil, 1961.*

Technical Notes:

No. 79.—“A Note on the Principles Affecting the Rate of Planting in Individual Districts in Kenya”. (Logie).

No. 80.—“Registered Experiment No. 79—An Experiment on Initial Espacement and Early Treatment of Softwood Plantations.” (Dyson).

No. 81.—“Volume Tables for *Cupressus lusitanica* Miller—In True Cubic Feet.” (Dyson—partly from equations derived by Pudden).

No. 82.—“Mechanical and Physical Properties of Kenya Exotic Pines.” (Compiled—Paterson).

No. 83.—“Death due to Drought in Plantations, 1961.” (Dyson).

C—Entomological Research

BY S. J. CURRY, FOREST ENTOMOLOGIST

The Forest Entomologist was on overseas leave during the first part of the year and the branch continued in his absence under the supervision of J. M. Baynes, Forester (Entomology).

Research on Oemida gahani (Dist.)

Research continued on similar lines to last year. The most important results obtained during the past year are as follows:—

Life in wood.—The longest part of the life cycle, which is entirely spent within the host tree and extends from larval entry to beetle emergence, averages about 33 months. Though it may vary from 12 months to 48 months, there appears to be no obvious relationship between the length of this period and the state of the host tree. Similarly, the rate of boring of larvae shows considerable variation, but seems to be generally higher in dead trees than in living trees. In Cypress, the rate varied from 0.3 in. to 6.0 in. per month, with a mean of 2.2 in. in dead trees and 1.4 in. in living trees.

Beetle emergence.—Despite the exceptionally heavy rain in all forest areas during November and December, there was no great increase in beetle emergence and oviposition. As in previous years, the greatest flush of emergence occurred after the beginning of the Long Rains, in April and May, though these were not as heavy as usual. It would seem that these rains provide the biggest stimulus to emergence, because they follow the longest dry period of the year, particularly West of Rift.

Flight.—The maximum distance so far achieved in one flight by a female beetle stimulated to fly in daylight, is 312 ft. Sticky traps have shown that more than 90 per cent of beetles fly only during the hours of darkness, but the maximum distances flown by female beetles to oviposit on trap trees in the field, seems to be little greater than 300 ft. It is unlikely that distances exceeding 100 ft. are flown by the majority of female beetles, though males may often fly further to find them.

Distribution.—Though the upper altitude range has recently been extended to 10,500 ft., such records as are available of the collection of the insect below 3,900 ft. in Kenya are very old and somewhat in doubt. It is most prevalent in forest areas between 7,000 ft. and 9,000 ft. where the most susceptible indigenous tree species are found in the greatest numbers and exotic *Cupressus* spp. also do best.

Incidence in Natural Forest and Cypress Plantations.—Widespread sampling of indigenous stumps has shown that the pest is twice as common West of Rift as it is East of Rift, in the highland forests. Incidence in the natural forest has been shown to vary with the number and proportion of susceptible host species. Thus, West of Rift, the ten most frequently attacked species form a large proportion of the stumps in nearly all forest areas. East of Rift, however, in only a few areas, mainly in Thomson's Falls and Nairobi Divisions, are some of these species found in comparably large numbers.

Incidence of attack in Cypress plantations is highest in those areas where it is also in natural forest. Nearly 75 per cent of plantations sampled West of Rift are attacked compared with only 28 per cent East of Rift, and rates of attack exceeding 5 per cent of trees in a plantation are much more frequent in the former region than the latter.

The survey of attack of stumps in plantations has shown that a number of the most susceptible indigenous species are very durable, and may thus remain a potential danger to Cypress plantations throughout a rotation. Such species as *Juniperus procera*, *Olea hochstetteri*, *O. africana*, and *Maytenus undatus* have been found to harbour active larvae 30 years after the clearance of a planting area.

Treatment of Wounds

Only two treatments, of more than 30 so far tried, have prevented deep penetration by larvae. The successful treatments are bituminous substances incorporating gamma B.H.C. (Benzene-hexachloride) and Creosote. Though both have retained their effectiveness for more than a year oviposition was not prevented.

Greases remain the most effective treatment for the prevention of oviposition and have proved reasonably efficient for two years. After this time their effectiveness decreases due to the formation of a hard coat of dirt on their exposed surface. It is likely that eggs may be laid on this surface but, if the grease is applied thickly enough, penetration by the larvae seems unlikely. If it is proved that their effectiveness is not lost after two years, then greases should prove to be more suitable and economical than the present treatment of bitumen incorporating 2 per cent gamma B.H.C.

Sawmill Allowances for Oemida Damage

The discovery of one plantation at Elburgon, in which 30 per cent of the timber in the final crop was rejected due to *Oemida* damage, necessitated the modification of the formula, which was being tested for a trial period, for the calculation of allowances on timber royalty. This plantation was found to be exceptional some years previously, when 76 per cent of a 200 tree sample was found attacked, but at that time the actual timber degrade did not appear to be so high. The final formula now gives an increased allowance for higher rates of attack in the cut ends of logs, up to a maximum of 50 per cent attack, and should meet all normal requirements.

OTHER PESTS

Scolytid damage to Cypress.—Four plantations were found to be suffering from damage by the Scolytid beetle *Phloeosinus schumensis* at Cengalo in Eldoret Division during June. Branches were girdled at their bases and a small number of trees finally succumbed. This beetle normally attacks weakened trees, dead trees and logs, both of cypress and its usual indigenous host tree *Juniperus procera*.

Defoliators

Pinus patula plantations were defoliated at Nabkoi and Londiani by the Lagriid beetle *Lagria Cyanicollis*. Those in the former area, which were planted in grasslands, suffered most severely as this beetle is common in grasslands. Damage was greatly reduced following the rain and the outbreak seemed to be a result of the drought.

The defoliation of *Pinus radiata* plantations by the Bagworm—*Semimantia aethiops* (previously *Acanthopsyche aethiops*) at Moridjo, Thomson's Falls Division, continued unabated until October. Aerial spraying with Lead Arsenate was about to begin when heavy rain caused its postponement. This continued until the end of the year, when, rather fortunately, the outbreak appeared to have died out as no living larvae, pupae or moths could be found.

D—Forest Pathologist—Kenya

DR. I. A. S. GIBSON

Forest Disease Research

General.—The work of the Forest Pathology Section has continued this year from the premises loaned by the East African Agriculture and Forestry Research Organization. Later in the year, work was started on an office and laboratory, which will provide additional working space and which should be in use in 1962.

A short tour of the Lushoto region in Tanganyika and a more protracted tour in Uganda has been made.

There have been no increases in staff in the course of the year, but two students from Makerere College spent six weeks assisting with the work of the section.

Talks and lectures have been given to pupils at the Forest Training School and Forest Courses at E.A.A.F.R.O.

Nursery Diseases

Little loss was experienced from damping off (*Rhizoctonia solani* Khun and *Pythium* spp.) in the earlier part of the year, when the weather was most unseasonably dry. Later, however, losses in pine seedlings from this cause increased sharply with the excessive rain at the end of the year.

Botrytis cinerea Pers. has been recorded at several stations during the latter half of the year, causing die-back and deaths in pines, particularly *Pinus radiata*.

Some experiments to test formalin as a soil fumigant, to reduce losses from damping off in beds and boxes after pricking out, gave inconclusive results.

Helicobasidium purpureum (Tul.) Pat. has been recorded killing teak (*Tectona grandis*) in a Tanganyika nursery.

Leaf spot, due to *Phyllachora pterocarp* (Syd.) Syd. has been recorded on nursery plants of *Pterocarpus angolensis* in Tanganyika.

Die-Backs, Cankers and Leaf Diseases.—Observations made in canker plots for the spread of Cypress Canker (*Monochaetia unicornis* (Cooke and Ellis) Sacc. within selected seed lines of *Cupressus lusitanica* have shown only light attack in the course of four years. On the other hand, cypress of about the same age, planted in bamboo forest sites where mist has been most prevalent, has shown a marked increase in attack.

The die back and needle cast of *Pinus radiata* at Lushoto, Tanganyika, which was associated with *Pestalotiopsis* spp. (Annual Reports 1960 and 1959) has now been shown to be most probably due to *Actinothyrium marginatum* Sacc., the causal agent of Red Band on *Pinus contorta* and *P. ponderosa* in the U.S.A. In making this determination we have had considerable assistance from the Commonwealth Mycological Institute, Dr. C. G. Shaw of Washington and Professor J. S. Boyce Jr.

At the same time as this determination was made, the disease was recorded in the Southern Aberdares in Kenya, where it has caused a serious defoliation in several plantations of *P. radiata* aged 4–7 years. Younger stock has also been recorded with the disease. Field observations in the worst affected areas strongly suggest that *P. patula*, *P. elliotii* and possibly other species are not attacked. A survey for the disease, covering East Africa, is now being carried out.

It is now possible to reproduce this disease under controlled conditions and investigations are going forward.

A. marginatum has also been recorded in Uganda and Nyasaland this year and it may well prove to be our most serious forest pathogen to date. The defoliation caused can be severe and certainly brings a check to growth with it. However, affected trees are seldom killed outright.

A stem of canker of young *Maesopsis eminii* from plantations of this species in Uganda has been examined. *Fusarium solani* has been consistently isolated from affected tissues and inoculation experiments indicate that this is the causal agent. This is a potentially important disease for the Uganda Forest Department and of some importance to Kenya where *M. eminii* is also on trial as a plantation species in the Nyanza Division.

Naemacyclus niveus (Pers. ex Fr.) Sacc. has been found throughout East Africa during the latter, wet, half of the year, causing a mild needle necrosis of pines. This fungus has been recorded previously in Kenya, but has not been noted for some years.

Root Diseases.—Some spore trapping and searches for *Fomes annosus* sporophores have been carried out during the year, following records of this fungus from spore traps in 1960. In this we have had the assistance of Dr. J. Rishbeth of Cambridge. If the presence of this fungus is confirmed in East Africa prompt precautions will be required to prevent serious damage to conifer plantations. For the last few months these investigations have been in abeyance due to the over-riding importance of needle cast of pines to *A. marginatum*. No further records of *F. annosus* have been obtained.

Armillaria Root Disease (*Armillaria mellea*) (Vahl. ex Fr.) Kummer. investigations have been brought to a close with the exception of some inoculation experiments, which failed to reproduce the disease, and a laboratory study designed to test whether the scarcity of sporophores of this fungus in East Africa was due to heritable or environment factors. Results of the latter strongly indicated that East African isolates of *A. mellea* could produce sporophores profusely under suitable environment.

Ustulina deusta (Hoffm. ex Fr.) Pat. has been recorded causing deaths in a young teak plantation in Tanganyika.

Rots in Standing Trees and Converted Timber

Polyporus revolutus Bres. and a possible *Polyporus nivicolor* have been obtained from rot of cypress associated with game damage.

Fomes senex (Nees and Mont.) Cooke has been found in association with heart rot of standing camphor (*Ocotea usambarensis*) in Tanganyika and *Fomes setulosus* Lloyd. and *Ganoderma applanatum* (Pers.) Pat. similarly in Kenya.

A number of collections of wood-destroying fungi have been identified for the section by staff of the Royal Botanic Gardens, Kew, during the past year.

No further records of heart rots in pines have been made.

Seed Testing.—Routine testing of seeds and some minor investigations have been made during the year.

Publications

1. Issue of the quarterly newsheet, "Pest Digest", has continued in collaboration with the Forest Entomologists of Kenya, Uganda and E.A.A.F.R.O.

2. "A Short Note on *Engleromyces goetzei*". *E.Afr.Agric.For.J.* (in press). With J. Kimeria).

3. "A Notebook on Pathology in Kenya Forest Plantations". Second Edition. (in press).

4. "Forest Pathology in East Africa". 8th British Commonwealth Forestry Conference (in press).

CHAPTER X—UTILISATION

Staff.—D. N. Paterson took over the direction of the Utilisation Branch from A. J. Hume in August. M. McCoy Hill, Timber Grading Inspector, remained at Mombasa and handled general Utilisation problems, including the Marine Borer Research, in addition to his other duties.

Timber Trade.—The economic recession had a disastrous effect on the milling industry. Several saw mills are in receivership or in liquidation. The rebate of royalty on exported timber was maintained in order to stimulate the export trade. Rebate of duty on fuel oils was also allowed to licenced timber producers.

Matches.—Mombasa Match Factory maintained production throughout the year, but it operated mainly on imported materials. Attempts are continuing to promote the use of local timbers. *Pinus radiata* is the most promising local timber for match splints found so far, but billets have to be graded to strict specifications. Experiments with *Podocarpus* timber may show it to be suitable both for match boxes and for match splints.

Wood Pulp.—An assessment made indicates that an economically viable plant, for the production of pulp and paper, would cost about £4,000,000 and that the market position is not yet favourable for a plant of this size.

Timber Testing.—The results of pine tests of various ages up to 30 indicate that:

(i) In general mature Kenya *P. radiata* is as strong as Baltic Redwood (*Pinus sylvestris*).

(ii) Mature *Pinus patula* will be as strong as Baltic Whitewood (*Picea abies*) and stronger than Sitka Spruce (*Picea sitchensis*). Since strength increases from the pith outwards, it can generally be said that both pines are unsuitable for structural purposes if they are less than 14 in. diameter in the case of *P. radiata* or 11 in. in diameter in the case of *P. patula*, assuming the average rate of growth of both species in Kenya.

Twist in timber derived from small logs is generally so severe that it is practically useless for structural purposes.

Cypress fortunately does not have a weak inner core, though immature logs of this timber are generally of poor quality due to knots. The strength properties of cypress are comparable to those of *P. patula*.

Railway Sleepers.—A full-scale service trial of treated sleepers of ten indigenous species was laid down by the E.A. Railways. From first observations it seems that indigenous hardwoods will not prove satisfactory.

An order was placed for 33,000 treated softwood sleepers, to be cut from *Podocarpus*, cypress or *Pinus* species. The production of these has gone smoothly except for difficulties in obtaining satisfactory penetration in the pressure impregnation of the cypress.

The interest of the E.A. Railways in timber sleepers owes something to the efforts of the Kenya Timber Sleeper Committee, whose work is to be commended.

In situ timber preservation.—The activities of the Timber Grading Inspector at Mombasa, in co-operation with wood preservation firms, have resulted in a good deal of experimental work for the preservation of timber *in situ* within Coast District.

It is noteworthy that a Mombasa Municipal bye-law has been proposed to prohibit the use of untreated timber in buildings within the Municipality.

Borax preservative.—So far results are inconclusive that Borax is toxic to *Oemida gahani*, but tests are continuing.

Marine Borer Research.—This was continued throughout the year, and much useful information has now been obtained from the work carried out, which has been on an empirical basis.

CHAPTER XI—PRODUCTION AND TRADE

There was a general decline in industrial activity during 1961 which resulted in a drop in log sales of 45 per cent from those of the previous year. The table below gives sales of timber to licenced sawmillers and contractors operating in forest reserve during the past five years:—

SALES OF TIMBER IN THE LOG IN TONS OF 50 CUBIC FEET TRUE MEASURE

Year	Softwoods	Hardwoods	Total	Percentage exported as sawn timber and logs	
				Ex E.A.	E.A.
1957 ..	121,053	26,420	147,473	14	8
1958 ..	120,218	25,968	146,186	14	11
1959 ..	115,655	22,662	138,317	13	8
1960 ..	122,098	29,711	151,809	15	7
1961 ..	70,344	12,967	83,312	21	9

Of the year's production about 40 per cent consisted of podo, 10 per cent of cedar, 25 per cent of cypress, a negligible percentage of pine and 16 per cent of hardwoods. These proportions of species are comparable with those of 1960 though the proportion of cypress and cedar have shown some increase at the expense of those of podo and hardwoods.

General

There was an adverse balance of trade in wood products of nearly £2,000,000. This was accounted for mainly by the net import of £2,129,700 worth of paper and pulp produce. In solid wood produce there was a deficit of £29,000 and in minor forest produce a gain of £176,000.

Trade within East Africa in solid wood produce was about 30 per cent of the total trade. Of this the trade balance was £49,939 favourable within East Africa but £78,959 adverse outside East Africa.

Matches, box wood and plywood, in this order, were the largest import items in value next to paper and pulp.

Exports

(a) To countries outside East Africa

Exports of timber and timber products at £289,325 were 10 per cent lower than in 1960.

The principal changes, worthy of comment, are:—

Mangrove Poles: A drop of 56 per cent, by value, as compared with 1960.

Charcoal: Exports were £30,167, almost entirely to the United Kingdom, and were very much greater than for any previous years. (The value of exports in 1960 was £2,633).

Sawn Timber: Exports were slightly lower at £95,333, and the drop from the 1960 figure of £101,102 is probably largely due to the break in rail communications with Mombasa in November and December.

Pencil Slats: Exports continued to increase (at £56,203 they were 67 per cent up on 1960) largely because of the exploitation of Egypt as a new market.

Builders Woodwork (Mainly flooring blocks): Exports at £50,683 fell back to the 1960 level largely because of the decline in exports of Muhugu.

(b) To Uganda and Tanganyika

Exports of timber and timber products at £167,361 were up by 4 per cent despite the unsettled state of these countries' economies. There was a very marked decline in the exports of sawn timber (down by 29 per cent) which was more than compensated for by increases in manufactures. The most noteworthy change in these was under the item of matches which, with the establishment of the new factory at Mombasa, were exported to the value of £20,000 in 1961 compared with a negligible sum in 1960.

Imports

(a) From countries outside East Africa

Imports of timber and timber products from outside East Africa were £368,284 as compared with £498,118 in 1960—a decrease of 26 per cent. This decline is a result of the condition of economic activity in 1961, and most of the principal imports were affected. In particular, the slump in building reduced plywood imports from £148,582 to £63,037.

(NOTE.—In previous Annual Reports the figures for imports have been those for direct imports. In this year's figures net imports have been used as this is a better guide to actual consumption in the Colony. Direct Imports include goods for Uganda or Tanganyika which are imported into Kenya and then transferred.)

(b) From Uganda and Tanganyika

The pattern for interterritorial imports was very similar to that for exports inasmuch as an overall decline (of 9 per cent from £129,930 to £117,622) was made up of a sharp fall in imports from one territory (Tanganyika—23 per cent) balanced by a lesser increase from the other (Uganda—4 per cent). The decline in imports from

Tanganyika was chiefly due to a drop in furniture and fixtures helped by a drop in sawn timber. The increase from Uganda however was due to a rise in sawn timber. Sawn hardwoods continue to comprise the greater part of interterritorial imports.

Full details of types of produce exported and imported during the year, both in trade overseas and with neighbouring territories, is given in Standard Form X in the Appendices.

Firewood

Kenya Form 5 details the sales of firewood during the past 11 years. During the past year sales fell by about 10 per cent from 7,209,682 cubic feet to 6,386,321 cubic feet. The Railway's share of this market continues to fall and is now negligible.

Minor Produce

This is detailed in Standard Form VIII. There were some marked changes during the year. Items for which sales fell included Mangrove and other Poles, Bamboos, Withies, Plants, Seeds, Dressed Stone, Bricks, Off-cuts and Fence Posts. Items for which sales rose included Mangrove Bark, Murram, Christmas Trees and Gum Amini.

CHAPTER XII—MECHANICAL TRANSPORT, ROADS AND BUILDINGS

Mechanical Transport.—The table below shows the present strength of the Department's fleet of vehicles.

MECHANICAL TRANSPORT VEHICLES

Type	Position at 31-12-60	Sold or written off during the period	Bought during the period	Position at 31-12-61
Motor Cycles	2	1	1	2
Land-Rovers	106	59	18	65
Light Delivery Vehicles ..	4	2	—	2
Motor Lorries	82	47	25	60
Motor Boats	3	—	1	4
Trailers	56	25	1	32
Tractors	45	1	3	47
Mobile Cinema	1	1	—	—
School Bus	1	—	—	1
Road Graders	4	—	2	6
Caravans	4	—	—	4

Roads.—Since last year each of the two Conservancies has had its own road unit which is concerned mainly with maintenance and repairs of existing roads. Although each unit still has some heavy earth-moving machinery and undertook some new road construction to assist Divisional road building programmes during the year, it is intended eventually to let heavy new constructional work out to contract and to use the Conservancy road units almost entirely for repairs and maintenance. Such heavy earth-moving machinery as the Department has on charge will not be replaced.

The heavy rains during the last part of the year caused widespread damage to roads, many bridges being washed away and roads blocked by washaways and landslides. At Meru on east Mount Kenya almost every road and bridge was damaged and rendered impassable.

In the East Conservancy most of the new work undertaken was in Thomson's Falls Division where 27 miles of new road was constructed in North Marmanet and Ol Arabel, and in Nyeri Division where 13 miles of new road was made in various districts. The Royal Engineers built a bridge across the Northern Naro Moru to give access to the higher slopes of north-west Mount Kenya. In Southern Division a new access road up Nzauzi was constructed.

In the West Conservancy most of the work undertaken was in Londiani and Elburgon Divisions, where 23 miles and 21 miles respectively of new road were made. Of this the Conservancy Road Unit constructed 24 miles and the Agricultural Department Soil Conservation Unit 15 miles, the remainder being put in by Divisional labour. Most of the mileage in Londiani was on the Londiani-Kerisoi road. In Kitale Division 5 miles of new road were put in along the ridge of Sondang mountain, and in Nyanza Division much work was done on a new alignment up Mount Elgon from Kimilili.

The West Conservancy road unit based on Londiani now has a well-equipped workshop under the supervision of the Conservancy Road Superintendent. In addition to road maintenance and construction this workshop now undertakes repairs to Department vehicles from stations within an economic distance and also carries out half-yearly inspections and reports on all vehicles in the West Conservancy. The Unit also gives courses on elementary vehicle maintenance to drivers and more advanced lectures on the workings of vehicles to Rangers and Foresters Courses at the Londiani Forest Training School.

The East Conservancy road unit established a workshop at Muringato near Nyeri township and undertook maintenance and repairs of vehicles from the Nyeri, Thomson's Falls and Fort Hall Divisions.

In the following table "motorable roads" are those suitable to all types of motor vehicles except after heavy rain, while "dry weather roads" are those unsuitable in wet weather for vehicles without, four-wheel drive.

MILEAGE OF ROADS

Division	Motorable Roads	Dry Weather Roads	Total
	<i>Miles</i>	<i>Miles</i>	<i>Miles</i>
Nairobi	255	117	372
Londiani	245	142	387
Elburgon	258	135	393
Eldoret	118	64	182
Nyeri	195	210	405
Thomson's Falls	100	338	438
Coast	100	22	122
Nyanza	52	13	65
Southern	—	50	50
Fort Hall/Embu	46	72	118
Kitale	134	8	142
Total	1,503	1,171	2,674

Buildings

As was the case last year the building of schools, school extensions, extra classrooms and teachers houses again formed the bulk of the building programme this year.

Buildings were financed from the Supplementary Forest Development Scheme, the Forest Resident Labour Welfare Fund and, in the case of schools, partly from voluntary contributions from villages concerned.

The projects listed below were completed during the year:—

<i>Type</i>	<i>No.</i>
Senior Staff Quarters	2
Junior Staff Quarters	49
Teachers' Houses	72
Forest Guards' Quarters	45
African Labour Lines (Villages)	10
Office-cum-Stores	4
Garage-cum-Petrol Store	5
Water Schemes	10
Schools	11
Classrooms and extensions to Schools	27
Dispensaries	5
Shops	20
Butcheries	6
Dairies	3
Market Centres	2
Produce Stores	10
Extensions to Water Supplies	9
Posho Mills	1
Fire Towers	8

CHAPTER XIII—STAFF AND LABOUR

The following posts remained unchanged:—

Chief Conservator of Forests

E. J. Honoré.

Deputy Chief Conservator of Forests

D. G. B. Leakey, O.B.E. (until the 5th December when he proceeded on leave pending retirement).

During the year the following changes in Staff took place:—

Resignations

T. W. Briddes, Survey Assistant Grade I.

The following Foresters:—

J. G. Mathias	P. J. Murrant	A. Graham
E. C. Goss	J. F. Adams	J. Johnston
P. J. B. Westlake	A. Swan	N. Skovgard
R. W. Nottage	R. G. M. Fiske	J. St. C. Whittal
J. N. Clayton		

Appointments terminated—Foresters

H. C. S. Davies E. F. Griffiths J. D. Scriven
E. Gairdner

Appointments

C. I. Peat, Assistant Conservator of Forests.
S. H. L. Engelbrecht, Forester.
A. Irwin, Forester.
Leonard Gichuhi, Survey Assistant Grade III.

Promotions

F. A. G. Noronha, Seedsman to Forester.

Ranger Grade II to Ranger Grade I

James N. Gathanga Njenga Gachahe Shabani M. Salim
Njuguna Ndatho

Survey Assistant Grade II to Survey Assistant Grade I

Dharam Singh Kalsi.

Ranger Grade II to Forester

James N. Gathanga Cyrus W. Kimata

Ranger Grade I to Forester

Thomas Kilonzo Henry Ikenye Jesse N. Kamau

The following were promoted from Ranger Grade III to Ranger Grade II

Titus Njihia	Henry Njugia	Stanley Mugambi
Bernard Githu	Muiruri Macharia	Amos Watitu
Samuel Mutahi	Chepchieng Ap.	Willie Gitau
Joseph Kamau	Chebon	Robert Mutura
Solomon Kamau	Edwin K. Ap. Bii	Godfrey Kinuthia
Harrison Kamengere	Samuel Ap. Langat	

Honours and Awards

Forest Guard, Mbalua Lunjae was awarded Badge of Honour.

Statement of Staff

The following is the authorized establishment of the Department at 31st December, 1961:—

Chief Conservator of Forests	1
Deputy Chief Conservator of Forests	1
Conservators of Forests	2
Assistant Conservators of Forests	25
Entomologist	1
Forest Pathologist	1
Silviculturist	1
Utilisation Officer	1
Staff Surveyor	1
Assistant Surveyors or Survey Assistants Grade I	2
Road Superintendents	2
Senior Foresters	9
Foresters	87
Forest Officers (African Affairs)	2
Timber Grading Inspectors	2
Seedsman	1
Forester Trainees	7
Senior Assistant Draughtsmen	1
Survey Assistant Grade II	1
Assistant Draughtsman	3
Forest Rangers	161
Medical Dressers	49
Drivers	199
Forest Guards	886
Subordinate Staff	24

Labour

The following table shows the number of resident and casual labourers employed in forest reserves at the end of the year:—

	31-12-60	31-12-61
Forest Department Resident Labourers	8,015	8,474
Sawmillers' and Contractors' Resident Labourers	1,681	1,012
Total	9,696	9,486
Forest Department Casual Labourers	2,946	2,470
Sawmillers' and Contractors' Casual Labourers	4,301	3,698
Total	7,247	6,168

CHAPTER XIV—AFRICAN WELFARE AND COMMUNITY DEVELOPMENT

General

D. Hartnell-Beavis and I. Hook remained in charge of welfare in the East and West Conservancies respectively.

Once again the provision of educational facilities was the largest item in the Department's welfare programme. The main source of revenue for the Resident Labourers Welfare Fund remained the cess on surplus agricultural produce grown in the Forest Areas.

East Conservancy

Each Forest Division within the Conservancy is now nearly self-supporting with regard to its individual welfare projects. The highest revenue figures of any year so far brought in over £10,000 to the Forest Resident Labour Welfare Fund, approximately 65 per cent of this accruing from cess from the Kinale area which supplies the bulk of the vegetables for the Nairobi Market.

Expenditure on educational projects absorbed about 45 per cent of the total revenue collected. In the Nyeri D.E.B. district the level of all Forest Department schools went up to Standard V, and Standard V classes were also introduced in schools at Nanyuki, Kinale, North Marmanet and Uplands. The increased accommodation needed to achieve this has been financed by voluntary contributions from the villages concerned, supplemented by grants from the Welfare Fund. The number of schools in the Conservancy now totals 28 with 43 "streams". These are staffed by 128 teachers and provide for 5,450 pupils.

No new villages were built but some of those more fortunately placed for the production of good agricultural produce were enlarged. Village committees, each one headed by the Village Headman and two Tribal Police seconded from the Administration continued to work well, and a constitution defining their duties and powers was passed during the year.

There are now 25 dispensaries in the Conservancy and three midwifery clinics were opened during the year.

Eighteen new shops, including four posho mills, were built during the year, bringing the total number of shops to 155; 39 of these are temporary structures which will be replaced by permanent ones as soon as funds are available. Shop rents yielded a revenue of about £2,200. There are now ten posho mills working, all of which have been financed by voluntary contributions and these save long and tedious hauls of produce into the Reserves.

The mobile cinema unit was disbanded.

The scheme to establish communal flocks of sheep at Nanyuki progressed slowly, and a sheep dip, pens and *bomas* were built by Village Committees. An overseer has been trained to supervise the scheme, but the success of the venture is still in doubt.

Under the auspices of the Kenya Civil Servant's Union each Division held at least one Joint Industrial Committee meeting. However, the movement is still immature, and only in the Nairobi Division can it be said to be working well.

West Conservancy

During the early part of the year maize crops were generally adequate but there was an acute shortage of potatoes.

Heavy rains during the second half of the year caused a glut of potatoes which flooded the market. The prolonged rains also spoiled much of the maize crop. A plague of Army Worm following the drought did some damage and in some areas replanting was necessary. It is evident that alternative crops to maize and potatoes should be encouraged in the more remote districts, which are far from communications and population centres, and, consequently, unable to compete with those more favourably placed. Onions, geranium for essential oil, and dried peas and beans have been suggested as alternative crops.

The building programme for Primary Schools comprising Standards I-IV is now virtually complete, and no more new schools are contemplated at present. There are now three Intermediate schools at Nessuit, Nabkoi and Kaptagat respectively, and these will become absorbed in 1962 into the seven years educational plan providing schooling from Standard I through to Standard VII. Twenty-one out of the thirty-two schools in the Conservancy are being extended to provide education up to Standard VII, of which nine will be double streamed in Standard V, giving a total of 30 new Standard V classes each of 50 children. The estimated figure for all children attending all standards in West Conservancy forest schools in 1962 is 7,333 at Standards I-IV and 1,435 at Standards V-VII.

Village Committees are generally working well but show a tendency to pass resolutions without taking adequate steps later to implement them.

Four Divisional athletic meetings were held during the year at Kitale, Eldoret, Londiani and Elburgon followed by an athletic meeting for the whole Conservancy at Nessuit in mid-July. This proved to be a great success. As a result of it a Forest team was selected to take part in the Nakuru District Sports, and three members of the team were subsequently chosen to represent Nakuru at the Provincial Sports at Tambach.

The East Mau Youth Centre was not very successful in the absence of a keen and experienced leader. Such a leader was recruited in November to try to get things going. *Maendeleo ya Wanawake* is now virtually defunct at Sabatia in spite of the best efforts of the Nakuru County Council Community Development Centre.

Despite vicissitudes and breakdowns in transport the mobile cinema continued to function throughout the year and a tape recorder has now been added to record songs, village concerts, etc. A collection of 35 mm. slides is being built up illustrating progress in community development in each village, for showing at other villages in the Conservancy in order to spread ideas and encourage emulation of desirable features.

Revenue exceeded the estimated figure by about £3,000 and was derived mainly from cess charged on agricultural produce.

CHAPTER XV—TRAINING AND EDUCATION

Forest Training School

Throughout the year P. Murrell, Assistant Conservator of Forests, was the Principal of the school assisted by B. M. Beer, Forester Instructor. J. G. Welford, Assistant Conservator of Forests, was posted to the school as an instructor in April and served there for the remainder of the year.

The third Rangers Long Course ended on 31st January with all 23 students passing the final examination. Eleven obtained Class II certificates and 10 obtained Class III certificates. Ephantus Kabiru passed out top of the course.

In February a promotion examination for 35 Grade III Rangers was held. This was followed by a Rangers Short Course for a month attended by 30 serving Rangers.

The most significant part of the year's work was the "doubling up" of the school in April to run the fourth Rangers Long Course and in addition an Advanced Rangers Course. The latter was started to prepare the most experienced serving Rangers for Foresters posts in accordance with the Government's localisation policy. This involved considerable reorganisation and the need for extra funds, staff, vehicles, stores and furniture. It was complicated by the fact that no extra living accommodation was provided for, and courses of instruction were in progress throughout the period of expansion.

Difficulties over accommodation were overcome by providing double bunks in the dormitories, increasing cooking facilities in the kitchen, and providing extra tables in the dining room. The dining room was also used for lecturing purposes. A new store was constructed for the additional stores required.

The Conservator (East) provided a new long wheel base Land-Rover and the Conservator (West) a 5-ton Bedford Lorry with driver. An old Land-Rover, due for boarding, was taken over for the purpose of instructing Advanced Course Rangers to drive.

The fourth Rangers Long Course started in mid-April after selecting 33 candidates from about 100 men sent from Forest Stations. The main selection was carried out by the Aptitude Testing Unit of the Labour Department. Of the 33 men 10 were serving Rangers and 23 were new recruits. By the end of the year 31 Long Course students remained and were due to take their final examinations in February 1962.

The Advanced Course started in mid-April with 20 students. A syllabus was prepared with the object of giving the students a training that would enable them to manage a Forest district. Besides all the normal forest subjects considerable emphasis was placed on office work, forest management and engineering, and motor vehicle maintenance. Instruction in vehicle maintenance was given by J. Eccles, Road Superintendent, West Conservancy.

During the year five students were withdrawn from the school to fill Forester vacancies within the Department.

The practical work associated with both courses was unfortunately hampered by the abnormally wet weather during the latter part of the year.

Forester Trainee and Contract examinations were conducted by the school staff at various times throughout the year.

During August the school staff, with the help of the Aptitude Testing Unit of the Labour Department, selected 41 learner Rangers to be sent to stations for initial training and assessment for the next Long Course. 450 candidates were put through the tests, after being selected from nearly 3,000 candidates who were interviewed by the school staff.

The need for additional school buildings was under review, and funds were allocated for an instructor's house.

Proposals to hold a diploma course in Forestry at Egerton College were under discussion towards the end of the year. This would be a two-year course and would take the place of the Advanced Rangers Course at the school.

The school received excellent co-operation from officers of the Forest Department, and of other Government Departments. Special mention should be made of the help given by the Aptitude Testing and Training Within Industry sections of the Labour Department.

CHAPTER XVI—FINANCIAL RESULTS

Total revenue for the year amounted to £179,145 as against an expenditure of £765,739 giving a deficit of £586,594. Standard Forms XI and XII of the Appendices give details of revenue and expenditure.

Total revenues actually derived from the Forest Estate during the past 5½ years have been as follows:—

Year	From Crown Forests (a)	From A.D.C. Forests (b)	Amount of (b) Credited to Dept. (c)	Net Revenue (a) & (c)
	£	£	£	£
1956/57	277,615	43,048	35,805	313,420
1957 (second half)	138,963	23,637	8,958	147,921
1958	260,071	44,436	29,993	290,063
1959	229,604	41,420	25,935	255,539
1960	235,602	39,946	27,790	263,392
1961	155,813	26,544	23,332	179,145

CHAPTER XVII—GENERAL COMMENTS

The year 1961 witnessed the most pronounced extremes of climatic conditions of any year within living memory. These extremes, first of drought and water shortage over vast stretches of the country, followed later in the year by destructive floods, have served to emphasize the paramount role which the Forest Estate must play in the present and future development of the country.

It can be claimed without fear of contradiction that but for the protection afforded to the major catchment areas of the country by forest and bush cover the shortage of water supplies early in the year would have been far more acute. It is also true that had the forest covered land of the mountainous regions of the country been more extensive, a greater share of the abnormally heavy rains which occurred late in the year would have been retained within the forest litter, and the destruction caused by the floods would have been correspondingly reduced.

The Forestry Subcommittee of the Kenya Development Committee of 1946 had this to say of the Forest Estate of the country:—

“Forests are a national asset and must be maintained, both for the improvement of the country itself and for the benefit of the people who live, and will live, in it. World-wide experience has shown that, with few exceptions and for a variety of reasons, privately owned forests are eventually destroyed, and that it is therefore the duty of the Government, in order to protect the people from their own improvidence, not only to retain under its own management a high proportion of the forests of the Colony, but to frame for that forest estate a long-range policy, based on its particular requirements, unaffected by political or other changes, and backed by stable finance.

Only by taking action on these lines can Government fulfil its obligations in respect of its forests to posterity.”

These comments have even more force today when the full resources of the Forest Estate are needed for the conservation of soil and water, to meet the expanding requirements for food crops and for forest produce for a rapidly increasing population.

The remark of a Nigerian Chief also deserves to be repeated. It ran:—“I regard all land as belonging to one large family, many of whom are dead, some are living and millions are yet unborn.” The forest estate is a heritage which must be held in trust for the generations which are to follow.

The past year has been notable for the advance made in training local staff to play an increasing part in the administration and technical direction of the Forest Department.

The steady improvement in the amenities and in the working conditions of the labour resident in the forest areas has also been well maintained.

It is with satisfaction that one can record a large measure of agreement with the Kenya Civil Servants' Union in devising a practical and workable arrangement for discussing and settling problems arising between management and staff, on the basis of mutual confidence and respect.

The past year, like all preceeding years, has provided its quota of problems and vicissitudes which have had to be overcome. This is no more than can be expected in the normal course of duty. However, the most heartening feature of the year has been the high morale and enthusiasm which have been maintained throughout, and the splendid teamwork without which the achievements of the year could not have been realized. I want to pay sincere tribute to the contribution which all officers and staff of the Department have made to the success of the year, and to their devoted service.

E. J. HONORE,
Chief Conservator of Forests.

Standard Form I

AREA OF FOREST LAND BY TYPES AS AT 31ST DECEMBER, 1961

Square Miles

RESERVE	Crown or A.D.C.	CLOSED FOREST		WOODLAND	BAMBOOS	GRASSLANDS	MANGROVE	FOREST RESERVES
		Productive	Protective					
Nairobi	Crown	63	139	24	68	20	—	314
	A.D.C.	3	1	1	—	—	—	5
Londiani	Crown	240	20	20	30	39	—	349
	A.D.C.	53	1	77	5	48	—	184
Elburgon	Crown	123	148	48	51	89	—	459
	A.D.C.	—	—	—	—	—	—	—
Eldoret	Crown	111	47	9	12	19	—	198
	A.D.C.	67	124	13	2	6	—	145
Nyeri	Crown	316	98	157	142	120	—	833
	A.D.C.	24	53	73	—	1	—	151
Thomson's Falls	Crown	57	559	710	4	312	—	1,642
	A.D.C.	—	—	—	—	—	—	—
Coast	Crown	154	37	15	—	59	209	474
	A.D.C.	16	6	4	—	4	—	30
Nyanza	Crown	351	—	34	49	19	—	453
	A.D.C.	107	41	20	97	11	—	276
Southern	Crown	—	—	27	—	—	—	27
	A.D.C.	14	67	155	16	69	—	321
Fort Hall/	Crown	205	29	5	163	17	—	419
Embu.	A.D.C.	5	—	18	—	1	—	24
Kitale	Crown	29	49	48	6	2	—	134
	A.D.C.	160	133	50	63	96	—	502
Total	Crown	1,649	1,126	1,097	525	696	209	5,302
	A.D.C.	449	359	411	183	236	209	1,638
GRAND TOTAL		2,095	1,485	1,508	708	932	209	6,940
Grand Totals as a percentage of Land area of Kenya		1.63%	1.63%	0.69%	0.32%	0.42%	0.10%	3.16%

NOTES.—(1) The total includes Forest Areas approved but not yet demarcated and gazetted, or not yet gazetted.

(2) The Land Area of Kenya is 219,789 square miles.

Square Miles

PROGRESS IN FOREST RESERVATION, 1961

Standard Form II

RESERVE	Crown or A.D.C.	RESERVES APPROVED BUT NEITHER DEMARCATED NOR GAZETTED			RESERVES APPROVED AND DEMARCATED BUT NOT GAZETTED			RESERVES DEMARCATED AND GAZETTED			Total at 31-12-61
		At 31-12-60	Change during the year	At 31-12-61	At 31-12-60	Change during the year	At 31-12-61	At*	Change during the year	At 31-12-61	
DIVISION—											
Nairobi ..	Crown A.D.C.	—	—	0.4	0.4	0.4	313.1	—	—	313.1	313.5
Londiani ..	Crown A.D.C.	0.3	—	0.3	—	0.3	4.8	—	—	4.8	5.1
Elburgon ..	Crown A.D.C.	0.2	+1.9	13.9	53.4	-1.4	117.2	—	—	117.2	183.1
Eldoret ..	Crown A.D.C.	—	-0.2	—	0.2	—	459.2	—	—	459.2	459.4
Nyeri ..	Crown A.D.C.	—	—	—	—	—	—	-4.0	-4.0	198.1	198.1
Thomson's Falls ..	Crown A.D.C.	1.9	-1.9	—	—	—	202.1	+17.9	127.1	145.0	145.0
Coast ..	Crown M'grove A.D.C.	2.2	—	2.2	0.8	-0.8	833.0	—	—	833.0	833.0
Nyanza ..	Crown A.D.C.	—	—	—	—	—	150.9	—	—	150.9	150.9
Southern ..	Crown A.D.C.	—	—	—	—	—	1,639.5	—	—	1,639.5	1,641.7
Fort Hall/Embu ..	Crown A.D.C.	—	—	—	19.5	—	245.9	—	—	245.9	265.4
Kitale ..	Crown A.D.C.	—	—	—	9.6	-4.7	209.4	+4.9	24.5	209.4	209.4
TOTAL		16.6	-0.2	16.4	288.0	-40.4	6,630.6	+45.4	6,676.0	6,676.0	6,940.0

*The discrepancy between this figure and that given in last year's report is due to a recomputation of areas.

Standard Form III

PROGRESS MADE IN WORKING PLANS

TYPE OF PLAN	AREA UNDER PLANS				Area not under plans	Total area Forest Reserves	Areas for which plans revised
	At 31-12-60	Added during period	Excluded during period	At 31-12-61			
Sanctioned and approved Plans completed and awaiting sanction or approval	1,369	333	—	1,702			
Plans under preparation	1,129	—	320	809			
Basic skeleton plan	93	140	13	220			
	3,358	—	286	3,072	1,902	6,676	
						—	

Standard Form IV

FOREST COMMUNICATIONS, 1961

Miles

CATEGORY OF FOREST LAND	ROADS			FIRE-LINES			INSPECTION PATHS		
	Added during 1961	Abandoned	Total at 31-12-61	Added during 1961	Abandoned	Total at 31-12-61	Added during 1961	Abandoned	Total at 31-12-61
Gazetted Forest Reserves	171	82	2,672	61	45	1,009	54	31	629

Standard Form V

Offence	Number of Cases reported	CASES TAKEN TO COURT						CASES COMPOUNDED	
		Number of Cases	Acquitted (Number)	Im-prisoned without option of a fine	Fined and/or Ordered to Pay Compensation		Number of Cases	Compen-sation Paid	
					Number	Fines			Compen-sation
A. Illegal Removal of Forest Produce	892	46	6	6	34	<i>Sh.</i>	<i>Sh.</i>	<i>Sh.</i>	
B. Illicit Grazing	706	197	4	—	193	3,606-00	310-00	11,730-05	
C. Careless use of Fire and Illicit Honey Hunting	247	46	—	2	44	13,003-00	4,755-00	20,127-30	
D. Damage to Young Trees	547	18	1	4	13	2,170-00	1,000-00	7,016-90	
E. Other Offences	359	231	26	17	188	470-00	10-00	6,921-80	
						4,319-50	1,290-00	3,534-50	
Total	2,751	538	37	29	472	23,568-50	7,365-00	49,330-55	

Standard Form VI PROGRESS IN REGENERATION AND AFFORESTATION, 1961 ACRES

DIVISION	REGENERATION OF EXPLOITED FOREST						AREA OF PLANTATIONS			
	Area Under Improvement			Area of Completed Improvement			On 31st Dec., 1960	Added during the year	Excluded during the year	On 31st Dec., 1961
	On 31st Dec., 1960	Added during the year	Excluded during the year	On 31st Dec., 1960	Added during the year	Excluded during the year				
Nairobi	1,126	—	—	1,350	—	—	29,755	3,150	514	32,391
Londiani	—	18	—	—	—	—	34,589	2,320	146	36,763
Elburgon	—	—	—	—	—	—	33,940	1,934	358	35,516
Eldoret	—	—	—	—	—	—	20,980	1,989	578	22,391
Nyeri	2,187	97	—	1,732	—	—	21,540	1,703	—	23,243
Thomson's Falls	—	20	—	—	—	—	6,869	618	83	7,404
Coast ..	970	3	3	77	—	—	2,089	244	334	1,999
Southern	—	—	—	—	—	—	8,924	1,268	—	10,192
Nyanza	1,216	25	—	31	—	—	5,986	1,056	251	6,791
Fort Hall/Embu	76	139	—	—	—	—	3,669	1,381	—	5,050
Kitale ..	301	—	—	359	—	150	9,731	829	224	10,336
TOTAL ..	5,876	302	3	3,549	—	150	178,072	16,492	2,488	192,076

Standard Form VII SALES OF TIMBER, FIREWOOD AND POLES, 1961 Units as Stated

Category of Forest Reserve	TIMBER (TRUE CUBIC FEET)						Total	FIREWOOD (ST. CUBIC FEET)			Power and Telegraph Poles No.	
	SOFTWOODS							Hardwoods	Railway	Public		Total
	Podo	Cedar	Cypress	Pines	Other	Total						
..	1,218,054	661,795	1,033,074	5,160	913	2,918,996	362,928	165,951	5,699,635	5,865,586	20,012	
..	430,174	38,975	28,381	704	—	498,234	285,444	—	520,635	520,635	—	
..	1,648,228	700,770	1,061,455	5,864	913	3,417,230	648,372	165,951	6,220,270	6,386,221	20,012	
Tons of 50 cubic feet..	32,965	14,015	21,229	117	18	68,345	12,967	—	—	—	—	

Standard Form VIII SALES OF OTHER FOREST PRODUCE, 1961 Units as Stated

Mangrove Poles	Other Poles	Bamboos	Withies	Fence Posts	Mangrove Bark	Plants	Seeds	Dressed Stone	Murram	X'mas Trees	Cedar Shingles
No. 461,501	R. ft. 4,684,441	R. ft. 11,207,557	H. Loads 53,976	Cu. ft. true 178,567	Lb. 841,693	No. 1,247,515	Lb. 749	Cu. ft. 53,517	Tons 1,347	No. 2,277	No. 5,800
Stone and Ballast Chips	Sand	Gum Amini	Moss	Off-cuts	Soil	Grass	Grass	Grass	Hay		
Tons 1,539	Tons 2,475	Lb. 16,807	Bags 10	R. ft. 5,570	Tons 507	Tons 25	H. Loads 21,717	Tons 506			

Standard Form IX PRIMARY FOREST INDUSTRIES, 1961

PARTICULARS OF INDUSTRY	QUANTITY OF FOREST PRODUCE SOLD		Value of Output	Persons Employed (Approximate Number)
	Unit	Amount		
Fuelwood	Stacked Cu. ft.	4,322,711	Not Available	982
Wood for charcoal	Stacked Cu. ft.	1,434,360		
Bamboo Poles	Running ft.	11,207,557		
Fence Posts	Cu. ft.	178,567		
Mangrove Poles	No.	461,501		
Timber—				
(a) Coniferous	True cu. ft.	3,517,203		} 5,097
(b) Non-coniferous	True cu. ft.	648,372		

TRADE IN TIMBER AND TIMBER PRODUCTS, 1961

Standard Form X

Item	Unit of Quantity	TRADE OUTSIDE EAST AFRICA				TRADE WITHIN EAST AFRICA				Balance of Trade
		Imports		Exports		Imports		Exports		
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	
Fuelwood	Centals of 100 lb.	—	—	347	87	747	36	—	—	51
Charcoal	"	—	—	38,429	30,167	766	336	—	5,173	35,004
Sawlogs—Softwoods	Cu. ft.	—	—	—	—	—	—	—	—	—
Sawlogs—Hardwoods:	"	—	—	—	—	—	—	—	—	—
Blackwood	"	—	—	15,475	18,277	—	143	—	—	21,457
Other	"	—	—	2,735	3,323	—	—	—	—	—
Poles and Posts:	"	—	—	—	—	—	—	—	—	—
Mangrove	Number	—	—	264,777	21,425	7,600	105	—	10,307	21,320
Other	—	—	—	49	25	—	—	—	—	10,332
Sawn Timber—Softwoods:	"	—	—	—	—	—	—	—	—	—
Cedar	Cu. ft.	—	—	11,364	7,503	—	—	—	1,764	125,309
Podo	"	—	—	119,769	62,296	3,508	1,496	—	10,925	—
Cypress	"	—	—	17,047	8,005	209	105	—	21,355	—
Other	"	—	—	—	—	—	—	—	25,987	—
Sawn Timber—Hardwoods:	"	—	—	—	—	—	—	—	—	—
Mvule	"	—	—	2,134	2,304	37,812	32,130	369	298	—
Camphor	"	—	—	15,437	7,941	25,986	16,127	19,931	10,925	—
Mahogany	"	—	—	—	—	27,283	15,379	536	432	—
Other	"	—	—	12,451	7,173	51,770	21,166	13,135	4,774	—
Boxes, Cases, Crates, etc.	"	—	—	1,407	6,093	654	3,980	828	3,623	—
Reconstituted Wood:	"	—	—	—	—	—	—	—	—	—
Pencil Slats	Cu. ft.	—	—	50,633	56,203	—	—	—	—	56,203
Other	—	—	—	—	—	—	—	—	129	—
Builders' woodwork, flooring, strips and blocks:	"	—	—	—	—	—	—	—	—	—
Cedar	Cu. ft.	—	—	7,360	5,015	—	—	432	233	3,750
Other softwoods	"	—	—	59,939	34,827	—	—	—	—	—
Muhugu	"	—	—	14,571	9,257	—	—	—	—	—
Other hardwood	"	—	—	34	89	2,241	1,395	248	262	42,862

Standard Form X—(Contd.)

TRADE IN TIMBER AND TIMBER PRODUCTS, 1961—(Contd.)

Item	Unit of Quantity	TRADE OUTSIDE EAST AFRICA				TRADE WITHIN EAST AFRICA				Balance of Trade
		Imports		Exports		Imports		Exports		
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	
Builders' woodwork, other than flooring, etc.	Centals	—	—	490	1,584	2,048	8,546	4,730	20,184	13,222
Railway Sleepers	Sq. ft.	—	—	—	—	—	—	—	—	—
Veneer Sheets	"	—	—	—	—	—	—	—	—	—
Plywood	"	2,092,804	63,037	—	—	583,695	12,995	26,834	1,201	-74,831
Cooperage	Centals	—	—	—	—	—	—	—	—	—
Furniture	"	—	22,453	—	6,416	—	2,429	—	24,649	6,183
Matches	Gr. boxes	424,933	128,630	700	430	270	151	36,300	20,199	-108,152
Prefabricated Buildings	"	—	—	—	—	—	30	—	1,669	1,639
Other Manufactures	"	—	36,195	—	974	—	873	—	14,197	-21,897
TOTAL WOOD	"	—	368,284	—	289,325	—	117,422	—	167,361	-29,020

PAPER AND PULP PRODUCE

Paper, Paperboard and Manufactures thereof	Sq. ft.	2,609,062	25,938	—	2,843	—	495,037	—	-2,090,930
Fibre board	"	38,766	—	—	—	—	—	—	-38,766
TOTAL PULP	"	2,806,907	2,647,828	—	25,938	—	2,843	—	495,037

OTHER FOREST PRODUCE

Mangrove Bark	Centals	—	10,729	—	9,999	—	—	—	—	9,999
Wattle Bark	"	—	110,113	—	141,283	—	—	67	—	141,343
Cedar Oil	Lb.	—	180,633	—	33,627	—	—	—	—	33,627
Gum Resins	Centals	1,203	8,864	174	581	154	694	3	23	-8,954
TOTAL OTHER	"	—	8,864	—	185,490	—	694	—	83	176,015
GRAND TOTAL	"	—	3,024,976	—	500,753	—	120,959	—	662,481	-1,982,701

Source—Annual Trade Report.

Standard Form XI SUMMARY OF REVENUE AND EXPENDITURE FOR THE CALENDAR YEAR, 1961

	Revenue (A)	Crown Recurrent (B)	Native Forest Reserve (C)	Development (D)	A.D.C. Afforestation Schemes (E)	S.F.D.S. (F)
	£	£	£	£	£	£
1. Timber	120,345					
2. Fuel	13,249					
3. Seeds and Plants	7,166					
4. Miscellaneous	12,973					
5. Sundry (Offences Compounded and Unclaimed Balances)	2,080					
6. Reimbursements	23,332					
7. Personal Emoluments		441,800	39,229		32,472	(*)
8. Travelling Expenses		70,282	9,905		7,945	(*)
9. Maintenance of Forest Stations and Roads		31,787	1,241	49,339	8,272	(*)
10. Miscellaneous		28,500	3,626			19,760
11. Purchase and Maintenance of Boats, Tools, Plant, Equipment and Stores		19,942	1,639			(*)
TOTAL	179,145	592,311	55,640	49,339	48,689	19,760

(*) Figures for items 7, 8, 9 and 11 relating to the Supplementary Forest Development Scheme are included under the column for Crown Recurrent (B).

Standard Form XII REVENUE AND EXPENDITURE, 1951-1961

Year	Revenue	Expenditure	Surplus or Deficit	Value of Free Issues
	£	£	£	£
1951..	214,660	202,141	+12,519	968
1952..	308,787	257,345	+51,442	1,389
1953..	238,139	291,836	-53,697	712
1954 ($\frac{1}{2}$)	135,411	162,190	-26,779	167
1954/55	236,401	368,879	-132,478	1,371
1955/56	290,692	425,140	-134,448	466
1956/57	313,420	558,970	-245,550	859
1957 ($\frac{1}{2}$)	147,921	249,235	-101,314	546
1958	290,064	581,346	-291,282	4,403
1959..	255,539	675,151	-419,612	2,600
1960..	263,392	711,598	-448,206	3,452
1961..	179,145	765,739	-586,594	

Standard Form XIII

STRENGTH OF FOREST STAFF ON 31ST DECEMBER, 1961

Number

TERRITORIAL UNIT	SENIOR STAFF		INTERMEDIATE STAFF			SUBORDINATE STAFF		Clerical Staff	Permanent Labour Force	Other Miscellaneous Staff. Medical Dressers, Drivers, etc.
	Field	Specialists	Foresters and Senior Foresters	Others	Rangers	Forest Guards				
Head Office	4	4	2	4	7	1	3	—	2	
<i>East Conservancy</i>										
Conservator's Office	1	—	—	2	—	—	4	—	—	
Nairobi Division	1	—	11	—	19	132	10	1,619	26	
Nyeri Division	2	—	11	2	20	123	11	1,518	19	
Thomson's Falls Division	1	—	4	—	6	88	5	527	9	
Coast Division	1	—	4	1	9	52	5	242	6	
Southern Division	1	—	4	—	4	27	4	500	4	
Fort Hall Division	1	—	5	—	9	41	5	1,000	11	
<i>West Conservancy</i>										
Conservator's Office	1	—	2	5	—	2	4	—	4	
Forest School	2	—	1	—	—	—	1	—	1	
Londiani Division	2	—	10	—	11	106	12	1,643	16	
Eldoret Division	1	—	9	—	13	31	14	1,122	9	
Nyanza Division	1	—	4	—	6	52	6	436	8	
Elburgon Division	2	—	10	—	8	115	15	1,674	16	
Kitale Division	2	—	5	—	7	30	6	663	—	
On leave	5	—	8	—	—	—	—	—	—	
Total	28	4	90	14	119	800	105	10,944	131	
GRAND TOTAL	32		104		919		105	10,944	131	

Kenya Form I GAZETTED FOREST AREAS AT 31ST DECEMBER, 1961 Square Miles

Division	Crown Forests	A.D.C. Forests	Mangroves	Total
Nairobi	313.1	4.8	—	317.9
Londiani	349.1	117.2	—	466.3
Elburgon	459.2	—	—	459.2
Eldoret	198.1	145.0	—	343.1
Nyeri	833.0	150.9	—	983.9
Thomson's Falls	1,639.5	—	—	1,639.5
Coast	245.9	24.5	209.4	479.8
Nyanza	452.5	272.7	—	725.2
Southern	22.6	218.9	—	241.5
Fort Hall/Embu	418.2	3.7	—	421.9
Kitale	134.4	463.3	—	597.7
TOTAL	5,065.6	1,401.0	209.4	6,676.0

Division	FIRES RECORDED AND FIRELINES, 1961			Units as Stated	
	Fires	Firelines Maintained	Maintenance Cost	Firelines Constructed in 1960	Construction Cost
	No.	Miles	Sh. per mile	Miles	Sh. per mile
Nairobi ..	27	217.0	98.60	8.0	139.90
Londiani ..	34	31.5	52.90	9.0	6.30
Elburgon ..	25	38.4	101.20	—	—
Eldoret ..	28	3.0	98.00	2.5	179.60
Nyeri ..	9	30.8	38.80	7.0	139.60
Thomson's Falls ..	45	17.5	140.00	13.0	102.00
Coast ..	21	23.8	24.50	1.0	N.A.
Nyanza ..	21	39.0	196.70	21.3	471.80
Southern ..	10	76.5	544.90	139.2	525.90
Fort Hall/Embu ..	13	28.8	93.00	1.0	—
Kitale ..	23	17.5	124.60	8.0	64.00
TOTAL ..	256	523.8	163.57	210.0	422.10

Kenya Form 2

Kenya Form 3

TIMBER SALES, 1951-1961

50 Cubic Ft. True

Year	Podo	Cedar	Cypress	Pines	Others	Total Softwoods	Hardwoods	Total Softwoods and Hardwoods
1951	82,792	28,169	19,913	—	477	131,351	34,362	165,713
1952	78,126	45,860	20,388	—	251	144,625	34,840	179,465
1953	80,863	30,486	19,756	—	591	131,696	24,953	156,649
1954	93,559	37,172	27,524	—	866	159,121	23,327	182,448
1955	89,197	39,406	29,645	1,115	1,141	160,504	23,994	184,498
1956	81,634	31,180	32,260	1,450	40	146,564	22,426	168,990
1957	66,015	17,642	34,137	3,225	38	121,057	26,421	147,478
1958	66,727	22,959	28,732	1,557	247	120,222	25,969	146,191
1959	62,749	21,221	27,247	4,224	244	115,685	22,662	138,347
1960	66,423	21,859	31,146	2,664	6	122,098	29,711	151,809
1961	32,965	14,015	21,229	117	18	68,344	12,967	81,311

Kenya Form 4 Units as Stated
DOMESTIC EXPORTS OF TIMBER AND TIMBER PRODUCTS, 1951-1961

Year	TIMBER AND WOODWORK				Ply-wood	Fire-wood	Char-coal	Man-grove Poles	Man-grove Bark	Other Articles	Total value of Exports
	Cedar Pencil Slats	Cedar	Podoc	Other Soft-woods							
1951	C. ft. 290,627	C. ft. 94,046	C. ft. 859,362	C. ft. 50,465	C. ft. 194,417	C. ft. 1,198,290	Tons 90	No. 11,898	Tons 414	£ 622	£ 824,435
1952	127,912	16,410	327,442	13,480	156,341	513,673	28	281,020	410	1,981	413,770
1953	102,377	25,722	461,265	77,920	70,514	635,421	1,016	343,480	354	2,853	622,367
1954	101,410	4,186	69,339	12,623	28,063	114,211	—	284,889	377	131	284,653
1955	106,764	2,509	50,203	20,085	15,961	88,758	—	431,619	211	1,911	212,201
1956	77,458	200	10,902	23,630	7,420	42,152	214	651,504	140	1,792	196,503
1957	28,523	1,839	49,858	36,169	35,188	123,054	35	477,232	265	11,359	157,329
1958	40,430	11,572	81,500	16,206	227,421	336,699	112	436,191	77	15,300	305,061
1959	29,850	10,045	108,836	26,361	112,413	257,655	24	239,784	107	16,740	212,659
1960	31,407	23,587	95,228	11,522	199,957	330,294	13	548,816	163	36,277	316,162
1961	50,633	18,724	119,819	17,047	104,532	260,122	15	264,777	479	48,934	332,761

Kenya Form 6 NEW PLANTING, REPAIRS AND MAINTENANCE, 1961

Division	NEW WORK		REPAIRS		MAINTENANCE	
	Acres	Cost per acre	Acres	Cost per acre	Acres	Cost per acre
Nairobi ..	3,150	Sh. 14.80	1,477	Sh. 4.95	11,786	Sh. 6.20
Londiani ..	2,320	31.80	863	7.85	15,936	8.25
Elburgon ..	1,934	21.70	1,337	5.33	13,489	7.20
Eldoret ..	1,989	27.10	704	5.00	10,584	9.75
Nyeri ..	1,701	29.40	579	6.80	10,329	6.70
Thomson's Falls ..	618	58.30	772	4.50	2,454	11.65
Coast ..	244	133.90	60	15.85	581	24.50
Nyanza ..	1,056	70.10	642	18.30	3,488	8.30
Southern ..	1,135	41.70	266	47.05	1,416	25.10
Fort Hall/Embu ..	952	49.20	643	4.90	2,486	10.10
Kitale ..	829	35.70	579	7.95	2,630	7.65
TOTAL ..	15,928	33.42	7,922	8.22	75,179	8.2

Kenya Form 7

AREA OF PLANTATIONS BY DIVISIONS

Acres

DIVISION	AREA OF PLANTATIONS AS AT 31ST DECEMBER, 1960										AREA OF PLANTING DURING 1961				
	Indigenous Softwoods	Indigenous Hardwoods	Exotic Softwoods			Exotic Hardwoods		Total	Indigenous Softwoods	Indigenous Hardwoods	Exotic Softwoods		Exotic Hardwoods		Total
			Cypress	Pines	Timber	Fuel	Cypress				Pines	Timber	Fuel		
Nairobi	1,761	847	5,398	10,225	683	10,841	29,755	12	2	828	1,993	—	315	3,150	
Londiani	3,922	763	15,102	10,487	573	3,742	34,589	—	11	723	1,544	18	24	2,320	
Elburgon	2,852	710	14,957	10,361	2,390	2,670	33,940	—	—	518	1,416	—	—	1,934	
Eldoret	782	497	9,190	8,852	1,144	515	20,980	—	74	342	1,559	—	—	1,989	
Nyeri	2,411	2,201	7,796	7,536	519	1,077	21,540	—	—	342	1,285	—	—	1,701	
Thomson's Falls	693	168	1,856	2,779	1,041	332	6,869	—	—	179	439	—	—	618	
Coast	—	156	—	1,897	30	6	2,089	—	18	—	226	—	—	244	
Nyanza	—	2,759	1,124	1,338	34	731	3,986	—	191	262	593	10	—	1,056	
Southern	137	176	2,208	4,959	157	1,287	8,924	—	6	17	1,068	—	48	1,135	
Fort Hall/Embu	—	103	805	2,723	34	4	3,669	—	6	160	773	—	13	952	
Kitale	547	24	4,466	3,823	74	797	9,731	1	3	229	590	—	6	829	
Total	13,105	8,404	62,902	64,980	6,679	22,002	178,072	13	307	3,688	11,486	28	406	15,928	

ADJUSTMENTS

AREA OF PLANTATIONS AS AT 31ST DECEMBER, 1961

DIVISION	ADJUSTMENTS										AREA OF PLANTATIONS AS AT 31ST DECEMBER, 1961				
	Indigenous Softwoods	Indigenous Hardwoods	Exotic Softwoods			Exotic Hardwoods		Total	Indigenous Softwoods	Indigenous Hardwoods	Exotic Softwoods		Exotic Hardwoods		Total
			Cypress	Pines	Timber	Fuel	Cypress				Pines	Timber	Fuel		
Nairobi	—	—	-120	+78	—	-472	-514	1,773	849	6,106	12,296	683	10,684	32,391	
Londiani	-21	+13	-25	-71	—	-42	-146	3,901	787	15,800	11,960	591	3,724	36,763	
Elburgon	—	-65	-122	+3	—	-174	-358	2,852	645	15,353	11,780	2,390	2,496	35,516	
Eldoret	-4	+38	-489	+4	+82	-49	-578	778	555	9,131	10,235	1,226	466	22,391	
Nyeri	—	+88	-61	+4	-24	-5	+2	2,411	2,363	8,077	8,825	495	1,072	23,243	
Thomson's Falls	-133	-35	-18	+21	-6	+88	-83	560	133	2,017	3,239	1,035	1,420	7,404	
Coast	—	-151	—	-208	+4	+21	-334	—	23	—	1,915	34	27	1,999	
Nyanza	—	-21	-71	-150	-9	+21	-251	—	2,929	1,315	1,781	35	731	6,791	
Southern	—	—	+10	+112	—	+21	+133	137	178	2,225	6,139	157	1,356	10,192	
Fort Hall/Embu	—	+15	+10	+392	-10	+22	+429	548	124	975	3,888	24	39	5,050	
Kitale	—	—	-112	-126	—	+14	-224	—	27	4,583	4,287	74	817	10,336	
Total	-158	-98	-1,008	-121	+37	-576	-1,924	12,960	8,613	65,582	76,345	6,744	21,832	192,076	
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
	6.7	4.5	34.2	39.8	3.5	11.3	100								

