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UNITED NATIONS INTERNATIONAL  
DEVELOPMENT ORGANIZATION

UNITED NATIONS  
DEVELOPMENT PROGRAM  
ORIGINAL - ENGLISH

ASSIGNMENT REPORT

OF

PHARMACEUTICAL INDUSTRY IN ZAMBIA<sup>1/</sup>

JANUARY - FEBRUARY 1973

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id.73-3855

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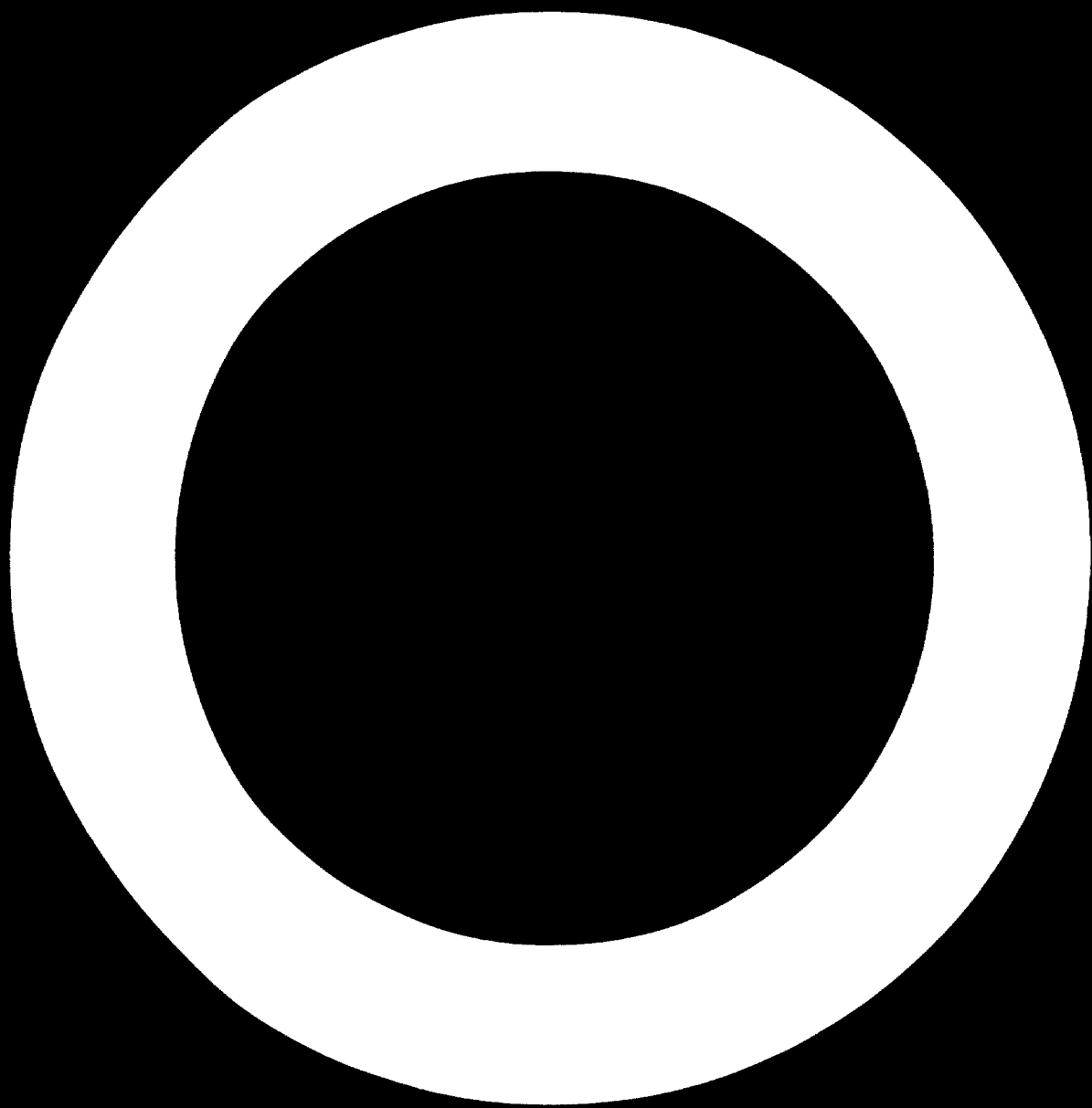


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## I. PURPOSE

The writer was asked by the United Nations Industrial Development Organization (UNIDO) to undertake a short-term assignment to assist the Government of Zambia in the followings:

(a) Study the scope, size and services provided by the existing small factories which produce drugs and assess their efficiency, study the equipment and machinery needs and services required for producing drugs of the type and quantity needed for both local consumption and export markets.

(b) To advise on the categories of pharmaceutical personnel to be trained for this sector in Zambia.

The assignment was taken up on 5 January 1973 for two months, and the writer arrived in Lusaka directly from Karachi on 6 January 1973. The senior Field Adviser of UNIDO, Mr. Branko Grgic introduced the writer to officials in the Ministry of Trade and Industry. Simultaneously the Chief Pharmacist of the Ministry of Health established contact with the writer and most of the time was spent in the Ministry of Health and with Dr. G.G. Dibue the WHO Representative.

The terms of reference were rather wide for the period of assignment, particularly in view of the fact that the matters incidental to having a direct bearing on the assignment had also to be investigated. In the available time the overall pharmaceutical requirements of Zambia were investigated with a view to identifying deficiencies in the existing manufacturing setup both in the Government including the Indeco Companies as well as those in the private sector. It was considered necessary for this purpose to meet a very large number of persons in the various Ministries, the International Agencies operating in Zambia, executives of the Indeco, Pharmaceutical trade and industry and visit institutions, hospitals, pharmaceutical factories and pharmacies including wholesale establishments. A list of persons contacted and institutions visited is given in Annexure I.

The writer recognised the importance of associated industries like dietary supplements, cosmetics and toiletries in view of the fact that the production of these items is a source of improvement

in the economics of manufacture of a pharmaceutical factory. The writer, in the short time, had to concentrate on pharmaceutical production and its problems and a study of the associated industries could not be undertaken.

The dramatic closure of the border with Rhodesia in the second week of January exposed the basic difficulties of the Government of Zambia in the field of communications in respect of goods and services. The problems of supply of drugs and medicines among other commodities, from abroad assumed new proportions and the assignment of the writer was given a sense of urgency and was considered timely.

Particularly acute was the problem of quick supply of Intravenous Fluids. Fortunately, a WHO expert, Mr. L. Fazan, also arrived from Geneva at the same time and the writer had the opportunity of working with Mr. Fazan for a few days in order to assess the requirements of Intravenous Fluids and the feasibility of manufacture of this group of essential products.

During the stay of the writer in Zambia, the Government of the Republic had to take urgent steps in controlling the import of all commodities including drugs and medicines and a new Import Policy was announced. Also, a United Nations Mission consisting of members of the Security Council visited Zambia to study the overall problem.

The writer had the benefit of referring to a number of UNIDO reports as also the data provided in numerous publications of the Government of Zambia. A list is given in Appendix II.

## II. PROJECT AREA

### 1. General

The Republic of Zambia having an area of about 780,000 square kilometers (about 290,000 square miles) is a land-locked country lying mainly on the watershed between Zaïre and Zambezi River System. It had a population of 3.5 million according to a census in June 1963 rising to 4.1 million in August 1969 census and estimated in mid 1972 as 4.5 million recording an annual growth rate of 2.6%. The main population density is in the Central Province where the City



of Lusaka is situated, and the Copper-Belt Province which together account for 40% of the total population. The non-African population which includes the European and Asians is about 2%. The literacy rate is estimated at 28%. The average life span is 45 years.

The Gross National Product at current prices in 1970 was estimated to be Kwachas\* (K) 1,185 million. The per capita income for the same period in 1971 is arrived at K 210 per annum which is the highest among countries of Independent Africa. Copper which is the main source of income provides 40% of the Gross National Product and accounts for 92.5% of the total exports. The price of copper which is the index of prosperity in Zambia stood at an all time high in 1966 at K 1090 per ton and was quoted in December 1972 at K 811 per ton. The per capita GNP has grown at the rate of 53% between 1965 to 1968 and has recorded an increase of 11% between 1968 to 1970. The internal prices based on a consumer price index with January 1972 as a base of 100 increased to approximately 145 in 1969 further rising to 147 in September 1970. The wholesale prices by industrial activity with 1966 as a base of 100 increased to 121 towards the end of 1972.

The total number of persons employed in December 1971 is recorded as 365,550 out of which 26,550 were non-Africans. The average annual earnings in 1971 for Africans is recorded as K 977 while for non-Africans the figure quoted is K 5635. The total wage-bill in case of Africans is K 331 million while in the case of non-Africans K 150 million.

The balance of payment in respect of trade is recorded as a favourable one at K 81.5 million in 1971 with export at K 480 million of which copper alone was K 450 million. After taking into consideration, the services and transfers and official transactions the net balance of payment stood unfavourably at K 185 million.

The Zambian Government has implemented and followed a policy of state participation in industry and for this purpose has acquired a majority holding of shares in a large number of companies in various sectors of the economy.

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\*) One kwacha (K) equals about US \$ 1.50

There has been a desire in Zambia to associate itself more closely with the East African Community consisting of Kenya, Uganda and Tanzania. An earlier proposal for Zambia to enter the East African Common Market has, however, not made headway, though relations with Tanzania particularly in the construction of Tan-Zam Railway and a larger use of Dar-es-Salaam as a port of entry for Zambia have grown. Close relationship is also being forged with Zaïre and a recent summit meeting between the Presidents of Tanzania, Zambia and Zaïre was indicative of possible future closer economic co-operation.

In respect of its internal policy the main issue is that of relationship between urban and rural areas where the standard of living in the former and wages that are earned has motivated a movement of population from the latter to the former. The minority groups in the country who constitute less than 2% of the population comprise mostly Europeans and Asians referred to as "expatriates" who supply skilled services. The state has a policy of "Zambianization" which has replaced an earlier policy of "Africanization" whereby Zambia received a large number of Africans from countries like Rhodesia, Malawi and South Africa.

## 2. Communications

From the time Zambia gained independence in 1964, there have been four main points of entry:

- From Port Elizabeth in South Africa through Rhodesia.
- From Beira in Mozambique through Rhodesia or Malawi.
- From Lobito in Angola.
- From Dar-es-Salaam in Tanzania.

The most popular routes previously selected by importers were Port Elizabeth and Lobito.

The closure of the border with Rhodesia almost entirely cut off the Port Elizabeth route and affected the Beira route as well and the import position therefore became difficult. There is heavy dependence on Dar-es-Salaam and Lobito for most sea-freight imports and exports.

The K 12 million Lusaka International Airport has enabled Zambia to be placed on a wide variety of international jet air-routes connecting Zambia with Britain, Europe and a number of African countries. In addition to normal air cargo services, air charters have been resorted to for obtaining quicker deliveries. The expense, however, of air-freight is high as the incoming air cargo flights are not assured of carrying equivalent load on their return journey.

The internal communication are fairly well developed. A railway net-work operates within Zambia which was taken over from the Rhodesia Railways System. An important rail-link is being completed to connect the Zambian Railway to Dar-es-Salaam through Kapiri Mposhi thereby providing a rail outlet to the Indian Ocean. Dar-es-Salaam is also connected through a tarred road with important Zambian towns. The road from Lusaka to Chipata provides a link for imports and exports via Salima on the Malawi Railways System. A number of road haulage companies operate internally and externally.

### 3. State Policy on Trade and Industry

The basic legislation of the Republic of Zambia in respect of business and industry is not dissimilar from that in a number of countries. The Government provides a legislative base for investment, taxation, tariff, import and export, labour relations, price control and professional regulations.

Since independence, the Government of Zambia has followed the policy of State acquisition of 51% of the share capital of companies through a parent organization called the Zambia Industrial and Mining Corporation (ZIMCO). The main wings of ZIMCO are MINDECO, i.e. the Mining Development Corporation, FINDECO, the Finance Development Corporation, and INDECO, the Industrial Development Corporation. The neat arrangement is that after the take-over of 51% equity share, ZIMCO and its subsidiaries principally INDECO, enter into a management contract with the former majority share-holders, but retain effective financial control and have the final say in the investment decisions of the companies taken over.

The financing of the 51% holding is done through dividends earned and accruing to the INDECO and other State participating agencies. A diagram to show the holdings of the INDECO Group is given in Appendix III.

INDECO, in addition to other consumer interests, is responsible for state acquired pharmaceutical business through its subsidiary INDECO Trading Limited. The INDECO Trading Limited took over the General Pharmaceuticals and Northern Drug Company which have been combined as National Drug Company which is now both an import and manufacturing house. The other company, INDECO Morison, is an import house for pharmaceuticals and food products.

The Government legislation in respect of investment and production was embodied in Pioneer Industry (Relief from Income Tax Act), but the operation of the Act was suspended since about two years. The taxation on profits is 45%. It is possible to depreciate varying proportions of expenditure against pre-tax profits. It is permitted to depreciate machinery at 20% in the first year and 20% of the residual amount in the next and subsequent years. The depreciation allowed on buildings is allowed at a lower rate, but this is not always claimed. There is a general trend of under-capitalisation in industry and to prevent this and control excessive remittances in foreign exchange, the Government has taken the following measures:

- (a) A foreign company is limited in borrowing local funds to an equivalent amount of its own share in equity holding.
- (b) The profit remittance is allowed up to a maximum of one half of the equity share of a particular year or one third of the total paid-up equity of the company whichever is less.

The second provision was temporarily suspended but re-introduced in September 1972. The advantage of being a Zambian-owned company is therefore apparent.

The patent law in Zambia is largely based on the British Patents Act whereby patents have an initial life of 15 years from the date of application and can be extended to a longer period. In pharmaceutical business however, the patent law had been of academic interest because of the small size of the business and patent infringements therefore are not infrequent. The patent holders have not shown a great deal of enthusiasm in suing companies who infringe patents. The Trade Marks can be registered for an initial period of seven years and renewed for a further period.

The tariff policy in the country is a simple one, whereby, like other countries, luxury consumer goods and non-consumer goods have a higher rate of duty. Most commodities have duties ranging from 15 to 30% but in certain items, for example alcoholic beverages, the duties go as high as 75%. All drugs and medicines are exempt from import duties though some items of pharmaceutical raw materials and packing materials are dutiable.

There is no formal Government legislation controlling monopolies or pricing in Zambia, but prices of foods are controlled through Price Control Board. Price control on clothing has recently been added to the responsibility of this Board. There is some disquiet in the country about the excessive prices of drugs, but the Government has not so far resorted to price control though the subject is under consideration. The country is too small for internal competition to provide a basis for anti-monopoly legislation and as such this is not contemplated.

The significant legislation in labour relations is the Factories Act of 1965 and Employment Act of 1965 and also the Minimum Wages and Councils Act of 1964. The Factories Act is more in the nature of general legislation and specifies the standards that must be maintained and facilities provided. The Employment Act lays down conditions of contract and statutory requirements for housing, welfare, etc. and also controls the functions of the employment agencies. The Minimum Wages and Councils Act provides a framework for statutory minimum wages

in a number of industries. The basic minimum wage of K 30 per month has been fixed for most industries but the small pharmaceutical units usually pay more than the minimum. There has been efforts to introduce what is called "Industrial Democracy" whereby representatives of workers would be co-opted on the Board of Directors of Companies. A Bill in this respect reportedly has been passed by the legislature but has not yet been brought into effect. The labour unions play a relatively minor role and this has been a source of some uncertainty as the workers may by-pass the Unions thereby creating some confusion in certain sectors of the economy.

#### 4. Import Policy

The import policy in Zambia developed through an initial period of open general licence followed by introduction of restrictions on a monthly quota basis culminating in a recent rationalisation effective from 1 February 1973.

All categories of import are now subject to quotas determined by the Ministry of Trade and Industry (MTI). Import licences are issued up to the limit of the quota fixed for each quarterly period. The fixation of quota is calculated on the basis of three months average of previous eighteen months imports. Officially, drugs and medicines are exempt from a fixed quota, but here the Government has kept its options open. The quotas are arrived at for each category by first breaking down the imports in S.I.T.C. (Standard International Trade Classification) 3-digit groups and then each S.I.T.C. group is further subdivided by I.S.I.C. (Industrial Standard Industrial Classification). Each such category is assigned by the MTI to a designated import agency who will advise MTI for the equitable and efficient allocation of the quota among interested importers by separate commodity items. In respect of drugs and medicines and other raw materials and packing materials, designated import agencies will be Ministry of Health (MoH), INDECO Trading (IT), INDECO Chemicals (IC) and the Ministry of Trade and Industry (MTI).

The procedure to be followed by the importers under the new system is as follows:

In each quarter the Ministry of Trade and Industry will advise the import agencies of foreign exchange available for each particular category of imports. The importers will give a formal indication of their foreign exchange requirements to their agencies appropriate to each category in which they are interested. The import agency will then allocate the foreign exchange up to the level of the quota for each category. Priorities within the quotas will be given to the needs of projects financed on foreign loans and to the requirements of approved mine suppliers. The priority may also extend to the supply of drugs and medicines and their raw and packing materials. After the allocation has been made to the agencies by the importers, the importers will formally apply for a licence to the agency who in turn will check the licence forms to ensure that they accord with the foreign exchange allocations to each importer and the forms will then be forwarded to MTI who would actually issue the formal licence.

In respect of special requirements of the mining groups other arrangements have been made and the restrictions may be waived. The Controller of Customs has been empowered to admit goods by air into Zambia where they can be shown to be needed for genuine emergencies. A list of items together with description as S. I. T. C. and I. S. I. C. Classifications relevant to the import of drugs and medicines and controlled by the Ministry of Health is given as Appendix IV. Items of raw and packing materials are distributed between INDECO Trading, INDECO Chemicals and Ministry of Trade and Industry.

5. Export Policy

The export regulations in respect of pharmaceuticals do not appear separately but are taken on general considerations. The Ministry of Trade and Industry is reluctant to allow export of repacked goods as well as re-export of imported finished goods because it is felt that this is of no economic value to the country.

However, there is a tendency to treat export of locally manufactured pharmaceuticals as re-export because majority of raw materials and packing materials used in their manufacture are imported. The Ministry of Trade and Industry has an open mind on this subject and is anxious to encourage the export of pharmaceuticals subject to considerations of price related to the cost of production, as also the cost of the imported components.

### III. HEALTH FACILITIES AND DRUG SUPPLY

#### 1. Health Care

Zambia has 76 hospitals containing about 12,000 beds, over 550 health centres and clinics with approximately 4,400 beds and 20 Leprosaria. The above figures are inclusive of mining and mission hospitals. The number of doctors in Zambia is given as 630, nurses 543, dentists 40 and pharmacists 111. There are 21 pharmacies and the distribution of pharmacists employed in Zambia is as follows:

Total	on full register	101
	on temporary register	<u>10</u>
		111
		<del>111</del>
Government		40
Retail		32
Mine Hospitals		10
Wholesale		13
Mission Hospital		2
Nursing Home		1
Representative		1
Not Employed (or unknown)		<u>12</u>
		111
		<del>111</del>

The National Expenditure in 1971 was about K 350.31 million of which Health accounted for K 24.15 million. The national budget for 1972 of K 296.38 million provided K 20.06 million for health and the actual expenditure for 10 months has been K 270.84 million and



21.29 million respectively, showing an increase in health cost from 6.9% to 7.8%. The per capita cost on health on Government account is nearly K 5.50. This figure does not include the expenditure on mining hospitals, mission hospitals and private clinics.

Zambia suffers from the diseases common to the whole of Africa. A major number is associated with malnutrition, environmental and social diseases. The chief diseases for which patients were treated provide a source of morbidity data but figures on mortality are to be taken with reserve and as such are not reproduced here. The disease incidence figures are based on in-patients and out-patients treated in all the hospitals and centres and give the following data on top ten diseases:

Abdominal	1,250,000
Respiratory Diseases	1,245,000
Injuries	1,076,000
Other Infections and Parasitic Diseases	666,000
Malaria	603,000
Eye and Ear	569,000
Skin Diseases	527,000
Anaemia and Malnutrition	128,000
Measles	126,000
TB and Pulmonary Infections	110,000

## 2. Drug Requirements

The writer tried to work out the full drug requirements for Zambia. According to FOB prices under several S.I.T.C. Classifications the total imports in 1969 were approximately K 3.50 million rising to K 4.15 million in 1970 and K 4.74 million in 1971. The details of items imported in 1971 are given below:

- Antibiotics in Bulk	K 3,700
- Vitamins in Bulk	4,300
- Hormones in Bulk	<u>5,900</u>
	K 13,900

<u>Sub-Total</u>	K	13,900
- Insulin		16,000
- Vaccines etc.		415,000
- Other Biologicals		40,000
- Antibiotics		560,000
- Anti-Malaria, Leprosy, Bilhazia and Tuberculosis		45,000
- Not Elsewhere specified		<u>3,654,000</u>
<u>T O T A L</u>	K	<u>4,743,900</u>

The above FOB import figure of K 4,74 million will amount to about K 5.70 million after payment of freight. Added to this will be cost of insurance and clearing charges and the commission and discount of agents, wholesalers and retailers. The average requirements of the country on the basis of prices to hospitals and retail prices will come to K 10 million per year, the Government accounting for 40%, the mining hospitals around 20%, leaving 40% to miscellaneous channels of outlets. The annual increase in drug imports has been a steady 15% since 1969 which will drop to 10% from 1973 onwards and projected to five years, i.e. up to 1978, the drug requirements for Zambia will be around Kwachas 20 million.

According to the computer print-out for the Medical Stores Depot for drugs consumed during the last one year, the writer has selected total quantities of the main ampoules, vials, tablets, capsules and other products and has listed them separately in terms of their consumption. The figures are as follows:

- Tablets	150	Million
- Capsules	10	Million
- Vials	2.5	Million
- Ampoules	2	Million

### 3. Pharmaceutical Legislation

The Ministry of Health is responsible for the administration of the following legislation in respect of pharmacy and medicines:

- Medical and Allied Professions Act and Regulations.
- Pharmacy and Poisons Act and Regulations.
- Dangerous Drugs Act and Regulations.
- Therapeutic Substances Act and Regulations.
- The Food and Drug Act.

The regulations in respect of the Food and Drugs Act have been finalised in respect of foods only. A WHO expert is expected to arrive in Zambia to draft and finalise the drugs regulations.

The Medical and Allied Professional Act is administered through a Medical Council of Zambia consisting of 16 members, two of them being fully registered pharmacists. Separate registers are maintained for medical practitioners, dental surgeons, pharmacists, nurses and midwives and registration is given after the Medical Council is satisfied about the Diplomas and certificates, compliance with training, payment of fees etc. The Medical Council operates through a Disciplinary Committee for removal from the Register and restoration of registration.

In respect of pharmacists, there are two types of registrations

- Full Registration
- Temporary Registration.

Full registration is at present open to qualified pharmacists from Great Britain and certain institutions from South Africa, Rhodesia, Ireland, Canada, Australia and New-Zealand. Qualified pharmacists from other countries have apply for temporary registration whereby after a certain period of training the pharmacist can be entitled to full registration after having passed certain examinations and/or tests prescribed by the Medical Council.

The Therapeutic Substances Act and the regulations made thereunder has prescribed a list of pharmaceutical products mainly antibiotics, the sale of which by wholesale and/or retail is to be supervised by a fully registered pharmacist.

The Dangerous Drugs Act again carries a similar provision and relates to the sale and manufacture of habit forming drugs like cannabis, opium and their manufactured products.

The Pharmacy and Poisons Act controls the profession of pharmacy and trade in drugs and poisons, and calls for the registration of pharmacist and pharmacy premises. A list of poisons is maintained under this Act and labelling instructions are also proscribed.

Food and Drugs Act is a recent legislation drafted by the FAO/WHO experts' team in Zambia and its main object is to control the import, manufacture and sale of foods, drugs, and cosmetics and for its enforcement through the Food and Drugs Board which consists of the following:

- Permanent Secretary of the Ministry of Health
- The Secretary-General of the National Council for Scientific Research
- Chief Health Inspector
- Chief Pharmacist
- One Public Analyst
- One member representing the National Food and Nutrition Commission
- Medical Officers of Health
- A person connected with the Food Industry
- One member from the Pharmaceutical Society of Zambia
- One member of the Zambia Standards Association.

There appears to be substantial overlapping between the various legislation on pharmacy and drugs as also the overlapping in the sphere of authority of each administrative agency responsible for their implementation.

#### 4. Pharmaceutical Control

Drugs control in Zambia is vested in the Ministry of Health through the Chief Pharmacist who in turn has an Assistant mainly concerned with drugs legislation and its implementation particularly in the case of Therapeutic Substances Act and regulations.

There is also an FAO Project on Food and Drugs Control headed by a project manager and three experts who have so far concentrated on food control only and as such pharmaceutical quality control in Zambia has yet to start. The Public Analyst mainly concerns himself with blood tests on drunken drivers involved in accidents, and very few other samples are tackled in the Public Analyst's Laboratory. The Public Analyst does not handle more than 40 samples of pharmaceuticals per year from the Government Medical Stores Depot. The Chief Pharmacist does not have a full time Inspector at his disposal to enforce the drug legislation. One of his assistants undertakes a periodic tour when time permits mainly to check the storage and record keeping of dangerous drugs.

The main responsibilities of the Chief Pharmacist at present are the procurement of pharmaceuticals and medical stores ranging from operation tables to sanitary towels and this work is attended to by a chief buyer. Recently, under the import policy the Chief Pharmacist has been made responsible for the import agency in relation to drugs and medicines for which he has another assistant. As a result of heavy pressure of work involved in both Medical Stores Depots as well as the import of drugs and enforcement of drugs legislation as it is, there is no long term planning in respect of pharmaceutical development particularly in the manufacturing sector or the development of pharmaceutical personnel.

The Government Hospitals employ registered pharmacists to hold charge of the pharmacies and dispensaries where most of the actual work is being done by either junior pharmacists or dispensing assistants. The pharmacist with spare time on his hand is also given the responsibility of acting as Secretary to the Hospital where he tends to get involved in day to day work of the hospital in matters like kitchen, food, personnel and such like, and his professional expertise is not made available to areas where it is most needed. This concept of the work of the pharmacist is carried to the retail and wholesale pharmaceutical establishments also

where the registered pharmacist with overseas qualification is doing day to day administration rather than any pharmaceutical planning. In the industry there are hardly any pharmacists and those there are, are again more as administration assistants rather than deeply involved in production matters.

5. Government Procurement of Pharmaceuticals and the Medical Stores Depot

The Government medical stores purchase organisation is located in the office of the Chief Pharmacist, though the Depot itself is separate under the supervision of a pharmacist. The Chief Buyer receives indents from the Medical Stores Depot for items required. These items are normally from a Catalogue of Medical Stores which is maintained in the Ministry and reviewed from time to time by a Standardization Committee. The formal tender is drawn up and issued to the following institutions:

- \*1
- All Countries Export Limited, a subsidiary of INDECO, with office in London.
- Direct importers
- Local business houses which include both importers and manufacturers.

The principle of lowest quotation is rigorously applied in the scrutiny of tenders by the Government Tender Board, responsible to the Ministry of Finance. A weightage of 10% is given to locally manufactured products and an additional 2½% for local agents making in the case of a manufacturer a weightage of 12½%. In addition, formal tenders of the value of K 5,000 are also issued for patented drugs, where the Ministry negotiates the price with the sole supplier. In further addition to the above, the main hospitals like those in Lusaka, Ndola, Kitwo, Livingstone, Chipata etc. are entitled to local purchase up to K 200 for which the approval of the Principal Medical Officer of the Province is sought. This relates to items which are not purchased by the Medical Stores Depot, but are considered essential and also such items which may be temporarily out of stock in the Depot.

- \*2) UNDP Lusaka have subsequently advised the writer in May 1973 that All Countries Export Limited have gone out of business.

The requirements of Mission hospitals are also supplied through the Medical Stores Depot and Ministry of Health. The stock items after being purchased are kept in the Depots while the non-stock items are supplied directly through the Ministry to the hospitals concerned. The Depot also has a small manufacturing unit which mainly prepares bulk liquid, eye drops etc. for hospital use, but this manufactory is dealt with separately in the Report.

The Medical Stores Depot receives a computer print-out on the actual consumption of drugs in the various hospitals on an annual basis. A list has been prepared of the main items consumed in the hospitals serviced by the Depot for the period 1 February 1971 to 31 January 1973 and is attached as Appendix V.

#### 6. Pharmaceutical Procurement for Mining Hospitals:

The writer visited the mining hospitals at Chigola, Kitwe and Nufulira. The hospitals are run at very high standard and pharmacies are under the direct supervision of the pharmacists-in-charge who are not saddled with other responsibilities. There are two mining companies, i.e. Anglo-American and RCM (Roan Consolidated Mines). The former has a Chief Pharmacist who co-ordinates the working pharmacies and pharmacists in the three hospitals and one dispensary. The other, i.e. RCM has independent pharmacists in their hospitals. The purchase policy however in both the mining companies in respect of pharmaceuticals is identical and informal co-ordination exists between the two organisations. The system of purchase on a tender basis is followed, but there is greater flexibility in the prices of products obtained. The mining hospitals often purchase directly from Britain. The pharmacists in the mining hospitals were a little concerned at the rising cost of drugs and medicines and have considered co-ordinating their skills for bringing out a more rationalized formulary and also the use of generic names in tender enquiries for their requirements.

#### IV. PHARMACEUTICAL INDUSTRY AND TRADE

##### 1. Pharmaceutical Industry

The problem areas in disease incidence in Zambia have already been described. The drug requirements and their availability has therefore to be oriented towards the treatment and eradication of these diseases.

The present status of pharmaceutical industry puts Zambia in Category II described in the UNIDO document ITD-82 of 3 May 1972. The pharmaceutical industry at present consists of two companies in addition to the manufactory of the Government Medical Stores Depot. Between them they supply about 30% of the requirements of the Government Medical Stores Depot and also about 20% of the requirements of mining hospitals and small quantities to the local market.

The present pharmaceutical industry in Zambia small as it is, provides tablets, capsules, ointments, creams, drops, lotions, etc. to hospitals and other health outlets. There is however no sterile processing at all and that means that no injectable products, i.e. intravenous fluids and liquid injections as well as vialled antibiotics are in production at present. Also there is an almost complete absence of any quality control facilities either at the Government level or in the private industry for the testing of any products at present manufactured or intended to be manufactured in future.

During the period of the writer's stay in Zambia, in addition to the manufactory of the Government Medical Stores Depot, only one company was found to be in production, i.e. The National Drug Company in Lusaka. Vinds Drugs House was getting started again for production and Lindsay Pharmaceuticals in Ndola were not in production. It would be best to describe the Government Manufactory and the three companies, their present scope of production and future plans and also make a reference to other companies which contemplate starting production.



(a) Government Medical Stores Depot Manufactory

The Medical Stores Depot has a small manufacturing unit under the supervision of Mr. Chellia who is a qualified pharmacist. Under him there is one dispensing assistant and twenty semi-skilled and unskilled workers. A list of products together with quantities produced during 1972 is given in Appendix VI. The manufacturing unit produces mainly bulk liquids like anti-diarrhoeal suspensions, gripe mixtures etc., and a few other preparations. The three rooms at present occupied by this unit are inter-connected and house some elementary equipment for making mixtures and suspensions. The methods of handling raw and packing materials are rather archaic so is the benching and general lay-out. Quite understandably an element of untidiness is an evidence in all the three rooms. Nevertheless, the output shown in Appendix VI for the year 1972 is impressive particularly when it is co-related to the price. The writer was informed that the price factor is particularly an arbitrary one which does not take into account any overheads, the rent of premises, the hours worked, the productivity, idle time etc. The pharmacist-in-charge has not received any training in manufacturing. There are no quality control arrangements.

(b) National Drug Company (NDC)

The National Drug Company (NDC) is the largest pharmaceutical unit in Zambia inclusive of manufacturing, import, wholesaling and retailing. In addition to pharmaceuticals the NDC also produces, imports and markets a number of cosmetics, toiletries and dietary supplements. The company operates through a manufacturing unit-cum-warehouse in Lusaka and a large warehouse and office in Kabwe. The NDC was originally called the Northern Drug Company with an office and warehouse in Kabwe, where small scale manufacturing was also undertaken. The INDECO through its subsidiaries took over the General Pharmaceutical Company with its factory and warehouse in Lusaka and with the further takeover of the Northern Drug Company by INDECO, the two were combined into a single company, the National Drug

Company, the majority holding, i.e. 51% being of INDECO and 49% held by the Boked Group of Companies. Through a management contract with INDECO, the Boked Group runs the management of the company. After amalgamation, the NDC decided to rationalize their operations as a result of the merger. The intention is to keep all warehousing and wholesaling operations and office in Kabwe and concentrate on the premises of General Pharmaceuticals in Lusaka for production. The chain of retail shops with the name Holdsworths is managed by NDC and administered from Kabwe.

The total turnover of NDC is in about K 6 million divided as follows:

- Factory	K	500,000
- Wholesale (Imported)		2,700,000
- Retail Sale		<u>2,800,000</u>
<u>TOTAL</u>	K	6,000,000
		*****

The pharmaceutical segment of the total turnover is K 4,700,000 of which the retail contribution is K 1,700,000. The average gross profit for factory operation is around 30%.

The total factory and warehouse area is 20,000 sq. ft. and houses the production facilities for tablets, liquids, ointments, creams and powders, and equipment for cosmetics. Dietary supplements are also being produced for an FAO Project in Zambia. There is also a small quality control laboratory. The range of production through this factory is a fairly large one and relates to almost anything for which the company can get a tender acceptance or requirement from the mining hospitals or supply to their own or other retail outlets. Naturally in a situation like this, production planning is not easy and the company relies on more day-to-day requirements rather than on long range planning. Through their import and wholesale the company stocks a large range of products of 30 foreign companies. This includes not only pharmaceuticals but cosmetics, veterinary products, perfumery, insecticides, chemists sundries etc.

The writer was apprised of NDC's expansion plans particularly in relation to contemplated project for Intravenous Fluids whose location at NDC was considered by the Ministry of Health. In addition to sterile processing, expansion of the quality control laboratory and general rationalization of space and equipment is also planned to make way for manufacture on contract for other companies. In this connection the company was already negotiating with Beecham and Johnson and Johnson. A list of equipment in the NDC Factory for manufacturing of pharmaceuticals and other items is given in Appendix VII, and a list of products packed and manufactured in Appendix VIII.

The writer would like to take this opportunity of expressing his deep appreciation of the ready assistance and co-operation received from Mr. D. Covell and his management team. Discussions with NDC were held in an atmosphere of frankness and all information was voluntarily given. But for the co-operation of this company, the task of the writer would have not been easy.

(c) Vindas Drug House

The Vindas Drug House at the time of the visit of the writer was a small unit importing pharmaceuticals, diagnostic re-agents and surgical equipment and also manufacturing some pharmaceuticals. During the time the writer spent in Lusaka, Vindas Drug House were busy acquiring the premises and equipment of another manufacturing company in Lusaka, CAFR (Central African Pharmaceuticals), a Rhodesian-South African owned company and which in previous years in turn had acquired the premises and equipment of Amalgamated Laboratories. The Vindas Drug House therefore were in the process of moving from their old premises to the new ones and it was expected that they would be in actual production again some time in March. Mr. R.V. Desai, the proprietor pharmacist of the Company, anticipated a turnover of K 150,000 per year. The annual production of Vindas will be geared to meeting Government requirements and also in selling in the outfall areas of Zambia. They anticipated

that the profitability on supplies to Government will be low. A list of equipment is given in Appendix IX, and a list of products produced by Vindas is appended as Appendix X.

(d) Lindsay Pharmaceuticals Limited

Lindsay Pharmaceuticals Limited, Ndola, is a wholesale unit located in Ndola. According to its proprietor, Mr. R. Wright, Lindsay were manufacturing some products at one stage, but they have not given up hope of re-starting moderate scale manufacturing, though the Company is facing, in his opinion, some temporary financial difficulties. A list of equipment which Mr. Wright is at present holding or has on order is given as Appendix XI. Lindsay intends concentrating on capsules making, production and manufacture of suppositories in addition to manufacturing liquids.

2. Pharmaceutical Trade

(a) According to publications in Lusaka, the companies listed as manufacturers in actual fact, turned out to be wholesalers except those described above. A list of wholesalers together with the pharmaceutical agencies they hold is given below:

<u>Firm</u>	<u>Agency</u>
National Drug Company Ltd., Kabwe	Abbott, Armour, Ayres, Beecham, Boots, Bristol, British Drug House, Ciba, Evans, F.B.A., Geigy, Glaxo-Allenburys, Lederle, Lilly, May and Baker, Moore Medicinal, Organon, Rexall, Riker, Roche, Sandos, Schering (USA), Smith Kline, Ethicon, Ortho and Johnson and Johnson.
Cooper (Zambia) Ltd., Lusaka	Burroughs Wellcome and Grims.
Indeco Morrison Ltd., Lusaka	Danassy, Plouffe, Parke Davis, Roussel, Schering A.G., Smith Nephew and Wyeth.

<u>FIRM</u>	<u>AGENCY</u>
Pfizer (Zambia) Ltd., Lusaka	Pfizer and Boehringer
Karibou Chemists Ltd., Lusaka	Merck Sharp and Dohme
Vindas Drug House, Lusaka	CAPS
Bancroft Pharmaceuticals Ltd., Lusaka	Not known
Baird and Tatlock Ltd., Ndola	Searle
Sterling Products International Ltd., Ndola	Sterling/Winthrop
ICI (Zambia) Ltd., Ndola	ICI
Lindsay Pharmaceutical Ltd., Ndola	Dott Bonapace
Scanpharm (Zambia) Ltd., Lusaka	Scanpharm
Unipharm (Zambia) Ltd., Ndola	Unipharm
Reckitt and Colman (Zambia) Ltd., Ndola	Reckitt and Colman
Nicholas Pharmaceuticals Ltd., Ndola	Aspro-Nicholas
Hoechst (Zambia) Ltd., Kitwe	Hoechst
J. Stubbs, Chingola	Rooken (Australia)

The writer visited Pfizer, Scanpharm, Indeco Morrison, Copper (Zambia) Limited, Karibou Chemists, Baird and Tatlock Limited, Bancroft, Reckitt and Colman, J. Stubbs, Sterling and also met the representatives of Glaxo, Burroughs Wellcome, Johnson and Johnson, Beecham, Wyeth and Schering A.G.

The problems of almost all the wholesalers who are also importers were difficulties in obtaining supplies due to difficult communications. The previous import policy of the Ministry of Trade and Industry, according to the wholesalers, was resulting in delayed imports and the new import policy where the Ministry of Health had a more direct say was generally welcomed. The majority of non-manufacturing companies were against starting

their own production due to a limited market size in Zambia. A number of them, however, particularly in the light of import stringency were exploring the prospects of third party or contract manufacture, prominent among them being Beecham and Johnson and Johnson.

Karibou Chemists Limited, had acquired the production premises of Colgate-Palmolive in Lusaka and were contemplating the manufacture of cosmetics and perfumery and later expanding it to pharmaceutical production.

A common complaint by wholesale companies was the stipulation of the Ministry of Health that all dealing in products covered by the Therapeutic Substances Regulations must be handled in wholesale outlets by qualified pharmacists on the permanent register. In view of the fact that mainly British pharmacists qualified for the permanent register, the cost to the wholesaler of employing an expatriate was considerable and the increase in his overheads resulted in higher prices.

(b) Retail

There are 32 retail pharmacies in Zambia, but a large majority of them are concentrated in the city of Lusaka and towns of the Copperbelt. For example Livingstone in the South had only two pharmacies and in the whole distance between Lusaka and Zambia which is about 300 miles, there was only one retail pharmacy at Choma. The National Drug Company, as mentioned earlier, had a chain of chemists shops called Holdsworths. Similarly, Karibou Chemists have two shops in Lusaka and another two in the Copperbelt. Lusaka Pharmacy has two shops in Lusaka. The average turnover of each large chemists shop is on an average K 200,000 per year inclusive of pharmaceuticals, cosmetics, perfumes, etc. Chemists shops are supervised by qualified pharmacists and run on the same lines as in England.

(c) Distribution Cost

The distribution trade in pharmaceuticals has the same problems as in most countries. The agent-importer normally earns 15% commission in relation to the landed cost and a wholesaler an additional 15%. Theoretically therefore an agent who is also a wholesaler takes about 30%. The retailer is supplied with drugs at 33% off the suggested retail price and this margin is, with exceptions, adhered to by the retailer. A drug therefore imported at landed cost of K 1 is normally sold in retail at a minimum price of K 1.80. In case of manufactured drugs however, the agency commission is not charged.

V. PHARMACEUTICAL EDUCATION AND TRAINING

Pharmaceutical education and training in Zambia is an embryonic stage. There is no degree or diploma education in pharmacy. A two-year dispensers course was started in the Evelyn Hone College with a staff of three pharmacist teachers, two lecture rooms, one laboratory catering for a dozen students. The intention behind this course is to train dispensers for various hospitals and health centres. The qualification for entry to the course is a GCE, 'O' level with three credits. The course has been in existence for the last two years and a follow-up on the employment of these dispensers has not been attempted. The theoretical syllabus is a wide-ranging and ambitious one and perhaps in excess of requirements and purposes for which this course is run. Dispensers who qualify through this course are not entirely certain in respect of what is expected of them. The writer had an opportunity to attend a meeting of the Advisory Committee of this course which included the Head of the course, the Chief Pharmacist of the Ministry and pharmacists and dispensers drawn from the Government and mining hospitals and the trade and industry. The course however has its own merits and is at least an attempt in providing some pharmaceutical training.

The need of a College of Pharmacy has been recognized in Zambia. The Commonwealth Medical Association in its meeting in Lusaka in November 1975 took note of Zambia's intention to start the College and encouraged her to ask the University to consider starting courses in pharmacy as soon as possible. This has been followed-up by the Ministry of Health and a provision has been made in a 10-year Health Plan to recommend to the University to commence education of pharmacists. The writer was informed that money may in fact be provided for in budget estimate of the Health Plan in the year 1975 for this purpose. The National Health Plan also recommended that the Government should encourage students to study pharmacy in one of the countries like Nigeria by providing financial assistance. At present there are no more than three Zambian Pharmacists in the country and ten are studying pharmacy abroad.

The writer also visited the National Council of Scientific Research and met the Secretary General and his Deputy. The Council, it appeared, is a research organisation concerned primarily with agricultural research in which food testing and research is given a special place. The Council however, is willing to play its part in promoting pharmaceutical training in its laboratories if this is sought by the University of Zambia.

## VI. MAIN RECOMMENDATIONS

The survey presented above shows that the pharmaceutical industry in Zambia has deficiencies and weaknesses and requires a more thorough study which will result in detailed suggestions and the setting-up of machinery for their implementation. The recommendations being made should be looked at in the context of the limitations of the present study, where an attempt has been made to bring out the more urgent and pressing requirements and proposals embodied in this Report to meet them.

### 1. Pharmaceutical Production

The writer has worked out the estimate of capital investment in the shape of equipment and amenities required for the expansion



of pharmaceutical industry. An amount of K 1,200,000 is required to put Zambia on the road to self-sufficiency in the supply of pharmaceuticals through local production. This amount has been arrived at by taking the requirements of each sector of pharmaceutical processing separately, for new type of production and in expansion of existing facilities.

The opening of new pharmaceutical units is not recommended, but also not discouraged, though the ultimate number is to be carefully controlled. The existing three units, i.e. Government Medical Stores Depot Manufactory, National Drug Company and Vindas Drug House should be expanded to provide for additional manufacturing facilities and for locating the manufacture of new dosage-form presentation. The K 1,200,000 required for expansion are in respect of all the three units and also include the plans of Lindsay Pharmaceuticals. The capital equipment cost on Intravenous Fluids Scheme being drafted by the WHO expert is also part of this estimate. The break-down of this investment is as follows and items of equipment presented in relevant appendices:

I. Sterile Processing and Production, Appendix XII	
A. Intravenous Fluids Manufacture	K 250,000
B. Liquid Injections Manufacture	K 20,000
C. Dry Antibiotics Filling	K 40,000
D. Equipment Common to B and C	K 100,000
T O T A L	K 410,000
II. Other Equipment (for expansion), Appendix XII	110,000
III. Government Medical Stores Depot Manufactory, Appendix XIII	100,000
IV. Quality Control Laboratories, Appendix XIV	30,000
V. Balancing, Modernisation and Providing Ancillary Services etc.	100,000
VI. Erection of New Building and Expansion	350,000
VII. Training Programmes and Services of Experts	<u>100,000</u>
G R A N D T O T A L	K <u>1,200,000</u>

The precise details of specifications, source of supply and prices of each item of machinery could not be obtained in the short time at the writer's disposal. The estimates for erection of new building are purely ad hoc and can be scaled down if the Intravenous Fluids Manufacture and the Government Manufactory can be housed in existing buildings.

The present and future pharmaceutical production units will require ancillary services like an engineering workshop, laundry for washing and pressing the uniforms and sterile clothing and a tailor's shop for repairs on the premises. In addition, medical centres and recreation facilities for workers will also be desirable.

The writer noted with satisfaction that the WHO had already taken steps to send out an expert to study the viability of setting up a plant for the manufacture of Intravenous Fluids primarily for the requirements of Zambia and also on a regional basis to meet the needs of the rest of the African countries in the WHO region. Unfortunately, the report of Mr. L. Pusan could not be received while the writer was in Zambia and it is difficult to give the full details of this project or its financing. The writer strongly feels that the project of Intravenous Fluids production should receive a high degree of priority in any international assistance offered to the Government of Zambia either on the basis of the United Nations assistance or through bilateral aid between Zambia and another country in a position to help. The advantage of the project for manufacture of Intravenous Fluids is that almost all the sterile processing manufacture which the writer is recommending will be carried in a more economic manner on its coat-tails. Even in the absence of the Intravenous Fluids project, the necessity for sterile processing is only too evident and arrangements should be made for manufacture of liquid injections and dry filling of antibiotics.

## 2. Basic Manufacture

The writer made a study of the possibility of basic manufacture of pharmaceuticals, but came to the conclusion that at the present state of development of chemical industry in Zambia and an almost complete absence of fine chemicals and solvents industry, there does not appear to be any prospect of basic industry in the near future. There is, however, a possibility of the development of fermentation industries in the long term, but considerable time has to elapse till then. Zambia will continue to depend on imports for the supply of basic pharmaceuticals and chemicals for use in pharmaceutical industry which essentially will have to be a processing industry, i.e. the manufacture of tablets, capsules, injections and other sterile products, ointments, creams, lotions, suppositories etc.

## 3. Packing Materials

The importance of the right packing materials for various types of drug presentation cannot be over emphasised. However, the size of the pharmaceutical market and the quantum of production does not justify the setting up of units for manufacturing packing materials which will continue to be imported for some time. There is, however, scope for local production of glass bottles and plastic containers, provided the sizes and shapes can be standardised to permit production on an economic basis. The glass factory being created at Kapori Mposhi, solely for the production of bottles for beer and beverages, can be investigated for production of standardised bottles for pharmaceutical use. Cartons and labels are already being made in Zambia, but the cost in comparison with imported paper and board is relatively high.

## 4. Quality Control

In making the overall estimate for vital pharmaceutical industry and its growth, the writer became only too concerned at the complete absence of quality control in Zambia either on Government level or

in the existing units. The Government should look at pharmaceutical quality control with a higher degree of priority and the sense of urgency in this respect be recognized by the FAO Food and Drug Control Project. A Government quality control laboratory should be set up independently as far as premises, equipment and staff are concerned, but within the administrative scope of the present FAO project. For this purpose WHO may provide an expert exclusively on pharmaceutical quality control to the Government of Zambia and a separate grant for laboratory equipment, chemicals, glassware and books may also be considered.\*)

Each pharmaceutical manufacturing unit should be equipped with a basic quality control laboratory, a list of equipment for which is given in Appendix XIV. Such a unit is expected to cost K 10,000. Three such units will be required, i.e. for the Government Manufacturing and the other two in the National Drug Company and the Vindas Drug House in Lusaka. In the case of National Drug Company, the expansion of the present quality control laboratory will be needed. In view of NDC's range of production extra equipment required will be of a more specialised nature and should include the purchase of sophisticated instruments. If Lindsay Pharmaceuticals in Ndola at all go into manufacturing and Karibou Chemists expand into pharmaceutical production, additional quality control laboratories will be required.

There appears to be a complete absence of the concept of pharmaceutical quality control in a number of African countries. This gives rise to a temptation on the part of some developing and developed countries to dump goods of doubtful quality on to the African countries. In order to emphasize the role of pharmaceutical quality control, both for protection against unscrupulous imports as well as for the healthy growth of pharmaceutical industry, the writer recommends that the WHO African Region may convene a Regional Seminar on Pharmaceutical Quality Control in Lusaka or any other suitable venue. Nominees of health and drug control authorities

\*) The writer has subsequently been informed that Lusaka Plastic Company can offer plastic containers to manufacturers.

as well as representatives of trade and industry in the African countries will participate in the Seminar. Decisions arrived at as a result of discussions will be placed before member countries for action. This would be in line with the efforts of the World Health Organisation in promoting pharmaceutical quality control in all regions and also popularising the WHO Code of Good Manufacturing Practices. Details of a seminar of this nature can be worked out, if required, in consultation with the writer.

#### 5. Training of Personnel

The paucity of qualified Zambian pharmacists makes it difficult to make any comprehensive suggestions on industrial training. The writer has therefore made his recommendations in the next chapter how pharmaceutical education can be promoted in Zambia. For the purpose of the requirements of the industry in this field the writer is constrained to refer to only two pharmacists working in industry without any previous training in pharmaceutical management, production or quality control.

Mr. S. Chalila of the Government Manufactory has initiative, but little expertise. Mr. P. Goma in MDC is hard-working, but again with no manufacturing experience. The writer therefore recommends that these two pharmacists may be awarded fellowships for six months each for receiving industrial training in pharmaceutical manufacturing establishments in developing countries of Asia belonging to UNIDO categories III and IV (ID.82 refers).

#### 6. Pharmaceutical Advisor

The writer feels that the problem of growth of the pharmaceutical industry and providing self-sufficiency to Zambia in the supply of drugs can best be tackled by looking at it in a complete manner and not in its isolated facets. In order to get tangible and lasting results, the whole problem has to be taken on a project basis spread over a period of five years so that the detailed proposals made after this study, if accepted by those concerned, can be implemented. The writer therefore recommends that a Pharmaceutical

Adviser may be provided by UNIDO or another agency for, initially, a period of three years with the following terms of reference:

- (a) To advise and assist the Ministry of Health and the Ministry of Trade and Industry in:
- the organization of the existing pharmaceutical industry both in the public and private sector.
  - the operation of the existing factories in an efficient manner and providing equipment, machinery and services required for producing drugs of the type and quantity needed for the country's public health requirements.
  - arranging training courses in pharmaceutical manufacture.
  - to prepare a National Formulary and to adapt standards in the existing Pharmacopias.
  - the execution of quality control programmes both at the Government level and in the manufacturing units.
  - modifying, expanding and implementing legislation on the quality control of pharmaceutical preparations.
  - proposing and implementing procedures on tariff, import and export and price rationalization of pharmaceutical preparations and their raw packing materials.
  - finding export markets in the neighbouring African countries.
- (b) To perform related advisory functions in fields of pharmaceutical education, profession and trade.

The Pharmaceutical Adviser after two years of his stay in Zambia may be provided with a counterpart who will be trained and will continue the work of the implementation of the project after the Adviser has left.

7. Export

In the short time at the disposal of the writer, export possibilities could not be explored due to absence of reliable data about the pharmaceutical market in the other countries of Africa. An effort was made to obtain some information from the trade missions of some countries in Lusaka but unfortunately, the material on pharmaceuticals was not available. In order to elicit information, the Chief Pharmacist, through the Permanent Secretary of the Ministry of Health, on the request of the writer, sent out a Proforma, presented in Appendix XV, to the Health Ministries of Botswana, Kenya, Lesotho, Malawi, Tanzania, Uganda and Zaïre with a request that it may be utilized as a questionnaire. No replies were received till the time of the departure of the writer.

It was not possible to visit any of the countries listed above as the time available was too short for such visits. A suggestion to visit Brassaville made informally by the WHO African Regional Office through the WHO Representative in Lusaka for obtaining pharmaceutical data of the region could also not be availed of.

However, some information was gained through discussion with representatives of pharmaceutical companies operating in African countries. The prospects of export of pharmaceuticals from Zambia to its neighbouring countries were not found optimistic at present. The main difficulty is communications which applies to all the countries except Tanzania and Malawi and the Copperbelt of Zaïre. In the last named, inspite of efforts, the writer was not able to find out if exports can be routed through Ndola and Kitwe into Lubumbashi in Zaïre through normal official channels. Malawi received most of its pharmaceutical supplies from Britain, Rhodesia and South Africa and it was difficult to assess if products of Zambian industry will find an acceptance in Malawi. This only left Tanzania with which the communications are constantly improving. Tanzania has an embryonic pharmaceutical industry of its own but, having an outlet to the sea, is not restricted in sources of supply. However,

bilateral arrangements can be considered between the Government of Tanzania and Zambia whereby the pharmaceutical industry in Zambia can be accepted as suppliers for some of the items like chloroquine phosphate tablets where the through-put of the Zambian industry will be enough to meet the requirements of Tanzania as well. The Intravenous Fluids as well as ampoules and vials for parental administration can also be presented for acceptance in Tanzania for Zambia. Similarly supplies of intravenous fluid can be made to Malawi from Zambia.

## VII. OTHER RECOMMENDATIONS

### 1. Tariff Import and Export Policy

It was not possible to study in depth the tariff structure in respect of all the raw and packing materials and equipment required by the pharmaceutical industry. However, certain trends were only too obvious. The finished pharmaceuticals are exempted from duty while some of the raw and packing materials are dutiable. This tariff structure acts adversely in the growth of the pharmaceutical industry as it gives an incentive for imports to continue. The writer therefore recommends that a detailed list of pharmaceutical raw and packing materials and equipment be prepared as are being imported at present. The tariff on each item is to be examined and if the items of such materials are exclusively for use in the pharmaceutical industry the duty should be withdrawn altogether. Where the item is not for exclusive use, an arrangement may be made whereby rebate on duty can be claimed by the manufacturer at the time of import if his request is supported by the Ministry of Health.

The Pioneer Industries Act, when received, may be applied to new units of pharmaceutical industry and also to the expansion programme of existing units. Balancing and modernization of equipment may be encouraged through a preferential rate of depreciation.

The present import policy is a step in the right direction and would certainly result in rationalization of import of drugs. A number of unnecessary and expensive items will be excluded through



scrutiny by the Ministry of Health. The Ministry of Health, who is the import agency for finished pharmaceuticals, should be careful to allow only such products as cannot be manufactured locally. This would apply particularly to Syrups, Tablets, Capsules and also to such injections for which manufacturing can be undertaken. A curb on import of finished pharmaceuticals is the best means of promoting the growth of local production. The writer is not in favour of protective rate of duty on imported finished products to protect the products of local industry.

The writer would like to sound a note of caution about introducing price control on drugs and medicines. While price control may lead to temporary reduction in prices, the long term effect on investment in pharmaceutical manufacture will be unfavourable. Price rationalization may, however, be considered and this can be done without adversely affecting the industry.

## 2. Government Buying

The present system of Government purchase tilts slightly in favour of imported drugs. The writer feels that this may be rectified by taking the following steps:

(a) The following items which can be easily manufactured in the country with the present facilities should only be purchased from local manufacturers and importers may be debarred from competing in tenders for these items:

- Ascorbic Acid Tablets, 200 mg
- Aspirin Tablets, 100 mg
- Aspirin Compound Tablets
- Chloroquine Phosphate Tablets, 250 mg
- Codeine Compound Tablets
- Ferrous Sulphate Compound Tablets
- Magnesium Trisilicate Compound Tablets
- Paracetamol Tablets
- Chloramphenicol Capsules, 250 mg

- Tetracycline Capsules, 250 mg
- Sulphadimidine Tablets, 500 mg
- Liquor Chloroxylenol
- Lysol.

(b) The weightage of locally produced drugs may be raised from 12% to 20% by the Tender Board, provided the quality of the local product is in no way inferior to that of the imported one. The writer is recommending enhanced weightage after going into the costing of the products of the National Drug Company and Vindas Drug House and is of the opinion that local industries will have greater chances of growth if they are given this very necessary protection in Government purchases.

\*)

(c) All-Countries Export Limited at present purchases items which the local industry is able to produce in sufficient quantities and acceptable quality. The sphere of the activities of the All-Countries Export Limited should therefore be restricted to buying medical stores including pharmaceutical and packed drugs. The pharmaceuticals purchased through All-Countries Export Limited are normally obtained from companies who do not have any business interests within Zambia and for this reason are unable to give any service or be accountable after the delivery has been made.

(d) The present Catalogue of Medical Stores in relation to Sections 7, 10, 11, 13 and 14 is under constant review by the Standardization Committee and the present number stands at 772. The Catalogue still contains a number of items with their multiple dosage forms which can be safely left out and the writer is confident that the Standardisation Committee will ultimately be able to reduce it to a more easily manageable Catalogue. In this connection, the

\*) Please see footnote on page 16.

writer wishes to record with appreciation the action of the Ministry of Health to control the prescribing of expensive pharmaceuticals in their circular 11/72 of 15 February 1972.

### 3. Pharmaceutical Education

The writer attaches a high degree of importance to personnel requirements for pharmaceutical industry in Zambia. In fact, the problem is part of the overall pharmaceutical personnel requirements in the Government, hospitals, trade and education. The number of Zambian pharmacists is an inadequately small one. The rate of turn out of Zambian pharmacists requires to be accelerated under a planned programme. No programme of expansion of industry can succeed and sustain itself without a firm base of personnel both in operation as well as in higher and middle management in the fields of production, quality control, education, Government administration, hospitals and trade.

There is no College of Pharmacy in the African Region South of the Equator and North of Zambesi. The international agencies in this region have a special responsibility in the matter. In fact, this is one field where they can render a great deal of assistance by providing experts and equipment.

It is the view of the writer that a degree course in Pharmacy can be started in the University at an early date. A beginning can be made either in the School of Medicines or School of Natural Sciences where in the early stages the subjects of Pharmaceutical study can be taught in the campuses of either of the two schools. For example, pharmacology, physiology and microbiology can be taken up in the School of Medicine while pharmaceutical chemistry, biochemistry, physics and pharmacognosy can be taught in the campus of the School of Natural Sciences. Pharmaceutical management is an essential ingredient of pharmacy education and this can be located for study in a management school. There does not appear to be a

dearth of scientific equipment in the University of Zambia. Practicals can also be equally distributed in the laboratories of the existing Department of Chemistry, Pharmacology etc. in the two schools. The Evelyn Hone College pharmaceutical laboratories can be used by students of the degree class. The courses can be tailored in such a way that a number of classes can be taken with the classes of Bachelor of Science courses. All this however will require careful co-ordination and the writer feels that a Pharmaceutical Education Expert may be provided by the WHO or any other international or foreign agency to the University of Zambia who will work with the Ministry of Health and act as a Project Manager for pharmaceutical education.

The present dispensers course in the Evelyn Hone College needs to be looked at with the objective of revising the syllabi of various subjects which could be slightly scaled down in volume without sacrificing the standards. The facilities for practical work and the number of experiments prescribed for the course needs to be augmented. The course would then qualify to be called a Diploma course in Pharmacy and would provide operators and supervisors for the pharmaceutical industry, junior pharmacists-in-charge for wholesale establishments and also to run retail pharmacies in various towns of Zambia. Also, the diploma holders can be employed in hospitals in the smaller towns and work under the supervision of graduate pharmacists in large hospitals. A bridge is however necessary between the diploma holders and their prospects of becoming graduates. This can be provided by suitable adjustment in the entry requirements for the degree course in pharmacy whereby promising diploma pharmacists, if they wish, can better their lot by qualifying for the degree course.

The proposal of diploma in pharmacy is purely of expediency and should necessarily be ad hoc in nature. The course should not be continued beyond ten years by which time sufficient number of graduate pharmacists will be available and the justification for the diploma course would have come to an end. In order to accelerate this matter further the writer would recommend that five graduates may be produced

in the University of Zambia every year for the first five years and thereafter the number may be gradually increased to ten in the long run. Simultaneously, five students may be sent every year to the college of pharmacy in the developed countries of Asia and Africa to qualify for graduate courses in pharmacy. The details of the above suggestions be worked by the Pharmaceutical Education Expert.

#### 4. Pharmaceutical Legislation

The field of legislation in respect of drugs is still an incomplete one, but the Ministry of Health is seized with the matter and with the assistance of FAO and WHO, the deficiencies are being made up. The WHO expert expected to arrive in Zambia will be able to draft and tidy up the existing legislation. However, there is a need for single piece of legislation on pharmacy and drugs in place of a multiplicity of such legislation which overlaps both in text and execution. Similarly, the authority to administer should be a single one. In the opinion of the writer, this should be in the office of the Ministry of Health.

#### 5. National Formulary

The problem of proliferation of brand names as well as the multiplicity of packs of different doses of certain single active ingredient drugs and their combinations is not unique to Zambia. The statement in the UNIDO document ITD/82 that "In one country study by UNIDO, it was found that there were 13 different brands of chloramphenicol, 40 anti-histamines, 40 tonics and 50 anti-diarrheals may well be true of Zambia. The writer feels that the need of a practical scientific formulary at least for the requirements of the Government, Mission and Mining Hospitals is of sufficient importance and urgency and recommends that an Expert Committee of the Ministry of Health consisting of clinicians and pharmacists should be constituted to draft a National Formulary for Zambia.

### ACKNOWLEDGMENT

The writer wished to express his thanks and appreciation to those who have helped him in his assignment particularly, Dr. H.H. Malumango, Permanent Secretary to the Ministry of Health, Mr. N. Kalinda, Under-Secretary to the Ministry of Trade and Industry, Mr. F. Harrison, Chief Pharmacist to the Ministry of Health, Mr. A. Gilpin, UNDP Representative and Mr. Branko Orgic, Senior UNIDO Field Adviser in Lusaka, for their kind reception and ready assistance and co-operation, and for giving time out of their pre-occupation which made the stay not only a pleasant one but also helped in presenting this report.

The writer wishes to express his thanks to members of the staff of the Ministry of Health and Ministry of Trade and Industry, the WHO Representative, the UNDP and UNIDO for their help.

APPENDIX I.

UN AGENCIES

1. Mr. A. Gilpin, UNDP Representative
2. Mr. B. Grgic, Senior UNIDO Field Adviser
3. Dr. G. G. Dibao, WHO Representative
4. Mr. K. Antony, UN Adviser in Statistics
5. Mr. T. Rose, Assistant UNDP Representative
6. Mr. J. Lupuin, FAO Project Manager on Food and Drug Control.

GOVERNMENT OF ZAMBIA, MINISTRY OF HEALTH

1. Dr. M. Nalunango, Permanent Secretary
2. Dr. C. O. Akerele, ADMS
3. Mr. F. J. Kataya, Under Secretary
4. Mr. S. S. Sakalla, Assistant Secretary
5. Mr. R. M. Makuni, Assistant Secretary
6. Mr. F. Harrison, Chief Pharmacist
7. Mr. J. J. Henderson, Chief Health Inspector
8. Mr. J. Innes
9. Dr. L. Stein
10. Mr. W. Pote
11. Mr. J. Macpherson
12. Mr. P. G. Moore
13. Mr. S. Challa.

MINISTRY OF TRADE AND INDUSTRY

1. Mr. H. Kalinda, Under Secretary
2. Mr. G. H. Linyama
3. Mr. J. L. Labast
4. Mr. Nyoni
5. Mr. G. H. Whitworth

APPENDIX I. (Continued)

INDECO

1. Mr. F. X. C. Makulwa, Secretary General
2. Mr. A. D. Zulu, Managing Director, Indeco Chemicals Ltd.
3. Mr. F. K. Mwanza, Managing Director, Indeco Training Ltd.

NATIONAL COUNCIL OF SCIENTIFIC RESEARCH

1. Dr. D. S. Krunika, Secretary General
2. Dr. S. M. S. Silangwa, Deputy Secretary General

UNIVERSITY OF ZAMBIA

1. Prof. Broadbent, Dean of School of Medicine
2. Prof. Skerlao, Head of Chemistry Department
3. Prof. Upadhyay, Chemistry Department
4. Dr. Connor Reilly, Head of Biochemistry Department

RYLAND HULL COLLEGE

1. Dr. Martin
2. Dr. B. H. Ryan
3. Mr. H. A. Chaudhry
4. Mrs. Upadhyay

GOVERNMENT HOSPITALS

1. Dr. Anis, Medical Superintendent, University Teaching Hospital, Lusaka
2. Mr. Allan, Chief Pharmacist, Lusaka
3. Dr. D. N. Braithwaite, Medical Superintendent, Ndola Hospital
4. Mr. W. Porter, Pharmacist, Kitwe Hospital
5. Mr. J. B. Paige, Pharmacist Secretary, Livingstone Hospital



APPENDIX I. (Continued)

HEALTH OFFICIALS

1. Mr. W. Reynolds, Group Chief Pharmacist, Kitwe
2. Mr. D. W. Green, Pharmacist, Chingola Hospital, Chingola
3. Mr. J. F. Butler, Pharmacist, Ikona Hospital, Kitwe
4. Mr. C. MacQuattie, Pharmacist, Mafilira Hospital, Mafilira

PHARMACEUTICAL TRADE AND INDUSTRY

1. Mr. D. G. Cowell, Managing Director, Northern Drug Co., Kabwe
2. Mr. R. Pearson, Northern Drug Co., Kabwe
3. Mr. D. Wadsworth, Northern Drug Co., Kabwe
4. Mr. W. Hanson, KDC, Lusaka
5. Mr. P. Goma, KDC, Lusaka
6. Mr. R. V. Doozi, Proprietor, Vindas Drug House, Lusaka
7. Mr. B. G. Ngoma, Pfizer, Lusaka
8. Mr. A. J. Makoona, Caps Ltd., Lusaka
9. Mr. E. Manji, Karibou Chemists, Lusaka
10. Mr. G. Schindler, Schering AG, Lusaka
11. Mr. R. W. Kielstrup, Searochem, Lusaka
12. Mr. Ernest A. Eraba, Wyeth, Lusaka
13. Mr. H. Bairdson, Glaxo, Lusaka
14. Mr. B. Harvie, Glaxo, Lusaka
15. Mr. H. G. Thomson, Cooper (Zambia), Lusaka
16. Mr. B. Adler, Burroughs-Wellcome, Lusaka
17. Mr. P. Gillies, Johnson and Johnson, Lusaka
18. Mr. I. Turner, Beecham, Lusaka
19. Mr. B. Ring, Indeco Harrison, Lusaka
20. Mr. J. Grogan, Midmorris, Lusaka
21. Mr. K. B. Patel, Lusaka Pharmacy, Lusaka
22. Mr. E. L. Wright, Lindsay Pharmaceuticals, Ndola
23. Mr. G. B. H. English, Baird and Snellock Ltd., Ndola
24. Mr. B. J. Marshall, Sterling Products Ltd., Ndola
25. Mr. E. White, General Pharmaceuticals, Kitwe

APPENDIX II.

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Minerals

Metals

State of Metals Corporation

National Transport Corporation of Zambia

Agribusiness

Indeco Chemicals  
Nyanja Chemicals of Zambia  
Refined Oil Products  
Shell B.P. Zambia  
Tobacco Packaging  
Kawanda  
Zambia Oxygen  
Kempson Minerals  
Kempson Glass Products  
Agro Zambia  
Indeco Oil Refinery Co  
1973

Steelbuild Holdings  
Aggregates Industries  
Aerials Industries  
Chibanga Cement  
Crushed Stone Sales  
Glen's Josephs of Zambia  
Hardware Merchants of Zambia  
Lusaka Engineering Co  
Mwanari Zambia  
Steel Supplies of Zambia  
Timber Merchants of Zambia  
Zambia Clay Industries

Indeco Trading  
Consumer Buying Corporation of Zambia  
General Pharmaceuticals  
Indeco Mowden  
Mowden Stores  
Zambia Natural Distribution Co.  
ZDC  
Zambia Trading Co  
National Drug Co

Rubson Holdings  
Rubson Milling  
Lubrication of Zambia  
Mwingi Timbers  
Mwambi Spheros  
National Milling Co  
Racem Industries  
Racem Baking Co  
Racem Saw Mills

Indeco Breweries  
National Breweries  
The Zambia Sugar Co.  
Zambia Breweries  
Brewery, Gilbey and Mowden (Zambia)

Indeco Industrial Holdings  
Consolidated Tyre Services  
Indeco Industrial Fabrics  
Kafue Timbers of Zambia  
Livingstone Motor Assemblies  
Metal Fabricators of Zambia

Other  
Single Text

Indeco Steel Centre  
Indeco Paperies  
Kafue Centre  
Mwambi Paperies  
Progressive Development  
Rural Post Centre

APPENDIX IV.

IMPORT LIST OF DRUGS AND MEDICINES  
CONTROLLED BY MINISTRY OF HEALTH

S I T C	DESCRIPTION	UNIT	B T N	I S I C
SECTION 5.				
541 11	Provitamins and Vitamins IB	KG	293810	352 7000
541 19	Provitamins and Vitamins NIB	KG	293820	352 7000
541 36	Antibiotics IB	KG	294410	352 7000
541 39	Antibiotics NIB	KG	294420	352 7000
541 46	Vegetable Alkaloids and Derivatives IB	KG	294210	351 2352
541 49	Vegetable Alkaloids and Derivatives NIB	KG	294220	351 8000
541 52	Insulin and Salts and Compounds IB	KG	293911	352 7000
541 53	Insulin and Salts and Compounds NIB	KG	293921	352 7000
541 58	Hormones and Steroids Nos IB	KG	293919	352 7000
541 59	Hormones and Steroids Nos NIB	KG	293929	352 7000
541 61	Glycosides and Derivatives IB	KG	294110	351 2311
541 62	Organo-Therapeutic Glands and Organs NIB	NIL	300100	352 7000
541 63	Microbial Cultures	NIL	300210	352 7000
541 64	Antisera, Vaccines, Toxins and Similar	NIL	300290	352 7000

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N.B. NIB - Not in Bulk  
NIB - Not elsewhere specified  
IB - In Bulk

APPENDIX IV. (Continued)

S I T 0	DESCRIPTION	UNIT	B T N	I S I C
SECTION 5.				
541 69	Glycosides and Derivatives NIB	KG	294120	351 2311
541 71	Insulin	WIL	300320	352 7000
541 72	Antibiotics	WIL	300320	352 7000
541 73	Anti-Malaria Leprosy Bilharzia TB Drugs	WIL	300330	352 7000
541 74	Veterinary Medicines	WIL	300340	353 7000
541 75	Medicaments, Other	WIL	300390	352 7000
541 99	Other Pharmaceutical Goods, NIB	WIL	300590	385 7000
551 31	Aqueous Solutions with 2% Alcohol, Medic.	L	330511	352 7000
551 32	Aqueous Solutions, Other Medicinal Use	L	330591	352 7000
599 77	Prepared Culture Media	KG	381900	351 2351

APPENDIX V.

GOVERNMENT HOSPITAL CONSUMPTION OF DRUGS MAIN LIST

INJECTIONS

<u>CODE NO.</u>	<u>NAME</u>	<u>QUANTITY</u>
502850	Adrenaline, 1 ml ampoules	20,635
507340	Ascorbic Acid 100 mg/ml, 5 ml ampoules	27,790
507480	Atropine Sulphate, 50 mg ampoules	38,900
508600	Calcium Gluconate 20%, 10 ml ampoules	13,834
510020	Chloroquine Phosphate, 5 ml ampoules	635,822
510090	Chlorpromazine Hydrochloride 2.5%, 50 mg in 2 ml ampoules	91,140
511340	Cyanocobalamin, 1000 µg ampoules	16,360
519350	Hyoscine N-Butyl Bromide (Dussopan) ampoules	31,290
520600	Inferon, 2 ml ampoules	115,496
520620	Inferon, 5 ml ampoules	83,134
521490	Liver Extract, 2 ml ampoules	9,819
524520	Morphine Sulphate, 15 mg/ml, 1 ml ampoules	6,816
527480	Nikethamide, 6 ml ampoules	26,937
534200	Pentamidine Hydrochloride, 50 mg ampoules	23,744
534300	Pentamidine Hydrochloride, 100 mg ampoules	31,348
535200	Phenobarbitone Sodium, 200 mg ampoules	20,920
540500	Promethazine Hydrochloride 2.5%, 2 ml ampoules	52,831
549670	Succinyl Choline Chloride, 50 mg/ml, 2 ml ampoules	20,105
555780	Aminophylline Intramuscular, 2 ml ampoules	29,957

APPENDIX V. (Continued)

<u>CONTRACT NO.</u>	<u>NAME</u>	<u>QUANTITY</u>
555960	Aminophylline Intravenous, 10 ml ampoules	43,665
559450	Vitamin A 100,000 units ampoules	36,406
561000	Vitamin K, Water Soluble, 10 mg, 10 ml ampoules	28,427
563000	Water for Injection, 5 ml ampoules	107,843
563250	Water for Injection, 10 ml ampoules	248,599
510000	Chloramphenicol Succinate 1 g Vial	45,483
530450	Penbritin 250 mg R.C.V.	35,000
530460	Penbritin 500 mg R.C.V.	26,950
531500	Penicillin G 0.5 mega R.C.V.	147,207
532000	Penicillin 5 mega R.C.V.	272,694
532040	Penicillin Benzathine 5 dose Vial	102,373
532760	Procaine Penicillin, Oily 30,000 Units/ml 10 ml R.C.V.	1,035,670
548960	Streptomycin Sulphate 5 m R.C.V. (Dr) Vial	112,460
549000	Streptomycin (Multi Dose Liquid) 5g/20 ml Vial	17,220
556830	Triphoson R.C.V.	189,215
560100	Vitamin B Complex, 10 ml R.C.V.	41,700
563570	Water for Injection, 30 ml R.C.V.	136,962

L. V. BUCK

Bartrose 5% in Water	65,000	Units
Bartrose 2 1/2% in Water	20,000	"
Bartrose 7% in Saline	33,000	"

APPENDIX V. (Continued)

Dextrose 2 $\frac{1}{2}$ % in Half Saline	16,000	Units
Invert Sugar 10% in Water	9,000	"
Invert Sugar 5% in Sodium Chloride 0.2%	3,000	"
1/6 Molar Lactate Solution	6,000	"
Ringer's Solution	5,000	"
Darrow's Solution	40,000	"
Lactated Ringer Solution	5,000	"
Darrow's Solution with 2.5% Dextrose	70,000	"
Normal Saline	50,000	"
Blood Plasma Expander	7,000	"
Various Other Solutions	7,000	"
A. C. D. Solution	42,000	"

EAR AND EYE PREPARATIONS

<u>CODE NO.</u>	<u>NAME</u>	<u>QUANTITY</u>
813680	Hydrocortisone 1% with Neomycin 0.5% Eye Drops, 3 ml	9,582
814340	Tetracycline with Hydrocortisone 4 ml Eye and Ear Drops	45,647
814700	Tetracycline Eye Ointment, 3 g Tube	74,336
814850	Golden Eye Ointment, 3 g Tube	12,276
814900	Penicillin Eye Ointment, 3 g Tube	36,070
815040	Sulphaacetamide Eye Ointment, 10% 3 g Tube	75,451



APPENDIX V. (Continued)

LIQUIDS

<u>QTY.</u>	<u>NAME</u>	<u>QUANTITY</u>
827700	Mixture Chloramphenicol Palmitate, 1 Litre	7,059
846400	Dettol, 1 Litre	10,614
851000	Lysol, 1 Gallon	2,098
851660	Solution Hibitane Conc 5% 1 Gallon	1,223
853980	Solution Savlon Conc, 5 Litre Tin	2,095
855160	Solution Sodium Hypochlorite Electrolytic 1% (Milton) 5 Litre Pack	1,363
855690	Solution Vitamin A and B Concentrated 50 ml Bottle	6,048
858700	Syrup Chlorpromazine, 1 Litre	1,172
860000	Syrup Pentritin, 100 ml	11,823
860440	Syrup Tetracyclin, D.M.C., 1 Litre	5,095
860460	Syrup Tetracycline, (Plain), 1 Litre	14,196
860700	Syrup Multivitamin, 1 Litre	24,144
860720	Syrup Multivitamin with Glycero-phosphate, 1 Litre	6,284
861600	Tetracyclin Paediatric Drops, 10 ml	7,678
863580	Chlorodyne Tincture, 80 fl. oz.	4,497

TABLETS

903880	Ascorbic Acid 200 mg, 100's	18,644
903880	Folic Acid 5 mg, 100's	34,161
903880	Aspirin 100 mg, 100's	207,380

APPENDIX V. (Continued)

<u>CODE NO.</u>	<u>NAME</u>	<u>QUANTITY</u>
903250	Asprin Soluble 300 mg, 100's	37,891
90440	Asprin Compound, 100's	126,859
905400	Calcium Gluconate, 100's	20,350
905650	Caroquin 200 mg, 100's	13,570
907100	Chloroquin Phosphate 250 mg, 100's	120,874
907200	Chlorpromazine Hydrochloride 25 mg, 100's	11,623
907220	Chlorpromazine Hydrochloride 100mg, 100's	10,855
90740	Codeine Compound, 100's	116,093
907570	Codein Compound Soluble, 100's	23,710
910220	Ephedrine Hydrochloride 30 mg, 100's	11,810
910820	Ferrous Gluconate 300 mg Tabs. 100's	31,118
910940	Ferrous Sulphate Compound Tabs. 100's	69,660
913650	Hyoscyne-N-Butylbromide (Buseopan) 10 mg, 100's	29,360
914540	Magnesium Trisilicate Compound Tabs. 100's	24,010
915034	Medox, 100's	17,860
919970	Paracetamol Tabs, 100's	43,839
921050	Penicillin V 125 mg, Tabs. 100's	37,347
922480	Phenobarbitone 30 mg, 100's	17,716
926570	Promethazine Hydrochloride 25 mg, 25's	15,575
926600	Promethazine Hydrochloride 10 mg, 25's	10,354
926610	Promethazine - 8 - Chlorotheophyllinate 25 mg, 10's	20,420
927420	Pyrimethamine, 25 mg Daraprim, 100's	11,965
933760	Sulphadiazine 500 mg, 100's	45,980

APPENDIX V. (Continued)

<u>CODE NO.</u>	<u>NAME</u>	<u>QUANTITY</u>
937900	Fraxol Tablets, 100's	12,272
939300	Thiazine (Adult) Tablets, 100's	20,100
939310	Thiazine (Child) Tablets, 30's	29,570
941600	Triple Sulphonamide 500 mg Tab., 100's	24,340
943000	Vitamin B Complex, 100's	63,120
949000	Vitamin A, B, C and D Tablets, 100's	151,077
948000	Yeast with Vitamin B Complex, 100's	21,650

CAPSULES

906990	Chloramphenicol Capsules 250 mg, 100's	12,239
909900	Penicillin Capsules, 100's	15,023
937400	Tetracycline 250 mg Capsules, 100's	60,872

APPENDIX VI.

PREPARATIONS MANUFACTURED BY GOVERNMENT  
MEDICAL STORES MANUFACTORY, LUSAKA  
JANUARY - DECEMBER 1972

<u>CODE NO.</u>	<u>PREPARATION</u>	<u>UNIT</u>
801200	Application Benzyl Benzoate B. P.	1 Litre
805440	Collodium Salicylic Acid	100 ml
806980	Cream Dimethyl Fththalate (Anti Mosquito) Cream	100 G
807262	Cream Cetrinide 0.5% in tubes (20G)	20 G
807260	Cream Cetrinide 0.5% in tins bulk packed	10 KG
807100	Cream Zinc Oxide	1 KG
807480	Cream Zinc and Castor Oil	1 KG
809000	Ear Drops Boric Acid	100 ml
810160	Ear Drops Phenazone	100 ml
810280	Ear Drops Phenol	100 ml
810440	Ear Drops Sodium bicarbonate	100 ml
810540	Ear Drops Spirit	100 ml
810650	Elixir Diphenhydramine	1 L
810700	Elixir Mepyramine Maleate	1 L
810740	Elixir Piperazine Maleate	1 L
810780	Elixir Promethazine	1 L
812140	Emulsion Liquid Paraffin	1 L
813340	Eye Drops Cocaine Oily	15 ml
814180	Eye Drops Sulphacetamide Sodium 10%	15 ml
814280	Eye Drops Sulphacetamide Sodium 10%	15 ml

APPENDIX VI. (Continued)

<u>FORMULA</u>	<u>PREPARATION</u>	<u>QUANTITY</u>
816170	Liquid Extract Ipecacuanha	100 ml
816290	Liquid Extract Liquorice	1 L
817100	Liquid Extract Senega	1 L
820390	Glycerin of Borax	100 ml
821140	Glycerin Thymol Co.	1 L
822700	Fly Spray (Knockdown)	1 L
823400	Linctus Pholeodine	1 L
823490	Linctus Squill Opiate B.P.C.	1 L
823510	Linctus Squill Opiate Paediatric	1 L
824100	Lotion Calamine Oily	1 L
824190	Liniment Camphor	1 L
824480	Liniment Methyl Sal	1 L
824840	Liniment Turpentine	1 L
825480	Lotion Calamine	1 L
827440	Mixture Belladonna and Ephedrine B.P.C.	1 L
827500	Mixture Bispect (Kaelin, Pectin, Sulpho- guanidine, Neomycin)	100 ml
827690	Mixture Ipecac, Opiate Paed. B.P.C.	1
827680	Mixture Ammon. Chlor. et Morph. B.P.C.	1
828290	Mixture Ammon et Ipecac. B.P.C.	1
828380	Mixture Fluids (Body Electrolytes NaCl, KCl, Mg (OH) ?)	1
828780	Mixture Influenza (Sod. Sal., Sod. Bicarb., Tinct. Opium Camphorated)	1

APPENDIX VI. (Continued)

<u>QUR. NO.</u>	<u>PREPARATION</u>	<u>UNIT</u>
828540	Suspension Streptomycin and Sulphaguanidine and Kaolin.	200 ml
828790	Mixture Kaolin and Morphine	1 L
829100	Mixture Lobelia and Stramonium	1 L
829140	Mixture Magnesium Hydroxide	L
829250	Mixture Magnesium Trisilicate	L
829710	Mixture Pot. Citrate	1 L
830120	Mixture Sodium Bicarbonate	1 L
830170	Mixture Sodium Salicylate	1 L
830320	Mixture Sulphadiazine	1 L
830410	Mixture Sulphaguanidine	1 L
830900	Mixture Triple Sulphonamide	1 L
832710	Nasal Drops Ephedrine 0.5%	100 ml
832870	Nasal Menthol and Thymol	100 ml
834170	Ointment Benzoic Acid Co.	1 EG
835290	Ointment Emulsifying	1 EG
835770	Ointment Hydrocortisone 0.7%	5 G
835790	Ointment Hydrocortisone 1%	15 G Tube
835820	Ointment Hydrocortisone 2.5%	15 G Tube
837690	Ointment Methyl Sal.	1 EG
837890	Ointment Nipple	1 EG
838770	Ointment Salicylic Acid	1 EG
838870	Ointment Sulphur	1 EG

APPENDIX VI. (Continued)

<u>CODE NO.</u>	<u>PREPARATION</u>	<u>UNIT</u>
839620	Ointment Zinc Undecanoate	25 g Tube
839680	Ointment Chloroquinol	25 g Tube
839840	Ointment Zinc Oxide	1 KG
84054C	Oxymal Squill	1 L
841400	Paint Crystal Violet 1%	Packet
841960	Paint Iodine Co.	100 ml
850200	Solution Cetrimide 1%	Packet
850220	Solution Cetrimide 10%	1 L
850310	Solution Chloramine 2%	Packet
851780	Solution Hydrogen Peroxide 20 vol.	1 L
851970	Solution Iodine Aqueous (Lugols)	100 ml
852080	Solution Iodine Strong	1 L
852170	Solution Iodine Weak	1 L
853870	Solution Proflarine	Packet
855200	Solution Sargol in Spirit	1 L
855280	Solution Suture Sterilising	1 L
856000	Spirit Ammonia Aromatic	100 ml
856070	Spirit Camphor	100 ml
856920	Spirit Orange Co.	100 ml
857100	Surgical Spirit	1 L
858330	Syrup Chloral	1 L
858400	Syrup Chloral for Children	1 L
858480	Syrup Chloroquin Phosphate	1 L

APPENDIX VII. (Continued)

<u>REF. NO.</u>	<u>PREPARATION</u>	<u>QTY.</u>
858790	Syrup Codeine Phosphate	1 L
862420	Tincture Belladonna	1 L
862740	Tincture Benzoin Co.	1 L
863420	Tincture Catucler	1 L
865020	Tincture Ipecacuanha	1 L
865790	Tincture Opium	1 L
865970	Tincture Opium Camphurated	1 L
866810	Tincture Squall	1 L



APPENDIX VII.

EQUIPMENT AVAILABLE AT NATIONAL MILK CO. LAHORA

- Ointment Filler 3 Gall. capacity
- Ointment Filler 8 Gall. capacity
- Ointment Filler 8 Gall. capacity
- Pallet Trolley 500 lb. capacity
- Artel Vacuum Filling Machine
- Filling Hopper capacity 4 Gall. Gravity (per) valve
- Labelling Machines hand operated x 4
- Powder Filler electronic timer etc.
- Glycerin packing plant
- 2 x 1 Gall./hour Mumcote automatic stills stainless steel
- Detoniser 14 Gall. capacity
- 1 x 120 Litre Herbst Mixer with steam jacketted bowl and spare bowl
- Mumcote Homogeniser 220 lb. 1 hour capacity
- 1 x 4 Gall. peerless mixer with bowls
- 1 x 28 Gall. stainless steel Mixing vessel
- 1 x  $\frac{1}{2}$  horse power mixer for (P)
- 2 x 100 Gall. Glass fibre tanks
- 1 x 2 horse power Silverton Mixer with fittings
- 1 x 250 Gall. Glass fibre tanks
- 1 stainless steel positive displacement rotary pump 45 Gall./hour
- 1 Filter Press with pump, capacity 5 Gall./min.
- 1 x 250 LB Scale
- 1 x 112 lb. Scale

APPENDIX VII. (Continued)

- 1 x 14 lb. Balance Scales
- 2 x 4 lb. Balance Scales
- 1 x 2.4 KG Ohaus triple beam balance
- 1 x 50 gramme dispensary Scale
- 1 Stabilised oven control 0-250°C - 1/2°C
- 1 200 deep freeze
- 1 Deans stark apparatus per water determination
- 1 x 6 Gall. Stainless steel simmerstat boiler
- 1 x 4 gall Tea Urn
- 2 small hotplates 500 W
- 1 double hotplate 300 W 500 W
- 3 x 10 Gall. stainless steel vessel with tops
- 2 x 4 gall stainless steel mixing vessels
- 1 x 1/8 horse power portable mixer for 10 Gall. vessel
- 1 Hyvac vacuum pump laboratory size
- 2 x 10 Litre vacuum filter flasks
- 2 x 11" Buchner vacuum filter funnels
- Glass Flasks measures etc. all breakable but replaceable
- 1 x 10 Litre stainless steel measure
- 1 x 20 Litre stainless steel measure
- 1 x 1 Gall. stainless steel measure
- 1 x 5 Gall. stainless steel measure
- 1 x 10 KG/hr triple roll mill Simplex electric single phase
- 1 x 1 Litre home liquidiser G.E.C.

APPENDIX VII. (Continued)

1 x 5 Litre Mafico Hydraulic Tincture Press  
Tablet/Capsule Filling Counter  
Capsule Filling Machine  
Mixing Pans 100 L  
Dry Powder Blender 25 KG  
Drying Oven 50 KG  
Coating Pans (100,000 per load)  
Labelling Machine (1,000 per hour)  
Green Filler  
Powder Blender (250 KG)  
Tabletting Machine Manesty F 2 (5,000 per hour)  
Ointment Mill (100 KG per hour)  
Ointment Depositor  
Emulsifier (50 KG per hour)  
Aerosol Plant (500 per hour)  
Conveyor Belts 20 ft.  
Mixing Pans 100 L  
Mixing Pans 100 L  
Mixing Pots 200 L  
Labelling Machine (New Man)  
Manesty Granulator  
2 Manesty Tabletting Machines (2B 3) 40,000 per hour  
Vortex Mixer and Stands (1,000 KG)  
Sizing Filler (Aronco Alite)  
Tablet Disintegration Tester

APPENDIX VII. (Continued)

Toothpaste Filler (Brester, 1,000 per hour)  
Tube Filling Machine  
Trolly, Containers and Drums  
Stainless Steel Drum  
Semi Automatic Filling Machine (Vacuum Filler)  
Horizontal Mixer (500 K1)  
Specyrophotometer  
Lens Grinding Machine  
Mixer and Blender (3001)  
Printing Machine (Adana 5/3)  
Mixer (100 L)  
10 Gall. Heated Tintment Filler. Tap fill : s/s? Old  
Nail Polish Filler : Air tight closure 1 Gall. : Home-made  
Liquid Valve Filler Gravity small volume  
Tube or Cream Filler water jacketed  
Adelphi Vacuum Filter complete with Pump large, 200  
Adelphi Junior Filler complete with Pump, new  
Two Lipstick Moulds, used  
Mascara Moulds  
Stainless Steel Tank 25 Gall. : Tap run-off  
Cream Filler. Adjustable. Well used  
Homogenizer Homonta Size A. Almost new (new price K 900)  
Plastic Tube Sealer : Heater.  
2 x Stainless Steel Oil Heater Hopper 400 lb. capacity complete with  
stirrers  
3 x 50 Gall. stainless steel tanks. Poor quality.  
2 Hand Oil Pumps.

APPENDIX VIII.

ITEMS MANUFACTURED AND PACKED BY  
NATIONAL DRUG CO., LTD., USAKA

1.	Acetone	50 ml
2.	Almond Oil	25 ml
3.	Alum	100 g
4.	Ammon. Pincture of Quinine	25 ml
5.	A.P.C. Tablets	25
6.	A.P.C. Tablets	100
7.	Anna Tablets	25
8.	Aspirin Tablets	25
9.	Aspirin Tablets	100
10.	Babycoff	50 ml
11.	Babycoff	100 ml
12.	Babycoff	500 ml
13.	Bonasp	100 ml
14.	Bicarbonate of Soda	500 g
15.	Boracic Crystal	100 g
16.	Boracic Powder	100 g
17.	Borax	100 g
18.	Boric Acid Ointment	25 g
19.	Brewers Yeast Tablets	100
20.	Brewers Yeast Tablets	1000
21.	Calamine Lotion	100 ml
22.	Camphorated Oil	100 ml
23.	Castor Tetrachloride	100 ml

APPENDIX VIII. (Continued)

24.	Carbon Tetrachloride	200 ml
25.	Castor Oil	50 ml
26.	Castor Oil	100 ml
27.	Cherridrine Cough Syrup	50 ml
28.	Childrens Diarrhoea Mixture	50 ml
29.	Childrens Diarrhoea Mixture	100 ml
30.	Childrens Diarrhoea Mixture	500 ml
31.	Citronella Oil	25 ml
32.	Codeine Co. Tablets	25
33.	Codeine Co. Tablets	100
34.	Cod Liver Oil	100 ml
35.	Cod Liver Oil	50 ml
36.	Cod Liver Oil	500 ml
37.	Cold and Influenza Mixture	200 ml
38.	Connosol	500 ml
39.	Creosoted Cough Mixture	200 ml
40.	Creosoted Cough Mixture	500 ml
41.	Curitan	50 G
42.	Diarrhoea Mixture - Adults	100 ml
43.	Diarrhoea Mixture - Adults	200 ml
44.	Diarrhoea Mixture - Adults	500 ml
45.	Dysentery Mixture	200 ml
46.	Expectoratory Mixture	500 ml
47.	Ear Drops	

APPENDIX VIII. (Continued)

48.	Embrocation	100 ml
49.	Ephedrine Tablets	100
50.	Epsom Salts	100 G
51.	Epsom Salts	500 G
52.	Eucalyptus Oil	50 ml
53.	Eye Drops Protargol	
54.	Eye Drops Zinc and Boracic	
55.	Flowers of Sulphur	100 G
56.	Inhalent	15 ml
57.	Friars Balsam	25 ml
58.	French Tussi Syrup	100 ml
59.	Gees Linotus	100 ml
60.	Gentian Violet Paint	25 ml
61.	Glaubers Salts	100 G
62.	Glucose Powder	500 G
63.	Glycerine Lemon and Honey	100 ml
64.	Ipecac	
65.	Glycerine	50 ml
66.	Glycerine	100 ml
67.	Glycerine	200 ml
68.	Glycerine	500 ml
69.	Glycerine and Rosewater	100 ml
70.	Glycerine of Thymol Co.	100 ml
71.	Hydrogen Peroxide 20 Vol.	100 ml
72.	Hydrogen Peroxide 20 Vol.	700 ml

APPENDIX VIII. (Continued)

73.	Hydrogen Peroxide 40 Vol.	100 ml
74.	Hydrogen Peroxide 40 Vol.	200 ml
75.	Hydrogen Peroxide 60 Vol.	200 ml
76.	Hydrogen Peroxide 100 Vol.	500 ml
77.	Indigestion and Stomach Mixture	200 ml
78.	Kidney and Bladder Pills	25
79.	Junior Aspirin Tablets	1000
80.	Lime	100 g
81.	Linseed Oil	100 ml
82.	Linseed Oil	500 ml
83.	Liquid Paraffin	100 ml
84.	Liquid Paraffin	200 ml
85.	Liquid Paraffin	500 ml
86.	Mercurochrome Solution	25 ml
87.	Methylene Blue Pills	100
88.	Methylene Blue Pills	1000
89.	Multivitamin Tablets	100
90.	Multivitamin Tablets	1000
91.	Multivitamin Syrup	100 ml
92.	No-Worm	25 ml
93.	No-Worm	500 ml
94.	Olive Oil	50 ml
95.	Olive Oil	100 ml
96.	Paracetamol Tablets	25
97.	Paracetamol Tablets	250



APPENDIX VIII. (Continued)

98.	Peppermint Cough Mixture	100 ml
99.	Potassium Permanganate	20 g
100.	Potassium Permanganate	50 g
101.	Resin Ointment	25 g
102.	Sal. Volatile	25 ml
103.	Spirit of Camphor	25 ml
104.	Stomach Powder	3/8
105.	Sulphur Ointment	25 g
106.	Sulphur Ointment	100 g
107.	Surgical Spirit	100 ml
108.	Surgical Spirit	200 ml
109.	Tincture of Iodine	25 ml
110.	Tincture of Iodine	100 ml
111.	Tincture of Iodine	500 ml
112.	Tonic Tablets	25
113.	Toothache Essence	15 ml
114.	Turpentine Oil	200 ml
115.	Turpentine Oil	500 ml
116.	Zinc and Castor Oil Green	25 g
117.	Zinc and Castor Oil Green	100 g
118.	Zinc Ointment	25 g
119.	Zinc Ointment	100 g

APPENDIX II.

VEGETAL DRUG HOUSE, LUNDA

EQUIPMENT

2 Electrical Stirrers

2 x 45 Gall. Churns

1 x 25 Gall. Churns

One complete unit, Aerosol filling semi-automatic for air fresheners and insecticides

One unit for manufacturing Plastic bottles, transparent, screw-cap necks

200 ml Bottles, 3500 Bottles per day.

25 ml Bottles, 5000 Bottles per day.

APPENDIX I.

VEDAS DRUG HOUSE, LISAKA

PRODUCTS

<u>TABLETS</u>	<u>PACK</u>
1. A.P.C. Tablets	25 50 100 1000
2. Aspirin Tablets, 100 mg	25 50 100 1000 5000
3. Aspirin Tablets, Pink, 100 mg	1000
4. Aspirin Junior, Flavoured, 75 mg	50 1000
5. Ascorbic Acid, Flavoured, 100 mg	100 1000
6. Chloroquine Phosphate (Malasler), 250 mg	1000
7. Codeine Compound	25 50 100 1000
8. Calcium Gluconate	1000
9. Ephedrine HCL., 30 mg	100 1000
10. Ferrous Sulphate CD	1000
11. Nattabs (Bartres/Saline)	100 1000

APPENDIX I. (Continued)

<u>TABLETS</u>	<u>PACK</u>
12. Lucanthone, 250 mg	1000
13. Multivitamins	1000
14. Phenobarbitone, 30 mg	1000
15. Phenobarbitone, 60 mg	1000
16. Prednisolone, 5 mg	1500
17. Paracetamol (Dacamol), 500 mg	25 50 100 1000
18. Sulphadiazine, 0.5 gm	1000
19. Sulphadimidine, 0.5 gm	1000
20. Sulphaguanidine, 0.5 gm	1000
21. Sulphathiazole, 0.5 gm	1000
22. Triple Sulphonamide (Sulphadiazine, 0.1 gm, Sulphadimidine, 0.2 gm, and Sulphathiazole 0.2 gm per Tablet)	1000
23. Theophylline CD. (Dacolon) (Ephedrine HCL 2 mg, Phenobarbitone 8 mg, and Theophylline Anhyd. 120 mg per Tablet)	50 100 1000

PACKED LIQUIDS (LARGE PACKS)

1. Cream of Magnesia	750 ml
2. Gess Linotus	750 ml
3. Eubrocation	750 ml
4. Gentian Violet Aqueous Solution	750 ml
5. Glycerine	750 ml

APPENDIX L (Continued)

6.	Methylated Spirit	750 ml
7.	Mist. Children Cough Cure	2 L
8.	Mist. Children Cough Cure (Triplex)	2 L
9.	Mist. Expect. Sed.	2 L
10.	Mist. Expect. Sed. QUAD	2 L
11.	Mist. Expect. Stim.	2 L
12.	Mist. Kaolin	2 L
13.	Mist. Kaolin with Morphine	2 L
14.	Mist. Magnesium Trisilicate	2 L
15.	Mist. Pot. Cit.	2 L
16.	Mist. Pot. Cit. (Triplex)	2 L
17.	Multivitamin Syrup (Multimin)	2 L
18.	Paracetamol Elixir (Dacamol)	750 ml
19.	Pectelin Suspension (Kaolin/Pectin)	2 L
20.	Piperazine Elixir	2 L
21.	Penicillin Suspension, Dry Powder, 125 mg / 5 ml	60 ml
22.	Penicillin Suspension, Dry Powder, 125 mg / 5 ml	100 ml
23.	Tincture Iodine	750 ml
24.	Whitefields Ointment	500 g
25.	Methyl Salicylate Ointment	500 g
26.	Zinc Oxide Ointment	500 g
27.	Caster Oil	750 ml
28.	Caster Oil	4 L
29.	God Liver Oil	750 ml
30.	Liquid Paraffin	750 ml

APPENDIX I. (Continued)

31. Liquid Paraffin	4 L
32. Calamine Lotion	750 ml
33. Methyl Salicylate (Liniment)	750 ml

ENCLOSURES (SMALL PACKS)

1. Blood Purifying Syrup	100 ml
2. Dexamol Mixture	50 ml
3. Vinalin Cough Mixture	100 ml
4. Melaelon (For Malaria)	50 ml
5. Worm Expeller	50 ml
6. Camphor Spirit	50 ml
7. Camphor Spirit	100 ml
8. Castor Oil	50 ml
9. Castor Oil	50 ml
10. Castor Oil	100 ml
11. Castor Oil	150 ml
12. Castor Oil	200 ml
13. Cod Liver Oil	50 ml
14. Cod Liver Oil	100 ml
15. Cod Liver Oil	150 ml
16. Cod Liver Oil	200 ml
17. Calamine Lotion	100 ml
18. Calamine Lotion	200 ml
19. Camphorated Oil (Liniment)	50 ml
20. Camphorated Oil (Liniment)	100 ml

APPENDIX I. (Continued)

21. Eucalyptus Oil	50 ml
22. Eucalyptus Oil	75 ml
23. Eucalyptus Oil	100 ml
24. Eucalyptus Oil	500 ml
25. Glycerine	5 ml
26. Glycerine	50 ml
27. Glycerine	100 ml
28. Glycerine	150 ml
29. Glycerine	200 ml
30. Glycerine	250 ml
31. Glycerine and Rose Water	100 ml
32. Glycerine and Rose Water	150 ml
33. Glycerine and Rose Water	200 ml
34. Emulsion	100 ml
35. Liquid Paraffine	50 ml
36. Liquid Paraffine	100 ml
37. Liquid Paraffine	150 ml
38. Liquid Paraffine	200 ml
39. Peppermint	100 ml
40. Soothing Drops	
41. Tincture of Iodine	30 ml
42. Tincture of Iodine	50 ml
43. Tincture of Iodine	100 ml
44. Tincture of Iodine	200 ml
45. and 46. Gentian Violet Paint	30 ml and 50 ml
47. and 48. Gentian Violet Paint	100 ml and 150 ml

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APPENDIX XI

LOREARY PHARMACEUTICALS LIMITED, BUOLA

Manufacturing Plant Presently Held or on Order

1 x Automatic Capsule Filler, Model A/R-

Manufacturer : Dott. Bassano & Co., Milano - Presently on Hand

Cap. Powered Capsule Filler, Model B/R-

Manufacturer : Dott. Bassano & Co., Milano - Presently on Hand

The output of the above two pieces of equipment, when used in conjunction with two operators is 12000 LOW-CAP type capsules per hour.

This output could be increased to about 20000 per hour with the addition only of a further B/R-6 machine, the purchase of which is being contemplated.

1 x 50 Gall. Stainless Steel Mixing Tank together with one Premier Mixer fitted with special disperator head.

On Order : 1 x 105 Lit Melting Vessel with Stirrer

Under Consideration : Complete Plant, including Melting Vessel, Filtering Unit and Storage Tank - for pharmaceutical ointments and cosmetic creams.

On Tentative Order : (We would prefer, if possible, to obtain the same machine in a second hand but reconditioned form)

One Continuous Automatic Suppository Manufacturing and Packaging arrangement, Model No. BF/1/6 - Manufacturer : Dott. Bassano and Co., Milano.

One King Tablet/Capsule Counting and Bottle Filling Machine. This machine is intended as part of an 'in Line' Bottle Unscrambling/Filling/Counting/Cotton Wool inserting and closing arrangement.



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APPENDIX III

LIST OF EQUIPMENT REQUIRED FOR PRIVATE CLINIC  
(INCLUDING INDECO-OWNED) PHARMACEUTICAL BUSINESS

I. STERILE PROCESSING AND PRODUCTION

- A. Intravenous Fluids Manufacturing Equipment K 250,000
- B. Liquid Injections Manufacturing as follows : K 70,000
1. Plant for Distilled Water - Pyrex - Free, Double Distilled
  2. Ampoule Washing Machine
  3. Ampoule Cutting, Milling and Sealing Machine
  4. Steam Autoclave
  5. Drying and Sterilizing Oven
  6. Ampoule Overprinting Machine
  7. Vial and Plug Washing Machines
  8. Filling Pump for Vials
  9. Inspection Unit for Filled Ampoules and Vials
  10. Capping Machine
  11. Labelling and Overprinting Machine (Medium Speed)
- C. Dry Antibiotic Filling Equipment as follows : K 40,000
1. Vials and Plug Washing Machines
  2. Steam Autoclave
  3. Drying and Sterilizing Oven
  4. High Speed Filling Machine
  5. Sealing and Capping Machine
  6. Balances for check-weighing

APPENDIX III. (Continued)

7. Equipment General to General Co. K 100,000

1. High-speed 1 1/2 Liter Machine
2. Overpacking Machine
3. Air-Conditioning Equipment, also ensuring dust removal
4. Two Steam Generators (Boilers)
5. Laundry for washing sterile clothing

TOTAL FOR STERILE PROCESSING K 410,000

II. OTHER EQUIPMENT

K 110,000

1. Automatic Capsule-Filling Machine
2. One manually operated Capsule-Filling Machine
3. Two Strip-Packing Machines
4. Tablet and Capsule Counting Machine
5. Two Tablet (Rotary) Machine
6. Drying Oven
7. Hobart Mixer
8. Granulating Equipment
9. Continuous Automatic Suppository Manufacturing and Packing Machines
10. Automatic Machinery for manufacturing Ointment and Creams.

APPENDIX A.III.

EQUIPMENT NEEDED BY GOVERNMENT MEDICAL STORES  
DEPT. LUSAKA FOR MANUFACTURING PURPOSES.

4 x 800 Litre Stainless Steel Mixing Tanks with Stirrers.

2 x 400 Litre electrically heated Boiling Pots for preparing Simple Syrup.

2 x 200 Litre electrically heated (Heating Mantles) Melting Pots for melting Fatty Substances e.g. Beeswax, Soft Paraffin and other Ointment Bases.

One Robart Mixer and Homogeniser for Creams and Fine Suspensions and Emulsions.

One Ointment Mill for mixing Ointment Bases with Ingredients.

One Automatic Ointment Tube Filling and Closing Machine with a Mixer.

One Vacuum Liquid Filling Machine.

One Filter Press for clarifying Syrups, Elixirs, etc.

One De-ionising Plant.

One Hot Air Oven.

One Autoclave Pharmacy Type.

One Bottle Washing Machine with Hot Air Drying.

One Labelling Machine.

One Equipment for a sterile room drawing air from outside, filtering dust particles and sterilising air before blowing the sterile air into the room and creating a positive pressure in the room so that when a door is opened no non-sterile air can enter.

APPROXIMATE TOTAL JOB VALUE K 100,000

APPENDIX XIV.

ANALYTICAL EQUIPMENT FOR BASIC UNIT  
FOR PHARMACEUTICAL QUALITY CONTROL

1. Analytical Balance
2. Sliding Weight Balance
3. Thermostatic Oven, Range 35° - 300°C
4. Vacuum Oven
5. Thermostatic Viscometer Water Bath
6. Vacuum Pump
7. Tablet Disintegration Test Unit
8. Water Steam Bath 4 holed
9. pH (meter) Bench
10. Lovibond Tintometer
11. Lovibond Nessleriser
12. Soxhlet Extracting Apparatus
13. Abbe's Refractometer
14. Muffle Furnace
15. Kjeldahl Heater Unit
16. Sterility Testing Unit
17. Miscellaneous Glass Ware.

Approximate Cost for one Unit as above

K 10,000

Three such Units required

K 30,000

APPENDIX IV.

PRO. DRUGS

REPORT ON DEALINGS IN PHARMACEUTICALS IN THE COUNTRY OF .....  
(FOR THE UNIDO SURVEY BEING CARRIED OUT IN THE REPUBLIC OF ZAMBIA)

1. Value of Annual Drug Requirements
  - a) Government .....
  - b) Non-Government .....
2. Value of Main Items (Government only)

ITEM	ESTIMATED VALUE (IF POSSIBLE)
A.	
B.	
C.	
D.	
E.	
F.	
G.	
H.	
I.	
J.	
K.	
L.	
M.	
N.	
O.	

APPENDIX IV. (Continued)

3. System of Procurement for:

a) Government:

- Imported - Estimated Value .....
- Locally Produced - Estimated Value .....

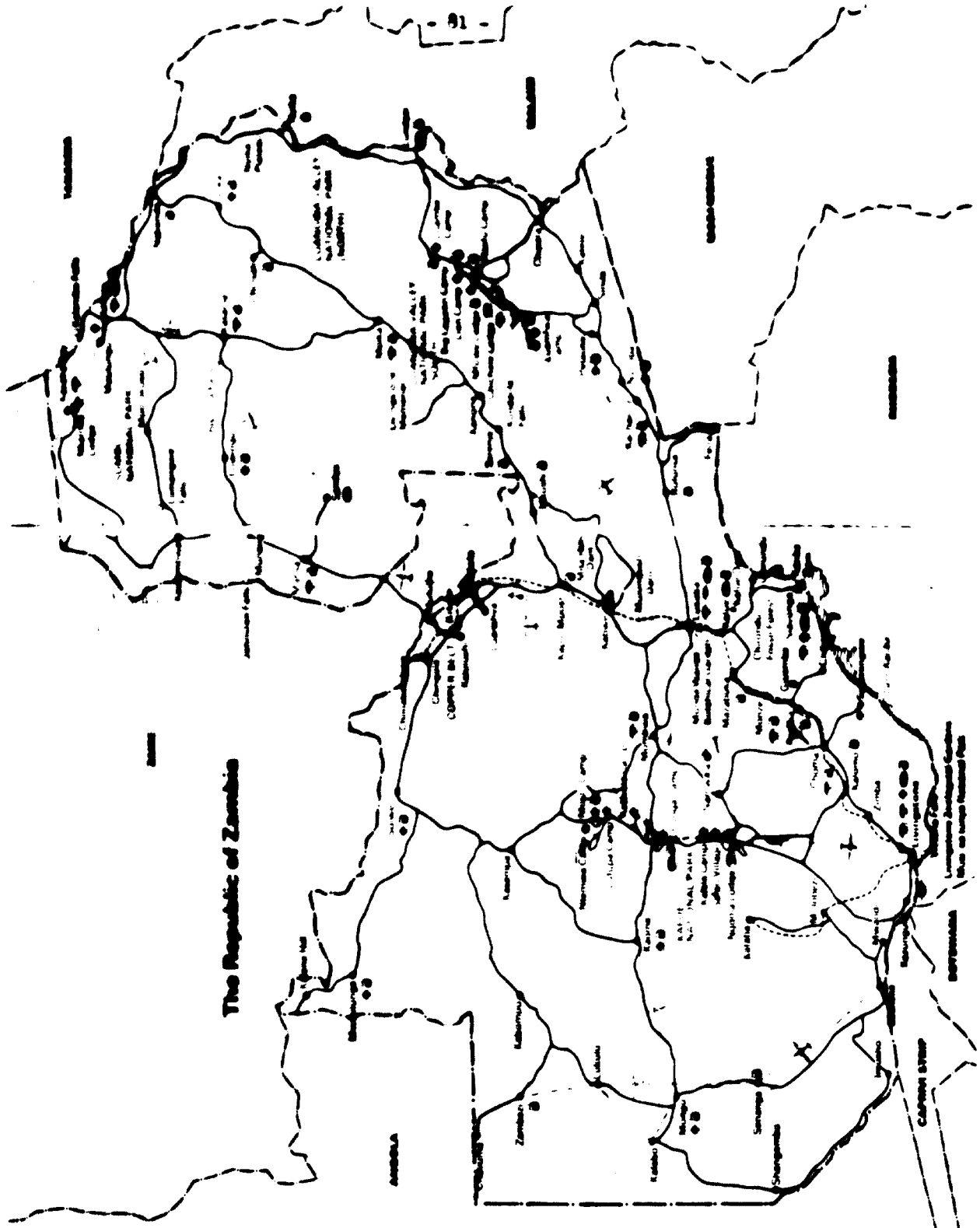
b) Non-Government:

- Imported - Estimated Value .....
- Locally Produced - Estimated Value .....

4. Brief Details of any Pharmaceutical Manufacturing Establishments

NAME	RANGE OF PRODUCTION	ANNUAL VALUE OF OUTPUT

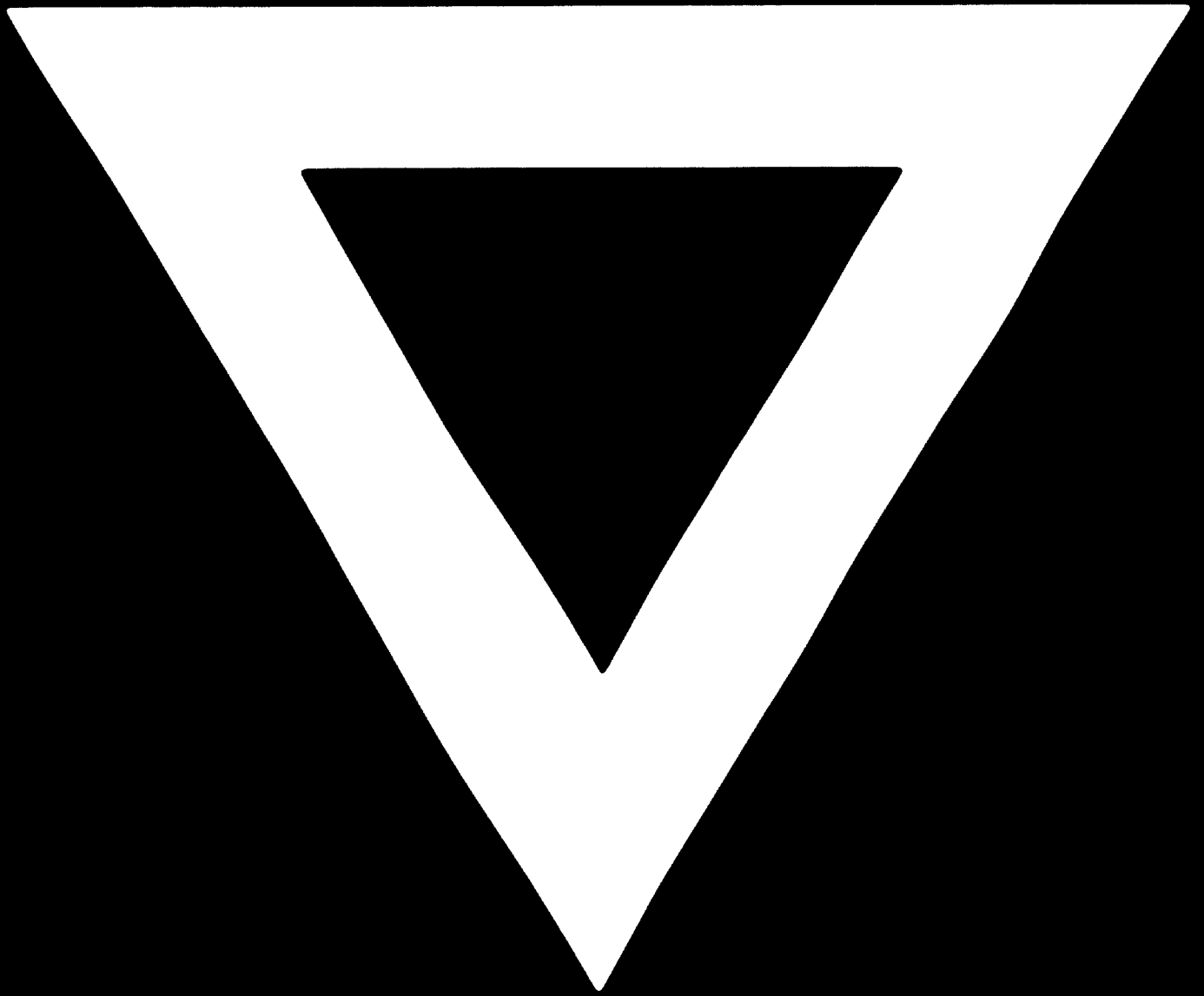
NOTE: Early return of this questionnaire would be appreciated; estimated figures only are required and it is hoped that it will not prove necessary to have to make detailed investigations to obtain these.



The Republic of Zambia

- main roads
- - - railway
- ⊠ Hotel or National Park Lodge
- ⊙ town
- ⊙ rest hut or rest camping camp
- ⊙ caravan park
- ⊙ picnic point
- ⊙ recreation ferry
- ⊙ interval or marker
- ⊙ National Park
- swamp or marsh

0 100 200  
kilometers



**76. 02. 13**