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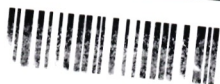


**FOREST DEPARTMENT
ANNUAL REPORT
1960**

KENYA NATIONAL ASSEMBLY

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FOREST DEPARTMENT ANNUAL REPORT, 1960

CHAPTER I—MAIN FEATURES OF THE YEAR

Supplementary Forest Development Scheme.—The final two stations due to be built under this scheme were completed during the year, bringing the total number of new stations to 29 since the scheme was launched in 1956.

Scheme for the Relief of Unemployment.—With the completion of the intake of resident labourers under the Supplementary Forest Development Scheme, a further scheme was approved late in the year for the absorption of an additional 930 families into the Forest Estate, as a measure for the relief of unemployment.

Planting.—In spite of a year of very uncertain rainfall, 15,986 acres of new planting was achieved which falls short of the record total of 1959 by no more than 339 acres.

Training.—Plans have been worked out for increasing the intake of trainee Rangers into the Londiani Forest School and for extending the scope of the school to include Forester training.

Promotions.—Two African Forest Rangers with several years service with the Department were promoted to Forester posts.

Trade Unionism.—This made notable headway and membership of the Kenya Civil Servants Union has been opened to all Resident Labourers in the Forest Estate.

Afforestation Schemes under the Swynnerton Plan.—Afforestation work under this plan came under the aegis of the Forest Department as from 1st July, 1960, and a number of new schemes have been started under the African Lands Development Board.

Forest Inventories.—A start was made on producing forest type maps from aerial photographs for forest inventory purposes.

Timber Industry.—Business declined steeply owing to reduced building activity due to loss of confidence. As a measure to arrest this decline by stimulating exports it was agreed to reintroduce the 50 per cent rebate of royalty on exported timber with effect from 1st January, 1961.

Forest Advisory Committee

2. There were no changes in the membership of this committee. The Rt. Hon. the Earl of Portsmouth continued to serve as Chairman, with the Hon. J. L. Riddoch, C.B.E., as vice-Chairman. Four meetings were held during the year.

East African Timber Advisory Board

3. The annual meeting of the Board was held at Moshi, Tanganyika, and included visits to the Forest Utilization workshops at Moshi and to hardwood forest areas on Mt. Kilimanjaro.

Legislation

4. The following rules were promulgated under the Forest Ordinance:—

Kwale Forest Rules.

Forest Areas (Controlled Entry) (Amendment) Rules, amending the Forest Areas (Controlled Entry) Rules of 1952 by substituting a new schedule of Forest Areas.

The Forest (General) (Amendment) Rules.

CHAPTER II—THE FOREST ESTATE

5. Twenty-seven new forest areas in Machakos, totalling 21,418 acres, were gazetted during the year bringing the area of gazetted forest in Machakos District up to 23,803 acres.

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

Additions

Legal Notice No.	Date	Forest Area	Acreage
532	9-11-60	Kilala Forest	373
		Waiya Forest	650
		Mutula Forest	1,400
		Makuli—Nguuta Forest	4,085
		Kyai Forest	262
		Kithendu Forest	541
		Kitondu Forest	2,682
		Katende Forest	2,345
		Tulimani Forest	805
		Nthangu Forest	2,085
		Kitoo Forest	92
		Utuuene Forest	409.5
		Kalimani Forest	444
		Kiu (Nguungu) Forest	206
		Nduluni—Kalani Forest	272
		Kioo Forest	112
		Kenze Forest	464
		Ndatai Forest	34
		Kiongwani Forest	83
		Ikilisa Forest	194
		Kyemundu Forest	348
		Makongo Forest	411
		Kitumbuuni Forest	188
		Mataa Forest	106
		Utangwa Forest	137
		Uuni Forest	229
		Nzaui Forest	2,390
286	16-6-60	Mount Londiani Forest	18.6
		Londiani Forest	42.9
		Total	21,480 or 33.5 sq. miles

The additions under Legal Notice 532 are the newly gazetted forests in Machakos.

Excisions

Legal Notice No.	Date	Forest Area	Acreage
152	29-3-60	Mtarakwa	63
288	16-6-60	Londiani Forest Reserve	6.2
288	16-6-60	Kitale Township Forest	14.8
471	13-10-60	Londiani Forest Reserve	54.8
		Total	138.8

7. Two forest areas were split off from larger forest blocks and regazetted under new names involving no change in the total area of forest reserve. These were:—

Leshau Forest, 481 acres, originally part of Aberdares Forest.
(Legal Notice No. 348 of 16-8-60.)

Uaso Narok Forest, 5,074 acres, also originally part of Aberdares Forest.
(Legal Notice No. 386 of 16-8-60.)

The name of Nyeri Forest Reserve was changed to Kiganjo Forest Reserve under Legal Notice No. 358 of 16-8-60.

8. The recorded area of the Forest Estate as on 31st December, 1960, was as follows:—

	<i>Square Miles</i>
Crown Forests (Land)	5,240.4
Crown Forests (Mangrove)	209.4
African District Council Forests (Land)	1,394.6
	<hr/> 6,844.4 <hr/>

CHAPTER III—SURVEYS AND BOUNDARIES

9. Mr. J. D. Bald remained in charge of the Department's Survey Branch, assisted by two Assistant Surveyors, Mr. J. Rutherford and Mr. W. Briddes.

10. The policy of plotting from aerial photographs the boundaries of newly demarcated forests for gazettelement purposes was continued. During the years 1959 and 1960, boundary surveys of 68 newly demarcated forest areas were completed. On 56 of these areas aerial survey methods were used.

Only ten new forest areas remain to be surveyed and it is expected that these will be photographed from the air early in 1961.

Boundary surveys completed during the year by air survey methods covered approximately 67,200 acres in Kitui, Taita, West Suk, Embu and Baringo, while boundary surveys completed by ground survey methods involved an area of about 16,000 acres in Machakos, Kwale and Baringo.

11. Attention was given to the possibility of using aerial photographs to produce and keep up to date forest management maps of those forests which have reached a high state of development. A block of 25,000 acres of forest reserve under development was plotted from recent aerial photographs, and comparison of the result with existing maps led to a decision to fly areas under

intensive development every five years or so subject to finance being available for the purpose. The decision was taken at the same time to make a start on producing forest type maps from aerial photographs for inventory purposes.

12. At the end of the year a contract had been arranged for aerial photographs of four blocks of forest which have been under increasing development for the past 20 years, totalling 140,000 acres; and three blocks of forest, under development for the past five years, totalling 9,000 acres.

13. A "Mercury" continuous printer was installed during the year and has considerably speeded up the production of prints which were previously produced by sun printing.

Boundaries

14. As a result of the additions recorded in paragraph 6 above the length of forest boundaries was increased by 196 miles, bringing the total to 4,914 miles, made up as follows:—

	<i>Miles</i>
Natural boundaries (rivers, roads, etc.)	708
Artificial boundaries	4,206

15. During the year 179.4 miles of new boundaries were demarcated at a cost of Sh. 395/25 per mile. 1,598.7 miles of boundaries were maintained at an average cost of Sh. 71/60 per mile.

CHAPTER IV—TERRITORIAL CHARGES

16. The Forest Estate continued to be divided into two Conservancies, east and west of the Rift. The number of Divisions was increased to 11 with the opening of a new Division, etc.

17. The officers in charge were:—

(1) EAST CONSERVANCY

Conservator M. C. Argyle throughout the year.

Divisions (in charge of Assistant Conservators)

- | | |
|----------------------------|---|
| 1. Nyeri | J. E. Cobby January to July.
C. W. Holloway remainder of the year. |
| 2. Fort Hall/Embu | T. J. Wormald throughout the year. |
| 3. Nairobi | D. N. Paterson January to July.
J. B. Smart remainder of the year. |
| 4. Thomson's Falls | J. S. Lightbody throughout the year. |
| 5. Southern | J. S. Spears throughout the year. |
| 6. Coast | T. A. M. Gardner January to December when G. Fry took over. |

(2) WEST CONSERVANCY

Conservator M. F. Abraham (acting) throughout the year.

Divisions (in charge of Assistant Conservators)

- | | |
|---------------------|--|
| 1. Londiani | B. E. St. L. Stuart January to July.
P. J. Pearman for remainder of the year. |
|---------------------|--|

2. Eldoret	P. St. J. Matthews January to June. G. Fry July to December when E. W. Chapman took over.
3. Nyanza	C. C. Plumb throughout the year.
4. Elburgon	R. D. H. Rowe January to July. A. D. Mather remainder of the year.
5. Kitale	P. St. J. Matthews from the opening of the Division in July until the end of the year.

CHAPTER V—WORKING PLANS

18. The work of this branch was in the charge of Mr. T. A. R. Choate throughout the year.

Much of the work during the year was concerned with an attempt to tidy up and clear some of the backlog of plans written by various officers in previous years and which, for one reason and another, had become held up pending approval. Very little new work was undertaken.

19. Management plans for the following districts were approved during the year:—

Karura, South Kinangop, Machakos, Kitui, Kaptagat, Nabkoi, Timboroa, Maji Mazuri, Narasha, Sabatia, Esageri, Molo.

Plans for the following were completed and are awaiting approval:—

Castle, Kiandongoro, Ragati, Nanyuki, Ol Bolossat, Nandi, Elgeyo, Kabarnet, Lambwe, Londiani, Sorget, Bahati, Lembus.

Plans in course of preparation:—

Nyeri, Taita.

The plans for the African District Council forest areas of Machakos, Kitui, Nandi, Elgeyo, Kabarnet, Lembus and Taita are in the form of memoranda laying down general financial implications for approval by the Council of Ministers; while the plan for the 250-acre experimental area at Lambwe consists more of notes and memoranda on past experience than of actual prescriptions. Apart from these, most of the plans completed but awaiting approval are being acted upon with certain provisos. A number of plans approved in past years, such as those for Mariashoni, Elburgon and Nessuit, are already largely out of date, on account of a redistribution of the felling series, and will need early revision.

20. Approximately 70 square miles of the Mount Kenya Forest Reserve between the Mutonga and the Thuchi rivers was type-mapped from aerial photographs as part of a programme for making an inventory of the natural forest in Irangi District. R.A.F. aerial photographs taken in 1947 were used, but the photography covering the remainder of the Irangi District between the Thuchi and the Kathendeni rivers was found to be inadequate. The covering of this remaining area was let out to contract, to be reffown early in 1961, and considerable work was done during the latter part of the year putting in ground identification points in readiness for flying.

The main species of commercial interest in this region is East African Camphor (*Ocotea usamberensis*), and it was found from ground checks that the mature camphor areas show up very readily on the photographs both by their characteristic appearance and by their tendency to be confined to steep-sided narrow ridges. Where the topography becomes more gentle the camphor usually

gives way to other types. It was also found that areas of mixed podo and hardwoods typically occurring above the camphor are readily identifiable, as is also dense forest of *Macaranga*, *Harungana* and *Syzigium* near the forest boundary. The identification of other types was more doubtful and will require further study in the field.

21. Enumerations of approximately 2,000 acres of podo and hardwood forest in the neighbourhood of the Sacred Lake at Meru, and 1,100 acres of largely cedar forest at Gathiuru, were carried out in connexion with possible sawmill extensions.

22. A part of the plantation ledger at Head Office was brought up to date, and it is intended to transfer the information contained therein on to punched cards of the Cope-Chatt type. It seems likely that a reassessment of areas based on the latest aerial photography will show our present plantations acreages to be inaccurate in many cases.

CHAPTER VI—PROTECTION

Protection Against Fire

23. In the Southern Division a second prolonged drought year created a serious fire hazard, and three fires occurred all of which did considerable damage to young plantations. Arson was responsible for the burning out of 200 acres at Katende; a fire spreading into Forest Reserve from a burning hut destroyed all the plantations (106 acres) on Utangwa; and 30 acres of young pine plantations were burned through at Kabonge after a fire on adjacent farmland had jumped the forest boundary. The major programme of fire protection started in 1959 was accelerated as a result of these experiences.

24. Elsewhere, in spite of the dry year, there was little major damage caused by fire, and most of the fires that occurred were quickly brought under control. An exception was a fire started by bush burning outside the Forest Reserve which crossed the boundary and burned over much of the Kiangombe A.D.C. forest near Embu and destroyed most of the plantations there.

25. Funds were made available for the construction of four fire towers in the Elburgon Division. The one at Nessuit was completed by the end of the year, and a further two at Elburgon and Bahati were almost completed.

26. The north Mount Kenya area, as usual, came in for more than its fair share of fire trouble and obviously has a higher fire hazard than most other forest areas, a situation which is not made easier by the presence of large areas of inflammable moorland difficult of access.

Protection Against Wild Animals

27. In the Marmanet forest buffalo have become a major problem causing severe damage to crops and plantations. Two of our resident labourers employed there were attacked and injured by buffalo during the year, one of them very severely. An investigation is being carried out to discover whether the buffalo in Marmanet forest are necessary as a reservoir to maintain the supply of animals in the adjacent Aberdares National Park.

28. Limited control shooting of the larger game continued to be necessary, mainly in Mount Kenya and the Aberdares, notwithstanding the accepted policy to avoid establishing plantations in areas which are much frequented by game. The practice of trying to channel the movements of big game through plantation areas by means of "game corridors", bordered by strategically placed brushwood covered moats which the animals usually fear to cross, is being continued. The

requirements of productive forestry and of big game preservation are quite incompatible, but the Forest Estate is sufficiently extensive for the needs of each to be met in its own well-defined zones.

Protection Against Insects and Fungal Disease

29. *Oemida gahani* continued to be the major insect pest although a new species of Cerambycid borer was discovered to be present in most of the Northern Province forests.

30. Research into the occurrence of *Armillaria mellea* in forest areas and in tea plantations continued.

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

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

CHAPTER VII—SILVICULTURE

New Planting

33. The year was one of the driest on record in Kenya and the second dry year in succession, rainfall being poor and erratic over most of the country. In spite of this and the need to expend considerable effort on repairs to the previous year's planting, to replace failures due to drought, a total of 15,986 acres of new planting was attained. The following table shows the acreage of new planting together with the average field costs per acre over the past five years:—

Year	Total New Planting	Average Cost per Acre
	<i>Acres</i>	<i>Sh.</i>
1956	9,112	34/15
1957	9,735	39/64
1958	12,949	36/36
1959	16,325	30/03
1960	15,986	29/73

34. Of the new planting this year 94 per cent consisted of exotic softwoods, 77 per cent of the exotic softwoods planted being pines and 23 per cent cypresses.

35. The method of calculating soil moisture build-up at the beginning of the rains developed by Dr. Pereira and Dr. McCullough of E.A.A.F.R.O. to determine the "safe" planting date was again used successfully in 1960. In highland areas, good establishment was widely achieved in spite of the fact that the year was a dry one with sparse and erratic rainfall at the planting season. In lower and drier areas the results were less satisfactory and in some districts, notably Kitui and Machakos, survival percentages were poor. As a result, some doubt has been cast on the wisdom of using soil moisture build-up as a method for determining planting date. The fault, however, does not lie with the method as, unfortunately, no amount of calculation, however abstruse and refined, will make plants live in the absence of adequate rainfall.

36. At Lambwe Valley, another area of uncertain rainfall, better results were obtained in 1960 than in previous and more favourable years. This improvement is ascribed to better quality planting stock planted with every care taken to ensure that the root-hairs never dry out during transplanting.

37. *Pinus elliottii* continues to show promise as a tree for lower altitudes, but tends to be susceptible to drought on marginal sites. At the Coast the most promising species so far planted are *Pinus elliottii*, *Araucaria cunninghamii* and *Pinus pinaster*; while in Londiani Division *Pinus canariensis*, *Casuarina equisetifolia* and *Callitris hugelii* have stood up well to the dry conditions in the Perkerra catchment.

38. Increasing use is being made of polythene bags for transport of trees to the planting site. At Kimakia in the Fort Hall Division all the planting was done in this way with bare-rooted plants, and it was found that 100 to 150 plants could be packed into each bag and that one Land-Rover could keep a gang of 100 men supplied with trees.

Repairs, Maintenance and Progress of Plantations

39. 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>
1956	9,103	9/27	55,858	7/18
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

40. East of the Rift Valley the short rains in November, and especially in December, were very much below average. *Pinus patula* and other more tender species planted on dry sites were showing signs of distress by the end of the year, and many have died during the dry weather early in 1961.

41. The Divisional Forest Officer, Eldoret, made a preliminary study of damage to *Pinus radiata* which he believed to be due to hail. The symptoms are sufficiently alarming to justify fuller investigation, and a survey of all *Pinus radiata* plantations over the age of six years was planned to start early in 1961. The survey, in addition to assessing hail damage, will sample for disease due to other causes, and also for growth yield data. *Pinus radiata* grows so fast in the Kenya highlands that damage to the leading shoot by hail or other agency can have a serious effect on subsequent development.

42. A survey was started during the year by the A.C.F. Nyeri to assess losses in growth and value in plantations damaged by big game, the relative efficiency of various protective barriers and the economic justification of these.

43. An 8 ft. × 8 ft. square spacing is now standard practice in softwood plantations, and considerable advance in the accuracy of staking and planting was achieved during the year. With the very uniform growth obtained in Kenya softwood plantations, much selection for thinning and tending can be done on a more or less mechanical basis by untrained or only partially trained staff. Where mechanical methods are used an accurate square initial espacement greatly simplifies the operation and is worth the extra trouble taken to ensure its accuracy before planting time.

44. No changes were made in the tending prescriptions for plantation crops during the year, but increasing difficulty in finding markets for 12-year-old thinnings in most districts may make it necessary to postpone the thinning operation at that age. No alteration in the pruning schedule is contemplated, however, except in the case of Cypress plantations where some delay is authorized in both thinning and pruning when it is necessary to suppress grass on the forest floor. Similar delay in pine plantations is rarely effective in suppressing grass, and instructions to prune and thin pine plantations to schedule, ignoring grassy floors, were therefore reconfirmed during the year.

Nurseries and Plants

45. The practice of raising seedlings in undercut "Swaziland" beds has gained in efficacy during the past two or three years, and more and more nurseries are converting, at least in part, from boxes to beds. The bed raises a larger, more robust plant provided that the espacement is not so close that "leggy" plants are produced. Experiments on espacement in transplant beds were reported in 1958, and the results are increasingly being put into practice with more nurseries using 3 in. \times 2 in. or 3 in. \times 3 in. espacements instead of 2 in. \times 2 in. or 1½ in. \times 1½ in. as had previously been done by analogy with boxed plant espacements.

46. Inoculation with pine soil to ensure the formation of mycorrhiza on pine seedlings is no longer necessary in the Muguga Research Nursery, nor in many old established district nurseries which now seem to have an adequate permanent population of the fungus.

47. In the Muguga Research Nursery compost made from lawn mowings, leaf litter, path sweepings and similar vegetable rubbish by a very simple technique of piling, turning and intermittent watering has given excellent results for the fifth year in succession.

48. Approximately 16,726,000 tree seedlings were brought to plantable size. Of these, approximately 13,044,000 were used in the Department's planting programme, and 1,422,000 were sold to members of the public or to African District Councils for use in their own afforestation schemes.

Purchase and Collection of Seed

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

	<i>lb.</i>
<i>Acacia mollissima</i>	546
<i>Araucaria cunninghamii</i>	467
<i>Juniperus procera</i>	80
<i>Pinus patula</i>	77
<i>Fraxinus berlandriana</i>	53
<i>Acrocarpus fraxinifolius</i>	52
<i>Aberia caffra</i>	49
<i>Calodendron capense</i>	38
<i>Podocarpus gracilior</i>	30
<i>Schinus molle</i>	25
<i>Castanospermum australe</i>	22
<i>Cupressus torulosa</i>	19
<i>Machaerium tipu</i>	14
<i>Grevillea robusta</i>	12

These figures do not include local collections of seed for use within districts and divisions.

50. Importations of seed totalled 1,112 lb. of which the main items were:—

<i>Pinus radiata</i>	665 lb. from New Zealand
<i>Pinus elliottii</i>	300 lb. from South Africa
<i>Cupressus arizonica</i>	50 lb. from South Africa
<i>Pinus pinaster</i>	50 lb. from Portugal
<i>Callitris robusta</i>	20 lb. from South Africa
<i>Callitris hugelii</i>	5 lb. from Australia
<i>Cupressus pyramidalis</i>	5 lb. from Italy
<i>Erythrina caffra</i>	5 lb. from South Africa
<i>Pinus longifolia</i>	5 lb. from South Africa
<i>Pinus palustris</i>	5 lb. from South Africa

51. All seed required for cypress and *Pinus patula* plantations was locally collected. In the case of *Pinus patula*, 1960 was the first year in which it has been possible to dispense completely with imported seed. Selected seed stands were treated and maintained especially for the collection of seed of cypresses, *Pinus patula*, *Araucaria angustifolia*, *A. cunninghamii*, and *Vitex keniensis*. Seed of other species was collected from good stands or from selected individual trees.

52. The Central Seed Store in Nairobi was placed more directly under the control of the Silviculturist during the year and, following difficulties in tracing the history of batches of seed received some ten years ago, improvements in documentation of seed batches were introduced. Doubts about the conditions of storage in the Nairobi seed store led to a greatly increased programme of seed testing in collaboration with the Forest Pathologist. It is hoped from these tests to obtain an estimate of the losses in viability induced by what appear to be unsatisfactory storage conditions.

Nairobi Arboretum

53. A further section of the Arboretum was opened up, and converted to lawn.

The following species were planted in the Nairobi Arboretum during the year:—

<i>Acacia lahai.</i>	<i>Pinus radiata.</i>
<i>Acacia xanthophloea.</i>	<i>Robinia pseudacacia.</i>
<i>Cryptomeria japonica.</i>	<i>Sequoia sempervirens.</i>
<i>Ginkgo biloba.</i>	<i>Widdringtonia whyteii.</i>
<i>Picea sitchensis.</i>	

All these are species which have been tried previously.

CHAPTER VIII—FORESTRY PROJECTS UNDER THE SWYNNERTON PLAN

Machakos

54. The gazettelement of the forests in the Machakos district was finally approved and there are now 34 gazetted forests totalling 23,083 acres in this district. A reduced planting programme of 180 acres was approved this year for the Machakos forest scheme but in actuality only 148 acres were planted owing to the poor rains. In some areas it was not possible to do any planting at all because of insufficient rainfall. The reduced planting programme allowed considerable progress to be made in weeding and cleaning existing plantations, and 1,865 acres were treated during the year.

55. It was another bad year for fires and 106 acres of young plantations were burned out on Utangwa and another 30 acres on Kabonge. A two-year-old plantation was largely destroyed by a fire that burned over 200 acres on Katende and was replanted during the year. It was noticed that some of the scorched *Pinus elliottii* recovered quite well during the ensuing rains. Drought took a heavy toll of the 1959 planting on Makuli and it was necessary to beat up 171 acres this year.

Kitui

56. Demarcation of 12 of the 14 hills originally included in the Kitui forest scheme was completed. Of the 14 hills scheduled for gazettelement the Native Lands Trust Board approved the gazettelement of seven, namely, Imba-Chakuyu, Mutuluni, Mai, Mutha, Nuu, Makongo and Ngamba. Poor rains made it impossible to attain the annual planting target at Kitui, and only 134 acres were planted out of the scheduled 200 acres.

West Suk

57. Surveys and boundary maps were completed for Kamatira/Kwaisagat and Sekerr, and these forests now await gazettelement. Completion of the demarcation of the Sekerr boundary of 26 miles proved to be a most arduous and difficult task.

South Nyanza

58. The experimental area at Lambwe was further developed, and a revised management plan was produced and submitted to the Council of Ministers for approval. Over 20 acres were planted and good reports received of *Pinus elliottii*, *Cupressus benthamii*, *Cupressus lusitanica*, and the direct sowing of *Cassia siamea*. *Pinus elliottii* on rock slopes shows 85 per cent establishment, and growth in the ploughed areas is good in spite of vigorous competing weed and grass growth. *Callitris hugelii* has been disappointing.

Baringo

59. In the Perkerra catchment at Kabarnet up to 60 per cent deaths of *Pinus patula* have occurred on account of the drought, but the *Pinus canariensis* is standing up well.

60. Areas under the Swynnerton plan came under the aegis of the Forest Department as from 1st July, 1960. A number of new schemes under the African Lands Development Board have been started and are listed below:—

- (i) *West Suk*.—Expansion of the original Swynnerton Scheme to Sondang mountain where the proposal is to demarcate and gazette all existing forest in the river catchments rather than embark on a range management scheme as in the other West Suk forest areas.
- (ii) *South Nyanza Advisory Scheme*.—This scheme is to assist South Nyanza farmers in farm forestry and to provide education in forestry by demonstrations and lectures at agricultural institutes and to farmers individually.
- (iii) *Baringo*.—Extension of the original Perkerra catchment scheme to the catchments of other rivers in the Kamasia Hills, notably those of the Kerio Valley.
- (iv) *Turkana*.—Funds for a large-scale forestry scheme in Turkana have not yet been spent though reconnaissance trips have been made. At the very end of the year a further full-scale reconnaissance by air and land was made, and is likely to result in the Forest Department agreeing to alter this scheme from one of forest protection to one of grazing control.
- (v) *Machakos*.—Extension of afforestation to the lower slopes of the larger hills already in the process of afforestation under the Swynnerton Scheme, and to drier hills elsewhere.
- (vi) *Kitui*.—An intended extension to the Swynnerton scheme was withdrawn and the funds distributed elsewhere.
- (vii) *Embu*.—A full-scale scheme to demarcate, gazette and develop the forest in nine locations of Embu District which were previously classed as A.D.C. By-law forests.
- (viii) *Taita*.—Extension to the Swynnerton scheme to include hills lost to that scheme, and extension of operations to some new areas and to existing natural forest on certain peaks.
- (ix) Funds are available to launch a drive for A.D.C. By-law forests in the Kilifi District, but progress has been slow in getting areas set aside.

CHAPTER IX—RESEARCH

A—General

61. Mr. H. H. C. Pudden, O.B.E., died suddenly on 16th February, 1960. He had been in charge of silvicultural research in Kenya for ten years, and his work contributed much to the success of the greatly accelerated exotic softwood planting programme prescribed in the 1946 Development Plan and in the 1956 "Craib B" Plan. His ingenious and critical mind devised a number of precise and elegant experiments which yielded reliable information remarkably quickly for forest research. His death was a severe loss to the Department and its suddenness inevitably left many of the experiments on which he was engaged incomplete. His successor has made a very good job of collating his notes and continuing the experiments he had initiated.

62. The Department continued to co-operate with E.A.A.F.R.O. in the two long-term water catchment experiments, at Kimakia in the eastern Aberdares and at Sambret in the south-western Mau respectively to assess the effect of artificially induced vegetation changes on water yield.

B—Silvicultural Research

BY W. G. DYSON, SILVICULTURIST

63. *Staff.*—Mr. W. G. Dyson, was appointed Silviculturist in succession to the late Mr. Pudden on 23rd June, 1960, on his return from vacation leave.

Mr. D. M. Rendle was appointed Forester (Silviculture) in January, 1960, after a brief period of training at Londiani Forest School.

During the interregnum following Mr. Pudden's death, and again during Mr. Dyson's absence in America, Mr. J. P. W. Logie, Conservator of Forests, directed the work of the Branch.

64. *General.*—In spite of disorganization caused by the death of Mr. Pudden, the absence of Mr. Dyson in Latin America for three months and changes in staff, routine periodic measurements and treatment of long-term experiments were carried out to schedule and some new projects were initiated. The survey of cypress plantations to obtain growth and yield data was continued for part of the year but further computation of the results could not be undertaken.

65. Towards the end of the year the Office of the Silviculturist was moved to the Muguga Laboratory. The concentration of all experimental and office records at one place made possible a comprehensive review of previous work, and compilation of periodic summaries of the longer-term experiments. This review was still in progress at the end of the year. The Branch continued to have the use of two offices and a store in the Conservancy headquarters at Londiani, and a laboratory at Muguga where a small research nursery is also maintained.

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

(i) *Soil Structures*

Preliminary examinations were made to find suitable sites for detailed investigations to be carried out in collaboration with E.A.A.F.R.O. on the changes on soil structure which occur as a result of replacing indigenous forest with repeated exotic conifer crops (with intervening "taungya" cultivation). Work carried out by Argyle in 1954 indicates that little chemical change is to be expected.

(ii) *Herbarium Specimens*

A small number of herbarium specimens were collected during the year and submitted to the East African Herbarium for determination or addition to the reference collection.

(iii) *Natural Regeneration*

Good crops of natural regeneration are being discovered with increasing frequency beneath plantation crops, especially under Cypress. With the present economical "shamba" system of planting in use in Kenya, advance natural regeneration has few advantages at present and no work on it was carried out by the branch. Intermittent work on the natural regeneration of valuable hardwood species in the forests at Kakamega, Embu and Meru is carried out by territorial staff.

Following discussions with the Silviculturists of other countries which have a more advanced tree selection programme, it would appear that Kenya has been too lenient in its selection of mother trees and that a much more stringent selection will have to be applied. Unless this is done the trials will become of unmanageable size, and the chances of finding a "winner" will be extremely small. It was probably an extremely fortunate accident that tree No. 31 appeared amongst the *Pinus patula* so early in the progeny trial programme.

(v) *Seed—Pre-sowing Treatments*

A series of experiments in Ragati District Nursery in an attempt to raise the plant yield from *Vitex keniensis* seed have shown that the most satisfactory method is to store freshly collected fruits for three or four days in a sack until the pulpy mass just begins to heat, then to sow them broadcast on to the seed bed and cover with a very thin layer of forest soil. The beds are not shaded but sprayed frequently during the day to keep them moist, and germination follows in several flushes during two to three weeks.

(vi) *Plant Rearing*

An experiment, repeated in several district nurseries, was carried out to find whether black, gusseted, perforated, polythene bags would justify their cost by raising larger, more easily transplanted plants in drier areas where planting out may be a hazardous operation. Two sizes of bags were used which, on filling with soil, gave flat-bottomed cylinders about 6 in. tall and 4 in. and 3¼ in. diameter, respectively. Assuming them to be filled with soil to within about half an inch of the brim, they give soil volumes of 75 cubic inches and 60 cubic inches respectively. Plants set in normal plant trays 4 in. deep were used for comparison. In the boxes the soil volume for each plant was about 23 cubic inches.

Nursery measurements showed that both sizes of bag produced larger plants than the boxes, and larger bags produced larger plants than the smaller bags, but the differences in height growth were small—about 2 per cent—and the use of these large individual containers is not justified by better growth in the nursery. A smaller container would do as well. The value of the bags must therefore lie in easier planting out, which will be tested in 1961.

(vii) *Transport of Planting Stock*

An experiment to test the efficiency of polythene bags as containers for transporting planting stock to the planting site, and for storage of plants, was carried out in several districts during the year. Several different methods of raising the stock from beds, and different storage times in the bags, were tested in comparison with normal planting stock. The results were rather incomplete and the experiment will be repeated in 1961, but the following preliminary findings were noted:—

Under favourable planting conditions no significant differences in survival of the plants was detectable after any of the lifting and storage treatments. Under less favourable conditions, and 1960 was a dry year with uncertain planting conditions in many districts, the removal of soil from the roots of plants before putting them into bags had an adverse effect on survival, and generally longer storage in bags reduced the percentage of takes. One station reported a better take with plants stored in the bags than plants planted the same day as lifted from the nursery bed. This is a curious result, but agrees with results obtained by the Silviculturist, E.A.A.F.R.O., at Muguga for two or three consecutive seasons.

Foresters carrying out the experiment also made several useful practical observations. The bags supplied, 2 ft. \times 1½ ft., were too small to hold a convenient number of larger plants, and were too flimsy a gauge of polythene, which resulted in much splitting when an over-full bag was handled on and off the transport vehicle. The bags full of plants, even though closed and sealed, must be kept in the shade if the plants are not to be "cooked" with a consequent high proportion of subsequent deaths on planting out.

(viii) *Growth and Yield Survey in Cypress Plantations*

The survey of Cypress plantations was continued during the early part of the year and, shortly before his death, Pudden obtained regression equations from which a revised and extended volume table for Kenya Cypress has been computed, and a provisional yield table for plantations west of the Rift Valley.

(ix) *Timber Preservation*

Diffusion Impregnation of Cypress Timber with Boron Salts.—The heartwood of Cypress timber is less readily impregnated with preservatives than the sapwood or the heartwood of most pine timbers. While adequate impregnation is fairly readily feasible, it is more costly and time consuming than impregnation of other softwoods and is a disadvantage of cypress timber.

Two experiments were carried out in collaboration with the Forest Entomologist to see if diffusion impregnation with boron salts would provide a cheap and simple method of treating cypress heartwood. Satisfactory penetration of 3 in. \times 2 in. blocks of cypress heartwood was obtained by the techniques used in Australia and elsewhere with boron salts, during four weeks' moist diffusion storage following dipping in a 20 per cent boric acid equivalent solution. The diffusion method is thus suitable for cypress timber. Unfortunately, the treated blocks, when tested with eggs and larvae of the borer beetle *Oemida gahani* Dist. were all attacked by the larvae; boron salts at well above the recommended concentration do not seem to provide protection from *Oemida*. It is proposed to repeat the experiment with other more toxic water soluble salts.

Publications

67. *Papers*—

Dyson, W. G. (1960).—"The Growth of Latin American Conifers in the Kenya Highlands."

Technical Notes—

The following technical notes were issued by the branch:—

- No. 73 Conversion Tables: Diameter/Girth and Girth/Diameter (Pudden).
- No. 74 Summary of Information on Forest Department Meteorological Observations, 1959 (Pudden).
- No. 75 Naval Stores Production (Leakey).
- No. 76 Forest Catchments in Semi-Arid Country (Pereira—issued Leakey).
- No. 77 Average Cypress Yields—West of Rift for correctly stocked plantations (Logie—computed from equations derived by Pudden).
- No. 78 Soil Moisture at Planting Time—1960 Supplement (McCullough—issued Logie).

C—Entomological Research

BY MR. S. J. CURRY, FOREST ENTOMOLOGIST

68. *Staff*.—The post of Forester (Entomology) was held by Mr. D. G. Powell until his departure on leave in May when these duties were taken over by Mr. J. M. Baynes.

69. *Research on Oemida Gahani* (Dist).—Research continued on similar lines as last year.

(a) *Indigenous Host trees*.—Sampling of indigenous stumps in plantations show that the pest is more prevalent in areas west of the Rift Valley than those to the east, and in some parts of the Londiani and Eldoret divisions infestation exceeds 40 per cent. More than 90 indigenous tree species have been found to be attacked and these include *Juniperus procera*, *Podocarpus* spp. and *Olea* spp.

(b) *Treatment of Pruning Scars*.—From experiments on pruning scars on plantation trees sited close to infested stumps it has been found that the female will oviposit on a wide range of chemical treatments including bitumen and creosote. More than 30 different treatments have been compared, and so far it has been found that only greases will prevent oviposition. Of the treatments on which eggs have been laid, more than two-thirds have been penetrated by the larvae after hatching though it is too early to be sure that they will continue to develop normally. As an interim measure it has been decided to continue to use Shellmac R.C.O. as a protective coating but with the addition of 2 per cent Lindane (Benzene Hexachloride). It is hoped, in due course, to replace this treatment with a more effective and less expensive coating.

(c) *Trap Trees*.—The experimental use of cypress, both with game wounds and artificial wounds, as trap trees has shown that such trees have to be very carefully sited to produce good results. They must either be close to indigenous stumps in which the borer is active or to natural forest in which there are dead trees harbouring it. It is therefore doubtful whether the method can be generally adopted without considerable supervision from the Entomology staff, though it may be worth while in the worst *Oemida* areas west of the Rift.

(d) *Distribution*.—In the course of *safaris* undertaken to forests in the Northern Province *Oemida* was found to be present in the Leroghi plateau, Matthews and Ndotos ranges, on Mount Nyiru and at Marsabit. This was not unexpected as the forests concerned contain a number of the species commonly attacked in other parts of the country, and it is likely that the pest has been introduced in cedar poles imported from other areas. Marsabit is the farthest north that *Oemida* has so far been discovered.

70. *Sawmill Allowances*.—A formula based on the results of a series of sawmill tests carried out over the past three years on cypress logs was worked out with the assistance of the E.A.A.F.R.O. statistician which will enable forest staff to calculate an allowance on royalty from observations made on the cut ends of logs during timber measurements. It is hoped that this will be accepted by all sawmillers after a trial period of operation.

71. *Other Pests*.—(a) A new species of *Cerambycid* which is closely related to *Oemida* and the similar borer in the Usambara mountains of Tanganyika, *Androeme plagiata*, was discovered in all the Northern Province forests apart from Marsabit. It has been provisionally placed in the genus *Acalopus*, but more exact identification is awaited from Europe. This borer was later discovered at an altitude of 10,000 ft. on Mount Elgon, but has not, so far, been discovered elsewhere. Its habits appear to be similar to those of *Oemida* and *Androeme* and it is possible that it could eventually emulate these borers as a cypress pest.

(b) Another pest previously unrecorded in East Africa was discovered in a godown at Mombasa and later in timber stored in it prior to export. This is the common Indian species of *Cerambycid-Stromatium barbatum*, which attacks more than 300 timber species in India, Europe, New Zealand and the islands of the Indian Ocean. Extensive damage was caused to the roof structure of the Mombasa building, and it is likely that the pest has spread to other buildings in the town.

(c) Another pest was found to be imported into Mombasa from the Indian region. This was the Scolytid Ambrosia beetle *Xyleborus* sp. near *bidentatus*, which was imported in *Avicennia* poles used as dunnage. This pest attacks a number of tree species in India, Burma and the Andaman Islands. Luckily, any chance of it becoming established in Kenya was prevented by prompt fumigation of the poles, but the danger of the importation of live borers in dunnage is still not generally recognized.

72. *Defoliation*.—Two new outbreaks of defoliation were reported during the year. One at Moridjo, Thomson's Falls was caused by a Bagworm, probably *Acanthophyche* sp., in which about 20 acres of a *Pinus radiata* compartment of 120 acres were stripped. No parasites or predators have been discovered, and it is possible that aerial spraying may be necessary to control the pest, should the outbreak spread further.

The other defoliator was a new record in our Pine Plantations. It is the Lasiocampid caterpillar *Lechriolepis basirufa* which produced about 40 per cent defoliation in a 29-acre *Pinus patula* plantation at Timboroa.

D—Forest Disease Research

BY DR. I. A. S. GIBSON, FOREST PATHOLOGIST

73. *General*.—Work on Forest Pathology has been restricted during this year due to the absence of the Forest Pathologist on vacation leave between July and December. During this leave the Sixth Commonwealth Mycological Conference was attended and a number of visits were made to research establishments in Great Britain including the Forest Products Research Laboratories at Princes Risborough and the Forest Commission Research Station at Alice Holt Lodge.

Earlier in the year a tour of the Tanganyika forest areas was made in which special attention was paid to softwood plantations.

74. *Nursery Diseases*.—(a) Damping off caused by *Rhizoctonia solani*, Kuhn *Pythium* spp. and *Fusarium* spp. has caused occasional losses in pine seed beds. No extension of work on this group of diseases has been made during the year.

(b) *Thelephora terrestris* (Ehrh.) Fr. has been recorded in further localities causing deaths in boxes of *Pinus patula* seedlings. This fungus is generally associated with overgrown boxes of plants and is easily controlled by manual removal of the fungus.

(c) *Botrytis cinerea* Fr. has been recorded causing a die-back of *Vitex keniensis* seedlings in the South Mount Kenya district. This was particularly associated with the less thrifty plants that germinated after the first flush of seedlings in the seed bed.

(d) A die-back and yellowing of pine seedlings with associated *Cylindrocarpon radicola* Wollenw. was recorded from Lushoto, Tanganyika.

75. *Die-backs and Cankers*.—(a) Dead Top in pines (particularly *Pinus radiata*) has been kept under routine observations but no fresh information on this disease can be reported.

(b) The die-back of *Pinus radiata* at Lushoto, reported in the Annual Report for 1959, has continued under observation during the current year. Inoculation experiments using the *Pestalotiopsis* spp. isolated from affected tissues have not indicated that these fungi are any more than weak wound saprophytes. The damage tends to be much more uniform than is usual with fungal infections, and it is possible that it is largely due to some physical factor in the environment predisposing the host to invasion by weak pathogens. Examination of the soils concerned for mineral deficiencies which may be contributory to this disease is being made. *Pinus patula* of the same age as the affected *P. radiata*, and older *P. radiata* plantings (11 years) do not seem to be affected by this disease although they are situated in the same area.

(c) Monochaetia Canker of Cypresses (*Monochaetia unicornis* (Cooke and Ell.) Sacc.) is now being observed at five different stations. Attention is being paid to differences in susceptibility between three seed lines of *Cupressus lusitanica* to the disease and the effect of pruning on disease incidence.

76. *Armillaria Root Disease*.—Experiments and field surveys for this disease have continued both in the forest areas and the tea plantations at Kericho. In the forest, examination of the roots of indigenous trees in a number of localities showed that epiphytic colonization by rhizomorphs of *Armillaria mellea* (Vahl. ex Fr.) Kummer was surprisingly frequent in relatively cold, wet regions. At altitudes below approximately 6,500 ft. a.s.l. they became much rarer. *A. mellea* has been found associated with all the common indigenous tree species under conditions favouring rhizomorph development.

Similar work in tea plantations has shown that the tea bush frequently carries associations of rhizomorphs on the root system and it is thought that under conditions leading to the predisposition of the host these may lead to attacks of the disease. Recent inoculation experiments designed to produce *Armillaria Root Disease* in tea have failed, probably due to the fact that insufficient inoculum was applied to the test bushes.

An account of work on *Armillaria Root Disease* in tea was given at the Commonwealth Mycological Conference.

Work on this subject continues.

77. *Rots in Standing Trees and Converted Timber*.—(a) Collaboration in a study of rots of cypress associated with game damage as a part of a more general survey has been started. *Polyporus caesius* (Schrad.) Fr. has been collected fruiting on game-damaged cypress in association with rot invasion through game scars. This is the first time that a sporophore has been found associated with cypress rot. *P. caesius* is found fairly frequently colonizing fallen cypress timber in plantations.

(b) Various specimens of rots in converted timber have been examined. The possible relation between fungal invasion of timber in marine use and its attack by marine borers has also been investigated.

(c) Indirect evidence of the occurrence of a heart rot in *Pinus radiata* timber has been obtained, from converted timber. The cause is not yet known.

78. *Seed Testing*.—Routine seed testing, particularly of pine seeds, has been undertaken by the section.

Publications

79. (1) Issue of the quarterly news sheet, *Pest Digest*, has continued. This is based on small articles on pest and disease subjects contributed by the Pathology and Entomology sections of the Department and the Forest Entomologists of E.A.A.F.R.O. and Uganda. Its circulation now covers the three Forest Departments of East Africa.

(2) "*Armillaria mellea* in Kenya Forests". *E. Afr. agric. & for. J.*, 26, 142-143. 1960 (with N. A. Goodchild).

(3) "A Note on variation between isolates of *Armillaria mellea* (Vahl. ex Fr.) Kummer." *Trans. Brit. mycol. Soc.*, 44. (In press.)

(4) "An anomalous effect of pentachloronitrobenzene on the incidence of damping off caused by a *Pythium* sp." *Phytopathology*, 51 (in press) (with M. Ledger and E. Boehm).

CHAPTER X—UTILIZATION

Forest Products Utilization, Testing and Treatment

80. *Staff*.—Mr. L. Lowsley, who had been Utilization Officer since September, 1953, died in England in September soon after arriving there on leave. Mr. A. J. Hume took over the Utilization Branch temporarily as acting Utilization Officer. Mr. M. McCoy Hill, Timber Grading Inspector, continued to direct marine borer research work at Mombasa, and to cover other forest product utilization activities, in addition to his routine duties.

81. *Timber Trade*.—This was expanding during the first quarter of the year, when loss of confidence caused much building development to be suspended and a corresponding contraction in the demand for timber. Local sales are alleged to have dropped to less than half their normal volume during the closing months of the year, and several sawmills and timber firms closed down.

In an endeavour to maintain timber production by encouraging exports, the reintroduction of the refund of 50 per cent of the royalty paid on exported timber was agreed to, with effect from 1st January, 1961.

82. *Timber Bill*.—The draft of this Bill was revised and brought up to date during the year.

83. *Future Timber Consumption*.—The team of F.A.O. experts, which is engaged on a forecast of the probable timber requirements of the three East African territories in the year 2000 A.D., completed its work in Uganda in May and spent much of the latter half of the year in Kenya.

84. *Matches*.—A match factory went into production at Mombasa during the year. For a start it has depended mainly on imports from overseas for its supplies of timber, but it has also experimented with a number of Kenya and Tanganyika timbers, both indigenous and exotic. So far cypress has been shown to be the most promising of the local timbers for box veneers, but less promising for splints.

85. *Wood Pulp*.—Sporadic interest continues to be shown in the possibilities of pulp production in Kenya, but no definite proposition has yet materialized.

86. *Timber Testing*.—Kenya is indebted both to Tanganyika and to Uganda for help given in testing the properties of locally grown pine species. The results of the tests on 16-year-old *Pinus radiata* and *P. patula* became available during the year and indicated an excessive tendency to twist, though in other respects the properties are satisfactory.

In December the Materials Testing Branch of the Ministry of Works commenced a comprehensive testing programme on 30-year-old *Pinus radiata* timber. Lack of knowledge of the properties of pine timber of this age grown in Kenya has been a serious gap in our knowledge so far.

87. *Railway Sleepers*.—A full-scale service trial for treated timber sleepers was in preparation during the year. It will include sleepers of ten species grown in East Africa amongst which will be 2,000 sleepers of Kenya—grown pine. Several different types of attachment fittings for the rails will also be tested during this service trial.

The East African Railways are showing increasing interest in the use of timber sleepers, and towards the end of the year placed orders for 33,000 of these to re-lay 17 miles of a branch line. These will be of pressure-treated podo and cypress.

88. *Inspection of Export Timber*.—The standard of grading of export timber has improved over the years and only about 2 per cent of the timber arriving at Mombasa during 1960 for shipment abroad was rejected. Much of this rejected timber had suffered degrade because of damage suffered in transit and not because of faulty original grading. The use of non-porous plastic tarpaulins to cover timber during rail transit to Mombasa was found to cause considerable stain damage because of heavy sweating.

89. *Treated Timber*.—There has been a steady increase in the use of pressure-impregnated timber during the year. There are at present four pressure-impregnation plants in Kenya. The preservatives used in these plants are creosote or Celcure. A fifth plant is being built which will use creosote and Tanalith. The amount of timber treated is increasing yearly as the public becomes aware of the advantages of using it.

90. *Inoculation/Eradication Treatment*.—The inoculation/eradication treatment of infested timber *in situ* continues to give excellent results in Mombasa, where the structural timbers of many buildings are infested with the dry-wood termites.

Cryptotermes dudleyi.—Mombasa Municipal Council is at present considering the introduction of a building by-law which would prohibit the use of untreated timber for use in buildings. This measure, if adopted, and the inoculation/eradication treatment referred to above, could do much to regain the popularity of timber as a building material at the Coast.

91. *Fumigation of Timber*.—Two major experiments were carried out to determine the efficacy of fumigating oemida-infested cypress with methyl bromide. The fumigation was effected under gas sheets in the open, and the period of exposure under gas was 48 hours. Samples of the most heavily attacked timber were sectioned and examined on completion and no live *Oemida gahani* were found.

The success of these experiments indicates that fumigation might also be effective in clearing cryptotermes infestations from buildings, and arrangements are being made to carry out a trial fumigation of an infested dwelling-house. Another important use would be the fumigation of infested dunnage.

92. *Marine Borer Research*.—Marine borer research was continued at Mombasa. This research, which is conducted entirely on empirical lines, has yielded much valuable data concerning the natural resistance of local species of timber to marine borer attack, and also concerning the effectiveness of various preservatives and preservative treatments. A separate report on this subject is prepared annually.

CHAPTER XI—PRODUCTION AND TRADE

93. The table below gives sales of timber to licensed sawmillers and contractors operating in forest reserves 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
1956.. .. .	146,559	22,425	168,984	12
1957.. .. .	121,053	26,420	147,473	14
1958.. .. .	120,218	25,968	146,186	14
1959.. .. .	115,655	22,662	138,317	13
1960.. .. .	122,098	29,711	151,809	15

94. Of the year's production about 44 per cent consisted of podo, 14 per cent of cedar, 20 per cent of cypress, 2 per cent of pine and 20 per cent of hardwoods. These figures are very comparable to those for 1959, though the proportion of hardwoods has shown some increase at the expense of those of cedar and podo.

95. The total volume of timber in the log on which royalty was paid shows a rise of 9.7 per cent over 1959, but this increase is more than accounted for by the reduction in the amount of outstanding accounts owed by purchasers of timber.

Exports

96. Exports show a considerable revival from last year's low figures and are more in line with those of previous years. The total value of exports was £325,224 as against £212,659 in 1959 or an increase of about 53 per cent on last year's figures.

The trends of the main items of export are as follows:—

Mangrove Poles: An increase of about 48 per cent on last year's figures.

Sawn Timber: Value of exports was £101,102 as against £64,188 or an increase of about 58 per cent.

Pencil Slats: Value of exports rose from £29,326 in 1959 to £33,614 or approximately 15 per cent. The long-term trend of this product, however, seems to be downward.

Builders' Woodwork (mainly flooring blocks): A rise in value of exports from £49,275 to £73,199 or about 49 per cent.

97. Full details of types of produce exported during the year are given in Standard Form X in the appendices. This form and the information summarized above refers to exports from the Port of Mombasa only. The table below summarizes exports to Tanganyika and Uganda.

EXPORTS TO UGANDA AND TANGANYIKA

		UGANDA		TANGANYIKA	
		Quantity	Value	Quantity	Value
			£		£
Mangrove Poles	Number	—	—	2,925	84
Other Poles		—	3,167	—	6,702
<i>Sawlogs and Veneer Logs:</i>					
Mvule	Cubic ft.	1,000	—	—	—
Other Hardwoods	"	1,000	298	—	—
<i>Sawn Timber Softwoods:</i>					
Cedar	"	2,041	609	3,522	1,289
Podocarpus	"	85,355	31,317	72,741	16,560
Cypress	"	21,747	6,952	89,137	23,589
Total Softwoods		109,143	38,878	165,400	41,438
<i>Sawn Timber Hardwoods:</i>					
Mvule	"	—	—	1,671	1,032
Camphor	"	238	83	2,435	1,439
Mahogany	"	—	—	2,174	1,013
Loliondo	"	—	—	195	137
Other Hardwoods	"	6,251	2,201	16,929	6,285
Total Hardwoods		6,489	2,284	23,404	9,906
<i>Wood Manufactures:</i>					
Boxes, cases, crates and parts thereof	Centals of 100 lb.	859	1,340	1,001	3,208
Plywood	Sq. ft.	13,551	302	5,175	106
Other	—	16	—	—	—
<i>Builders' Woodwork:</i>					
Blocks and Strips for Parquet Flooring—					
Cedar	Cubic ft.	—	—	363	206
Mvule	"	—	—	42	42
Other Hardwoods	"	272	129	1,570	239
<i>Wood Manufactures:</i>					
Others	Cental	757	3,941	2,059	10,542
<i>Manufacture of Wood, n.e.s.</i>					
Wood Furniture and Fixtures			5,691	—	3,484
Wood Furniture and Fixtures with mattress			8,202		15,003
Fuel Wood (including sawdust)	Centals of 100 lb.		5,193		12,969
Charcoal	"	5	6	—	—
		16,835	4,580	130	34
Total			29,384		45,833
GRAND TOTAL			70,546		97,177

These local exports show a decline of about 11 per cent compared with last year and the trend appears to be downward.

Imports

98. Imports through the Port of Mombasa amounted to £417,337 in value as compared to £430,843 in 1959 or a decrease of about 5 per cent.

The main items concerned were plywood 38 per cent, boxes and crates 27 per cent, fibreboard 10 per cent. Full details of imports are shown in Standard Form X.

99. The following table shows imports from Uganda and Tanganyika during 1960. It will be noted that sawn hardwoods continue to comprise the largest item.

IMPORTS TO KENYA FROM UGANDA AND TANGANYIKA

		UGANDA		TANGANYIKA	
		Quantity	Value	Quantity	Value
			£		£
Mangrove Poles	Number	—	—	560	11
Other Poles	—	—	—	—	271
Sawn Timber, Softwood:					
Cedar	Cubic ft.	—	—	64	46
Podocarpus .. .. .	..	35	16	7,519	3,100
Cypress .. .. .	..	—	—	1,427	536
Total Softwoods		35	16	9,010	3,682
Sawn Timber Hardwoods:					
Mvule .. .. .	..	27,179	18,386	25,799	18,444
Camphor .. .. .	..	—	—	17,874	9,337
Mahogany .. .. .	..	31,335	16,596	—	—
Loliondo .. .. .	..	—	—	775	343
Other Hardwood .. .. .	..	27,348	12,693	17,599	9,293
Total Hardwoods		85,862	47,675	62,047	37,417
Plywood	Sq. ft.	904,548	18,212	—	—
Wood manufactures:					
Boxes, cases, crates and parts thereof	Centals of 100 lb.	473	2,661	294	2,438
Builders' woodwork:					
Blocks and strips for Parquet Flooring:					
Cedar .. .. .	..	—	—	1,174	1,111
Mahogany .. .. .	..	977	525	—	—
Loliondo .. .. .	..	—	—	2,135	910
Other hardwoods .. .. .	..	670	591	—	—
Other manufacture of wood .. .. .	..	238	1,440	117	537
Manufacture of wood, n.e.s. .. .. .	..	—	159	—	213
Wood furniture and fixtures	—	—	2,469	—	6,639
Wood furniture with mattresses	—	—	1,148	—	124
Total		—	27,205	—	11,972
GRAND TOTAL		—	74,896	—	53,053

100. It is apparent that there is scope for Kenya to expand its production of better quality hardwoods at the expense of imports from the adjacent territories.

Firewood

101. Kenya Form 5 details the sales of firewood during the past ten years. During the year sales rose by about 11 per cent from 6,459,356 cubic feet to 7,209,682 cubic feet. This market appears to have become more or less stabilized over the past few years at a level of about 7,000,000 cubic feet with minor fluctuations from year to year.

Minor Produce

102. This is detailed in Standard Form VIII. There were heavy increases in the sales of mangrove bark, bricks and offcuts while the sales of building stone and murrum sharply declined.

CHAPTER XII—MECHANICAL TRANSPORT, ROADS AND BUILDINGS

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

MECHANICAL TRANSPORT VEHICLES

Type	Position at 31-12-59	Sold or written off during the period	Bought during the period	Position at 31-12-60
Motor cycles	3	1	—	2
Land Rovers	73	9	42	106
Light Delivery Vehicles ..	6	2	—	4
Motor lorries	57	10	35	82
Motor Boats	4	1	—	3
Trailers	51	—	5	56
Tractors	41	8	12	45
Mobile Cinema	1	—	—	1
School Bus	1	—	—	1
Road Graders	4	—	1	4

104. *Roads.*—The old concept of a fully-equipped Departmental road unit, capable of tackling all types of road work and under a single direction, has now been finally discarded. Such a unit tends to become static, and owing to its immobility road maintenance work inevitably suffers.

Each Conservancy is now self-sufficient in its road construction and road maintenance equipment. Each Conservancy has its own Road Superintendent, and emphasis has been placed on mobile equipment such as auto-patrols and other machinery required for the maintenance and improvement of existing roads. Heavy new construction work will be undertaken on contract or with hired machinery supplemented by hand labour.

105. The Road Superintendent for West Conservancy is stationed at Londiani, where he has a well-equipped workshop and facilities for carrying out all types of vehicle repair and maintenance work. During the year the

machinery under his direction constructed 38 miles of new roads in the Elburgon Division, carried out road maintenance work in most districts in the Londiani Division, and at the end of the year was engaged in the construction of a new road from Londiani to Kerisoi. In November the Royal Engineers spent a useful three weeks at Londiani and Sabatia during which time they constructed a 90-ft. span bridge and two masonry bridges, and also undertook road and quarry blasting. The Soil Conservation Unit has so far built eight miles of new road at Sorget and four miles at Esageri.

106. In the East Conservancy most of the new work undertaken was in the Nyeri Division where 21 miles of new roads were built during the year, about 12 miles of this total being mainly concerned with providing better communications and access for the purpose of fire protection.

Eighteen-inch diameter concrete culverts are now in general use to replace wooden culverts, and also to replace bridges over small streams where "banks" of such culverts are found to be very effective and cheap to use, each culvert costing under Sh. 10 to produce from standard moulds.

In Thomson's Falls Division the Kichich-Morit road was continued but not completed, and $2\frac{1}{2}$ miles of the N.W. Aberdare fire protection road were built including a difficult crossing of the Melawa river. A considerable mileage of disused roads was opened up and made suitable for traffic, including the approach road to the Aberdares Royal National Park.

107. In the following table "motorable roads" are those suitable for 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>
Nyeri	198	197	395
Nairobi	243	110	353
Thomson's Falls	91	292	383
Coast	111	22	133
Southern	—	41	41
Fort Hall/Embu	41	74	115
Eldoret	199	—	199
Londiani	245	151	396
Nyanza	51	13	64
Elburgon	239	131	370
Kitale	124	8	132
TOTAL	1,542	1,039	2,581

Buildings

108. The building of schools, extensions to existing schools, and teachers' houses formed a large slice of the very large building programme carried out during the year. Buildings were financed from the Supplementary Forest Development Scheme, the Forest Resident Labour Welfare Fund, and also from the Unemployment Scheme.

The projects listed below were completed during the year:—

<i>Type</i>	<i>No.</i>
Senior Staff Quarters	6
Junior Staff Quarters	45
Teachers' Houses	44
Forest Guards' Quarters	75
African Labour Lines (Villages)	7
Office-cum-Store	7
Garage-cum-Petrol Store	9
Water Schemes	17
Schools	9
Classrooms and Extensions to Schools	24
Dispensaries	5
Shops	17
Butcheries	6
Produce Stores	2
Extensions to Water Supplies	8
Posho Mills	3
Strongrooms	1

CHAPTER XIII—STAFF AND LABOUR

109. The following posts remained unchanged:—

Chief Conservator of Forests

E. J. Honoré.

Deputy Chief Conservator of Forests

D. G. B. Leakey, O.B.E.

110. During the year the following changes in staff took place:—

Resignations

J. H. Wreford-Smith, Forester.

P. J. Baxendell, Forester.

N. D. McIntyre, Forester.

A. R. Webster, Forester.

B. T. Clay, Forester.

C. H. N. Stabler, Forester.

J. C. M. Pelissier, Forester Trainee.

Deaths

H. H. C. Pudden, O.B.E., Silviculturist.

L. Lowsley, Utilization Officer.

Retirement

G. Thomason, Road Superintendent.

Transfers

A. J. Carn, Forester, to Game Department as Game Warden.

Appointments

- W. G. Dyson, from Assistant Conservator of Forests to Silviculturist.
 J. J. Emtage, Assistant Conservator of Forests.
 I. Hook, Forest Officer (African Affairs).
 E. C. Goss, from Forest Officer (African Affairs) to Forester.
 J. Eccles, from Forester to Road Superintendent.
 A. M. Howitt, Forester (locally recruited).
 E. F. Griffiths, Forester (locally recruited).
 A. D. S. Stevens, Forester (locally recruited).
 N. C. Manig, Forester (locally recruited).
 E. Gairdner, Forester (locally recruited).
 D. D. Wright Hill, Forester (locally recruited).
 J. M. Williams, Forester (locally recruited).
 H. C. S. Davies, Forester (locally recruited).
 G. P. Stevens, Forester (locally recruited).
 P. M. Gladman, Forester (locally recruited).
 J. D. Scriven, Forester (locally recruited).
 Paul Kihara, Forester (locally recruited).
 H. H. J. Niemeyer, Forester Trainee (locally recruited).
 James Mwangi, Forester Trainee (locally recruited).

Promotions

- W. MacDonald, from Forester to Senior Forester.
 E. E. Antao, from Assistant Forester to Forester.
 A. L. King, from Forester Trainee to Forester.
 Hulbert Z. Gathu, from Ranger Grade I to Forester.
 Donatus T. Ndegwa, from Ranger Grade I to Forester.
 Donatus T. Ndegwa, from Ranger Grade II to Ranger Grade I.
 Henry K. Ikenye, from Ranger Grade II to Ranger Grade I.
 Jesse Kamau, from Ranger Grade II to Ranger Grade I.
 Thomas Kilonzo, from Ranger Grade II to Ranger Grade I.

Honours and Awards

111. Ranger Jonathan Inwani was awarded the Badge of Honour.

Statement of Staff

112. The following is the authorized establishment of the Department at 31st December, 1960:—

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
Utilization Officer	..	..	..	..	1

Staff Surveyor	1
Assistant Surveyors or Survey Assistants Grade I ..	2
Road Superintendents	2
Senior Foresters	9
Foresters	95
Forest Officers (African Affairs)	2
Timber Grading Inspectors	2
Seedsman	1
Forester Trainees	7
Senior Assistant Draughtsmen	1
Survey Assistant Grade II	1
Assistant Draughtsmen	3
Forest Rangers	148
Medical Dressers	49
Drivers	95
Forest Guards	880
Subordinate Staff	24

Labour

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

	31-12-59	31-12-60
Forest Department Resident Labourers ..	7,693	8,015
Sawmillers' and Contractors' Resident Labourers	1,258	1,681
Total	8,951	9,696
Forest Department Casual Labourers ..	2,853	2,946
Sawmillers' and Contractors' Casual Labourers	8,039	4,301
Total	10,892	7,247

CHAPTER XIV—AFRICAN WELFARE AND COMMUNITY DEVELOPMENT

General

114. Mr. D. Hartnell-Beavis continued in charge of welfare in the East Conservancy, while in the West Conservancy Mr. I. Hook took over from Mr. E. C. Goss at the beginning of the year.

115. The provision of educational facilities remained the biggest item in the Department's welfare programme. In spite of the dry year crops were generally good and the contributions to the Welfare Trust Fund from the cesses levied on surplus agricultural produce exported from the Forest Estate were well maintained. Potatoes continued to be by far the most financially valuable crop in the East Conservancy.

116. An important development during the year was the beginning of a trade union movement among the Department's labourers, organized by the Kenya Civil Servants' Union. The percentage of paid up members at the end of the year was still small, but it will certainly increase very considerably, and machinery is already being set up to deal with discussions and agreements on employer and employee relationships.

East Conservancy

117. The year was one of continuing development and consolidation in the existing villages, the village at Kamweti being the only new one to be opened during the year. Village administration continued as last year with each village having its headman and two tribal policemen, the former sitting on village committees and acting as liaison with the District Officer concerned. The system of subcommittees to deal with special subjects such as schools, hygiene, sports and shops was continued.

118. A modified plan for future classrooms was drawn up which should cut the capital costs for each classroom from £200 to £75, but as this coincided with an accelerated educational programme the total financial commitment visualized shows little reduction in aggregate. S.F.D.S. funds, however, have financed all schools and teachers' houses for stations, and have paid for just under half the total of the East Conservancy's capital costs for educational purposes over the past ten years. There were approximately 4,300 pupils in attendance at the 29 schools in the Conservancy during the year.

119. There are now 26 dispensaries in the Conservancy. An innovation during the year has been the employment of midwives in some of our villages, and by the end of the year five villages, namely Kinale, Kimakia, Castle, Kamae and Kabaru had been provided with this service.

120. Eighteen new permanent shops were built, but there are still many temporary shops urgently in need of attention to bring them up to modern standards of modern hygiene. At present there are 98 permanent and 66 temporary shops within the Conservancy.

121. The number of performances given by the mobile cinema unit was reduced owing to lack of funds, and after June the unit was sent out only to sports meetings. This service is being left to the Department of Information.

122. There are now five experimental garden plots where a variety of vegetables are tried, using good selected seed, with the object of finding the most suitable vegetable crops for the various districts.

123. Communal flocks of sheep have been started in Nanyuki District in liaison with the Provincial Veterinary Officer, and general opinion favours a "mutton" type of sheep such as Romney Marsh rather than a wool-producing type.

West Conservancy

124. There has been considerable expansion of school facilities during the year financed from three sources as follows:—

- (a) *Forest Resident Labour Welfare Fund.*—Completion of Nessuit and the start of Nabkoi intermediate schools. Extra classrooms at Likia, Teret, Kiptunga, Sorget, Sengalo, Kipkurere, Kipkabus, Esageri, Kieni, Sabatia, Londiani, Narasha and Maji Mazuri.
- (b) *Supplementary Forest Development Scheme.*—The completion or near completion of ten new schools at Likia, Teret, Kiptunga, Sorget, Sengalo, Kipkurere, Esageri, Kinari and Sabatia.

(c) *Unemployment Scheme.*—Twenty-four new classrooms and 28 teachers' houses.

125. Most stations now have their foreseeable primary school requirements, and pressure is being felt for the expansion of intermediate education up to Grade VIII. As universal education up to this level cannot be provided from the F.R.L.W. Fund the attitude of the community seems to be that they are prepared to build at their own expense. The total number of children in the 30 primary schools during the year was approximately 5,200.

126. Only one new shop was built from F.R.L.W. funds during the year but shops built from S.F.D.S. funds considerably increased shopping facilities.

127. The mobile cinema gave over 100 performances during the year and proved universally popular.

128. Experiments with various strains of potatoes, with a view to finding a good high altitude variety, were started at Likia with seed supplied by the Horticultural Research Station at Molo.

129. Village committees are working well in most of the older and larger villages, but not so well in the newer and smaller ones. The most valuable man on the committee is usually the Ranger, and this is an additional but very important item in the list of duties which Rangers should undertake at present.

130. Most of the *Maendeleo ya Wanawake* women's clubs collapsed when leaders' salaries were discontinued after June, and interest in these clubs does not seem strong enough to enable them to survive without financial support and close European supervision.

131. Great enthusiasm was shown at the athletics meetings held at Kinari, Gichage and Londiani. A good site for a permanent Conservancy athletics track was levelled at Nessuit and should be ready in time for the 1961 athletics season.

CHAPTER XV—TRAINING AND EDUCATION

Forest Training School

132. Early in the year Mr. J. B. Smart proceeded on vacation leave and Mr. P. Murrell took over as Principal of the school, assisted by Mr. B. M. Beer as Forester Instructor.

133. Prior to the third Rangers' Long Course which started on 1st April, a Forest Guards' course was held at Kaptagat followed by a six weeks' course for Forester Trainees. The latter was held at the school and dealt with silviculture, mensuration and surveying, engineering, protection and office procedure as its main subjects.

134. The third Rangers' Long Course was not due to end until 31st January, 1961. By the end of the year only 23 students remained out of the 36 who originally started the course. Of these, 12 were serving Rangers and the remainder were new recruits who were appointed as Rangers on temporary terms soon after the course started.

135. Towards the end of the year steps were taken to recruit candidates for the fourth Rangers' Long Course and the assistance of the Aptitude Testing Unit of the Labour Department was being sought to assist in selecting candidates. The minimum educational qualification for entry is still the Kenya African Preliminary Examination, but preference is to be given to School Certificate candidates in future. The selection of suitable men for training continues to be one of the main difficulties.

136. Promotion examinations for Grade III and Grade II Rangers were held at the school, as also were the Foresters' and Forester Trainees' examinations.

137. The school continues to enjoy valuable help from Specialist Officers, Divisional Forest Officers and Foresters in the form of lectures.

CHAPTER XVI—FINANCIAL RESULTS

138. Total revenue for the year amounted to £263,392 as against an expenditure of £711,598, giving a deficit of £448,206. This deficit, as was the case last year, is very largely due to capital investment by the United Kingdom in the Forest Estate to finance the development programme involved in the Supplementary Forest Development Scheme and Swynnerton and ALDEV schemes.

139. Standard Forms XI and XII of the appendices give details of revenue and expenditure. Revenue from sales of timber shows a rise of about 5 per cent and total revenue shows a rise of about 3 per cent over last year's figures.

140. 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)
	£	£	£	£
1955/56	272,263	35,428	18,329	290,692
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

CHAPTER XVII—MISCELLANEOUS COMMENTS

Obituary

141. It is with deep regret that the loss of three serving officers during the year has to be recorded. Reference has already been made to the death of Mr. H. H. C. Pudden (in Chapter IX) and Mr. L. Lowsley (in Chapter X). The third officer who died was Mrs. M. Ellis-Evans, who joined the Forest Department as Librarian in 1954 and who subsequently transferred to the Ministry's head-quarter staff.

142. Marjorie Ellis-Evans died late in September following a severe operation. In addition to her normal duties as Librarian she gave valuable help, throughout her six years with the Ministry, to the Silviculturist in classifying his records and dealing with his technical correspondence. Her work was notable for its efficiency and zeal.

143. Leonard Lowsley's service extended over a period of exactly seven years. When he joined the Department in September, 1953, he brought with him wide experience in sawmilling, mill management and woodworking of all types, acquired during his service in several parts of the world. He showed zest and enthusiasm in every task he undertook, and he drew perhaps too freely on his reserves of strength. Following a severe illness in May, 1959, he appeared to make a good recovery, but his health had been permanently impaired and he was readmitted to hospital late in June last year.

144. Hedley Pudden served in Kenya for ten years, having previously served in Burma from 1921 to 1947, less the interregnum due to the war. Reference to his services and ability has already been made in paragraph 61. His basic training in science, coupled with a gift for sound observation, proved of the greatest value in his task of rationalizing the management of exotic softwood plantations, on which so much of the future prosperity of the Forest Estate will depend.

Advisory Services to the Public

145. Advice on tree planting and on forestry in general continued to be given to all sections of the public by officers of the Department whenever pressure of other duties permitted. Talks on forestry subjects were again given at farmers training centres at Kabianga (near Kericho), at Maseno, and at centres in Elgon Nyanza.

146. Late in the year a Forester was posted to Kisii where his duties will be almost entirely advisory since he will have a very small territorial charge. The scope for farm forestry in the South Nyanza District has very great potential, particularly since the district has virtually no forests.

Sociological Problems in Forest Reserves

147. The rapid and very large increase in the numbers of resident labourers within the Forest Estate, during the past four years, has brought with it a growing volume of sociological problems. Chief among these is that of providing educational facilities for children of forest employees, for although provision has now been made for primary education there is an increasing demand for secondary education as well.

148. The drive to improve the general standard of living and hygiene in forest villages has gone forward steadily during the past 12 years and has shown encouraging results. The present demand for greatly increased educational facilities has, however, sprung up much more recently, and it will tax the collective resources of the Department and of the resident labourers themselves to the limit, if it is to be met.

General

149. Twelve months ago officers of the Department were looking forward to a respite from building, road making, labour recruitment and all the extraneous duties resulting from the rapid expansion under the Supplementary Forest Development Plan, and to the opportunity to concentrate on technical forest matters. Today problems arising from development have been replaced by sociological and administrative ones, not least those arising from the advent of Trade Unionism, and technical forestry still cannot be accorded the attention it should get.

150. It is satisfactory to be able to record that differences which existed with some county councils in 1959 were largely resolved during the past year. These differences revolved mainly round the ownership of sheep by forest resident labourers, and there is reason to hope that communally-owned flocks of sheep may prove successful and provide the solution to these differences.

Recognition

151. The past year has once again been one in which the energies and resources of all officers of the Department have been severely taxed, in addition to the uncertainties concerning the future which have beset many of them. I would like to pay very high tribute indeed not only to their achievements but to their resilience and cheerfulness during a difficult year.

Standard Form I

AREA IN SQUARE MILES OF FOREST LAND ON 31ST DECEMBER, 1960

Category of Forest Land	Division	Total Land Area		CROWN			A.D.C.			Private Forest Total	Forest Land Total	Percentage of Land Area
		Pro-ductive	Pro-ductive	Pro-ductive	Pro-ductive	Pro-ductive	Pro-ductive	Pro-ductive	Total			
Closed Forest ..	Nairobi ..	59	140	199	2	1	3					
	Londiani ..	235	20	255	46	1	47					
	Elburgon ..	122	148	270								
	Eldoret ..	120	36	156	66	44	110					
	Nyeri ..	315	98	413	24	52	76					
	Thomson's Falls	73	552	625								
	Coast ..	153	37	190	16	6	22					
	Nyanza ..	351		351	108	40	148					
	Southern ..				14	67	81					
	Fort Hall/Embu ..	230		230	5	1	6					
	Kitale ..	32	52	84	161	144	305					
	Total ..		1,690	1,083	2,773	442	356	798		3,571	1.63%	
	Woodland ..	Nairobi ..			28			1				
		Londiani ..			61			84				
Elburgon ..				17								
Eldoret ..				8			35					
Nyeri ..				96			84					
Thomson's Falls				687								
Coast ..				184			8					
Nyanza ..				37			22					
Southern ..				24			202					
Fort Hall/Embu ..				91			19					
Kitale ..				50			13					
Total ..				1,284			468			1,752	0.70%	

Standard Form I—(Contd.)

AREA IN SQUARE MILES OF FOREST LAND ON 31ST DECEMBER, 1960

Category of Forest Land	Division	Total Land Area		CROWN		A.D.C.		Private Forest Total	Forest Land Total	Percentage of Land Area
		Pro-ductive	Pro-ductive	Pro-ductive	Pro-ductive	Pro-ductive	Total			
Bamboos	Nairobi ..									
	Londiani ..						6			
	Elburgon..									
	Eldoret ..									
	Nyeri ..									
	Thomson's Falls									
	Coast ..									
	Nyanza ..									
	Southern									
	Fort Hall/Embu..									
	Kitale ..									
Total			563				183		746	0.33%
Grasslands	Nairobi ..									
	Londiani ..									
	Elburgon									
	Eldoret ..									
	Nyeri ..									
	Thomson's Falls									
	Coast ..									
	Nyanza ..									
	Southern									
	Fort Hall/Embu..									
	Kitale ..									
Total			646				228		874	0.41%
Mangroves	Coast ..								209	0.10%
	Totals		219,730	5,324			1,636		7,152	3.17%

STATEMENT IN SQUARE MILES OF PROGRESS IN FOREST RESERVATION DURING 1960

Standard Form II

CATEGORY OF RESERVE	RESERVES APPROVED BUT NEITHER DEMARCATED NOR GAZETTED				RESERVES APPROVED AND DEMARCATED BUT NOT GAZETTED				RESERVES DEMARCATED AND GAZETTED				TOTAL FOR 1960
	On 31-12-59	Change during the year	On 31-12-60	On 31-12-59	Change during the year	On 31-12-60	On 31-12-59	Change during the year	On 31-12-60	On 31-12-59	Change during the year	On 31-12-60	
	Nairobi Division	+0.3	-0.3	—	—	+0.3	+0.3	396.0	-80.8	315.2	315.2	-80.8		315.2	315.5
A.D.C. ..	—	—	—	—	+0.3	+0.3	4.7	—	4.7	4.7	—	4.7	5.0
Londiani Division	—	+0.3	+0.3	—	—	—	441.6	-50.6	391.0	391.0	-50.6	391.0	391.3
A.D.C. ..	—	+12.0	+12.0	+29.9	+23.5	+53.4	27.4	+89.8	117.2	117.2	+89.8	117.2	182.6
Elburgon Division	—	+0.2	+0.2	+0.2	—	+0.2	464.2	-39.3	424.9	424.9	-39.3	424.9	425.3
A.D.C. ..	—	—	—	—	—	—	—	—	—	—	—	—	—
Eldoret Division	—	—	—	+35.9	-35.9	—	546.1	-347.4	198.7	198.7	-347.4	198.7	198.7
A.D.C. ..	—	—	—	—	—	—	632.0	-482.2	149.8	149.8	-482.2	149.8	149.8
Nyeri Division	—	+1.9	+1.9	—	+0.8	+0.8	652.9	—	652.9	652.9	—	652.9	652.9
A.D.C. ..	—	—	—	—	—	—	159.1	—	159.1	159.1	—	159.1	161.8
Thomson's Falls Division	+2.2	—	+2.2	+176.7	-176.7	—	1,625.0	-1.1	1,623.9	1,623.9	-1.1	1,623.9	1,626.1
Crown ..	—	—	—	—	—	—	—	—	—	—	—	—	—
A.D.C. ..	+10.9	-10.9	—	+8.5	+11.0	+19.5	413.2	—	413.2	413.2	—	413.2	432.7
Coast Division	—	—	—	—	—	—	24.7	—	24.7	24.7	—	24.7	34.3
Mangrove	+1.7	-1.7	—	+7.2	+2.4	+9.6	209.4	—	209.4	209.4	—	209.4	209.4
A.D.C. ..	—	—	—	-14.5	+14.5	—	258.6	+197.4	456.0	456.0	+197.4	456.0	456.0
Nyanza Division	—	—	—	+15.6	-11.3	+4.3	270.8	+3.0	273.8	273.8	+3.0	273.8	278.1
A.D.C. ..	—	—	—	—	—	—	22.6	—	22.6	22.6	—	22.6	22.6
Southern Division	+20.8	-20.8	—	+93.3	+43.3	+136.6	249.4	-24.5	224.9	224.9	-24.5	224.9	361.5
A.D.C. ..	—	—	—	—	—	—	—	—	—	—	—	—	—
Fort Hall/Embu Division	—	—	—	+12.0	+12.7	+24.7	591.2	—	591.2	591.2	—	591.2	591.2
Crown ..	—	—	—	—	—	—	—	—	—	—	—	—	—
A.D.C. ..	—	—	—	—	—	—	0.1	+150.7	150.8	150.8	+150.7	150.8	150.8
Kitale Division	—	—	—	—	+38.2	+38.2	0.0	+476.3	440.4	440.4	+476.3	440.4	478.6
A.D.C. ..	—	—	—	—	—	—	—	—	—	—	—	—	—
TOTAL	+35.9	-19.3	+16.6	+364.8	-76.9	+287.9	6,989.0*	-108.7	6,844.4	6,844.4	-108.7	6,844.4	7,148.9

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

Standard Form III

STATEMENT IN SQUARE MILES OF PROGRESS MADE IN WORKING PLANS DURING THE YEAR ENDING 31ST DECEMBER, 1960

TYPE OF PLAN	AREA UNDER PLANS			Area not under plans	Total area Forest Reserves	Areas for which plans revised
	On 1-1-60	Added during period	Excluded during period			
Sanctioned and approved	724	505	—	1,229	—	—
Plans completed and awaiting sanction or approval	1,112	522	505	1,129	—	—
Plans under preparation	551	20	478	93	—	—
Basic skeleton plan	3,701	—	343	3,358	6,844	—

Standard Form IV

RECORD OF MILES OF FOREST COMMUNICATIONS FOR 1960

CATEGORY OF FOREST LAND	ROADS			FIRE-LINES			INSPECTION PATHS		
	Added during 1960	Abandoned	Total at 31-12-60	Added during 1960	Abandoned	Total at 31-12-60	Added during 1960	Abandoned	Total at 31-12-60
	<i>Miles</i>	<i>Miles</i>	<i>Miles</i>	<i>Miles</i>	<i>Miles</i>	<i>Miles</i>	<i>Miles</i>	<i>Miles</i>	<i>Miles</i>
Gazetted Forest Reserves ..	248	98	2,583	254	20	992	138	56	608

Standard Form V

SUMMARY OF FOREST OFFENCES FOR THE PERIOD 1ST JANUARY, 1960 TO 31ST DECEMBER, 1960

CATEGORY OF OFFENCE	No. of cases reported	CASES TAKEN TO COURT				CASES COMPOUNDED		
		Imprisonment without option of fine	Fined		Compensation Awarded		No. of cases	Compensation paid
			No. of cases	Amount	No. of cases	Amount		
A. Illicit Grazing	819	5	<i>Sh.</i> 1,910	26	<i>Sh.</i> 2,460	1	<i>Sh.</i> 9,305.38	
B. Illegal Removal of Forest Produce	758	—	7,650	27	2,430	14	26,996.50	
C. Careless use of Fire and Illicit Honey Hunting	112	4	675	9	1,500	2	2,999.00	
D. Damage to Young Trees	1,280	—	—	1	100	—	12,384.46	
E. Other Offences	287	14	4,620	34	2,175	15	4,882.98	
Total	3,256	23	14,855	97	8,665	32	56,568.32	

Standard Form VI

STATEMENT OF PROGRESS IN REGENERATION AND AFFORESTATION DURING THE YEAR ENDING 31ST DECEMBER, 1960

DIVISION	REGENERATION OF EXPLOITED FOREST (Acres)						AREA OF PLANTATIONS (Acres)				
	Area Under Improvement			Area of Completed Improvement			On 1st Jan., 1960	Added during the year	Excluded during the year	On 31st Dec., 1960	
	On 31st Dec., 1959	Excluded during the year	On 31st Dec., 1960	On 1st Jan., 1960	Added during the year	On 31st Dec., 1960					
Nairobi	—	—	1,126	—	—	1,350	26,411	3,364	20	29,755	
Londiani	—	—	—	—	93	93	29,832	4,757	—	34,589	
Elburgon	—	—	—	—	—	—	35,728	1,741	3,529	33,940	
Eldoret	—	—	—	—	—	—	27,818	2,127	8,965	20,980	
Nyeri	2,072	97	2,187	—	43	1,689	18,934	2,606	—	21,540	
Thomson's Falls	—	—	—	—	—	—	6,150	719	—	6,869	
Coast	950	—	970	—	4	73	1,800	289	—	2,089	
Southern	—	—	—	—	—	—	8,799	282	157	8,924	
Nyanza	1,188	—	1,216	—	31	—	5,304	739	57	5,986	
Fort Hall/Embu	—	68	68	—	—	—	2,482	1,187	—	3,669	
Kitale	400	99	301	—	51	308	—	9,731	—	9,731	
Total	4,610	196	5,868	129	93	3,513	163,258	27,542	12,728	178,072	

Standard Form VII

OUTPUT IN ROUND CUBIC FEET OF TIMBER, POLES AND FUEL FROM THE FOREST ESTATE DURING 1960

Category of Forest Reserve	SOFTWOODS CUBIC FEET TRUE						Hard-woods C. ft. True	Total Soft and Hard-woods C. ft. True	FIREWOOD ST. CUBIC FEET		Power and Telegraph Poles Nos.	
	Podo	Cedar	Cypress	Pines	Others	Total			Railway	Public		Total
Crown	2,487,897	1,048,006	1,534,201	131,765	300	5,202,169	6,251,022	261,044	6,160,767	6,421,811	11,758	
A.D.C.	833,244	44,947	23,099	1,450	—	902,740	1,339,445	—	787,871	787,871	20	
Total	3,321,141	1,092,953	1,557,300	133,215	300	6,104,909	7,590,467	261,044	6,948,638	7,209,682	11,778	
Tons of 50 cubic feet	66,423	21,859	31,146	2,664	6	122,098	151,809					

Standard Form VIII

OUTPUT OF MINOR FOREST PRODUCE FOR THE PERIOD 1ST JANUARY, 1960 TO 31ST DECEMBER, 1960 (CROWN AND A.D.C. FORESTS)

Mangrove Poles	Other Poles	Bamboos	Withies	Fence Posts	Mangrove Bark	Plants	Seeds	Grass	Dressed Stone	Murram	Xmas Trees	Bricks
No.	R. ft.	R. ft.	H. Loads	Cu. ft. (true)	Lb.	No.	Lb.	H. loads	Cu. ft.	Tons	No.	No.
684,800	5,364,986	13,218,267	81,219	372,532	712,721	1,421,768	1,409	17,461	133,239	443	1,888	59,000
Stone	Sand	Gum Amini	Bamboo Tips	Moss	Off-cuts	Clay	Forest Soil	Swaziland and Madi Grass	Walking Sticks	Red Ochre	Grass Roots	Hay
Tons	Tons	Lb.	Lb.	Bags	R. ft.	Tons	Tons	Bags	No.	Lb.	Bags	Tons
1,293	2,458	10,264	4,480	27	21,351	408	3	65	63	4,440	100	27

PRIMARY FOREST INDUSTRIES

PARTICULARS OF INDUSTRY	Quantity of Forest Produce Consumed during 1960	Value of Out-turn	Approximate Number of Persons Employed
Fuelwood, stacked cubic feet	.. ..		709
Wood for charcoal, stacked cubic feet	.. ..		822
Poles, running feet	.. ..	Details not Available	112
Posts, cubic feet	.. ..		715
Mangrove Poles, numbers	.. ..		1,336
Timber—			
(a) Coniferous, True cubic feet	.. ..		4,819
(b) Non-coniferous, True cubic feet	.. ..	
	6,104,909		
	1,485,558		

Standard Form X

IMPORTS AND EXPORTS OF TIMBER, WOODFUEL AND MINOR FOREST PRODUCE FOR THE YEAR 1960

CATEGORY	Local Unit	GROSS IMPORTS		GROSS EXPORTS		NET IMPORTS OR EXPORTS		Average Annual Net Imports or Exports for the 5 Years ending 31st December, 1960	Percentage by Quantity of Gross Imports or Exports from or to Different Sources or Destinations During 1960
		Total	Value	Total	Value	Total	Value		
Fuelwood...	Centals of 100 lb.	—	—	287	99	287	99	1,773	Ships' Stores 100 per cent.
Charcoal	"	—	—	3,440	2,633	3,440	2,633	2,764	United Kingdom 98 per cent, Ships' Stores 2 per cent.
Logs:									
Softwoods	Cu. ft.	—	—	8	9	8	9	—	Seychelles 100 per cent.
Hardwoods—	"	—	—	20,727	15,795	20,727	15,795	4,145	Japan 96 per cent, France 2 per cent, U.S.A. 2 per cent.
Blackwood	"	—	—	278	125	722	498	145	Ships' Stores 100 per cent.
Other Hardwoods	"	1,000	623	548,816	49,097	548,816	49,097	470,698	Iraq 54 per cent, Somalia 23 per cent, Other British Commonwealth Countries 16 per cent, Zanzibar 5 per cent, Other Countries 2 per cent.
Mangrove Poles	Number	—	—	—	—	—	—	—	Somalia 78 per cent, U.S.A. 16 per cent, Other Countries 6 per cent.
Other Poles and Posts	"	—	10	—	765	—	755	—	United Kingdom 77 per cent, Mozambique 8 per cent, Norway 5 per cent, Somalia 5 per cent, Netherlands 4 per cent, Other Countries 1 per cent.
Railway Sleepers	Cu. ft.	—	—	—	—	—	—	—	United Kingdom 48 per cent, Eire 16 per cent, Netherlands 10 per cent, Germany (W.) 8 per cent, Other Countries 18 per cent.
Sawn Timber:									
Softwoods—									
Cedar	"	—	—	17,646	12,927	17,646	12,927	6,000	Ships' Stores 47 per cent, Somalia 24 per cent, Mauritius 14 per cent, Zanzibar 3 per cent and Aden 12 per cent.
Podo	"	—	—	94,888	49,742	94,888	49,742	69,810	Somalia 100 per cent.
Cypress	"	—	—	10,512	6,015	10,512	6,015	19,036	
Other Softwoods	"	—	—	1,002	476	1,002	476	—	

IMPORTS AND EXPORTS OF TIMBER, WOODFUEL AND MINOR FOREST PRODUCE FOR THE YEAR 1960—(Contd.)

CATEGORY	Local Unit	GROSS IMPORTS		GROSS EXPORTS		NET IMPORTS OR EXPORTS		Average Annual Net Imports or Exports for the 5 Years ending 31st December, 1960	Percentage by Quantity of Gross Imports or Exports from or to Different Sources or Destinations During 1960
		Total	Value	Total	Value	Total	Value		
Sawn Timber:									
Hardwoods—									
Mvule	Cu. ft.	—	—	24	68	24	68	—	U.S.A. 100 per cent.
Camphor	"	—	—	22,673	11,226	22,673	11,226	17,136	United Kingdom 84 per cent, South Africa 4 per cent, Other Countries 12 per cent.
Loliendo	"	—	—	2,996	2,125	2,996	2,125	17,736	United Kingdom 100 per cent.
Other Hardwoods	"	293	229	39,282	18,523	38,989	18,294	—	United Kingdom 49 per cent, Ships' Stores 37 per cent, Other Countries 14 per cent.
Veneer Sheets	Sq. ft.	2,505	89	—	—	2,505	89	4,585	Germany (W.) 100 per cent.
Plywood	"	4,585,108	156,807	—	—	4,585,108	156,807	3,940,412	Japan 41 per cent, Finland 28 per cent, Italy 11 per cent, South Africa 9 per cent, Other Countries 11 per cent.
Fibreboard	"	3,323,050	43,785	—	—	3,323,050	43,785	3,279,908	Finland 54 per cent, Norway 17 per cent, Sweden 14 per cent, South Africa 11 per cent, Other Countries 4 per cent.
Reconstituted Wood (except fibreboard) and other wood simply worked:									
Pencil Slats	Cu. ft.	—	—	31,406	33,614	31,406	33,614	41,533	United Kingdom 38 per cent, Germany (W.) 34 per cent, Czechoslovakia 10 per cent, Other Countries 18 per cent.
Other	"	—	39,787	—	—	—	39,787	—	South Africa 33 per cent, United Kingdom 34 per cent, Other Countries 48 per cent.

IMPORTS AND EXPORTS OF TIMBER, WOODFUEL AND MINOR FOREST PRODUCE FOR THE YEAR 1960—(Contd.)

CATEGORY	Local Unit	GROSS IMPORTS		GROSS EXPORTS		NET IMPORTS OR EXPORTS		Average Annual Net Imports or Exports for the 5 Years ending 31st December, 1960	Percentage by Quantity of Gross Imports or Exports from or to Different Sources or Destinations During 1960
		Total	Value	Total	Value	Total	Value		
Wood Manufactures: Boxes, crates and parts thereof	Centals of 100 lb.	25,394	£ 111,587	807	£ 8,407	24,587	103,180	19,601	Sweden 47 per cent, Finland 45 per cent, United Kingdom 8 per cent, Sudan 61 per cent, Aden 20 per cent, Belgian Congo 19 per cent.
Cooperage products .. Builders' Woodwork: Blocks and strips for parquet flooring (conifers)— Cedar Podoc Other conifers	" Cu. ft. " " "	— — — 94	— — — 216	— 5,941 340 —	— 3,810 292 —	— 5,941 340 94	— 3,810 292 216	—	United Kingdom 100 per cent. Aden 100 per cent. Rhodesia and Nyasaland 100 per cent.
Builders' Woodwork: Blocks and strips for parquet flooring (non-conifers)— Camphor Muhugu	" " " "	— — — —	— — — —	692 93,074	345 54,452	692 93,074	345 54,452	98,450	South Africa 100 per cent. United Kingdom 82 per cent, Italy 11 per cent, Belgium 5 per cent, Other Countries 2 per cent.
Loliondo	"	—	—	10,979	7,667	10,979	7,667	—	United Kingdom 94 per cent, Netherlands 5 per cent, Germany (W.) 1 per cent. United Kingdom 100 per cent.
Other Hardwoods ..	"	—	—	9,232	5,708	9,232	5,708	—	South Africa 97 per cent, Sweden 2 per cent, Zanzibar 1 per cent.
Other Builders' Woodwork	Centals of 100 lb.	230	£ 1,239	253	925	23	314	1,252	

Standard Form X—(Contd.)

IMPORTS AND EXPORTS OF TIMBER, WOODFUEL AND MINOR FOREST PRODUCE FOR THE YEAR 1960—(Contd.)

CATEGORY	Local Unit	GROSS IMPORTS		GROSS EXPORTS		NET IMPORTS OR EXPORTS		Average Annual Net Imports or Exports for the 5 Years ending 31st December, 1960	Percentage by Quantity of Gross Imports or Exports from or to Different Sources or Destinations During 1960
		Total	Value	Total	Value	Total	Value		
Other Manufacture of Wood (excluding furniture) n.e.s.	—	—	£ 39,716	—	£ 542	—	£ 39,174	—	Japan 21 per cent, Sweden 17 per cent, U.K. 15 per cent, Germany (W.) 12 per cent, Other Countries 35 per cent, Aden 48 per cent, Bahrain Islands 26 per cent, U.S.A. 15 per cent, Other Countries 11 per cent.
Prefabricated Buildings and their assembled parts, etc.	—	—	—	—	—	—	—	—	United Kingdom 27 per cent, Hong Kong 22 per cent, India 10 per cent, Denmark 7 per cent, Germany (W.) 7 per cent, Other Countries 27 per cent.
Furniture and fixtures	—	—	£ 23,249	—	£ 4,426	—	£ 18,823	—	Somalia 60 per cent, U.S.A. 17 per cent, Zanzibar 7 per cent, Other countries 16 per cent.
Mangrove Bark	—	—	—	3,655	4,372	3,655	4,372	3,369	Egypt 100 per cent.
Cedarwood Oil	Lb.	—	—	138,648	21,977	138,648	21,977	84,235	United Kingdom 50 per cent, U.S.A. 44 per cent, France 6 per cent.
Ships' Dunnage	Cu. ft.	—	—	18,296	9,062	18,296	9,062	—	Ships' Stores 100 per cent.

N.B.—The value and volume under this column has been incorporated under the appropriate categories of Timbers exported. Hence these figures are not included in the totals.

Standard Form XI

SUMMARY OF REVENUE AND EXPENDITURE FOR THE CALENDAR YEAR 1960

	REVENUE	EXPENDITURE				
		Crown Recurrent	Native Forest Reserve	Development	Swynnerton Plan	Supplementary Forest Development Scheme
	£	£	£	£	£	£
1. Timber	197,940					
2. Fuel	14,372					
3. Seeds and Plants	7,561					
4. Miscellaneous	13,430					
5. Sundry (Offences Compounded and Unclaimed Balances)	2,299					
6. Reimbursements	27,790					
7. Personal Emoluments		312,530	33,679		33,580	70,758
8. Travelling Expenses		55,151	6,310		4,482	20,405
9. Maintenance of Forest Stations and Roads		24,858	1,228	26,958	4,583	9,605
10. Miscellaneous		17,117	648			55,925
11. Purchase and Maintenance of Boats, Tools, Plant, Equipment and Stores		26,195	722			6,864
Total	263,392	435,851	42,587	26,958	42,645	163,557

Standard Form XII

COMPARATIVE FINANCIAL STATEMENT OF REVENUE AND EXPENDITURE FOR THE TEN YEARS ENDING 31ST DECEMBER, 1960

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(½)	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(½)	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

Standard Form XIII

STRENGTH OF FOREST STAFF ON 31ST DECEMBER, 1960

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	2	—	11	—	18	134	11	1,692	25
Nyeri Division	2	—	10	2	20	123	11	1,706	19
Thomson's Falls Division	1	—	5	—	6	85	6	502	9
Coast Division	2	—	5	1	9	51	5	314	6
Southern Division	1	—	3	—	5	27	4	656	4
Fort Hall Division	1	—	6	—	11	41	5	981	11
<i>West Conservancy</i>									
Conservator's Office	2	—	—	4	—	2	5	—	4
Forest School	1	—	1	—	—	—	—	—	—
Londiani Division	2	—	9	—	14	97	12	1,483	18
Eldoret Division	2	—	9	—	13	31	11	844	6
Nyanza Division	1	—	4	—	6	52	4	398	4
Elburgon Division	1	—	11	—	7	108	10	1,697	17
Kitale Division	1	—	5	—	7	30	6	641	5
On leave	4	—	16	—	—	—	—	—	—
Total	28	4	97	13	123	869	97	10,914	130
GRAND TOTALS	32		110		992		97	10,914	130

GAZETTED FOREST AREAS BY DIVISIONS AT 31ST DECEMBER, 1960

Division	Crown Forests	A.D.C. Forests	Mangroves	Total	Total Land Area	Percentage of Total Land Area
	Sq. miles	Sq. miles	Sq. miles	Sq. miles	Sq. miles	
Nairobi	313.1	4.8	—	317.9	—	—
Londiani	349.1	117.2	—	466.3	—	—
Elburgon	459.2	—	—	459.2	—	—
Eldoret	202.1	127.1	—	329.2	—	—
Nyeri	833.0	150.9	—	983.9	—	—
Thomson's Falls	1,645.5	—	—	1,645.5	—	—
Coast	245.9	19.5	209.4	474.8	—	—
Nyanza	452.5	275.7	—	728.2	—	—
Southern	22.6	183.1	—	205.7	—	—
Fort Hall/Embu	418.2	—	—	418.2	—	—
Kitale	150.7	476.3	—	627.0	—	—
TOTAL IN SQ. MILES	5,091.9	1,354.6	209.4	6,655.9	219,730	3.03%

Kenya Form No. 2

STATEMENT SHOWING NUMBER OF FIRES RECORDED, LENGTH OF FIRELINES MAINTAINED AND COST PER MILE FOR MAINTENANCE

Division	Number of Fires	Miles Maintained	Cost per Mile	New Fire Lines made during the year	Cost per Mile
Nairobi ..	11	110.4	Sh. cts. 83 32	Miles 34.3	Sh. cts. 79 68
Londiani ..	8	57.5	98 20	2.0	172 50
Elburgon ..	33	56.8	81 46	1.5	—
Eldoret ..	12	16.5	210 90	5.0	175 19
Nyeri ..	20	31.5	100 02	4.5	206 28
Thomson's Falls	16	99.0	71 61	9.5	187 37
Coast ..	15	30.0	68 68	13.3	103 30
Nyanza ..	11	12.5	286 42	4.2	86 12
Southern ..	3	28.0	314 82	152.0	706 58
Fort Hall/Embu ..	1	8.5	20 13	6.0	—
Kitale ..	9	27.8	123 24	7.3	654 02
TOTAL ..	139	478.5	107 10	239.6	503 19

Kenya Form No. 3

COMPARATIVE STATEMENT OF TIMBER SOLD IN TONS OF 50 CUBIC FEET TRUE, 1951-1960

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	115,684	22,662	138,347
1960	66,423	21,859	31,146	2,664	6	122,098	29,711	151,809

COMPARATIVE STATEMENT OF PRINCIPAL EXPORTS, 1951-1960

Year	Cedar Pencil Slats	SAWN TIMBER				Ply- wood	Fire- wood	Char- coal	Man- grove Poles	Other Poles	Man- grove Bark	Manu- factured articles f.o.b.	Total f.o.b. value of exports
		Cedar	Podo	Other Soft- woods	Hard- woods									Total
1951	C. ft. 290,627	C. ft. 94,046	C. ft. 859,362	C. ft. 50,465	C. ft. 194,417	Sq. ft. 10,048	C. ft. 4,500	Tons 1	No. 11,898	No. —	Tons 414	£ 622	£ 824,435
1952	127,912	16,410	327,442	13,480	156,341	—	1,416	1	281,020	—	410	1,981	413,770
1953	102,377	25,722	461,265	77,920	70,514	—	60,890	1	343,480	—	354	2,583	622,367
1954	101,410	4,186	69,339	12,623	28,063	—	—	—	284,889	—	377	131	284,653
1955	106,764	2,509	50,203	20,085	15,961	1,564	547	2	431,619	—	211	1,911	212,201
1956	77,458	200	10,902	23,630	7,420	—	4,790	64	651,504	—	140	1,792	196,503
1957	28,523	1,839	49,858	36,169	35,188	—	776	149	477,232	—	265	11,359	157,329
1958	40,430	11,572	81,500	16,206	227,421	—	7,819	164	436,191	—	77	15,300	305,061
1959	29,850	10,045	108,836	26,361	112,413	609	1,672	86	239,784	—	107	16,740	212,659
1960	31,406	23,587	95,228	11,522	199,957	—	897	154	548,816	—	163	36,277	325,224

COMPARATIVE STATEMENT OF FIREWOOD SALES IN STACKED CUBIC FEET, CROWN AND A.D.C. FORESTS, 1951-1960

YEAR	CROWN		A.D.C.	CROWN AND A.D.C.		Total
	Supplied to Railway	Supplied to Public		Supplied to Railway	Supplied to Public	
1951	5,807,508	7,696,489	1,095,271	5,807,508	8,791,670	14,599,268
1952	4,420,391	8,512,409	997,862	4,420,391	9,510,271	13,930,662
1953	2,855,294	5,707,629	696,962	2,855,294	6,404,591	9,259,885
1954	988,791	6,193,466	447,434	988,791	6,640,900	7,629,691
1955	670,116	5,245,907	578,157	670,116	5,824,064	6,494,180
1956	346,451	6,585,043	593,686	346,451	7,178,729	7,525,180
1957	248,820	7,905,113	1,194,777	248,820	9,099,890	9,348,710
1958	330,550	6,029,097	926,815	330,550	6,955,912	7,286,462
1959	428,430	5,021,694	1,009,232	428,430	6,030,926	6,459,356
1960	261,044	6,160,767	787,871	261,044	6,948,638	7,209,682

STATEMENT OF NEW PLANTING, REPAIRS AND MAINTENANCE, 1960

DIVISION	NEW WORK		REPAIRS		MAINTENANCE	
	Acres	Cost per Acre <i>Sh. cts.</i>	Acres	Cost per Acre <i>Sh. cts.</i>	Acres	Cost per Acre <i>Sh. cts.</i>
1. Nairobi	3,364	15 88	1,794	4 32	9,673	6 47
2. Londiani	2,184	29 04	636	5 08	13,027	8 66
3. Elburgon	1,741	25 22	843	3 71	17,755	5 66
4. Eldoret	2,127	23 19	577	3 52	6,221	7 02
5. Nyeri	2,447.5	28 58	887	5 85	13,020	13 43
6. Thomson's Falls	655	32 52	281	5 76	3,133	8 35
7. Coast	289	91 43	625	54 07	2,226	7 69
8. Nyanza	739	79 15	644	11 70	2,564	9 94
9. Southern	282	92 11	371	51 68	2,883	12 87
10. Fort Hall/Embu	1,179	26 88	787	4 92	3,969	3 08
11. Kitale	979	32 12	194	9 31	3,214	6 33
TOTALS	15,986.5	29 73	7,639	11 67	77,685	8 15

Sh. 2,757.32 extra on Game Protection.
Sh. 4,500.00 extra on Game Protection.

Sh. 433.81 extra for Extraction Roads.
Sh. 54,307.03 extra for Game Protection.
Sh. 1,051.14 extra for Game Protection.

STATEMENT SHOWING TOTAL ACREAGE OF PLANTATIONS BY DIVISIONS

DIVISION	ACREAGE OF PLANTATIONS AS AT 31ST DECEMBER, 1959						ACREAGE OF PLANTING DURING 1960							
	Indigenous Softwoods	Indigenous Hardwoods	Exotic Softwoods			Total	Indigenous Softwoods	Indigenous Hardwoods	Exotic Softwoods			Total		
			Cypress	Pines	Timber				Fuel	Cypress	Pines		Timber	Fuel
Nairobi ..	1,741	899	4,720	8,215	693	10,143	26,411	—	—	630	2,040	20	674	3,364
Londiani ..	3,927	763	12,349	8,814	576	3,403	29,832	—	—	407	1,769	—	8	2,184
Elburgon ..	3,075	703	16,775	10,043	2,251	2,881	35,728	—	—	436	1,256	—	49	1,741
Eldoret ..	1,370	465	13,341	10,476	1,164	1,002	27,818	—	—	510	1,617	—	—	2,127
Nyeri ..	2,407	2,048	7,133	5,749	519	1,078	18,934	—	78	510	1,859½	—	—	2,447½
Thomson's Falls ..	683	133	1,706	2,227	1,029	372	6,150	—	—	134	511	—	—	655
Coast ..	—	132	—	1,640	28	—	1,800	—	24	—	257	2	6	289
Nyanza ..	—	2,669	970	911	46	708	5,304	—	76	227	436	—	—	739
Southern ..	137	49	2,055	5,277	160	1,121	8,799	—	1	23	258	—	—	282
Fort Hall/Embu ..	—	75	470	1,899	34	—	2,482	—	20	333	826	—	—	1,179
Kitale ..	—	—	—	—	—	—	—	8	—	138	823	—	—	979
Total ..	13,340	7,936	59,519	55,251	6,500	20,712	163,258	18	199	3,348	11,652½	22	747	15,986½

DIVISION	ADJUSTMENTS						ACREAGE OF PLANTATIONS AS AT 31ST DECEMBER, 1960							
	Indigenous Softwoods	Indigenous Hardwoods	Exotic Softwoods			Total	Indigenous Softwoods	Indigenous Hardwoods	Exotic Softwoods			Total		
			Cypress	Pines	Timber				Fuel	Cypress	Pines		Timber	Fuel
Nairobi ..	+20	-52	+48	-30	-30	+24	-20	1,761	847	5,398	10,225	683	10,841	29,755
Londiani ..	-5	—	+2,346	-96	-3	+331	+2,573	3,922	763	15,102	10,487	573	3,742	34,589
Elburgon ..	-223	+7	-2,254	-938	+139	-260	-3,529	2,852	710	14,957	10,361	2,390	2,670	33,940
Eldoret ..	-588	+32	-4,661	-3,241	-20	-487	-8,965	782	497	9,190	8,852	1,144	515	20,980
Nyeri ..	+4	+75	+153	-72½	+12	-1	+158½	2,411	2,201	7,796	7,536	519	1,077	21,540
Thomson's Falls ..	—	+35	+16	+41	+12	-40	+64	693	168	1,856	2,779	1,041	332	6,869
Coast ..	—	—	—	—	—	—	—	—	156	—	1,897	30	6	2,089
Nyanza ..	—	+14	-73	-9	-12	+23	-57	—	2,759	1,124	1,338	34	731	5,986
Southern ..	—	+126	+130	-576	-3	+166	-157	137	176	2,208	4,959	157	1,287	8,924
Fort Hall/Embu ..	—	+8	+2	-2	+74	+878	+8	—	103	805	2,723	34	4	3,669
Kitale ..	+539	+24	+4,328	+3,000	+157	+787	+8,752	547	24	4,466	3,823	74	797	9,731
Total ..	-253	+269	+35	-1,923½	+157	+543	-1,172½	13,105	8,404	62,902	64,980	6,679	22,002	178,072
								7.3%	4.7%	35.3%	36.5%	3.8%	12.4%	100%

