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INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

INTERNATIONAL DEVELOPMENT ASSOCIATION

APPRAISAL OF

A ROAD ENGINEERING PROJECT

REPUBLIC OF CONGO

April 14, 1969

Transportation Projects Department

CURRENCY EQUIVALENTS

Currency Unit	=	CFA Franc (CFAF)
CFAF 1	=	US$.004
US$1	=	CFAF 247
CFAF 1 million	=	US$4,050

FISCAL YEAR

January 1 - December 31

WEIGHTS AND MEASURES: METRIC

Metric: British/US Equivalent

1 kilometer (KM)	= 0.62 miles (mi)
1 meter (m)	= 3.28 feet (ft)
1 hectare (ha)	= 2.47 acres (ac)
1 liter (l)	= 0.22 imp. gallongs
	= 0.26 gallons (US)
1 metric ton (m ton)	= 2,204 pounds (lbs)

ABBREVIATIONS - ACRONYMS

ATEC	- Agence Transequatoriale des Communications
BCEOM	- Bureau Central des Equipments d'Outre-Mer
CAR	- Central African Republic
CFCO	- Chemin de Fer Congo-Ocean
CPC	- Compagnie des Potasses du Congo
FAC	- Fonds D'Aide et de Cooperation
FED	- Fonds European de Developpement
RNTP	- Regie Nationale des Travaux Public
UNDP	United Nations Development Program
LNETP	- Laboratoire National d'Etudes des Travaux Publics
FAO	- Food and Agriculture Organization
RN	- Route Nationale
COMILOG	- Compagnie Miniere de l'Ogeoue

REPUBLIC OF CONGO

APPRAISAL OF A ROAD ENGINEERING PROJECT

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This report was prepared by Messrs. J. Doyen (Engineer) and H. O. Schulte (Economist).

REPUBLIC OF CONGO

APPRAISAL OF A ROAD ENGINEERING PROJECT

SUMMARY

i. The Government of the Republic of Congo (Brazzaville) has asked IDA to help finance an engineering project consisting of:

(a) the detailed engineering for the Sibiti-Zanaga road (143.5 km);

(b) an economic feasibility study of the Pointe Noire-Bondi road (43 km) and, on the basis of the findings of this study, the completion of the detailed engineering;

(c) the preparation of a program to improve the maintenance of the national highway system.

ii. The total cost of the project is estimated at US$760,000 equivalent. The foreign exchange component is estimated at about US$630,000 equivalent and would be financed by the proposed credit. Local currency requirements would be provided by the Government. The Government has selected the French consulting firm BCEOM to execute the project under two separate contracts.

iii. The engineering project would prepare for a future highway maintenance and construction project. Construction, together with a possible maintenance program, would be carried out in 1970-72 at a total estimated cost of about US$14 million equivalent.

iv. The Sibiti-Zanaga road would open a new forest area in the southwestern part of the country and permit the production of an estimated 2 million tons of okoume. A feasibility study and the preliminary engineering of the road were made by consultants in 1967-68 under a Bank technical assistance grant. The estimated economic rate of return for this road (including the connection to the railroad) is 20%. The Pointe Noire-Bondi road is part of the main highway between Pointe Noire and Brazzaville and links the port of Pointe Noire with the site of the potash mine of the Compagnie des Potasses du Congo (CPC) near St. Paul. The economic justification of this road would be investigated in the economic feasibility study. The maintenance study will define measures for the improvement of road maintenance operations.

v. The project provides a suitable basis for an IDA engineering credit in the amount of US$630,000 equivalent. An appropriate term for the credit would be ten years including a two year period of grace.

REPUBLIC OF CONGO

APPRAISAL OF A ROAD ENGINEERING PROJECT

1. INTRODUCTION

1.01 In 1965, a Bank/IDA mission identified two road projects in Congo (see Map): (i) the construction of a 143.5 km long laterite road between Sibiti and Zanaga to open a new forest area for timber exploitation and (ii) the bituminous surfacing of the 43 km long Pointe Noire-Bondi road which mainly serves the potash mine of the Compagnie des Potasses du Congo (CPC) and the agricultural hinterland of St. Paul.

1.02 A feasibility study, including preliminary engineering of the Sibiti-Zanaga road, was carried out from April 1967 to April 1968 by the French consultants Bureau Central d'Etude pour les Equipements d'Outre-Mer (BCEOM) under a Bank Technical Assistance Grant of US$185,000, signed in November 1966.

1.03 The Sibiti-Zanaga road will be an extension of the Jacob-Sibiti road, the construction of which will be financed by FED with a grant of CFAF 900 million (US$3.6 million equivalent). Construction of Jacob-Sibiti is expected to start early in 1970 upon completion of the detailed engineering which is also being financed by FED. Construction of the Sibiti-Zanaga road could begin at about the same time. Together the two roads would allow the evacuation of timber from the Bouenza forest to the CFCO railway (Chemin de Fer Congo-Ocean) at Jacob, from where the logs would be transported by rail to the port of Pointe Noire on the Atlantic Ocean.

1.04 The improvement of the Pointe Noire-Bondi road has been under consideration by the Government of Congo for a number of years. Although the potash production from St. Paul will be transported to Pointe Noire by rail, it is expected that the opening of the mine will considerably increase the level of traffic on the road and justify major improvement works. The Compagnie des Potasses du Congo (CPC) expects the formal ceremony marking the completion of the project and the inauguration of the mining, refining, and port loading facilities, for which the Bank Loan No. 480 for US$30 million was made in 1967, to be held in May 1969.

1.05 The project would include a study to ascertain the economic justification of the improvement works and the most suitable engineering designs. The Government, with the assistance of SATET, a local surveying firm, has undertaken detailed engineering studies for the bituminization of the road. These studies were expected to be completed by March 1969. Since the firm involved has limited experience in road engineering and only a reconnaissance-type soil investigation has been carried out, the detailed engineering would be reviewed and completed, as necessary, under the project.

1.06 The Government has applied to FAC for the financing of urgent rehabilitation of the Pointe Noire-Bondi Road. FAC has granted CFAF 250 million (US$1 million), of which CFAF 100 million (US$400,000) would be used to meet the most urgent maintenance needs of the road. The remaining CFAF 150 million (US$600,000) would be used for rebuilding part of the road on the basis of the

studies included in the present project. It is expected that the FAC allocation would allow reconstruction of about 15 km starting from Pointe Noire. The length of the section will be defined precisely after the design standards have been selected and when detailed cost estimates become available. The end of the FAC section would mark the beginning of a possible IDA construction project. The phasing of construction of the two sections will be discussed further during the execution of the present project.

1.07 Originally it was planned to include in the project the preparation of programs for the strengthening of the RNTP subdivisions of Sibiti and Pointe Noire who will be responsible for the maintenance of the two project roads. However, during negotiation it appeared that the most effective way to proceed was to carry out an overall study of the maintenance needs of the highway system. The project was expanded to include an item for the preparation by consultants of a highway maintenance program.

1.08 The basic appraisal of the project was carried out by an IDA mission in January 1968; however, the preparation of the report had to be held up until the feasibility study of the Sibiti-Zanaga was completed. In November 1968 a second mission visited the Congo in order to update the economic justification of the project and to define the scope of the consulting services to be financed under the proposed credit. The latter mission consisted of Messrs. Huguet (Forestry Expert; Consultant with the FAO/IBRD Cooperative Program), Doyen (Engineer) and Schulte (Economist). The proposed project would be the first Bank/IDA lending to the Republic of Congo for transportation.

2. BACKGROUND

2.01 The Republic of Congo has an area of 343,000 km^2 (about the size of Italy), roughly one-half of which is covered by tropical forest. Its present population is about 950,000; the density of 2.7 inhabitants per km^2 is very low. The main cities are Brazzaville (200,000) and Pointe Noire (90,000). Gross domestic product per capita was estimated at about US$220 in 1968.

2.02 The economy of the Congo is based on forestry, agriculture, mining and transportation. Forest exploitation (okoume and limba woods) and the production of timber and various wood products are the main economic activity and represent the most dynamic sector. Since 1958 timber exports have tripled, reaching 400,000 tons per year in 1967 and accounting for about 50% of total exports receipts and 12% of GDP (see Table 1).

2.03 Forestry operations, which depend on the existence of roads and railways, have until now been concentrated in the coastal region and along the railway that serves the manganese ore mine of the Compagnie Miniere de l'Ogooue (Comilog) in Gabon and links with the CFCO to provide transport for the ore to Pointe Noire. Timber is generally transported by road to the railhead and by rail to the port of Pointe Noire. The timber reserves presently accessible by roads and/or railways are rapidly being depleted. In order to sustain the present level of production, new forests will have to be made accessible by the construction of new roads. The Bouenza forest north of the Niari Valley will be opened by the Jacob-Sibiti-Zanaga road. For the longer term, transport facilities will have to be provided for the exploitation of the valuable forests of the Northern part of the Congo.

2.04 The large areas covered by forest and the country's generally poor soils have limited the development of agriculture on which about 60% of the population depends. Most of the agricultural activity is concentrated in the Western region, particularly in the Niari Valley, which is the most promising area for agriculture and ranching. Development of the Central (Cuvette) and Northern (Sangha) regions has been hampered by the deterioration of the regional road transport system.

2.05 The Congo plays an important role in the trans-equatorial transportation system. Its railways and navigable rivers provide an outlet to the sea for the Central African Republic (CAR) and Chad, and also for exports of manganese ore from Gabon. The industrial sector of the country is small but relatively diversified. There are few known mineral resources except the high grade potash ore at St. Paul which will be exploited by the CPC. The mine is expected to start operations in May 1969 and to produce 1.2-1.5 million tons/year by 1975.

3. TRANSPORT SECTOR AND ROAD SYSTEM

A. General

3.01 The backbone of the transportation system of the Congo consists of:

(i) the CFCO railway between Pointe Noire and Brazzaville (510 km) with the Comilog branch (285 km) leading to the manganese deposits at Moanda in Gabon;

(ii) the 1,750 km long system of waterways, formed of parts of the rivers Congo, Ubangui and their tributaries which lie within or along the country's borders;

(iii) the road network of about 10,800 km which serves primarily as a feeder to the railway and waterway system.

3.02 The railway and river route Pointe Noire-Brazzaville-Bangui (CAR) is the main access to the sea for landlocked CAR and an important international transport connection for CHAD. The route is serviced by the Agence Transequatoriale des Communications (ATEC) through the CFCO railway and river services on the Congo and Ubangui rivers. ATEC is an intergovernmental agency jointly set up and administered by the Congo, CAR, Chad and Gabon, and operates various transport facilities serving these four countries.

3.03 Traffic on the CFCO railway has increased markedly since 1962 mainly because of the increase in the production of manganese ore and timber. It is now close to 2.4 million tons and may reach about 5 million tons by 1975 due to the expected expansion of manganese, timber and sugar traffic, and to the potash production of the CPC-mine at St. Paul. The most heavily used section of the railway is that between Pointe Noire and Dolisie (about 170 km long) which includes the crossing of the mountainous area of the Mayumbe. An application for a feasibility study to improve the alignment of the track on this section is presently under consideration by the UNDP. ATEC's management of the CFCO railway appears to be satisfactory.

3.04 ATEC is expanding the rolling stock of the CFCO railway and plans to construct a timber loading dock in Jacob to handle the traffic expected to develop upon completion of the Jacob-Sibiti and Sibiti-Zanaga roads.

B. The Road System

3.05 The highway network comprises 8,280 km of roads classified under three categories: national (primary), prefectoral (secondary) and local (tertiary or feeder), and 2,570 km of unclassified seasonal tracks. The entire network is administered by the Regie Nationale des Travaux Publics (RNTP). The classified roads include about 400 km of paved roads mainly around Brazzaville and Pointe Noire, and 1,400 km of all-weather laterite roads including sections of the Brazzaville-Pointe Noire road (Route Nationale 1),

sections of the Brazzaville-Ouesso road (RN 2) and the Dolisie-Kibangou-Gabon road (RN 3). All other roads are tracks of poor quality.

3.06 The vehicle population is estimated at 7,000 vehicles of which 65% cars, 20% light trucks and buses, and 15% trucks. Registration statistics show that the purchase of light cars for urban and suburban use is increasing while the number of new trucks (not including timber trucks) is diminishing. The reduction in the number of trucks is attributed to the use of diesel powered trucks with larger capacity and to the decrease of merchandise traffic on interior roads.

3.07 Overall traffic growth appears to have been relatively low over the last five years. On the basis of traffic counts that have been conducted at river crossings since 1966, present average daily road traffic is estimated to be less than 25 vehicles. Traffic has increased above average in and around the cities of Pointe Noire and Brazzaville, on the Gabon road (timber) and on the Niari Valley road Madingou-Loudima-Dolisie (sugar). It has decreased in the Central and Northern regions as a result of the deterioration of roads; traffic counts in these regions showed an average drop of 20% in 1967 compared with 1966.

3.08 Deterioration of the road system was caused by insufficient road maintenance, and has resulted in the gradual isolation of some agricultural regions with a decrease in the production of commercial crops. The Government has undertaken corrective measures by increasing the equipment and resources of the road maintenance organization. The recent rehabilitation of some Cacao feeder roads in the Sangha has shown that the existence of a reliable road link is a key factor in reviving agricultural production.

3.09 Most of the country is sparsely populated and the roads are carrying very low traffic. However, these roads are vital for the administrative and economic life of the vast rural areas of the country. The low level of traffic would hardly justify major construction works and the proper solution for ensuring adequate road transport capacity would consist in providing for each road a level of maintenance adapted to its economic role. The maintenance study included in the project will investigate the overall road maintenance requirements and recommend an optimum annual maintenance program taking into account the economic and administrative importance of the roads.

C. Road Administration and Maintenance

3.10 In 1965 the Government replaced the Directorate of Public Works by the RNTP, an autonomous state enterprise responsible for transport infrastructure, road planning, construction and maintenance. The RNTP is administered by a Board of Directors presided over by the Minister of Public Works and Transports (see Organization Chart). The RNTP headquarters comprises four central services placed under the direct authority of a Director General. The Central Technical service is responsible for highway planning, engineering and construction supervision. The Central Administration and Accounting Service is in charge of personnel, central accounting and budget preparation while the Equipment service is in charge of equipment procurement, field inspection and central workshop. The Special Operations service manages several

small commercial undertakings (quarry exploitation, goods and passengers transport and civil engineering contracting). The RNTP field organization comprises three geographic areas with their subdivisions. Each subdivision is responsible for the maintenance of about 800 km of roads.

3.11 The RNTP prepares its annual budget from a detailed program of works planned for the coming fiscal year. It obtains its funds from the general budget and from the Road Fund which is fed by revenues from taxes on motor fuel. As shown in Table 2, total allocations have markedly increased since 1965 and road maintenance expenditures now average US$260 per year/km of classified road. If efficiently used, this should be adequate.

3.12 In 1965, the RNTP undertook the mechanization of its road maintenance operations and equipped its subdivisions with mechanized brigades. Sizeable quantities of equipment were purchased with FED and FAC grants and suppliers' credits. The present equipment fleet (total purchase value estimated at US$6 million equivalent) would be sufficient for adequate road maintenance of the network of primary and secondary roads, but because of lack of qualified personnel, shortages of supplies and difficulties of communication, the equipment is neither efficiently operated nor properly maintained. Up to now no adequate provisions for equipment replacement have been made in the annual budgets. The present equipment is being rapidly worn out and will have to be renewed within the next five years. The problem of equipment management will be investigated in the maintenance study included in the project. The consultants will formulate recommendations concerning the allocation, the utilization and the inspection of the equipment, the organization of the maintenance shops and the expansion and renewal of the equipment fleet. Financing of the foreign cost of the program to implement the measures recommended by the consultants might be considered by the Association in connection with future construction projects.

3.13 The RNTP headquarters staff is reinforced by ten French engineers provided by FAC. The Government is pursuing a policy of Africanization which is, however, limited by the lack of qualified local staff. A number of senior Congolese are presently being trained abroad, mostly in France. FAC has indicated that it will continue its technical assistance until sufficient qualified African personnel becomes available.

3.14 The lack of qualified local staff is the major problem of the RNTP's field organization, especially since the road maintenance operations were mechanized. To remedy the shortage of qualified road maintenance personnel, the RNTP has prepared plans to establish a training center for foremen, equipment operators and mechanics in Dolisie. The personnel requirements of the RNTP together with the needs for a training program and training facilities will be investigated under the maintenance study. The consultants will formulate recommendations concerning the training, recruitment and management of personnel and if this appears to be the proper solution, they will draw detailed plans for the establishment and operation of a permanent training center.

D. Road Construction and Financing

3.15 Highway engineering is normally carried out by consultants. The Laboratoire National d'Etudes des Travaux Publics (LNETP) is well equipped and conducts soil investigations and geotechnical studies for road engineering and construction supervision. Road construction is usually carried out by private contracting firms. Since the RNTP does not have enough qualified staff to conduct continuous field inspection and control, future lending for road construction should include consulting services for supervision.

3.16 As the length of the road network is generally sufficient, the Government is directing road investments predominantly to the rehabilitation and improvement of existing roads. Financing for road construction has been provided mainly by FED and to a lesser degree by FAC (see Table 2). Over the period 1962-67, the FED contribution to road investments amounted to about US$10 million equivalent for the bituminous surfacing of roads around Brazzaville and Pointe Noire, improvement works of sections of the Brazzaville-Ouesso road and for the purchase of road maintenance equipment. Total capital investment in highway infrastructure, including external and local financing, averaged US$2 million equivalent annually over the last six years. The impact of the investments has been mainly limited to the regions around Brazzaville and Pointe Noire.

3.17 The Government has prepared a long-term general plan for the development of the road system. The investment projects included in this plan involve the upgrading of the two main trunk roads Brazzaville-Pointe Noire and Brazzaville-Ouesso and construction of feeder roads connecting with the railway and navigable rivers. The Government was advised during negotiations to introduce economic criteria in the planning of road investments and agreed to undertake systematic traffic counts on all important roads.

4. THE PROJECT

4.01 The Project consists of the following services by consultants:

(a) Detailed engineering and the preparation of tender documents for the Sibiti-Zanaga Road (143.5 km);

(b) An economic feasibility study for the Pointe Noire-Bondi Road (43 km) and on the basis of the findings of this study, the completion of detailed engineering and tender documents;

(c) The preparation of a comprehensive program for the maintenance of the national highway system including the reorganization and strengthening of the road maintenance organization.

A. Description

(a) The Sibiti-Zanaga Road

4.02 The construction of the Sibiti-Zanaga road will permit the evacuation of okoume timber from the Bouenza forest north of Sibiti to the CFCO railway in Jacob. The present road is a low standard forest track which would be inadequate to carry the expected traffic of heavy timber trucks (about 30-40 trucks per day in each direction) which will develop once logging operations in the Sibiti-Zanaga area have started.

4.03 The detailed engineering will provide for an all-weather road with a roadway of 9 m and a laterite carriageway of 7.5 m. The design standards shown in Table 3 are adequate. They are required to insure safe driving conditions and to allow timber trucks to be efficiently operated on a one return trip per day basis and are comparable to the standards adopted for similar Bank financed roads in Gabon (Loan 385-GA, 1966).

4.04 The alignment follows approximately the existing track except for the section between Mapati and M'Bila where a new alignment has been designed to bypass Komono. The new alignment offers better grade characteristics and shortens the distance between Sibiti and Zanaga by about 13 km.

4.05 The Sibiti-Zanaga road will be an extension of the Jacob-Sibiti road which will be built with FED financing. To provide a continuous road link between the forest area and the CFCO railway at Jacob, the two road projects will be coordinated. Agreement has been reached with FED on the following points:

(i) the 2 km junction between the future CFCO timber-loading station in Jacob and the beginning of the FED road will be included in the FED project;

(ii) a 3.5 km road section to bypass Sibiti will be included in the present project to link the FED and IDA roads;

(iii) several grades will be reduced in the direction of loaded trucks.

The alignment and the major characteristics (roadway width, grades, design speed) of the two roads are consistent. The FED road will have a 6 m wide laterite carriageway versus 7.5 m for the Sibiti-Zanaga section. The Government intends to increase the width of the laterite course to 7.5 m when the FED road is resurfaced. The difference in design standards will not affect the timber traffic which will take place in the early years of forestry operations. The phasing for the two construction projects would be examined during the execution of the present project.

4.06 Proper maintenance of the new Jacob-Sibiti-Zanaga road (216 km) will require reinforcement of the Sibiti subdivision of the RNTP. The maintenance study will include recommendations for the setting up of adequate road maintenance capacity in Sibiti.

(b) The Pointe Noire-Bondi Road

4.07 The Pointe Noire-Bondi road is part of the Route Nationale 1 and links the city of Pointe Noire with the site of the CPC potash mine at St. Paul. The existing road runs through flat and rolling terrain. The first 6 km are paved, but need resurfacing as a result of insufficient maintenance; the next 8 km have no wearing course and the last 29 km have a laterite surfacing which is expensive to maintain and inadequate for the traffic which is expected to develop in connection with mining operations in 1969. The Government intends to upgrade the Pointe Noire-Bondi road as soon as possible to a bituminous surfaced road.

4.08 The information available on the economic merits of the proposed upgrading of the road, in particular possible savings in vehicle operating and road maintenance costs, is insufficient. The proposed project, therefore, contains an economic feasibility study which would analyze the justification of the proposed improvement works and of possible alternative designs.

4.09 Detailed engineering for the proposed improvement has been undertaken by the RNTP (ref. para 1.05). The alignment selected by the RNTP for the improved road is satisfactory, but additional geotechnical studies and soil investigations will be required to complete the pavement design, to ascertain the base thickness and to locate suitable supplies of base material. Also, a revision of the design standards proposed by the Government (7 m road width, 2 m shoulders, design speed 100 km/h) might be required as a result of the feasibility study. These complementary studies, including the completion of the bidding documents, would be financed by the present project.

4.10 The Pointe Noire-Bondi road would form together with other roads around Pointe Noire, a small network of paved roads about 150 km in length for which improvement of maintenance is needed. The maintenance study, therefore, will include recommendations for the establishment within the subdivision of Pointe Noire of an adequate organization for the maintenance of these paved roads.

(c) Preparation of a Highway Maintenance Program

4.11 The operations of the RNTP are inefficient because of (i) lack of qualified personnel; (ii) deficient management and maintenance of the equipment; (iii) lack of organization and control of the field subdivisions. The planning of maintenance operations should be improved by relating the level of maintenance to the economic and administrative importance of the roads. The consultants will investigate these problems and formulate recommendations for their solution.

4.12 The consultants will: (i) assess the overall road maintenance requirements and prepare an optimum annual maintenance program; and (ii) recommend measures to strengthen the RNTP and increase its efficiency. The consultants will prepare detailed plans for (i) the training of personnel; (ii) the modernization of the equipment fleet and repair shops; and (iii) the reinforcement of the field subdivisions including Sibiti and Pointe-Noire.

B. Cost Estimates

4.13 The following table shows the estimated total cost of the project. The estimates are based on contracts recently negotiated between BCEOM and the RNTP (see paras 4.15 and 4.16). The foreign exchange component represents 80% of the total cost for the engineering and 90% of the total cost for the maintenance program. The foreign component includes subsistence allowances for the consultant's expatriate experts during their stay in the Congo.

Engineering Credit - Republic of Congo

	Foreign	Local	Total	Foreign	Local	Total	% Foreign/ Total
	(Million CFAF)			(Thousands US$ equivalent)			
I. Detailed Engineering							
A. Sibiti-Zanaga Road							
Detailed engineering and preparation of bidding documents	82.0	20.5	102.5	328.0	82.0	410.0	80
B. Pointe Noire-Bondi Road							
i) Economic Feasibility Study	4.0	1.0	5.0	16.0	4.0	20.0	
ii) Completion of detailed engineering and preparation of bidding documents	8.0	2.0	10.0	32.0	8.0	40.0	
Sub-total (B)	12.0	3.0	15.0	48.0	12.0	60.0	80
C. Contingency allowance (about 15%)	14.0	3.5	17.5	56.0	14.0	70.0	
Sub-total I (A+B+C)	108.0	27.0	135.0	432.0	108.0	540.0	80
II. Maintenance Program Preparation	43.7	4.4	48.1	174.8	17.6	192.4	90
Contingency allowance (about 10%)	4.4	0.5	4.9	19.2	1.7	20.9	
Sub-total II	48.1	4.9	53.0	194.0	19.3	213.3	90
Total Cost of Project	156.1	31.9	188.0	626.0	127.3	753.3	
Rounded				630	130	760	

C. Execution and Financing

4.14 The RNTP has engaged the Consultants BCEOM, who carried out the Sibiti-Zanaga Road feasibility study (ref. para 1.02), to execute the detailed engineering under I above. This is acceptable to the Association.

4.15 The contract was prepared during the visit of the last IDA mission and finalized during negotiations. The soil investigations will be subcontracted by BCEOM to the LNETP in Brazzaville. To avoid delay, the Government

has authorized the consultants to start work immediately. Expenditures incurred under the contract prior to the effectiveness of the credit agreement will be paid by the Government and would be retroactively financed by the Association. The amount involved would not exceed US$75,000 equivalent assuming that the credit becomes effective by May 31, 1969.

4.16 A draft contract proposal for the maintenance study was prepared with BCEOM during negotiations on the basis of terms of reference prepared by the Association. The contract will be finalized shortly and it is expected that field work for the study would start by June 1969.

4.17 The credit of $630,000 would be applied to the foreign cost of the project. Disbursements are expected to total $450,000 in 1969 and $180,000 in 1970. The local costs would be met by the Government which would also provide offices and field accommodation for the consultant's team.

D. Timing of the Project and Possible Future Lending

(a) Sibiti-Zanaga Road

4.18 The detailed engineering and the preparation of bidding documents for the Sibiti-Zanaga Road is expected to be completed in 12 months. Appraisal of a construction project for this road could therefore be undertaken in early 1970. If a construction credit were approved early mid 1970 construction could start by mid 1970, taking advantage of the dry season of that year. The road could then be completed by the end of 1972. The first section Sibiti-M'Bila would be opened by the end of 1971 allowing forest exploitation to begin at that time. Total construction cost, including supervision, is estimated at US$8.4 million equivalent or about US$60,000 per km.

(b) Pointe Noire-Bondi Road

4.19 The construction project for the Pointe Noire-Bondi Road could be ready a little earlier than Sibiti-Zanaga. Construction could start early in 1970 and be completed within about one year. Execution of the proposed improvement works, including supervision, would cost about US$1.8 million equivalent or US$42,000 per km. Reconstruction of the first 15 km would be financed by FAC (refer para 1.06). The construction standards for the Pointe Noire-Bondi Road will be selected with the agreement of the Association.

(c) Preparation of a Maintenance Program

4.20 The implementation of the measures recommended by the consultants (refer para 4.12) could be included in the Sibiti-Zanaga construction project. This would involve technical assistance and capital expenditures for (a) the reorganization of the DPW and modernization of the equipment fleet and repair shops, (b) the establishment and operation of training facilities, (c) pilot programs for the field subdivisions. Total cost of the program is roughly estimated at US$2 million equivalent.

4.21 It is proposed that any subsequent construction credit would include refunding of the present engineering credit.

5. ECONOMIC EVALUATION

A. Sibiti-Zanaga Road

General

5.01 The Congo (Brazzaville) and Gabon are the world's only major producers of okoume, a valuable tropical timber which is used mainly for the production of plywood veneers. Market prospects for okoume are good and prices are expected to remain at, or rise above, their present level. The construction of the Sibiti-Zanaga road will allow the production of okoume from the forest area into which the road would be built.

5.02 Timber production is one of the main economic activities of the Congo and is the country's most important source of foreign exchange earnings (see Table 1). Present production totals about 400,000 tons per year, of which okoume accounts for about 45%, and is concentrated in the forest areas around the Comilog railway in the south-western part of the country. The concessions in this region are being gradually depleted. If new forest areas are not opened, okoume production will drop to about a quarter of its present volume within a few years.

5.03 The Sibiti-Zanaga road would be constructed into the forest zone east of the present area of exploitation. It would open an area of about 1.2 million ha, of which about 700,000 ha are covered by okoume. It is conservatively estimated that about one-half of the okoume area would be suitable for early exploitation. The estimated marketable output of okoume is 6 tons per ha. Total production from the area to be opened by the road, therefore, would reach about two million tons. At an estimated future annual production of about 130,000 tons, this would permit forest exploitation for about 15 years.

5.04 Logging operations along the Sibiti-Zanaga road will be profitable, and there is sufficient evidence that existing logging companies are ready to move into the new area. No concessions, however, have been issued so far in the region around the project road pending a definite decision on its construction, and the Government has not finally decided on the forestry policy to be adopted for the new area. During negotiations the Government agreed to send a letter to the Association confirming its intention to define its policy for the exploitation of the Bouenza forest and for the sale of logging concessions.

Economic Analysis

5.05 Construction of the Sibiti-Zanaga road is a necessary but not sufficient condition for forest exploitation in areas to be served by the road. The production and sale of timber will be dependent also on investments and operations by the logging companies and on its transportation to the port of Pointe Noire. The gross benefits of the combined operation (road, logging and transportation to port) consist of the f.o.b. value of timber at the port. To arrive at the net benefits (or value added) the economic costs of (i) road

construction and maintenance (including those of the FED financed Jacob-Sibiti road (73 km)); (ii) logging operations and (iii) transportation to port must be deducted from the gross benefits. Based on preliminary information as to these costs, the expected f.o.b. prices and the probable timing of logging operations in the Sibiti-Zanaga area, the annual net benefits of the whole operation are estimated to be about US$2.6 million equivalent when in full production. When appropriately discounted they yield an economic rate of return of 23%. Although this may be a slight overestimate because of the manner in which any added investment costs in logging and internal transportation have had to be handled at this stage (i.e. as depreciation rather than capital outlays in specific years), the return is clearly sufficient to justify proceeding with detailed engineering of the road. Confirmation of this conclusion is shown by the fact that if the cost of road construction (including the road financed by FED) were to be about 30% higher than estimated the economic return on the whole operation would still be 15%. Details of the data used in the economic analysis are summarized in Table 4.

Distribution of Benefits

5.06 By far the largest share (about 65%) of the net benefits would accrue to the Government in the form of revenues from (i) the sale of logging concessions; (ii) direct taxes on the production and export of okoume; and (iii) taxes on the income of the logging companies about one-quarter of which are Congolese and three-quarters expatriate firms. Net governmental income from these sources is estimated at about US$1.7 million equivalent (undiscounted) over the economic life of the project. The benefits accruing to the expatriate logging firms, in the form of net profits, are estimated to total about US$0.4 million per year or about 15% of total net benefits. Since net profits of these companies will normally be transferred abroad this part of total benefits would not be retained by the economy of the Congo. The remaining benefits would accrue to Congolese loggers, the railway (in the form of an excess of revenue over marginal costs of timber transport) and the agency handling timber exports in Pointe Noire. The net foreign exchange earnings that can be expected from the exploitation of the timber resources of the Sibiti-Zanaga area would amount to about US$3.5 million equivalent per year.

5.07 The Government intends to attach an obligation for certain infrastructure and social investments to logging concessions to be issued in the Sibiti-Zanaga area. It thus hopes to lay the basis for some general economic development of the region which would continue once the logging operations have come to an end. In the long run, the project road would serve to support this development.

B. Pointe Noire-Bondi Road

5.08 The Pointe Noire-Bondi road would serve the general traffic between the country's sea port and the CPC potash mine near St. Paul as well as the nearby new township of Makola. Makola is being constructed for the African personnel working at the mine and is expected to develop into a community of about 6,000 to 10,000 people. (The potash, that will be produced at the mine, will be transported to Pointe Noire via the CFCO railway). The road also carries some general traffic to and from the agricultural areas beyond the

mine site. Total traffic may be expected to be about 100-120 vehicles per day in 1969, growing at a rate of at least 5% per annum. The economic benefits to be derived from the proposed improvement works would mainly consist of road user savings and possibly savings in road maintenance expenditures, as well as some increase in agricultural activity in the hinterland. The economic feasibility study is intended to ascertain the economic justification of the proposed improvement of the road, the case for which à priori appears good.

C. Preparation of a Maintenance Program

5.09 The preparation of a maintenance program is expected to lead to a maintenance project for the reorganization of the RNTP and improvement of its road maintenance operations. This project would produce substantial benefits in the form of savings in road transport costs and would contribute to the general economic development by providing better access to agricultural areas.

6. RECOMMENDATION

6.01 During negotiations the Government agreed:

(i) to initiate systematic traffic counts on all important roads (para 3.17);

(ii) to select the design standards for the roads Pointe Noire-Bondi in agreement with the Association (para 4.19);

(iii) to confirm by letter its intention to define its policy for the exploitation of the Bouenza forest (para 5.04).

6.02 The project provides the basis for an engineering credit in the amount of US$630,000. A suitable term would be 10 years including a two-year period of grace.

April 14, 1969

REPUBLIC OF CONGO

ROAD ENGINEERING PROJECT

TIMBER EXPORTS

(In thousands of metric tons and in billions CFAF)

	1964			1965			1966			1967		
	Qty.	Value	% of total value of exports	Qty.	Value	% of total value of exports	Qty.	Value	% of total value of exports	Qty.	Value	% of total value of exports
Logs	409.6	4.65	43	383.9	4.4	41	401.2	4.8	43	357.8	4.08	34
Sawn Timber	6.5	.1	1	5.3	.08	1	5.7	.08	1	5.4	.09	1
Plywood Veneer	8.2	.3	3	20.4	.64	6	16.9	.71	6	18.7	.79	6
Total Timber Products	424.3	5.05	47	409.6	5.12	48	423.8	5.59	50	381.9	4.96	41
Total Exports		10.8	100		10.7	100		11.25	100		12.07	100

TABLE 1

Source: Bulletin des Statistiques No. 11 1964 and No. 60 1968 and IMF economic report 1968

February 4, 1969

TABLE 3

REPUBLIC OF CONGO

ROAD ENGINEERING PROJECT

Proposed Design Standards for the Sibiti-Zanaga Road

Design speed	60 km/h
Roadway width	9 m
Surfacing width	7.5 m
Minimum horizontal radius of curvature	100 m; exceptionally 50 m
Maximum grade	
loaded trucks direction	6%
empty trucks direction	8%
Maximum axle load	10 tons or 5 tons linear
Maximum design load for bridges	35 tons
Roadway Surface	compacted laterite

February 4, 1969

TABLE 4

REPUBLIC OF CONGO

ROAD ENGINEERING PROJECT

DATA USED IN ECONOMIC ANALYSIS

A. Economic Costs

1. Road construction, including detailed engineering and supervision, net of taxes:

Sibiti-Zanaga	:	CFAF 1683 million
Jacob-Sibiti	:	CFAF 684 million

2. Cost of road maintenance, Jacob-Sibiti and Sibiti-Zanaga roads:

CFAF 39 million per year

3. Logging costs, including cost of road transport to railway station at Jacob, net of taxes:

CFAF 6200/ton

4. Cost of railway transport Jacob-Pointe Noire (estimated marginal costs):

CFAF 753/ton

5. Handling costs at railway station and port:

CFAF 1200/ton

B. Benefits

Sales of okoume valued at f.o.b. prices:

13,500 CFAF per ton

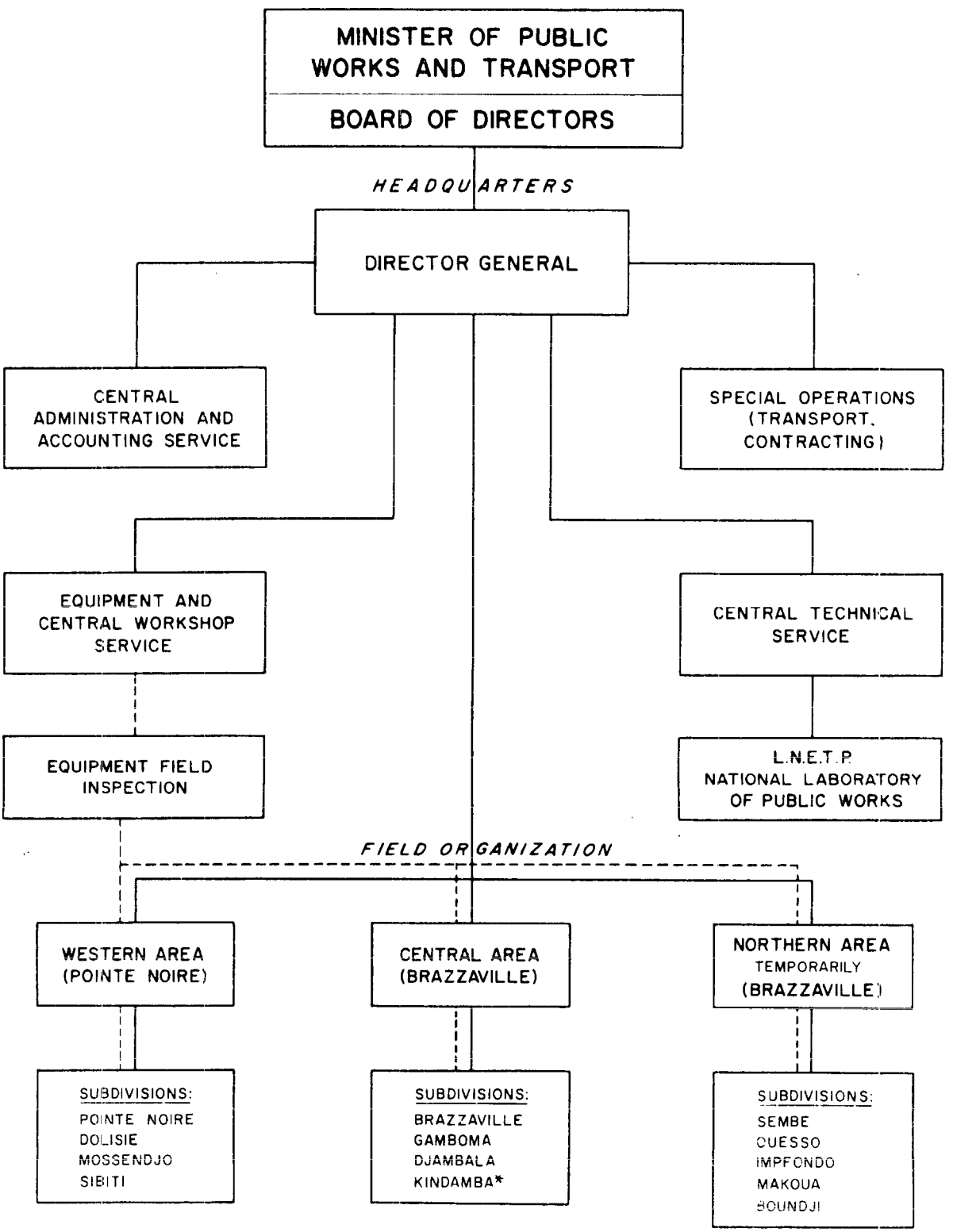
C. Government Revenue from Production and Sale of Okoume

Surface tax	:	CFAF 25/ton
Sale of concessions	:	CFAF 1200/ton on average
Export taxes	:	CFAF 1800/ton
Income Tax	:	about CFAF 500/ton

1/ Source: Reports on Sibiti-Zanaga road project by BCEOM and Mr. Huguet, of the IBRD/FAO Cooperative Program, and missions' estimates.

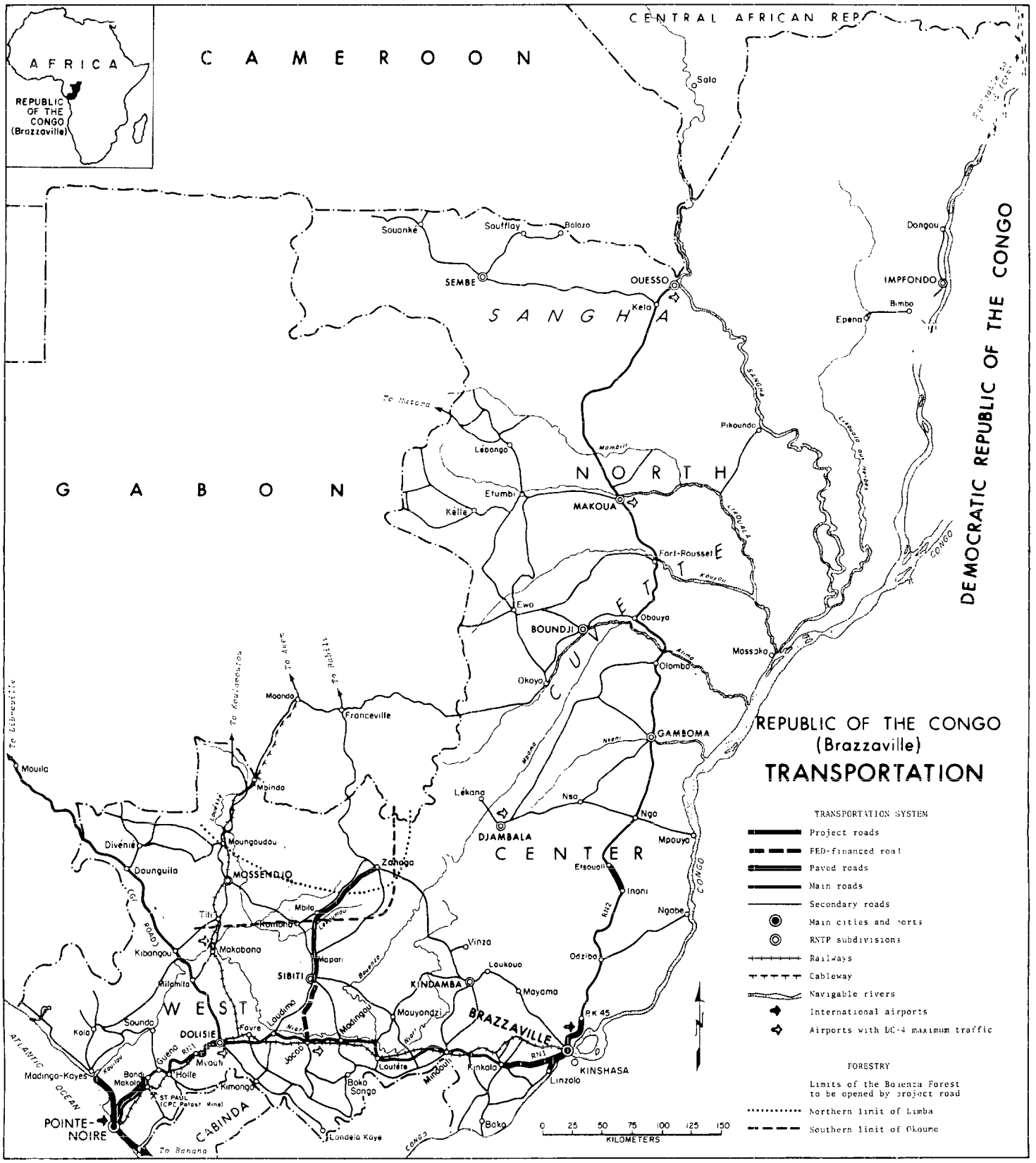
February 4, 1969

REPUBLIC OF THE CONGO (BRAZZAVILLE)
ROAD ADMINISTRATION
R.N.T.P.
(REGIE NATIONALE DES TRAVAUX PUBLICS)
ORGANIZATION CHART



* To be established end 1968

IBRD - 4198



APRIL 1969

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