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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

FEASIBILITY STUDY ON LOCAL MANUFACTURE OF DRUGS IN ZAMBIA

POLYTECHNA SPOFA

PRAGUE - CZECHOSLOVAKIA 1981

UNITED NATIONS

INDUSTRIAL DEVELOPMENT ORGANIZATION

DRAFT FINAL REPORT

FEASIBILITY STUDY ON LOCAL MANUFACTURE OF DRUGS IN ZAMBIA

Project No. DP/ZAM/78/008

POLYTECHNA SPOFA

PRAGUE - CZECHOSLOVAKIA

DECEMBER 1980

NOTICES:

1.ALL PRICES ARE ON THE LEVEL OF THE FIRST HALF-YEAR 1980

2.ALL TABLES, FIGURES AND APPENDICES ARE CONCENTRATED IN THE ANNEX 1. OF THE FEASIBILITY STUDY UNDER CHAPTERS I -XI.

I. EXECUTIVE SUMMARY

Project background and history (chapter II)

At its present stage of development the Republic of Zambia is faced with the problem of ensuring its own industrial production of drugs. At the suggestion of the respective Zambian authorities the scheme for working out a project of pharmaceutical industry came into being, a scheme based on the preliminary study elaborated for UNIDO by Dr. R.A.Khan in 1973. Commissioned by the United Nations Industrial Development Organization in Vienna, the Czechoslovak Foreign Trade Corporation Polytechna in Prague undertook to work out the Feasibility Study on Pharmaceutical Industry in Zambia and formed a working team of four pharmacists, namely PhMr. Stanislav Bach (United Pharmaceutical Works - SPOFA)
RNDr. PhMr. Jiří Bína, deputy team leader (United Pharmaceutical Works - SPOFA)
Assoc.Prof.Dr. PhMr. Vladimír Smečka, CSc, team leader (Pharmaceutical Faculty of Charles University)
Prof.Dr.PhMr. Jan Solich, CSc (Pharmaceutical Faculty of Charles University).

The elaboration of the Feasibility Study was performed according to the agreements between UNIDO and Polytechna as formulated in the contract designated Project No DP/ZAM/78/008.

The objective of the Feasibility Study consists in preparing conditions for constructing a pharmaceutical plant in Zambia that would be able to

1) ensure such a manufacturing programme that would secure for the population drugs used in the medicament therapy of the most frequently occurring diseases;

2) gradually attain such a plant capacity as to cover

the requirements of medical care in Zambia and, possibly, to allow future exports into the neighbouring countries;

3) attain this objective with maximum application of drugs recommended by WHO;

4) make use, if possible, of local raw materials;

5) afford job opportunities to a reasonable number of workers.

By fulfilling these points it will be possible to improve medical care, make the country independent of imports of drugs, achieve savings in foreign currency and extend the industrial base of the country.

Market and plant capacity (chapter III)

An analysis of the basic assortment of drugs has been made which we recommend to produce in Zambia during the first stage; applying the method of frequency analysis we analysed the rate of diseases in correlation with the recommendations by WHO on curative procedures and their material provision. The assortment selected has been quantified according to the data supplied by the Zambian Ministry of Health on the basis of the actual consumption in 1980. The assortment suggested provides for covering the treatment of ca 80% of the diseases occurring in Zambia, with 78.5% of the items being recommended by WHO. The starting assortment is represented by 70 ready-made medicaments and, according to the medicament form, it is grouped as follows:

Tablets and capsules	- ca 15 million pcs
Liquid forms	- ca 127 thousand litres
Ointments	- ca 16.5 tons
Suppositories	- ca 330 thousand pcs

The manufacture of injections has not been included in this balance since it has turned out that parenteral solutions are made in the plant of the General Pharmaceuticals Ltd in Kabwe and that this production is on a high technical level. By extending this existing plant it will be possible to start the production of injections on condition, of course, that Zambian-made ampoule glass will be available.

In connection with the market analysis we have also been faced with the problem of the distribution of locally made drugs and its consistent checking. Since the proposed industrial production of drugs is orientated solely to health establishments controlled by the Government it would

be of utmost advantage for the State to conceive the project of industrial production of drugs in a broader context and to make upon itself together with the production also an organized supervision over the distribution of drugs. Beyond the terms of reference of the Feasibility Study we have therefore worked out an additional Chapter XI, in which we propose to create a network of government-controlled hospital pharmacies attached to the respective hospitals. The task of these pharmacies, made up of sectional elements, would be to:

1) organize the flow of drugs to the patients;

2) rationalize medicament therapy in the given area;

3) complement industrial production with own small-scale production of drugs for local specific needs.

Materials and inputs (chapter IV)

Our basic task was to find out whether the envisaged Zambian pharmaceutical industry would be able to use for the production of drugs raw materials of local provenance. It has been found that Zambia cannot avail itself of own chemical industry, whether basic or applied, and that it will be indispensable even in future to import basic materials necessary for local industrial production of drugs. Due to this fact Zambia will have to be included among Group II countries according to the classification by B. Shah, i.e. countries which are able to manufacture final products (drugs) but which must still import the necessary raw materials.

Some of the Zambian raw materials can be used as auxiliary materials, such as alcohol, starch, sugar, talcum, glycerin, atc. A special group is formed by medicinal herbs, which are a potential source of raw materials for the production of drugs. In Zambia there is a number medicinal herbs of wellknown or assumed curative effects. Prior to exploiting these resources an extensive pharmacognostic investigation must be carried out and facilities prepared for an industrial isolation of active substances, which is a project that be implemented not earlier than in 10 years. This estimate has been consulted with Zambian experts.

With regard to the complexity of the calculations necessary in the pharmaceutical production the balance of the basic semiproducts and auxiliary materials has been made on a Hewlett-Packard computer by our own program. The selection of raw materials processed by the computer was made in the ensemble of technico-economic norms of the

proposed production assortment. The first quantification step was made on the basis of the year 1980 and further modelled in keeping with the principles applied in the marketing estimation of the consumption. This means that for the calculation the time series of the consumption of raw materials were indexed with the same paces as the final products, the aim being to apply the computer-processed material also for later purchasing strategy and for the determination of the plan of purchases.

Location and site
(chapter V)

It appeared to be of greatest advantage to locate the proposed pharmaceutical plant in the capital town Lusaka. There were a number of reasons speaking in favour of this decision, the most important of which are the concentration of industry and central authorities, the advantages connected with good road, rail, and air transport, favourable stratification of the population, the presence of existing research facilities, etc. Not less important are the favourite climatic conditions, especially form the viewpoint of their effects on the storage of drugs.

Within Lusaka, the choice has fallen on the existing facilities incorporated in the National Import and Export Corporation Limited (NIEC) under the name of Medical Stores Ltd. This Company, controlled by the Ministry of Health, offers very good possibilities of extending the existing facilities by building a pharmaceutical pavilion for the production of tablets and capsules. Moreover, the existing premises can with advantage be adapted and house a department for the production of liquid medicament forms, ointments and suppositories.

The choice of the site location has been recommended because it is the most advantageous not only from the viewpoint of minimizing investment costs but also overhead costs by linking up with the existing organization and distribution network of the Medical Stores Ltd.

Project engineering
(chapter VI)

The lay-out arrangement of the project has been affected by the requirement of ensuring capacities for the yearly production in one shift. The project meets the WHO requirements of good manufacturing practice at a medium-high productivity of labour.

With regard to the present state of production, required capacities and proposed technologies we have chosen this basic lay-out arrangement of the project:

1. Tablets and capsules will be manufactured in the newly built pavilion.

2. Liquid medicament forms, ointments and suppositories will be manufactured in existing facilities, which will be modernized and complemented with the necessary technical equipment and machinery.

1. The new building is designed on the basis of light reinforced concrete structure with concrete foundations, dimensions ca 22 x 80 m, with the basic lay-out arrangement of ground-floor production. The building links up with the north-west part of the existing store house and has immediate approach to the railway siding.

2. The proposed lay-out arrangement envisages dividing the existing hall by light glass-paned partition walls which will separate the manufacturing and the auxiliary areas. The manufacture of liquid medicament forms will thus be allocated 570 m^2, the manufacture of ointments and suppositories 280 m^2.

The technologies have been chosen on the basis of the latest achievements of the pharmaceutical industry in Czechoslovakia, Switzerland, Federal Republic of Germany

Sweden, Soviet Union, etc. Chosen for the production of tablets has been the conventional technology, i.e. the wet granulation of basic substances - the drying of the granulate - tabletting - and (on a smaller scale) film-coating. For the manufacture of capsules we suggest the technology of filling powders directly into hard gelatin capsules, possibly with slight pregranulation (bricketing).

It the two cases the blister packing technique will be-used throughout.

The manufacture of liquid medicament forms will be performed by a technology which has partly been introduced in the Medical Stores already, namely dissolving and mixing the active substances into vehicles - curing - filtration - filling. The filling technique will remain the same, i.e. using the 1, 3, and 5 litre polyethylene bottles as has been customary in the Medical Stores up to now.

In the case of ointments the conventional technology will be applied, with this sequence of operations: dissol-ving the vehicles - straining - homogenizing the solid active substances and possibly mixing the liquid substance - cooling - filling. Ointments will be filled into alu-minium tubes.

Suppositories will be made by pouring into moulds, manually, made up in cellophane and packed in tins.

The technologies chosen are common knowledge and thus it is not necessary to take into consideration licence pur-chases or royalty payments.

The technical equipment corresponding to the technologies chosen has been proposed such as to be on contemporary world level of the pharmaceutical industry; all this equipment must be imported into Zambia.

Plant organization and overhead costs (chapter VII)

It is proposed that the manufacture of pharmaceutical preparations should be introduced in Zambia by way of extending the existing facilities of the Medical Stores Ltd, Lusaka. This basic approach has affected the technical solution of the project itself. In the present organization chart of the Medical Stores a nucleus of the production division can be found, even if with considerably fewer employees than envisaged in our project. It would be unreasonable and erroneous not to make use of the existing organization set-up. The authors of the Feasibility Study therefore recommend to conceive the whole manufacturing division of the Medical Stores, with their basic existing organization lay-out, as a single production and cost centre.

Moreover, by linking up directly with the existing organization and distribution network of the Medical Stores Ltd overhead costs can be minimized.

Manpower

(chapter VIII)

In the sphere of manpower the workers of the future pharmaceutical plant have been classed in ten wage and salary categories (I - X), the summary recapitulation being as follows:

A	Fixed workers	5 persons
B_1	Direct workers of overhead nature	23 persons
B_2	Direct workers at full capacity (1988)	39 persons
C	Fixed employees	25 persons
	Total	92 persons

The requirements on the qualification and prior practice of employees is basically given by the WHO recommendations for good manufacturing practice. The working procedures in the pharmaceutical industry are very demanding and after the introduction of new technologies on modern machinery suitable training will have to be provided for the respective workers. We therefore recommend to provide 2-3years' training for category B_1 workers in the operation and maintenance of pharmaceutical machines in a pharmaceutical plant of world reputation.

Implementation scheduling (chapter IX)

The implementation stage of the project will positively be affected by the fact that the new construction will take the form of extending the existing facilities and organization. The individual organization units, especially in the field of administration and management, have already been established and they can be made use of also in implementing the project, which will greatly simplify the problem of creating a staff in charge of implementation work and reduce the costs connected with this activity.

For the construction of the new building within the Medical Stores and for revamping the existing building a flow chart has been prepared which schedules the whole implementation of the project over a period of 4 years and 1 month. The flow chart is dividied into the following sections:

Preparatory stage - 7 months
Ensuring the site and plot - 13 weeks
Constructing the pharmaceutical pavilion - 18 months
Ensuring the machinery - 30 months
Organizing the centre (recruiting and training the workers) - 32 months
Ensuring the supply system - 15 months
Ensuring the financing - 1 month
Debugging the production - 12 months

The individual sections of the flow chart overlap, of course.

Financial and economic evaluation (chapter X)

Total investment costs amount to:

	Currency		
	Foreign thou $	Local thou K	TOTAL thou K
Initial investment fixed costs	2460	525	2403
Working capital	-	5134	5134
Pre-production capital expenditures	256	155	351
Total	2716	5814	7888

The financing of these costs is envisaged as follows (in thousand Kwacha):

Sources	Fixed investment	Working capital	Total
Short-term borrowing	-	3000	3000
Long-term borrowing	2403	-	2403
Governmental grant	271	2134	2405
UNIDO grant	80	-	80
Total	2754	5134	7888

The financial standing of the existing Medical Stores Ltd was not favourable in the last year.

	1979/80 thou K	1978/79 thou K
Turnover	14649	14422
Profit before tax	1275	867
Profit before tax as a percentage of turnover	8.7%	6.0%

At K 14.6 million the turnover of the Company during the year under review was only marginally better than that of the previous year. Profit-wise, however, there was some improvement which was brought about by the larger availability of imported stocks and strict vigilance on costs. The supply position improved considerably during the year due to arrivals, towards the end of the year, of imports effected under a British Loan. The capitalisation and transfer of assets to the Company have not yet been finalized by the Government. As a result, the Company is unable to raise finance from Banks to improve its services. On the other hand, Government departments and Ministries owed the Company K 7.9 million as at 31st March, 1980, of which K 7.2 million was due from the Ministry of Health. Because of this, the liquidity position of Medical Stores was deteriorating very rapidly through the year and it will be very difficult to find sources of project financing. It is practically out of the question to finance the project by a normal long-term bank loan (20 years, 8-9% interest), notwithstanding the fact that the project will be profitable thus early:

	Year								
Profit before tax estimation (in thou K)	1	2	3	4	5	6	7	8	9
	-	-	-	3100	7200	7750	8300	8900	9500

According to the public policy of the Republic of Zambia the source of long-term finance is available at government-to-government level. This can take the form of general bilateral credit or tied credit, which may be related to the purchase of machinery and equipment from a particular

country or even from a particular source. For technical reasons this way is very difficult (see Chapter VI.).

Another possibility is to earn a long-term credit from the International Development Association (50 years' pay-back period, without interest, 3.1% charge).

Short-term loans can be earned from the Development Bank of Zambia (10% interest, limit 60%), the rest from the Government - this loan for financing the working capital will be repaid during 5 years since sufficient cash surplus will have already accumulated by then.

Total production costs amount to:

	Currency		Total
	Foreign thou $	Local thou K	thou K
Direct materials and inputs	8937	747	7463
Direct manpower	-	359	359
Financial overhead costs:			
short-term interests	-	300	300
long-term interests	-	72	72
Depreciation	-	240	240
Total	8937	1875	8591

Basic conclusions:

a) From the very beginning the envisaged production shows a profit level ranging from 4.3 to 50.8% of the total sales.

b) At a current taxation rate and distribution of this profit it can be expected thatin the sphere of working capital the project will be able to finance itself as from the 6th year after the initiation of the construction. The time of investment return has by simple calculation been determined to just under 5 years from the initiation of the construction (i.e. 2 years from the production initiation):

Total investment costs 2850 thou K

	Yearly net profit + interests + depreciation	Returnable amount	Balance at the end of the year
Year 1	-	0	2850
2	-	0	2850
3	-	0	2850
4	1900	1900	1950
5	4000	4000	-

The simple rate of profit in the 7th year of investment (full capacity) for the total investment costs is

$$R = \frac{\text{net profit}}{\text{total investment costs}} \times 100 = \frac{4300 \times 100}{2850} = 150.8\%$$

The project rentability calculated as the ratio of the profit to the costs amounts in the 7th year of investment (full capacity) to

$$\frac{4300 \times 100}{8600} = 50\%.$$

Due to the nature of the technical solution of the project, i.e. extending the existing state-owned company, and the nature of sales, i.e. supplying the state medical

service with indispensable drugs, this part of the study has been elaborated in strict observation of the methods as laid down in the "Manual for the Preparation of Industrial Feasibility Studies" -.UNIDO publication No E.78.II.B.5 of 1979, in the required tabular form;

Conclusions

Regarded as one of the major advantages of the proposed project can be the fact that the project would be implemented within the framework of the existing facilities of Medical Stores Ltd. This entails a number of advantages of both organizational and economic nature, affects positively the overall balance and is for the Government of Zambia rational and economical.

A major disadvantage in contemplating local industrial production of drugs in Zambia can be seen in the fact that the country lacks the necessary chemical industry as a source of raw materials for the final production of drugs. This means that raw materials must be imported and processed into the final form. A similar disadvantage is that, up to now, it has not been possible in Zambia to manufacture glass of the first hydrolytic category, which is necessary for the production of ampoules. Thus, for the time being, local production of injections cannot be considered.

We are of the opinion that the prospects of implementing the project of constructing a pharmaceutical plant in Zambia are good. The leading representatives of the country with whom we discussed this problem all believe that the existence of own industrial pharmaceitical base is indispensable to Zambia. It must however, be pointed out that some powerful and influential international pharmaceutical companies with commercial interests in Zambia will undoubtedly voice, in one form or another, their objections to the project.

We regard as very significant a complex conception of the pharmaceutical situation in Zambia and we therefore

recommend to solve, parallel with the construction of the pharmaceutical plant, also our proposed network of hospital pharmacies that would channel the flow of drugs from the production to the patient and, at the same time, serve as production units complementing conveniently the basic industrial manufacturing programme.

II. PROJECT BACKGROUND AND HISTORY

Project background

At its present stage of development, the Republic of Zambia is faced with the problem of ensuring its own industrial production of medicaments. The situation up to now, when the majority of drugs must be inported, is a reflection of the earlier state of affairs in the country. Zambian industrial potential, however, is growing and thus the idea of building up its own pharmaceutical industry is gaining ground. This industry should be in a position to cover by its production the need for medicaments in the country, either completely or for the larger part. Likewise, the question arises as to what extent it would be possible to employ domestic raw materials in the manufacture of medicaments and thus help to stop the drain of scarce foreign currency.

The considerations on the feasibility of providing a solid production base are supported by the fact that Zambian health care has been developing on the principle of the medical care being accessible to the widest public possible. Most of the health establishments in the country are government controlled and medicaments prescribed in these establishments are provided free of charge. Besides the government-controlled sector there is also a comparatively small private sector represented by surgeries of private physicians, some hospitals outside the government control (for example mining hospitals) and private pharmacies. Because of its small size and extreme diversity (as explained bellow), the private health sector is of little interest for our further considerations so that we shall concentrate on that considerably larger sector of health services represented by government-controlled health institutions.

Expressed in simple terms, the health care system in Zambia works along four independent lines:

1. The governmental sector (together with mission hospitals) gets medical supplies from the Medical Stores Ltd, Lusaka; they are mostly atricles imported from abroad. Imports of pharmaceuticals, dressing and surgical materials in the years 1972-1980, correlated with overall expenditures on health care, are shown in the statistics drawn up partly according to the data encountered in the UNIDO publication "Country Industries Profile of Zambia" (1979) and partly from the data obtained by the courtesy of Mr Moor, Chief Pharmacist of the Ministry of Health of the Republic of Zambia:

in millions of K

	1972	1973	1974	1975	1976	1977	1978	1979	1980
Overall expend. on medical care	23.9	29.2	32.2	33.3	42.8	52.6	51.5	58.6	69.6
Total imports - pharmaceuticals, dressing & surgical materials	6.1	5.4	6.3	7.6	7.5	7.9	7.8	10.6	15.4
					+ UNIDO data				
share of imports in overall expenditures (%)	25.5	18.5	19.6	22.8	17.5	15.0	15.1	18.1	22.1

The share of imports exhibits varied tendencies, in the years 1976 to 1978 the imports were greatly reduced due to the foreign currency situation of Zambia. This has come to be manifested by a disproportion between the growth of medical services as a whole and the material provisions, specifically a considerable shortage of medicaments in the facilities of the health administration.

About 60% of the overall expenditure on imports relate to pharmaceutical preparations (data from the Ministry of Health; no accurate statistics have been made):

in millions of K

	1972	1973	1974	1975	1976	1977	1978	1979	1980
Imports of pharmaceutical preparations	3.7	3.2	3.8	4.6	4.5	4.7	4.7	6.4	9.2

2. Private physicians, private clinics provide medical care for payment. The patients must pay for the medicaments prescribed and they purchase them in a network of private-owned pharmacies. The network is supplied by a number of suppliers scattered all over the country; some of these form part of the distribution network of pharmaceutical companies operating all over the world (Pfizer, National Drug Co, Vindas Drug House, International Chemicals, etc.). Imports are made on the basis of licences granted, the market situation is rather confusing. This group has no bearing on the solution of the present task.

3. Traditional medicine - it is developed all over the country, especially in rural areas. The Ministry of Health tries to be in overall control. From our viewpoint this group is not decisive.

4. The situation is further complicated by the existence of medical services provided in ore mines in the Copperbelt area, where material is supplied directly from abroad.

As regards pharmaceutical industry, there exist in Zambia a few small manufacturers of pharmaceuticals; of which three are worth mentioning; namely:

The National Drug Company, Lusaka -

it produces tablets (maximum capacity 50 million pcs per year), ointments, capsules, liquids, and also cosmetics. There is no possibility of extension(the surrounding area, in the centre of Lusaka, is all built up).

General Pharmaceuticals Ltd, Kabw -

it is a perfect modern manufacture of intravenous infusion solutions, capacity 1 million bags per year with one shift, under a Vifor licence. This plant would be easy to extend to cover parenteral injection forms but only subsequently to the introdustion of the technology of the manufacture of glass ampoules in Zambia (in keeping with a UNIDO recommendation).

Government Medical Stores Ltd, Lusaka -

it has modern, so far unused facilities for the storage of materials to be supplied to the State sector, 1000 m^2 of manufacturing area, with necessary power supply, utilized only partially for dispensing and manufacturing liquids and ointments. They are ideally suited for possible extension since there is sufficient area and space, a railway siding, etc.

The plant in Kabwe, specialized in the production of parenteral medicaments, satisfies by its capacity and work quality our expectations as to meeting all the requirements and because of the possibility of increasing its output, we could leave intravenous solutions completely out of our Feasibility Study.

The extent of the production of the two other plants does not and cannot satisfy the present or future needs of the country as regards the capacities and the manufacturing programmes. Thus it is necessary to look for a solution in creating a pharmaceutical industrial plant that would be able to

a) ensure a manufacturing programme that would provide the country's population with medicaments applied in the medicament therapy of the most frequent diseases in Zambia,

b) gradually attain such a production level as to cover completely the requirements of medical care in Zambia and, in the future, make possible exports to neighbouring countries,

c) attain this goal with maximum application of medicaments recommended by the WHO,

d) make use of existing raw material resources,

e) offer job opportunities to a reasonable number of workers specially trained for this purpose.

When items a) to d) are fulfilled, it would be possible to

1) improve medical care,
2) make the country independent of imports of medicaments,
3) achieve savings in foreign currency,
4) earn foreign currency by possible exports (in the future),
5) broaden the industrial base of the country.

Project promoter
and/or initiator

The promoter of the Feasibility Study is the Government of Zambia through the United Nations Industrial Development Organization (UNIDO) in Vienna, Austria. This organization has financed

a) the Pre-feasibility Study

b) the Feasibility Study.

Other participating parties include, above all, the Zambian Ministry of Health, then the Ministry of Industry, and the Ministry for Planning and Development.

Project history

In connection with efforts aimed at building up the Zambian pharmaceutical industry a pre-feasibility study was elaborated as early as 1973, bearing the title: "Assignment Report on Pharmaceutical Industry in Zambia". This study was worked out by Dr. Riaz Ahmed Khan in January and February 1973, commissioned by UNIDO; it is filed under the number UNIDO/TCD 200 of May 24th, 1973. The report analyses in detail the situation of pharmaceuticals in Zambia, treats in depth of local pharmaceutical industry and contains recommendations as to its future development. On the basis of this Pre-feasibility study the first-rate pharmaceutical plant in Kabwe (General Pharmaceuticals Ltd) came into existence.

Dr. Khan's report was worked out in a very satisfactory manner and it has been of much use to us in examining the problem of constructing a pharmaceutical plant. The fact that the report was written in 1973 does not detract from its informative value since - as we have found - the situation in the field of health care in general and in pharmacy in particular has not changed to any considerable degree since 1973.

Within the framework of UNIDO, Mr. P.K. Goma, present general manager of Medical Stores Ltd, Lusaka, reported on problems of the pharmaceutical industry in Zambia and his conclusions have been made available in the UNIDO publication "Appropriate Industrial Technology for Drugs and Pharmaceuticals", No. 10, pp 131 - 134 (United Nations, New York 1980).

F e a s i b i l i t y s t u d y

According to the UNIDO contract No 80/112/Dr of Aug. 8th, 1980, the group of experts comprising Dr. Smečka, Dr. Solich, Dr. Bína and Dr. Bach is to work out a study on the feasibility of developing pharmaceutical industry on the basis of local raw materials in Zambia. The work has been divided into two stages:

1st stage - surveying local conditions in Zambia and collecting fundamental data - from 20.9.1980 to 20.10.1980

2nd stage - elaboration proper of the study after return to Czechoslovakia, according to the methodology of the UNIDO Manual for the Preparation of Industrial Feasibility Studies

Cost of preparatory studies and related investigations.

An estimate of these costs is given in Schedule II-1.

Schedule II - 1

ESTIMATE OF INVESTMENT COST

Pre - investment studies and preparatory investigations

No	Quantity	Unit	Item description	Local	Foreign	Unit cost	Cost		
							Foreign	Local	Total
1	1		Assignment report on Pharmaceutical industry in Zambia January-February 1973	-		14000	14000 $		10600 K
2	1		Feasibility Study on Manufacture of Drugs from Local Raw Materials in Zambia, 1980	-		62700	62700 $		47900 K
						Total	76700 $		58500 K

III. MARKET AND PLANT CAPACITY

Demand and market study

For the time being the demand is covered through import of ready-made medicaments and to very small extent by local production. This local production is of little significance except for parenteral solutions which are produced by General Pharmaceuticals 2td in Kabwe. That plant located about 100 miles northward from Lusaka is able to satisfy the needs of Zambia in parenteral solutions both quantity and quality wise.

In our efforts to estimate the current and potential demand for medications we first looked at the import picture and then made an inguiry about the more prevalent diseases and the drugs used for their cure and prevention.

Imports

Our investigations with the Ministry of Health, manufacturing companies and import agencies showed that it is extremely difficult to asses the imports of drugs into the country since there is no registration of the imported ready-made medicaments but only import statistics by generic names for drugs bought by the Government for use in the government controlled health institutions.

The list of these drugs, divided in pharmaceterapeutical groups comprises a total of 241 items. This assortment is considerably shorted than the assortment of ready-made medicaments found in private pharmacies but it covers basic demand for therapy.

A consideration of the imports of these drugs shows a widening gap between them and the total budget of the

national health service in Zambia. This is explained by the difficult foreign exchange situation of the country which means that the actual demand for these drugs is much higher than what is reflected by import statistics (see Figure III/1).

The present supply system, based on imports of final products, requires large quantities of foreign exchange and would require much larger expenses in foreign exchange to satisfy the actual demand for drugs especially in the national health service. It is to expect that the national health service administration will face even greater financial difficulties in the future.

Direct market inquiry

Since the import pattern is distorted by foreign exchange restrictions we made an inquiry into the more prevalent diseases and the potential demand in drugs for the care of prevention of such diseases.

Data propared on the basis of the "Report for the years 1973 - 1977" published in 1980 by the Ministry of Health of Zambia give the frequency analysis of diseases which occured in Zambia in 1977 (see Table III/1).

The frequency analysis of deseases and the drugs necessary for the treatment of 15 most frequently occurring diseases (Table III/2) have been compared with the closer selection of drugs drawn up by the Ministry of Health of Zambia for the needs of Government-controlled health establishments.

We have dropped from this the drugs whose quantitative consumption in 1979 did not correspond to the economy of industrial technology. We have further performed a check the results of which were to give an answer to the question of whether the amount of the given drug bought for and used in the treatment corresponded with the occurrence of the respective disease in the given year. Examples of this check, the so-called recommended daily doses (RDD) can be found in Table III/3.

We have compared the drugs we selected with the WHO requirements and found that from the 70 denominations prepared for industrial production in Zambia 55 are identical with the denominations given by WHO in "The Selection of Essential Drugs" published by WHO, Geneva 1977, i.e. 78.5% of the drugs selected comply with the World Health Organization recommendations (Table III/4) (see also the denominations of these WHO drugs in the table on the page 11-17 of this Chapter).

The production programme related to the number of inhabitants of Zambia (in the fourth year of production it is 1 000 000 000 tablets for an assumed population of ca 7 million, which gives 142 tablets/inhabitant) is not very high when compared with data from similar territories (e.g. in Ghana the capacity is 3 000 000 000 tablets for ca 10 million inhabitants - see Marchés trop 34, 1706, 1983, 1978, ref. Akt. Probl. Pharm. Ind. No 1, 15-16, 1979).

All the drugs selected, which appear under generic terms can be checked for their quality according to the pharmacopoeias which the drugs of these generic denominations cite (most often BP and USP). The other drugs selected have as to their composition been taken over from BP and BPC. The whole collection of drugs can thus be accurately defined.

The following table gives a summary of drugs consumed in government sector in Zambia in 1979 classified according to application forms:

Application form	Denomination	Sort	Quantity	Price (K)
1. Tablets	63	77	274,138.000 pcs	4 008 570
2. Capsules	6	7	47 186 000 pcs	856 562
3. Solutions	16	16	56 671 l	164 160
4. Syrups	3	3	48 700 l	194 170
5. Suspensions	7	7	44 400 l	515 850
6. Emulsions	1	1	8 600 l	22 500
7. Eye drops	4	4	1 540 l	42 400
8. Eye ointments	5	5	460kg	9 600
9. Ointments	7	7	16 964kg	127 560
10. Supprositories	3	5	329 000 pcs	23 750
11. Sterile solutions	14	14	496 000 l	956 360
12. Injections (ampoules)	56	68	7 406 000 pcs	3 623 570
13. Miscellanea	13	13	99 437 pcs	471 000
	198	227	-	110 160

Sales forecast and marketing

The total consumption of drugs (in application forms) has then been broken down into two parts, namely one which contains drug forms suitable for initiation of industrial production in Zambia and one containing these drugs rolwhich will have to be supplied by imports for the near future . since their manufacture in small batches would be un economical or would unduly complicate the operation of the contemplated plant.

Summary of drugs consumed in the government controlled establishments in 1979 and suitable for local production

Application form	Denominations	Sort	Quantity	Price (K)
1. Tablets	40	53	266 985 000 pcs	3 448 030
2. Capsules	4	4	46 200 000 pcs	657 910
3. Solutions	8	8	25 600 l	125 090
4. Syrups	3	3	48 700 l	194 170
5. Suspensions	5	5	43 150 l	470 000
6. Smulsion	1	1	8 600 l	22 500
7. Eye drops	1	1	650 l	11 300
8. Eye ointments	1	1	370kg	7 400
9. Ointments	4	4	16 100kg	73 200
10. Suppositories	3	5	329 000 pcs	23 750
Manufacture	70	85		5 033 350

Summary of drugs consumed in the government controlled establishments in 1979 and proposed for imports (excluding point 11. Sterile solutions which are produced in Kabwe.

Application form	Denominations	Sort	Quantity	Price (K)
1. Tablets	23	24	7 153 000 pcs	560 540
2. Capsules	2	3	986 000 pcs	198 652
3. Solutions	8	8	31 161 l	39 070
4. Syrups	-	-		
5. Suspensions	2	2	1 250 l	45 850
6. Emulsions	-	-		
7. Eye drops	3	3	890 l	31 100
8. Eye cintments	4	4	90 kg	2 200
9. Ointments	3	3	364 kg	54 360
10. Suppositories	-	-		
11. Sterile solutions	14	14	496 000 l	956 360
12. Injections (ampoules)	56	68	7 406 000 pcs	3 623 570
13. Miscellanea	13	13	99 437 pcs	471 000
	128	142		5 982 702

The table listing the drugs suitable for production includes 70 intems and indicates a total of 5 million Kwacha in 1979. The contemplated plant will be designed to meer these needs. It is estimated that, in line with the world-wide trend observed in other developing countries, consumption will develop at a rate of increase of about 8% per year, so that the above total would grow to 7,5 million Kwacha in 1985 expressed at 1979 prices. However, as explained above, there will be a large supposed demand, so that when locally-produced drugs are available, Consumption will jump suddenly and probably double within a year. After that adjustment the

previous trend will be reduced at a slightly lower rate estimated at 6% per year (see table incluted in Chapter II).

The calculations have been made in keeping with the publication issued by the Government of Zambia (Ministry of Health) in January 1980, under the title "Health by the People - proposals for achieving health for all in Zambia".

The distribution of the drugs consumed in the government controlled establishments goes through Medical Stores Ltd but is implemented in a haphazard way through the requst received from each establishment.

Moreover, in these establishments, there sums to be no pharmacy (except in one case in Lusaka) to control the proper use of the drugs and take care of the medications from the professional point of vieu.

For the future it is recommended to consider the establishment of government controlled pharmacies attached to individual hospitals..

The existence of hospital pharmacies/dispensaries may

1) ensure professional supervision on orders, storage and comsumption of drugs produced in the contemplated pharmaceutical plant

2) complete the industrial production of drugs through manufacture of locally demended medicaments or medicaments of limited consumption.

We understand the existence of a network of appropriately equipped hospital pharmacies/dispensaries as an inevitable part of the drug manufacture programme in Zambia. All necessary details of the idea are incorporated in the Chapter XI.of the Feasibility Study.

Production Programme and Plant Capacity

As mentioned above, an analysis of the basic assortment to recommend for the first stage of manufacture in Zambia was carried out by way of frequency analysis of diseases in correlation with the recommendations of WHO as to the treatment procedures and their material provision in developing countries. The assortment selected was quantified according to data supplied by the Zambian Ministry of Health on the basis of actual consumption in 1979. The proposed assortment covers about 80% of the treatment of diseases occurring in Zambia, and 78,5% of the items have been recommended by WHO. According to the medicament forms the initial assortment has been divided as follows:

Tablets and capsules	ca 315 million pcs
Liquid forms	ca 127 thousand litres
Ointments	ca 16.5 tons
Suppositories	ca 330 thousand pcs

The manufacture of injections has not been included in this balance since the manufacture of sterile medicament forms is ensured in Kabwe and can be extended (see below). We expect that this manufacture would require material imports worth ca 2 million K instead of imports of medicaments worth 3.8 million K.

Taking into account the expanded increase in consumption until 1985 and the pent-up demand, the proposed plant should provide for the production in 1985 of:

Tablets	430 million pcs
Capsules	70 million pcs
Liquids	190 thousand litres
Ointments	24 tons
Suppositories	490 thousand pcs

In the total value of 7.5 million K (at 1979 unit prices)

Provided the Feasibility Study is accepted and its conclusions implemented immediately, preliminary operations could start in 1984 and industrial production in 1985.

For the year 1986 a fundamental turning point is expected in meeting the demands due to a doubling of production; after that, till 1995, a small yearly increase on the level of the world trend of 6% yearly is expected to follow.

Medicament form	1980	1985	1986	1987	1988	1989	1990	1995	2000
Tablets in million pcs	288	430	860	910	965	1056	1120	1500	2000
Capsules in million pcs	46	70	140	148	157	166	177	240	320
Liquid medicament forms in 1000 lit.	127	190	380	403	427	453	478	640	800
Ointments in tons	16.5	24	48	51	54	57	60	80	110
Suppsitories in 1000 pcs	330	490	980	1040	1100	1170	1240	1650	2200
Production value in million K (at 1979 prices)	5.1	7.5	15.0	15.9	16.9	17.9	18.9	25.3	33.8

We therefore recommend to build the following production capacities of final medicament forms:

Form:	Capacity in 1 shift	Capacity in 2 shifts
Tablets	1 000 million pcs	2 000 million pcs
Capsules	150 million pcs	300 million pcs
Liquid medicament forms	400 thousand litres	800 thousand litres
Ointments	50 tons	100 tons
Suppositories	1 million pcs	2 million pcs

Such capacities would ensure the coverage the country's needs till the year 2000. In the second stage the production base of local raw materials and semiproducts should be developed purposefully, together with building up the chemical industry.

The next table brings a list of drugs suggested for initial production in Zambia:

1. Tablets

1. Acetozolamide	Tab. 250 mg B.P. (Diamox)	11 350 000 pcs
2. Aminophylline	Tab. B.P. . .	18,100 000
3. Amitriptyline	Tab. 10 mg B.P.	310 000
"	25 mg B.P.	750 000
4. Ascorbic Acid	Tab. 50 mg B.P.	8 990 000
"	200 mg B.P.	7 100 000

5.	Aspirin Tab. 300 mg B.P.	34 000 000
6.	Chloroquine Phos. Tab. 250 mg.B.P.	31 275 000
7.	Chlorpromazine Tab. 10 mg B.P.	450 000
	" 125 mg.	5 000 000
8.	Compound Codeine Tab. B.P.C.	14 100 000
9.	Cotrimoxazole Tab. B.P.	2 300 000
10.	Dapsone Tab. 10 mg	1 750 000
	" 25 mg	3 300 000
	" 100 mg B.P.	1 400 000
11.	Diazepam Tab. 2 mg B.P.	3 750 000
	" 5 mg B.P.	3 550 000
12.	Digoxin Tab. 0,25 mg B.P.	800 000
13.	Diphenoxylate Tab. 2,5 mg	1 550 000
14.	Ephedrine Hydrochlor.Tab. 30 mg B.P.	3 250 000
15.	Ferrous Sulphate Tab. 200 mg B.P.	4 600 000
16.	Folic Acid Tab. 5 mg B.P.	8 200 000
17.	Furosemide Tab. 30 mg	1 300 000
18.	Griseofulvin Tab. 125 mg B.P.	1 100 000
19.	Isoniazid Tab. 100 mg B.P.	800 000
20.	Magnesium Trisilicate Tab. Comp. B.P.C.	12 500 000
21.	Methyldopa Tab. 250 mg B.P.	650 000
22.	Metronidazole Tab. 200 mg B.P. (Flagyl)	1 700 000
23.	Niridazole Tab. 100 mg	1 900 000
	" 500 mg	1 400 000
24.	Paracetamol Tab. 500 mg B.P.	33 500 000
25.	Phenobarbitone Tab. 15 mg B.P.	750 000
	30 mg B.P.	5 800 000
26.	Phenoxymethylpenicillin Tab. 125 mg B.P.	4 000 000
27.	Phenylbutazone Tab. 100 mg B.P.	1 900 000
	" 200 mg B.P.	2 100 000

28.	Piperazine Phoshate Tab. 500 mg B.P.	500 000
29.	Potassium slow release Tab.	700 000
30.	Prednisolone Tab. 5 mg B.P.	1 250 000
31.	Promethazine Hydrochloride Tab. 10 mg B.P.	850 000
	" 25 mg (Phenergan)	2 000 000
32.	Propantheline Tab. 15 mg	1 400 000
33.	Pyridoxine Tab. 50 mg B.P.C.	750 000
34.	Pyrimethamine Tab. 25 mg B.P.	1 700 000
35.	Quinidine Sulf. Tab. 200 mg B.P.	800 000
36.	Salbutamol Tab. 2 mg B.P.	600 000
37.	Sulphadimidine Tab. 500 mg B.P.	11 200 000
38.	Thiacetazone Tab. 25 mg B.P.C. Izoniazid Tab. 66 mg	850 000
	Thiacetazone Tab. 150 mg Izoniazid Tab. 300 mg	6 400 000
39.	Benhexol Tab. 2 mg B.P.	1 000 000
	" .5 mg B.P.	300 000
40.	Vitamin B Tab. Compound, B.P.C.	1 500 000

2. Capsules

1. Ampicillin Caps. 250 mg B.P.	4 100 000
2. Chloramphenicol Caps. 250 mg B.P.	2 500 000
3. Multivitamin = Vitamins Capsules B.P.C.	21 500 000
4. Tetracycline Caps. 250 mg B.P.	18 100 000

3. Solutions

1. Ampicillin Mixt. 125 mg 5 ml B.P.C.	4	300	1
2. Belladonna and Ephedr. Mixt., Paed B.P.C.	1	100	1
3. Chlorpromazine Elixir 25 mg/5 ml B.P.C.	1	800	1
4. Ferrous Sulphate Mixt., Paed.B.P.C.	2	000	1
5. Methyl Salicylate Lin. B.P.C.	1	500	1
6. Paracetamol Elixir, Paed. B.P.C.	6	000	1
7. Promethazine Elixir 5 mg/ 5 ml B.P.C.	5	500	1
8. Sod. bicarb. 550 mg/ 10 ml	2	400	1

4. Syrups

1.	Pholcodine Linctus B.P.C.	21 000	1
2.	Piperazine Citrate Elixir 705 mg/5 ml B.P.C.	3 700	1
3.	Simple Linctus Peadiatr. B.P.C.	24 000	1

5. Suspensions

1.	Co-trimoxazole Susp. B.P.C.	3 250	1
2.	Chloramphenicol Mixt. 125 mg/ 5 ml B.P.C.	13 000	1
3.	Magnesium Hydroxide Mixt. 550 mg/10 ml B.P.	11 200	1
4.	Phenoxymethylpenicillin Mixture 125 mg/5 ml B.P.C.	8 500	1
5.	Sulphadimidine Mixt. Paed. B.P.C.	7 200	1

6. Emulsion

1. Benzyl Benzoate Applic. B.P.	8 600	l

7. Eye drops

1. Sulphacetamide Eye-drops 10%	650	l

8. Eye ointments

1. Chloramhenicol Eye Ointm. 1% B.P.C.	370	kg

9. Ointments

1. Benzoic Acid Ointment B.P.C.	5 000	kg
2. Hydrocortisone Oint. 10 B.P.	700	kg
3. Methyl Salicylate Oint. B.P.C.	5 000	kg
4. Chlorhexidine Cream B.P.C.	5 400	kg

10. Suppositories

1. Aminophylline Suppos. 100 mg B.P.	31 000	pcs
2. Bismuth Subgall. Suppos. 300 mg B.P.C.	24 000	
3. Glycerine Suppos. adult. 4 g	95 000	
" child. 2 g	122 000	
" infants 1 g	57 000	

The plant in Kabwe, which manufactures parenteral solutions is organized and managed on modern lines (see Fig. III/2). It possesses first-class technical equipment, is capable of meeting the requirements for intravenous solutions for the whole of Zambia, and even producing for possible exports. On these grounds we have refrained in our plans from any considerations of providing a department for the manufacture of parenteral solutions in the envisaged new pharmaceutical plant. After a closer examination of the situation in Kabwe and following the discussions with Company's top executives (general manager Mr. Nsensema, UNIDO adviser Mr. Sarin, UNIDO adviser Dr. Khan) we have dropped injection preparations from the manufacturing programme that we recommend, the reasons being as follows: A separate construction for the manufacture of injections in Zambia would be extremely uneconomical if we consider that there is a plant in Kabwe, orientated to essentially identical production, with all the necessary subsidiary technology. Under these circumstances it appears to be highly rational and economical to drop injections from the manufacturing programme of the plant we propose and to take into consideration the manufacture of injections in a suitable section of the Kabwe plant (ca 10 miles to the north of Lusaka), which at present works to about 50% of its capacity. It had been built with considerable UNIDO aid. The location of the buildings on the factory grounds provides an ideal possibility of ensuring future local production of injection medicament forms by constructing a simple injection pavilion in the area of the present vegetable garden, and this at a comparatively low investment cost (easy connection to the supply of demineralized water and steam for sterilization for the existing pavilion - see attached drawing, Fig. III/3.

In keeping with the UNIDO recommendation - "Summary of the Draft World-wide Study of the Pharmaceutical Industry", of June 21st, 1978, we recommend to realize this extension but only in the further stage of the development of pharmaceutical industry in Zambia, when the home manufacture of ampoules for injections and of bottles for dry injections (especially antibiotics) has been mastered, because:

For the manufacture in Zambia it is for the initial period possible to consider 61 kinds of injection preparations, i.e. ca 7.5 million pieces at a total retail price of ca 3.6 million Kwacha and an import price of ca 2.7 million Kwacha. For this production it would be necessary to import alone in packing material

5.7 million empty ampoules
(calculated production and transport loss of 50%)
worth ca $ 620 000

and 4.8 million empty penicillin bottles
(calculated production and transport loss of 25%)
worth $ 350 000

and 3.7 million pcs penicillin caps
worth $ 20 000

	sub-total	$ 990 000
transport charges	ca	$ 180 000
	total	$1170 000
other packing material	ca	$ 100 000
Total packing material	ca	$1270 000

i.e. 1.7 million Kwacha

It would be no problem to extend the production in General Pharmaceuticals Ltd in Kabwe and it is possible to come back to this task the moment Zambia in able to meet the basic precondition of the manufacture of injections, i.e. the manufacture of its own glass on the level of the required hydrolytic class I. There are some prospects in this respect, namely in connection with the Zambian Glass Co in Kapiri-Mposhi, not far from Kabwe. At present, however, this Company manufactures only plain bottle glass of low hydrolytic class for the needs of breweries. On the saaumption that either by own development or by purchasing a licence it will be possible to master the manufacture of hydrolytic class I glass, which is necessary for the manufacture of ampoules and bottles, it will be possible to build and additional pavillion for the manufacture of injections in Kabwe. With a view to the presence in Zambia of highly competent UNIDO experts (Dr. Khan, Mr. Sarin) the preparatory work for the construction of this additional pavilion can start immediately on complying with the requirement for the manufacture of glass and without any prior Feasibility Study since we could establish the potential demand for injections as dealt with below.

The following table brings a list of injections recommended for industrial production in Zambia after construction of a new pavillion in the existing General Pharmaceuticals Ltd in Kabwe.

Injections

1.	ACTH / LA 40 Units . .	7 600 pcs
2.	Adrenalin Inj. 1:1 000, 1 ml B.P.	62 000
3.	Aminophylline Inj. 10 ml B.P.	81 000
4.	Ampicillin Inj. 250 mg B.P.	
5.	" 500 mg B.P.	94 000
6.	Ampiclox Neonatal Inj. 75 mg	75 000
7.	Atropin Sulphate Inj. 0,6 mg/ml	
8.	Benzathine Penicillin Inj. 2,4 mega	187 000
9.	Benzylpenicillin 5 mega	680 000
10.	" 0,5 mega	656 000
11.	Calcium Gluconate Inj. B.P.	16 500
12.	Chloramphenicol Sodium Succinate Inj. 1 g B.P.C.	62 000
13.	Chloquine Inj. 40 mg/ ml, 5 ml B.P.	900 000
14.	Chlorpromazine Inj. 50 mg/ ml, 2 ml	130 000
15.	Cinchocaine Hydrochloride in 3% Glucosae, - 3 ml . .	7 500
16.	Cloxacillin Inj. 250 mg B.P.	66 000
17.	Cysnocobalamine Inj. L mg	34 000
18.	Dexamethazone Inj. 4 mg/ ml - 2 ml	6 200
19.	Diazepam Inj. 10 mg	105 000
20.	Diazoxide Inj. 300 mg/ 20 ml B.P.	1 000
21.	Digoxin Inj. 0,5 mg . .	18 500
22.	Ergometrine Inj. 0,5 mg B.P. . .	120 000
23.	" 0,5 - Oxytocin 5.I.V./ml	100 000
24.	FurosemideInj. 20 mg (Lasix)	62 000
25.	Gentamycin Inj. 50 mg/ 2 ml	26 000
26.	Heparin Inj. 5 000 Units/ ml - 5 ml B.P.	9 000
27.	Hydrocortisone Succinate Inj. 100 mg B.P.	82 000
28.	Iron - Dextran Inj. 2 ml	185 000
29.	" 5 ml	140 000
30.	" 20 ml	12 000

31.	Isoprenaline Inj. 2 mg/ 2 ml	5 000
32.	Ketamine Inj. 10 ml	1 300
33.	Lignocaine Inj. 2% - 30 ml	41 000
34.	Melarsoprol Inj. 3,6% - 5 ml	5 000
35.	Methyldopa Inj. 50 mg/ ml - 5 ml	6 200
36.	Metoclopramide Inj. 10 mg/ 2 ml	16 000
37.	Morphine Sulphate Inj. 15 mg B.P.	12 500
38.	Mustine Inj. B.P.	800
39.	Noradrenaline Inj. 4 ml B.P.C.	2 100
40.	Oxytocin Inj. 100 I.V.	25 000
41.	P.A.M. Inj. (Pralidoximjodid)	1 600
42.	Pethidine Hydrochl. Inj. 50 mg B.P.	30 000
43.	" 100 mg.	40 000
44.	Phenobarbitone Inj. 200 mg.B.P.	35 000
45.	Phytomenadion Inj. 1 mg B.P.	125 000
46.	" 10 mg	7 000
47.	Procaine Penicillin Inj. 300 000/10	1 600 000
48.	" Oil	350 000
49.	Promethazine Hydrochloride Inj. 2,5%-2ml	102 000
50.	Protamine Supphate Inj. 10% - 10 ml B.P.C.	500
51.	Quinine Hydrochloride Inj. 300 mg/ml B.P.	7 000
52.	Strepromycin Sulphate Inj. B.P.	310 000
53.	Sulphadiazine Inj. 1 g B.P.	33 000
54.	Suramin Inj. 1 g B.P.C.	1 600
55.	Suxamethonium Chloride Inj.50 mg/ 2 ml B.P.	26 000
56.	Tetracycline Inj. 50 mg / ml	180 000
57.	" 500 mg / ml B.P.	25 000
58.	Thiamine Inj. B.P.	9 000
59.	Thiopentone Inj. 1 g B.P.	14 000
60.	" 5 g B.P.	4 300
61.	Vitamin B Inj., Compound - 10 ml	210 000

Schedule III - 1 ESTIMATION OF SALES REVENUES

Products description		Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 11	
		Q	S	Q	S	Q	S	Q	S	Q	S	Q	S	Q	S
TABLETS	mil. pcs	430		860		910		965		1056		1120		1500	
CAPSULES	mil. pcs	70		140		148		157		166		177		240	
LIQUIDS	thous. lt.	190		380		403		427		453		478		640	
OINTMENTS	tons	24		48		51		54		57		60		80	
SUPOSITORIES	thous. pcs	490		980		1040		1110		1170		1240		1650	
TOTAL SALES IN MIL.ANACHA			7,5		15,0		15,9		16,9		17,9		18,9		25,3

- quantities to be sold
- sales

Schedule III-2

Sales and Distribution Costs:

Since in Chapters IV, V, and VI we suggest as an optimum solution manufacturing facilities to locate the new production in the existing Medical Stores Ltd the existing equipment and organization of this Company will be aslo used. The cost level of sales and distribution remains unchanged, it is insluded in the calculation of the storage and distribution overhead charges of the Company. We therefore show in Schedule III-2, the storage and distribution overhead charges related to the production programm.

Schedule III - 3 PRODUCTION PROGRAMME

PRODUCT	UNITS AT 100 % CAPACITY	Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 10	
		C	U	C	U	C	U	C	U	C	U	C	U	C	U
TABLETS	1000000000 pcs	43	430	86	860	91	910	96	965	105	1056	112	1120	150	[illegible]
CAPSULES	150000000 pcs	47	70	88	140	98	148	109	157	110	166	118	177	150	[illegible]
LIQUIDS	400 000 lt	47	190	95	380	100	403	107	427	113	453	119	478	160	[illegible]
OINTMENTS	50 tons	48	24	96	48	102	51	108	54	114	57	120	60	160	
SUPOSITORIES	1 000000 pcs	49	490	98	980	104	1040	110	1100	117	1170	124	1240	165	[illegible]

C - Capacity %

U - Units

The above values represent a continuous linear development of the production [illegible]

Schedule III-4

Emissions disposal

In the manufacture proposed there is no need to consider emissions or exhalations. Other expenses with waste disposel are included in the calculations in Schedule VII/1 - overhead costs.
Production material losses have been included in the calculation of material norms in the computer report and presented numerically in Schedule IV-1 and IV-2. There is therefore no need to fill in Schedule III-4 of the manual.

IV. MATERIALS AND INPUTS

Characteristics of materials and inputs

Raw materials of local origin

The problem of local industrial production of drugs is closely related to the problem of the exploitation of local raw materials. We have studied this important question in great depth and found that at present it is absolutely impossible to expect that the Zambian pharmaceutical industry might manufacture drugs from raw materials of local origin, excepting a few items which are not very significant. The reason is that the Republic of Zambia has neither basic nor applied chemical industry and this fact admits no other solution but importing the necessary raw materials and processing them into the final form in local pharmaceutical facilities. In this way Zambia would more clearly than up to now be classed among the Group II Countries, if we apply the classification by B. Shah given in No 10 Appropriate Industrial Technology for Drugs and Pharmaceuticals, published by UNIDO (United Nations, New York 1980), pp 17-31.

While Group I Countries only import drugs, Group II Countries are able to manufacture final products from imported raw materials. The steps they should take are:

1) Establish formulation units to convert bulk drugs into dosage forms such as tablets, capsules, liquids, ointments and infusion solutions.

2) Establish facilities to control quality from the raw material to the finished product.

3) Set up requisite organization to monitor drug stability.

It is only Group III Countries that are able to produce own basic raw materials, which, of course, is conditional on the existence of own basic and specialized chemical industry. There are also two further groups (IV and V) but these are beyond the scope of our specifically Zambian considerations. In these circumstances the present state of the development of the chemical base does not allow an optimistic prognosis of utilizing own Zambian raw materials of chemical provenance till at least 1990. However, the application of some raw materials can be envisaged which are produced by petrochemistry, agriculture, ceramic and food industries. These are, above all, the important auxiliary pharmaceutical raw materials such as refined sugar, talcum, starch, alcohol, glycerine, zinc-oxide, copper-suplhate, paraffin oil, solid paraffin, wax, acetic acid, methylalcohol, vegerable oils (castor, linseed, ground-nut oils) and some vegetable volatile oils (ol. eucalypti).

The above raw materials of local provenance have been included in the production programme and they are taken into consideration (see e.g. Table 1 - Computer resuls).

In a country like Zambia it is not without interest to cover, in connection with industrial production of drugs, also such sources as local medicinal herbs.

There is no doubt that the African flora offers to the botanist a rich field for collecting, and the satisfaction of frequent discoveries.

In his book "Some African Poison Plants and Medicines of Northern Rhodesia" (The Rhodes-Livingstone Museum, Li-

vingstone 1964), W. Gilges lists some 210 plants out of which 90 are regarded by local inhabitants as drugs and another 102 varieties are, from the viewpoint of medicine, unexplored up to now butpotentionallyutilizable in the future.

The Zambian Ministry of Health has become quite aware of the wealth hidden in Zambian nature and for the future it counts on organized research into medicinal herbs. The Government is equally aware of the curative results offen achieved by local witchdoctors, and so within the framework of the Ministry of Health a special department was formed, headed by Mrs. K. Sikota, whose task it is to collect in a suitable manner all information on the procedures and drugs used, and to forward it to the respective institutions for sciectific examination.

Summing up ti can be said that as far as medicinal herbs are concerned, the prognosis for Zambia is favourable but the present situation is not ripe enough to be of any use in our considerations in connection with the building up of pharmaceutical industry. Starting from general experience we can say that it will take at least 7 to 10 years for the development to take the following course:

a) basic pharmacognostic research of medicinal herbs

b) organizing the growing, harvesting and purchasing of medicinal herbs

c) industrial processing of medicinal herbs into the form of basic raw materials.

This opinion of ours is shared by Mrs. Sikota (see above) and Dr. Makulu, professor of pharmacology at the Medical Faculty of the University in Lusaka; according to both of them the workers of the National Institute of Scientific Research in Lusaka are of the same opinion. Likewise, they agreed with us as regards the basic raw materials of chemical nature. It is highly advisable that a group of experts (pharmacognosists, botanists, physicians, pharmacists) should be entrusted with preparatory investigation (land survey) and sent to Zambia to carry out research similar to the one organized by UNIDO in Lesotho and in Botswana.

Owing to its enormous scientific and ensuing technological pretentiousness, this work must definitely be presented in the form of a separate Feasibility Study.

With a view to the above problems relating to the raw materials of local provenance we have, in the following, made a model calculation of material inputs of the proposed production assortment, with the starting capacity on the level of the 1980 quantification, in keeping with the conclusions of Chapters III and IV of the present Study.

Proposséd industrial materials

The balance of basic semiproducts and auxiliary pharmaceuticochemical materials has, due to the complexity of calculations necessary in pharmaceutical production, been performed on a Hewlett-Packard computer by our own program (which is attached see set of Tables under No. 1) for two inputs, namely

Category 1 - basic semiproducts (effective substances)

Category 2 - auxiliary pharmaceutico-chemical material.

The selection of these raw materials has been made in the form of technico-economic norms of the proposed production assortment (they are attached). The first quantification step was made on the basis of the 1980 quantification and further modelled in keeping with the principles applied in the marketing estimate of consumption in Chapters II and III. This is to say that in the calculation the time series of the raw materials consumption were indexed with the same paces as the final products, the aim being to apply the computer material also in subsequent purchasing strategy and in the determination of the purchasing plan.

Used as inputs were average world prices of the first half of 1980, cif Hamburg, in US $ in the case of imported materials and in Kwacha in the case of Zambian materials. In developing the time series in terms of finances the inflation rate was not considered in the calculation. In the case of pharmaceuticals prices may fluctuate widely and cannot be progmosticated with any certainty. Since exactly the same method will be applied throughout the other Chapters of the present study there will be no discrepancy in the prices levels or any confusion in the final financial results.

The required quality properties were given no prominence since they are given:

a) in Category 1 inputs by exact pharmacopoeia prescriptions (BP, USP)

b) in Category 2 inputs by the requirements on these substances contained in the National Formulary USA-XII.

These quality requirements have been laid down by WHO and they have been included in the price inputs.

Supply programme

Raw materials

To determine the cubic space and the conditions necessary in the transport and storage of materials we have entered into the program 4 basic codes as to the nature of input raw materials:

1 - powder raw material
2 - liquid
3 - ointment basic material
4 - inflammable

Chosen as the basic calculation unit of final products was the economic batch, i.e.

1 million pcs in the case of tablets
100 litres in the case of liquids
100 kg in the case of ointments
1 kg in the case of suppositories.

The other chosen programme codes are clear from the attached input statement and basic output report.

After the sorting of the collection of data, a detailed calculation of the material balance was made by classifying and arranging it into the time series covering the time frame from 1980 (the starting point) through 1985-'86,7,8, 9 - 1990 - 1995 to 2000.

Within this time series the total calculations were made (see the Schedule VI-2 of the output report):

A) Total value in US $ of imported materials of Categories 1 and 2

B) Total value in Kwacha of local materials of Cate-

gories 1 and 2

C) The toal value in Kwacha of all the materials of Categories 1 and 2 (at the October 1980 rate of exchange of 1 Kwa = 1.31 US $).

The same values A, B, C were then calculated separately for Category 1 materials and separately for Category 2 materials. Subsequent to this the volume was calculated for
- imported materials
- local materials

in physical units according to the grouping

(1 - powders
2 - liquids
3 - ointment basis material
4 - inflammables)

plus summaries in financial terms intended for further estimates of transport costs, storage costs, etc.

To give a clear picture of these aspects, we insert here the table of final results of the attached computer report:

TOTAL MATERIAL SHOW

	1980	1985	1986	1987	1988	1989	1990	1995	2000
RAW MATERIALS									
TOTAL [US $]	1654115	2431549	4863099	5160839	5458580	5789403	6136767	8220953	10999865
TOTAL (KWACHA)	0	0	0	0	0	0	0	0	0
TOTAL US$+KWACHA IN KWACHAS	1262683	1856145	3712289	3939572	4166855	4419392	4684555	6275537	8396844
AUXILIERY MATERIALS									
TOTAL [US $]	199192	290132	580264	615790	651317	690790	732238	980922	1312502
TOTAL (KWACHA)	31067	45668	91336	96928	102520	108733	115257	154401	206594
TOTAL US$+KWACHA IN KWACHAS	152059	221875	442950	470069	497188	527321	558960	748796	1001910
IMPORT MATERIALS									
IN LOOSE KG	107280	157702	315404	334714	354025	375481	398010	533183	713413
IN FLUID L	17530	25769	51539	54694	57850	61356	65037	87125	116576
OINTMENT KG	7990	9827	19653	20856	22060	23397	24800	33223	44454
COMBUSTIBLES L	750	1103	2206	2341	2476	2626	2783	3728	4989
TOTAL [US $]	1853307	2721681	5443363	5776629	6109897	6480194	6869005	9201875	12312367
DOMESTIC MATERIALS									
IN LOOSE KG	23293	34241	68481	72674	76867	81525	86417	115766	154898
IN FLUID L	5703	8383	16767	17793	18820	19960	21158	28344	37925
OINTMENT KG	0	0	0	0	0	0	0	0	0
COMBUSTIBLES L	2806	4124	8248	8753	9258	9820	10409	13944	18657
TOTAL (KWACHA)	31067	45668	91336	96928	102520	108733	115257	154401	206594

G R A N D T O T A L :

TOTAL US $	1853307	2724362	5448723	5782318	6115914	6486575	6875770	9210937	12320492
TOTAL KWACH	31067	45668	91336	96928	102520	108733	115257	154401	206594
TOTAL US$+KWACHA IN KWACHAS	1445805	2125333	4250667	4510912	4771157	5060318	5363937	7185652	9614603

Packaging materials

a) For the packing of 1 million tablets or capsules by the blister method (see Chapter V) we need, on the average, 370 kg aluminium foil - prices US $ 1100 a ton 1700 kg
PVC foil - prices US $ 320 a ton
1000 pcs cartons for batch packing - this is returnable packing material. Assuming the cartons are returned five times then, even with losses being included in the calculation, only 230 pcs at US $ 0.60 each will be necessary.

b) The packing of liquid medicament forms will be done by the currently applied technology, using recoverable 1-, 3- and 5-litre polyethylene bottles. Average price of a PE bottle is 1.10 Kwacha. We expect that a lump purchase of 11,000 pcs of these bottles will be necessary as an investment, with additional yearly purchases of 1,000 pcs. One part of the assortment (eye drops) will be packed in glass bottles, average price (with stopper and label) is US $ 40 a thousand, weighing ca 20 kg. In this case, too, 5 times returned cartons will be used for 1000 bottles a total of 230 cartons at US $ 0.60 each.

c) Ointments will be filled into tubes which are expected to be locally produced by then. The price estimate is made on the basis of world prices of this material and it is 60 Kwacha a thousand pieces. Added to this must be the price of 5 times returnable cartons, i.e. for 1000 tubes 230 pcs at US $ 0.60 each.

d) For the packing of suppositories we calculate the consumption of 1 kg cellophane per 1000 pcs, at US $ 0.21, and 10 pcs flat boxes at 2.20 Kwacha.

Taking into considerations these relations and the expected rate of production growth we have estimated the need for packing material as follows:

(relations for the years 1991 - 2000 can be derived by applying the yearly growth rate coeficient of 6%)

	Years						
	1980	1985	1986	1987	1988	1989	1990
Medicament forms							
Tablets in million pcs	288	430	860	910	965	1056	1120
Capsules in million pcs	46	70	140	148	157	166	177
Liquid medicament forms in thousand litres	127	180	380	403	427	453	478
Ointments in tons	16,5	24	48	51	54	57	60
Suppositories in thousand pcs	330	480	980	1040	1100	1170	1240
Value of production in million K	5,1	7,5	15,0	15,8	16,9	17,8	18,9
Packing material requirements							
Al foil in tons	123	185	370	392	416	440	466
PVC foil in tons	850	1240	2480	2630	2780	2950	3120
PE bottles in pcs	0	1000	1000	1000	1000	1000	1000
Tubes in thousand pcs	825	1230	2460	2600	2760	2930	3100
Bottles in thousand pcs	200	300	600	640	670	710	750
Cellophane in kg	330	490	980	1040	1100	1170	1250

	1980	1985	1986	1987	1988	1989	1990
Cartons in thousand pcs	312	465	930	980	1050	1100	1160
Tins in kg	3300	4900	9800	10300	11000	11600	12300
Total in tons	1060	1560	3000	3200	3380	3560	3750
Price in thousand US $							
Al foil	135	201	400	425	450	480	500
PVC foil	272	400	800	850	900	950	980
Bottles	8	12	24	25	27	28	30
Cellophane	1	1	1	1	I	I	1
Cartons	187	275	550	580	620	655	690
Total in thousand US $	603	889	1775	1881	1998	2114	2201
Price in thousand Kwachas							
PE bottles	-	1	1	1	1	1	1
Tubes	50	75	150	160	170	180	190
Tins	8	Il	22	23	24	25	26
Total in thousand Kwachas	58	87	173	184	195	206	217
Grand total							
US $ + Kwacha (in round figures) in thousand Kwachas	520	770	1490	1620	1720	1820	1900

Cost estimation

Imported input materials, discussed in previous Sections of this Chapter, will have to be transported to Lusaka; since the price relations have been based on 1980 price levels, cif Hamburg, transport costs will have to be added according to the following tariffs:

a) Freight cost from Hamburg to Dar-es-Salam according to the international rates as supplied by Čechofracht Praha (averaged as the "miscellaneous material" item)

	US $ 215.50	per ton
+ loading dues	US $ 2.50	per ton
Total	US $ 218.00	per ton

b) Cost of transport Dar-es-Salam to Lusaka according to the Zambia-Tanzania Road Services Ltd (again, the tariff of the "miscellania" item is used to obtain an average value)

106.60 Kwacha per ton

The items transported will consist of:

In tons (rounded up)	1980	1985	1986	1987	1988	1989	1990
Powder medicament forms	107	158	315	335	354	375	398
Liquids - auxiliary substances	18	26	52	55	58	61	65
Ointment basis meterials	8	10	20	22	24	25	33
Inflammables	1	1	2	2	2	3	3
Packing materials	1060	1560	3000	3200	3350	3560	3750
Total in tons (rounded up)	1200	1750	3400	3600	3800	4000	4200
Cost of transport in thousand US $	260	380	740	780	830	870	920
in thousand Kwachas	130	190	360	380	400	420	440
in US $ + Kwachas - converted into thousand Kwachas	330	480	920	980	1030	1080	1140

Calculation of the foreign currency component and the overall material share in the value of production

On the basis of calculations carried out above a table can be prepared from which the share of imports and of input materials taken as a whole in the value of the production can be determined on the basis of information contained in Chapters II and III.

Indicator	1980	1985	1986	1987	1988	1989	1990	1995	2000
Value of production in million Kw	5,1	7,5	15,0	15,9	16,9	17,9	18,9	25,3	33,8
Imports:									
Value of Categories 1 and 2 input materials + packing materials + costs of transport in million US $	2,8	4,0	8,1	8,6	9,3	9,7	10,2	13,6	18,2
ditto in million Kw	2,1	3,0	6,2	6,6	7,1	7,4	7,8	10,4	13,9
Share of imports in total production, in percentage	4,12	40,0	41,3	41,5	42,0	41,3	41,3	41,1	41,1
Total for Categories 1 and 2 materials + packing material + cost of transport, in million Kwachas	2,3	3,4	6,7	7,1	7,5	8,0	8,4	11,3	15,0
Total share of material costs in production, in percentage	45,0	45,3	44,5	44,6	44,3	44,6	44,5	44,4	44,5

From this table it can be seen that the assumption expressed in Chapter II. of the Study has, basically, turned out to be correct, namely that for an equal (or smaller) expense in foreign currency twice as much material can be manufactured in own facilities with imported substances when compared with imported ready-made medicaments. The actual calculation has shown that for the manufacture in the value of drugs imported in 1980 (5.1 million Kwacha in foreign currency) imports of raw and packing materials worth only 2.1 million Kwacha (in foreign currency) would be necessary; the ratio of the two sums is about 40%. To put it briefly: when the additional capacity is completed in 1985, then starting with 1986 the supplies for the Zambian health services can be doubled while the same amount of foreing currency is spent.

Approximately a year and a half prior to initiating the manufacture, tenders should be invited for the supply of materials according to the attached computer report, for each material from several world manufacturers. The computer report gives generic terms of substances; a key drawn up according to leading companies can be found in a number of technical publications. In the present case of the newly built plant we recommend to require tenders according to the key contained in the publication Martin Negwer: Organic-chemical drugs and their synonyms, Akademie - Verlag - Berlin 1978.

Prior to inviting tenders it is necessary to specify the normatives once more, according to a more detailed production plan of the assortment as to this date.

After receiving the respective tenders, optimum price relations will be established and orders will be placed so that the first storage norm should reach Lusaka at least 3 months before the initiation of the production so that the materials could be properly accepted by technical inspection.

For reasons of transport (loading and unloading the materials in two ports and train transport from Dar-es-Salam to Lusaka over a distance of 2000 km) we recommend to lay down at least 5 months' norms of supplies of imported materials. This means that the storage facilities of the Medical Stores will be burdened permanently with ca 1450 tons of material, which with a production cycle of 1 month represents a 160 days' cycle of stores turnover. This impact is not so great as it seems at first sight since, on the other hand, there will be fewer imports of ready-made medicaments by at least the same tonnage and volume but with approximately half the stores turnover cycle. We suggest that the present storage facilities comprising more than 1000 m^2 of storage area and the most upto-date equipment, be used to cope with this task which in practice means an increase of ca 120 tons of material in the dispatch volume.

To be in a position to do this we recommend to engage

1 storekeeper
2 store hands

in addition to the existing staff. Problems in connection with ensuring supply administration are dealt with in Chapter VII.

The increase in the stores turnover will have an impact on the financial sphere. With regard to the fact that, simultaneously, the mass of profits stemming from own manufacture will be poured here, this impact will not be substantial and it will be discussed in Chapter X of the present Study.

The other production inputs:

For the proposed manufacture they will be:

- electric power
- compressed air
- supply of water

Due to the nature of the envisaged manufacturing process and water have been taken into account in overhead expenses and they are therefore treated in Chapter VII of this Study. It is, however, different with electric power which, must be considered the basic source of power and it requires, to be divided into direct and overhead parts. The first direct demand will be determined at this point.

Before that, however, it must be emphasized that the Republic of Zambia is a large producer of electric power, which is obtained exclusively from waterpower (the largest dams Kafue and Kariba), with hydroelectric stations producing a total of ca 4 million kWA, a considerable part of which is exported.

The situation regarding the power supply on the site is very favourable (see Chapters V and VI).

The price for 1 kWh is 0.17 Kwacha, the charge for electricity reading is 3.6 Kwachas per month (which is negligible).

According to the calculation of inputs as given in Chapter IV the consumption at a factory level on an optimum capacity of

1,000 million tablets
150 million capsules
400 thousand litres of liquids
50 tons of ointments
1 million suppositories

will in the individual groupings amount to the following maximum values per 1 hour:

Ion-exchanger station	3 kWh
Adjustment	20 kWh
Film-coating	10 kWh
Pressing of antibiotics tablets	6 kWh
Granulation of antibiotics	5 kWh
Pressing of tablets	15 kWh
Fluid granulation	20 kWh
Granulation	10 kWh
Powders	3 kWh
Trituration	10 kWh
Manufacture of liquids	
and, in addition,	
Dissolving tanks	30 kWh
Mixers	3 kWh
Filtration equipment	3 kWh
Homogenizers	20 kWh
Total	158 kWh
Power input per shift	1264 kWh

When taking into consideration the envisaged capacities (see the Schedule of capacity growth), this consumption will

basically remain constant in the period from 1986 to 1990; in 1991, when the second shift is partly operating, the consumption will increase by ca 30%, in 1995 by about 50%, and in the year 2000 it will be twice as large.

At the production initiation stage in the year 1985-86 about 70% power demand can be expected.

With an actual yearly number of working shifts of 202 (see the calculation in Chapter VIII) the yearly direct consumption of electric power at full production capacity will amount to

255 thousand KWh

and it will cost ca 50 thousand Kwachas (at 1980 prices). The results of these considerations are summarized in the Schedule IV-1.

The import of drugs into Zambia is duty-free and it is not liable to taxation. We expect that the import of all components for Zambian own production will also enjoy the same conditions as the present imports for the manufacture of infusion solutions in Kabwe.

Schedule IV - 1

ESTIMATE OF PRODUCTION COST

Materials and inputs

No	Quantity	Unit	Item description	Local	Foreign	Unit cost	Cost		
							Foreign in 1000$	Local in 1000 K	Total in 1000 K
1	3800	ton	Basis effective substances	-	F	See previous analysis	5458	-	4166
2		ton	Auxiliary pharmaco - chemical material	L	F		651	103	497
3	3350	ton	Packing material	L	F		1998	195	1720
4	3800	ton	Cost of Transport	L	F		830	400	1030
5	36158	kWh	Power /direct/	L	-	0,17 K	-	50	50
						Total	8937	747	7463

Schedule IV - 1

Note: The Schedule IV-1 has been made up for the year 1988, when the capacity is fully used and the value of production is 16,9 million Kwachas (at 1980 prices).

Schedule IV - 2

SUMMARY SHEET - PRODUCTION COST				
Material and inputs				
Project component		Production cost carried over		
No	Description	Foreign	Local	Total
		in 1000 $	in 1000 K	in 1000 K
1	Manufacture of tablets, capsules liquids, ointments and suppositories	8937	747	7463
	Total	8937	747	7463

V. LOCATION AND SITE

L o c a t i o n

It appears to be of the greatest advantage to locate the proposed pharmaceutical manufacturing facilities in the capital city Lusaka or its immediate vicinity. There are a number of reasons speaking in favour of this solution, the most important of which are the concentration of industries and central authorities, advantageous connections by road, rail and air skilled manpower, the presence of existing and future research facilities, etc. The climatic aspects are not negligible either, especially with regard to the effects on the storage of medicaments. In this respect Lusaka and its environs are also of advantage, this locality does not require any special provisions in the field of manufacturing or packaging technology (tropicalization) since the climate is subtropical, the mean temperature ranging from 70° F (21° C) to 90° F (32° C), with a maximum of 103° F (39° C) and a minimum of 56° F (13° C). There are three seasons here: hot and dry from September to November, warm and wet from December to April, cool and dry from May to August.

The average rainfall varies from seventy inches in the north-west to twenty-five inches in the southeast of Zambia. The cool season (May to August) is completely dry. It is cool in the mornings and evenings with almost constant sunshine. In some places, the temperature may drop below zero. Regional variations in the climate are quite conspicuous. In the high plateau the mean temperature ranges from 55° F (13° C) to 75° F (24° C), with a maximum of 86° F (30° C) and a minimum sometimes below the freezing point. The altitude of Lusaka is 4,200 feet (1,280m) and it ensures a healthy climate. The hottest month is October,

with a maximum temperature of 90° F (32° C), while the coldest month is July, with an average temperature of 64° F (18° C). Even during the hottest months the nights are pleasantly cool.

Further:

The dustiness in Lusaka area, outside of town, is negligible and there is no danger of surface water flooding.

The Lusaka region does not lie in a zone prone to earthquakes, to that there are no special building requisement.

Site

Data and alternatives

The choice of the site (and the proposed technical solution, as given in Chapter IV) has been made after a thorough examination with a view to the solution meeting the following conditions:

- easy access, transport facilities
- water and power supplies
- wastes disposal possibilities
- possibilities of hiring manpower
- linkages to sales organizations and firms in the field of health services
- availability of means of communication
- possibilities of providing utility connections
- trained personnel

The two alternative solutions that can come into consideration are

- revamping one of the existing establishments
- constructing new independent facilities.

For economical reasons we considered advantageous to first examine the alternative of revamping some of the existing establishments and, consequently, we studied detail existing pharmaceutical works in Zambia. Worth mentioning are the following three firms:

1. National Drug Co Lusaka - this is the largest pharmaceutical manufacturer in Zambia, engaged also in the production of cosmetics (ca 60% of its manufacturing capacity), imports, and wholesale and retail selling.

The manufacturing facilities are housed in the centre of Lusaka, on a plot approximately 50 by 100 m, the building facing the Freedom Way, the rear wing facing the Lumumba Road, flanked on sides by the Lechwe House and the Duly Motors Co Ltd (Zambia), as shown in the attached drawing (Fig. V/1) and photo (Fig. V/2).

The National Drug Co is part of the INDECO concern, 51% of the firm being state property, 49% owned by private shareholders. The buildings of this company date bank to 1952; (produced on mostly obsolete equipment are tablets (according to our estimates the maximum yearly production is 150 million pcs), capsules (filled manually), liquids and ointments (together with parapharmaceuticals and cosmetics and production of tooth pastes). At present the manufacturing facilities are exploited only partially (because of raw material problems) with about 30 sorts of pharmaceutical preparations being manufactured. Storage facilities are insufficient.

The present location of the National Drug Co does not allow any revamping and for the same reason any modernization of the existing manufacturing facilities in keeping with the principles of Good manufacturing practice (GMP) as laid down by WHO is almost impossible.

2. General Pharmaceuticals Limited in Kabwe has a perfect modern production of intravenous infusion solution made under a Vifor licence, with a capacity of 1 million bags per year when working in one shift. The brand new manufacturing facilities, incorporated in the state economy sector, lie in the industrial area of the town Kabwe

(some 100 miles to the north of Lusaka). They are mentioned here only in order to make the picture complete since they do not satisfy the criteria given in the paragraph "Choice of location". Moreover, the production is oriented here exclusively to infusion solutions. According to Dr. Khan and Mr. Sarin, both of them UNIDO advisers working in the above factory in Kabwe, locating this factory outside the capital proved to be rather unlucky and brings many difficulties. Nevertheless, the problem of producing injections made us consider the possibility of adding a special wing to this factory, which was already mentioned in Chapter III.

3. Medical Stores Ltd. Lusaka, are modern storage facilities supplying material for the state health sector of the Republic of Zambia, coming under the control of the Ministry of Health. They have been built on an area of ca 74,000 m^2 in the industrial area of Lusaka. These stores are incorporated in the National Import and Export Corporation Limited (NIEC) whose economic profile can be seen from the Table V/1 and in whose total turnover the Medical Stores participate by 8.8% (see the Table V/2).

Site Selection

Having considered the existing possibilities, we concentrated on the plot, buildings and facilities of Medical Stores Ltd., which are national distributors of all medical and pharmaceutical products in Zambia and, on practical grounds, we recommend:
to solve the problem of constructing pharmaceutical production facilities by adding to the existing Medical Stores

one pharmaceutical pavilion for the production of tablets, and capsules, of reinforced concrete structure, where the latest achievements of leading contemporary technology would be used. We also recommend to install in the existing facilities equipment for the production of liquid medicament forms, ointments and suppositories. For a detailed design refer to Chapter VI.

The selection of the site was recommended because it is definitely the most advantageous both for production and distribution costs:

- the possibility of using the existing plot; thus it is not necessary to include into the calculation its purchase and other related expenses

- the basic utility network is available

- inputs of basic materials and outputs of final forms will be realized by way of existing storage and administration capacity

- considerable reduction in overhead expenses by continning the existing organizational structure

- location in the industrial area of the capital with abundant manpower, good transport conditions and possibility of direct communication with governmental authorities

- direct linkage between production and distribution (storage) moreover modern buildings housing the administration offices and stores of sanitary material are located on own extensive tract of land, as can be seen from the respective drawing (in Fig. V/3, V/4, V/5 and V/6).

In the central building a production area of 1000 m^2 is available which is provided with power and water supply,

and drainage. At present this is only used in a limited extend, namely for the production and bottling of liquids and ointments. The building is connected to the water supply and sewerage systems of the municipality of Lusaka, the total daily inlet being ca 100 m^3 of water maximum hardness of 199 ppm (the mean value is 90 ppm) per shift. The building is provided with an equalizing water-supply tank (at present made use of to less than 50%). The total power input of 220-240 V/380 V - 400/h is also used at present to 50% only.

There is a good connection to the road network and own two-track railway siding.

Legal provisions of the Republic of Zambia require the drawing documentation to be submitted for approval by the City Council of Lusaka prior to starting the construction work. The Council issues a building licence and appoints the municipal building supervision. All these formalities take up about three monts (for details refer to Chapter) and expenses covering the legal formalities in the amount of ca 5,000 Kwacha (included in Schedule V-1).

The problem of insurance is, together with insurance rates, dealth with in Chapter VIII.
The whole project of the construction of Medical Stores has been designed by architects Montgomerie, Oldfield, Kirby. The construction itself has been the work of Lewis Construction Co (Z) Ltd, P.O.Box 2056, Lusaka, which is the largest local contracting firm engaged in the construction of industrial plants.

We contacted Mr. Golson, manager of Lewis Construction Co, who has given us an estimate of the cost of construction work (refer to Chapter VI). We recommend to have the above firm construct the additional pharmaceutical pavilion since this firm is of a high technical level.

The basic building materials are currently available from local sources (a large cement factory and brick factory close to Lusaka, the production of asbestos-cement plates, atc.). As regards the location of the new pavilion within the Medical Stores grounds, for which several variant solutions can be thought of, we recommend, after due consideration of all the relevant aspects, to place the site in the northern part of the plot, between the present approach to the railway siding ramp, the railway siding and the wall of the service yard (see Fig. V/9), which is an area of 22 by 78.5 m. This choice has been made with a view to easy and smooth communication between the new production facilities and the present store facilities.

The other variant of situating the new building as an addition to the eastern front of the existing storehouse, as suggested by Mr. Golson, manager of the Lewis Construction Co, would entail a complete change in the flow of material in the existing area since it would block the present day expedition.

The whole situation can roughly be outlined as it can be seen in Fig. 21 by 83 m. Pictures of the present state of the grounds (see Fig. V/9-11). With a view to the solution suggested we fill in only Schedule V-1; Schedule V-2 is irrelevant (titles and possible annuities either do not exist or they have been included in the expenses of the existing Medical Stores).

Local conditions

The site chosen for the construction according to variant 1, i.e. in the northern part of the Medical Stores, plot is flat, the soil consisting of 80 cm of loess and then, down to a depth of 10 m, second-class rock; ground-water level is below 10 m. It does not require any special preparation or development, except for the construction of provisional communication and elementary building site facilities in area A (see Fig. V/7) costs ca 10,000 Kwacha.

The good road network enables ample use of road haulage, and a private railway siding including a loading and unloading ramp provides for connection to the rail transport (see drawing documentation - Fig. V/4). Air transport - international airport of Lusaka, at a distance of 25 km.

Current refuse is disposed of through the municipal refuse collection system (containers).

Larger types of wastes (solid wastes from production) must be taken by own means to a refuse dump, distant some 10 km. Waste water is collected into the municiapl sewerage system. For detailed budget estimates refer to Chapter VII.

Schedule V - 1

ESTIMATE OF INVESTMENT COST									
Land									
Plot									
nO			Item description			Unit cost	Cost		
							Foreign	Local	Total
1			Legal expenses	L	-		-	5000 K	5000 K
2	150	m	Provisional access	L	-	30 K	-	4500 K	4500 K
3	100	m	Provisional fencing	L	-	10 K	-	1000 K	1000 K
4			Basic Equipment for the building site	L	-		-	4500 K	4500 K
							Total	15000 K	15000 K

Schedule V - 2

The existing land of Medical Stores Ltd. in Lusaka will be used. We therefore do not fill in the Schedule V - 1.

VI. PROJECT ENGINEERING

Schedule V - 2

The existing land of Medical Stores Ltd. in Lusaka will be used. We therefore do not fill in the Schedule V - 1.

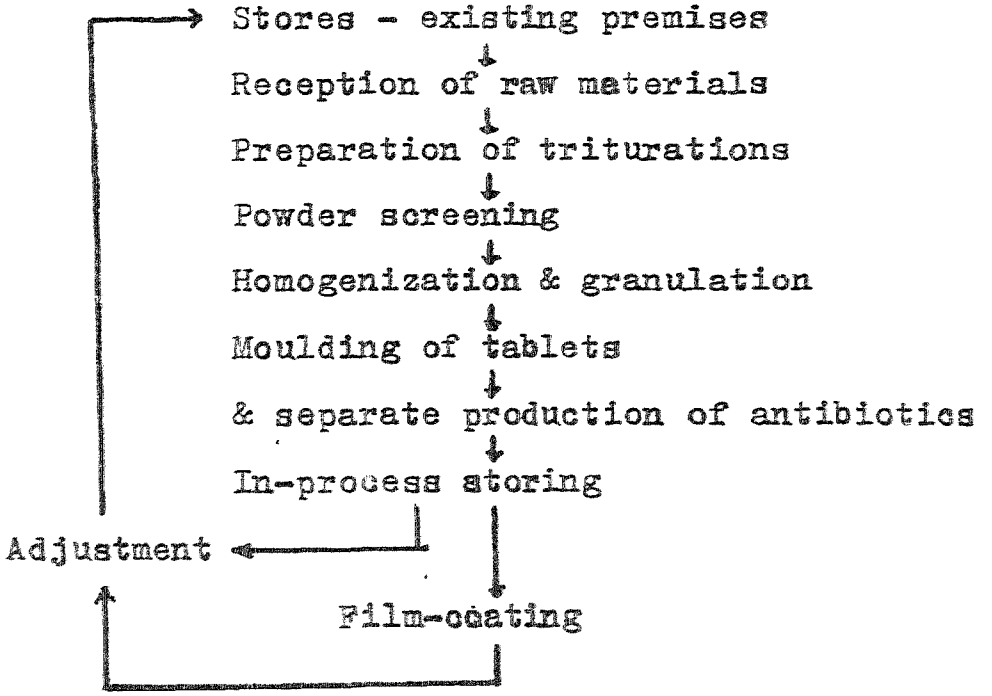
VI. PROJECT ENGINEERING

Project layouts

The solution of the project lay-out has resulted from the requirement of providing capacities for the production per year and shift of

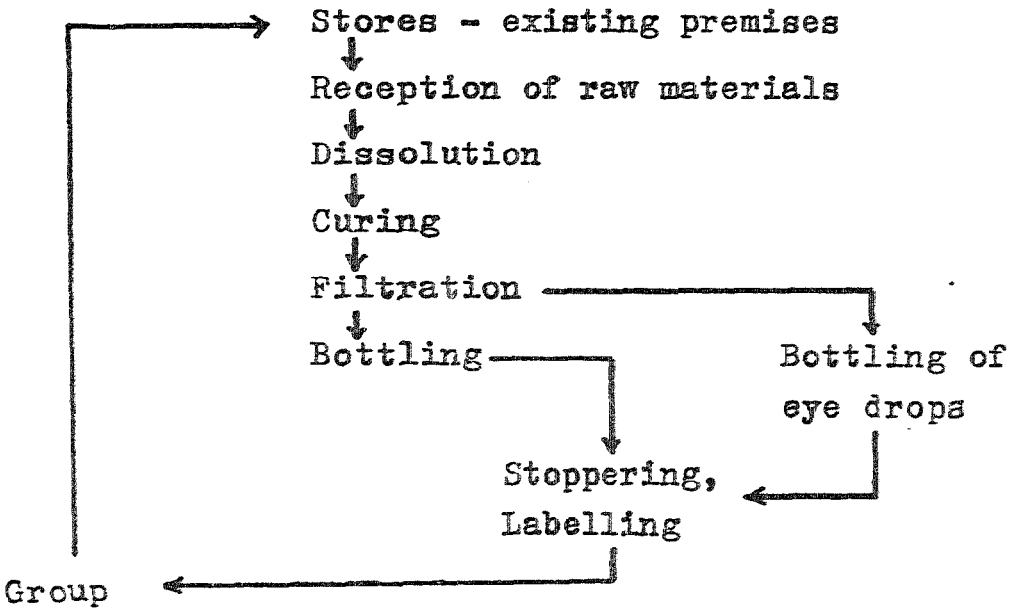
1 000 million tablets and coated tablest
150 million capsules (hard, gelatine)
400 thousand litres of liquid medicament forms
50 tons of ointments
1 million pcs suppositories.

The selection of the technologies and, consequently, of the necessary machine equipment has been made on the basic of the letest achievements of the pharmaceutical industry in Czechoslovakia and abroad (the latter obtained during visits to Switzerland, the Federal German Republic, Sweden, USSR, etc.). The desing provides for the following proportionally balanced flow of materials:

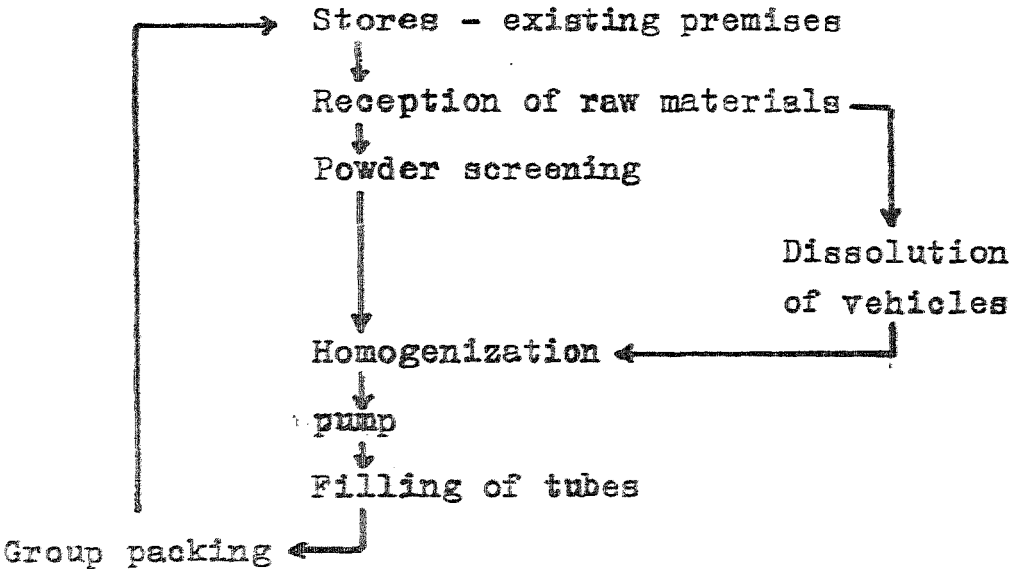


The technology provides for all the conditions of good manufacturing practice, as stipulated by WHO, being satisfied and a high productivity of labour being achieved. For the specification of individual working procedure steps and the consequent servicing see Chapter VIII.

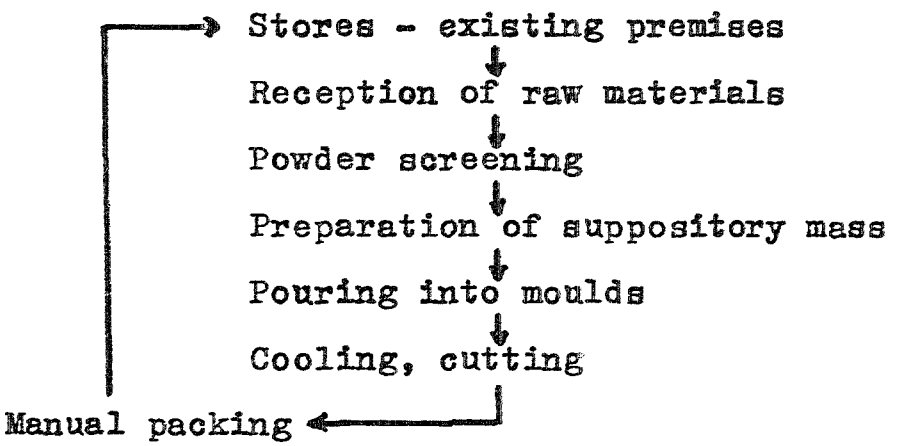
A. Production of liquid medicament forms:



B. Production of ointments:



C. Production of suppositories



The project provides for the implementation of the WHO requirements as to good manufacturing practice (GMP) at an avarage productivity of labour. For the specification of individual working procedure steps and the consequent servicing see Chapter VIII.

Scope of project

Selection of the scope of the project

With regard to the present condition of production, the required capacities and the technologies proposed we have chosen the following basic lay-out of the project:

1. Tablets and capsules should be produced in the newly built independent facilities in keeping with the GMP requirements,

2. The other medicament forms given above should be manufactured on the basic of the existing limited capacity, whose premises (ca 1000 m^2, not fully made use of, but with all the necessary power and water supply lines) will, according to our porject, be complemented with necessary equipment and modernized.

Owing to the different nature of the two manufacturing set-ups we shall, in the following, deal with each partial unit separately.

1. Manufacture of tablets and capsules:

We suggest extending the existing premises of the Medical Stores by an independent pavilion for the production of tablet medicament forms in the area of the Medical Stores, as presented in Chapter V. For easy orientation see Fig. V/4.

The building itself is designed on the basis of light reinforced concrete structure on concrete foundations, measuring 21.0 by 83.0 the basic ground-floor arrangement of the manufacture can be seen in the drawing attached. (Fig. VI/1 and VI/2).

Running along the basic manufacturing unit is a peripheral strip 1.5 m wide, the central corridor width is

3 m. All the manufacturing compartments are separated by partition walls, the glass paning reaching from the height of 1.5 m up to the ceiling, which is 4 m high. The only exception are rooms No 10 - film coating and room No 16. - fluid driers and granulation where due to safety regulations the partition walls must be made of reinforced concrete of a strength of 1500 kg/m^2, vis-à-vis both the corridor and the adjoining rooms, the reinforced walls reaching up to the pavilion roofing.

The ceiling above the manufacturing rooms must have a minimum bearing capacity of 350 kg/m^2, the space between the ceiling and the roofing accommodates the air conditioning aggregates. All the manufacturing area is centrally air-conditioned. The administrative and social amenities section is separated from the manufacturing sections by a protecting corridor. It takes up two floors (cloak rooms, shower baths, WC, offices, library), the height of the ceilings is 3 m, with air-conditioning.

Running below the central corridor of the manufacturing section is a channel 3 x 2 m, which contains the power, water and sewerage distribution lines and also houses the dust-exhaust equipment of tablet pressing, powder screening and granulation rooms. Outside the building, continuing in the direction of the central corridor, there is a small ramp providing communication in case of repairs and communicating with the blower house (which is a simple annex 3 x 3 m) and the shed where propane-butane bottles are stored.

The outside of the building will be glass-paned (with reflection foil), the roof will be flat, with re-

flection coating.

Due to climatic conditions, the project does not provide for central heating, temperature fluctuations will be balanced by the air-conditioning system.

To provide basic orientation a simple drawing is included (Fig. V/4), detailed drawing documentation is attached (Fig. VI/3).

The summary of technical data is as follows:

Reinforced concrete structure, glass partitions.

Carrying capacity: floor 1500 kg/m^2
ceiling 350 kg/m^2

Built-up area: 1727 m^2

Space enclosed: 10362 m^3

Electric power input: maximum 200 kW/hour

Water supply: maximum 30 m^3/shift (= 8 hours)

Discharge water: maximum 15 m^3/day

Description of work rooms:

No	Room	floor area	input el. power kW/hour	water m^3/shift
1	Ion exchange/station	6 x 8	3	3.0
2	Store of packings	6 x 8	lighting	-
3	Adjustment	16 x 8	20	0,2
4	In-process store of tablets	6 x 8	lighting	-

5	Quarantine	6 x 8	lighting	-
6	Foremen's office	4 x 8	lighting	-
7	Maintenance	6 x 8	3	-
8	Control room of air conditioning	6 x 8	2	-
9	Technologists'room	6 x 8	2	0.1
10	Film coating	6 x 8	10	0.2
11	Pressing of antibiotic tablets	6 x 8	6	0.1
12	Granulation of antibiotics	6 x 8	5	0.2
13	Pressing of tablets	8 x 8	15	0.2
14	In-process store of granulates	6 x 8	lighting	-
15	Wash room	4 x 8	2	3.0
16	Fluid granulation	6 x 8	20	0.2
17	Granulation	8 x 8	10	1.0
18	Powder screening	6 x 8	3	0.1
19	Trituration and reception of raw materials	6 x 8	10	0.3
20	Cloak room, shower baths, WC	12 x 8	2	3.0
21	Refreshment room	12 x 8	lighting	0.1
22	Administration	12 x 8	lighting	0.1
23	Library, study	12 x 8	lighting	0.1
24	Blower house	3 x 3	20	-

Glass partition walls, total 1000 m^2

Central air-conditioning for corridors and rooms No 1 to 19

Local air-conditioning for rooms No 20 to 23

Drains are provided in the floors of rooms No 1, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20

Compressed air distribution into the rooms No 1, 3, 7, 8, 9, 10, 12, 16, 17 = ca 150 m of 1" piping

Floors:

ceramic flooring in rooms No 1, 7, 9, 11, 12, 13, 15, 16, 17, 20

concrete flooring in the corridors

cast resin flooring in rooms No 2, 3, 4, 5, 6, 8, 10, 14, 18, 19

glued carpet flooring in rooms No 22, 23

rubber carpet flooring in room No 21

We have asked the largest contracting firm dealing in the construction of industrial facilities in Zambia, the Lewis Construction Co (this firm also built the existing Medical Stores) to make a qualified rough estimate of the cost of this capital investment. Mr. Golson, manager of the construction department, made this estimate using unit proces as given in Schedule VI-4.

The proposed contractor for the construction work is the mentioned Lewis Construction Co (Z) Ltd, P.O.Box 2056 Lusaka.

2. Manufacture of liquid medicament forms, ointments and suppositories

As already mentioned at the beginning of this Chapter

there is on the grounds of the existing Medical Stores Co a shop built on a total area of ca 1000 m^2 with all the necessary distribution lines; at present it is only partially being made use of for the manufacture and bottling of liquids and ointments. In its northern part the shop links up with a huge store (10875 m^2) and on the western side it communicates with the administration building. The shop also houses a partially equipped laboratory of technical inspection. The shop also contains social amenities and cloak-rooms for ca 30 staff members. A drawing of the present building situation is enclosed (Fig. V/4).

On the unused premises some machine equipment is installed at present:

a) Incomplete equipment for the manufacture and bottling of liquids:

Manual filler of liquids	2 pcs
Dissolving tank with stirrer, capacity 500 litres	2 pcs
1000 litres	1 pc
Work benches	
Printer of adhesive labels	1 pc

b) Incomplete equipment for ointment filling:

Small filler of the Bonapace type	1 pc
Work bench	1 pc

c) Bottle washing room furnished with a washing machine of British provenance

d) Partially equipped technical inspection laboratory located in two rooms in the centre of the shop.

The present state can best be documented on the set of

pictures (Fig. VI/4-9).

Our suggestion of the lay-out arrangement is based on dividing the shop by light glass-paned partition walls that would define the fillowing manufacturing and auxiliary areas:

A. Manufacture of liquid medicament forms
19 x 30 m = 570 m^2

B. Manufacture of ointments and suppositories
14 x 20 m = 280 m^2

C. The remaining part in the centre of the shop, already divided by light glass partition walls to be used by the technical inspection laboratory, will also be used for the tablets and capsules pavilion.

D. What remains is the area of the present wash room.

E. Aligned with the axis of the communication from the existing huge store an in-process store of incoming material will be built.

The estimate of capital investment costs:

ca 140 m^2 glass partitions, priced 20 Kwacha/1 m^2 = 2800 Kwacha is included in Schedule VI-4:

For the situation and proposed lay-out arrangement refer to the attached drawing (Fig. VI/10).

The necessary machine equipment has been specified in keeping with the lay-out arrangement of the shop and the chosen manufacture technology, and according to individual operations.

T e c h n o l o g y (i e s)

For the manufacture of tablets we have chosen the conventional technology:
- wet granulation of basic materials
- drying the granulated material in fluid driers
- pressing of tablets
- on a smaller scale, film-coating the tablets with methylcellulose

For the packing of tablets the blister form has been chosen on principle since in this case only the basic and the covering foils are necessary, which are easy to transport and store, are of minimum volume and comparativele low price and yield a high productivity of labour in the course of adjustment work. Another advantage is the high degree of hygiene since individual tablets are mutually separated. There is no need to attach an instruction leaflet, the instructions are printed on the foil.

The technology chosen for the manufacture of capsules is that of gilling powder straight into hard gelatine capsules, with the possibility of slight pregranulation (briqueting, caking). Here, too, the blister-type packing is envisaged, as in the case of tablet adjustment.

In the manufacture of liquid medicament forms a technology will be used which, on a minor scale, has been used by the Medical Stores Ltd. i.e.

- dissolving and mixing active ingredients into the vehicles
- vehicle maturing
- filtration
- bottling

We suggest maintaining the present type of adjustment i.e. employing the already established polyethylene bottles (1, 3 and 5 litres), with only part of the assortment being filled into glass containers. This technique is established and followed up in health establishments up to final dispensing.

Manufacture of ointments - here the conventional technology will be employed, with the following sequence of operations:

- vehicle dissolution
- strainning
- homogenization of solid active ingredients, possibly mixing with liquid substances
- cooling
- filling

Adjustment into aluminium tubes bearing the necessary data (printed by the tube manufacturer) on the composition and application; otherwise only lot packing into cardboards with grates. There is no need to print instructions or individual cartonnage (so far unavailable in Zambia). In the course of next three years the manufacture of aluminium tubes is expected to start in Zambia.

Suppositories will be made by the method of pouring into moulds; due to the small volume of work and cheap manpower this will be done manually, with the following technological procedure:

a) glycerine suppositories by saponifying and pouring into moulds, cooling, cutting

b) other possible assortment
- vehicle dissolution

- suspension of active ingredients
- pouring
- cooling
- cetting and knocking out

Adjustment of suppositories - individual packing into cellophane, performed manually; clinical packing into tins (made in Zambia).

The technologies chosen being general knowledge, htere is no need to include into our calculations any expenses connected with their purchase or with paying royalties. On these grounds the Schedule VI-1 has not been filled in.

However, we strongly recommend that in the course of the construction of the envisaged facilities and also in the period of debugging the manufacture a team of at least 4 to 5 experts, pharmaceutical manufacture technologists, be available, possibly with UNIDO assistance, to guarantee a proper runing-in of the production.

We consider this existence necessary, especially because in the period between the time of the elaboration of the present study and the time of its implementation there may be some innovation in the technical facilities or in the technology, in spite of the fact that the authors have used facilities and procedures which at present are the most advanced.

Equipment

The specification of the required machine equipment has been made in line with the monobloc construction lay-out and the chosen technology, according to individual operations, as follows:

Room No	Equipment needed for manufacturing tablets & capsules					
	Manufacturing equipment		Auxiliary equipment		Other equipment	
	Item	pcs	Item	pcs	Item	pcs
1 ion exchange station	"Mix bed" deionization station	1	Milipore filter, Ø 200 mm	1	Polyethylene drums	60
2 store					shelf 4x6 m	4
3 Adjustment	Servac PH (Hoefliger-Karg, FRG)	2			containers	60
					writing desk	1
					chairs	14
					work bench	2
4 In-process store					shelf 4x6 m	4
5 Store			balance 50 kg	1	shelf 4x6 m	
6 Foremen's office					writing desk	4
					chairs	6
					typiwriter	1
					calculator	1
					wardrobe	2

7 Maintenance					work bench fitting shop equipment chairs	2 1 3
8 control room					writing desk chairs	1 2
9 technology	"Erveka" or "Allemagne" robot (GB, FRG) 16 type RU/tabl. machine (Kilian,FRG)	1 1	Friabilator Dissolution tester Uni-glatt balance, 25 kg	1 1 1	work bench writing desk chairs typewriter calculator	1 1 4 1 1
10 film-ciating	Dissolving tank with stirrer, 150 litres "System Wurster 18" (made in Cz)	2 1			work bench chairs	1 1
11 pressing of antibiotic tablets production of capsules	Type RT-324 tablets machine (Kilian, Capsule machine Zanussi, Italy	1	Apothecary scales 200 g	1	work bench chair	1 1
12 granulation of antibiotics	Diosna 100 l kneading machine (FRG) El.hot-air drier 2 m^3 (made in CSSR) Frewit granulator (Switzerland)	1 1 1	balance, 5 kg balance, 150 kg	1 1	work bench	1

13 pressing of tablets	Type NRD-39-H tablet machine (Kilian, FRG)	2	balance 200 g balance 50 kg	2 1	work bench chair	1 1
14 In-process store of granulated material						
15 Wash room					sink 250 l shelf 4x8m	2 1
16 Fluid granulation	FG-120 fluid granulator (Glatt,FRG) Algaier 1200 sieving device (Algaier, FRG) Granulator tanks	2 1 4	Tilting device (made in Cz)	1		
17 granulation	Diosna 300 l kneading machine (FRG) Frewit granulator (Switzerland) KÜPPER homogenizer (GDR)	1 2 1	Balance, 25 kg Balance, 300 kg	1 1	work bench	2
18 Powder sieving	Algaier sieving device (FRG) ø 600 mm	2	barrels, 50-100 l, for transport of bulk material	80		

19 Raw material reception and trituration	Duplicator 100 litres	2	desk mixer balance 200 g 5 kg 50 kg	1 1 1 1	shelf 4x4 m work bench chairs	1 1 2
20 cloak-rooms, shower baths, WC					wardrobes bench, ca 2m long	50 16
21 refreshment room					dining table chairs work bench el. cooker	10 40 2 2
22 administration					writing desks conference table arm-chairs chairs typewriters calculators wardrobe	8 1 2 10 4 7 8
23 library, study					shelf 12x3 m conference table small desk chairs slide projector TV set	1 1 4 30 1 1

In the concluding part of the Chapter this list will be, together with the equipment for the production of liquid medicament forms, ointments and suppositories included in Schedule VI-2 and an estimate of investment costs will be made.

Equipment needed for manufacturing liquid medicament forms, ointments and suppositories

Shop section	Manufacturing equipment		Auxiliary equipment		Other equipment	
	Item	pcs	Item	pcs	Item	pcs
A.	Existing equipment - not included in Schedule VI-2					
Production of liquid forms	Manual filler	2	Printer	1	work benches and chairs	3
	Dissolving tank with stirrer					
	500 l	2				
	1000 l	1				
	New equipment to complete production lines (to be included in Schedule VI - 2)					
	Type Poldi dissolving tank, 500 l, stainless, (Czechoslovakia)	1	Milipore filter, ø 200 mm	2	work benches	6
	ditto, 1000 l	1	balance, 50 kg	4	chairs	12
	ditto, 100 l	1	balance, 300 kg	1	writing desk	1
	High-speed HOMOREX mixer (FRG)	1	pump	2		
	Set of SEITZ filters (FRG)	2				
	Manual filler of liquids (Czechoslovakia)	4				
B.	Existing equipment - not included in Schedule VI-2					
Production of iontments and suppositories	Type Bonaface filler	1			work benches	3

New equipment to complete production lines
(to be included in Schedule VI-2)

FREWIT sieving machine (Switzerland)	1	balance, 200 g	1	work benches	3
Multihomo Brogli 300 (FRG)	1	balance, 5 kg	1	chairs	10
Homogenizer Collovelox Brogli	1	balance 300 kg	1	writing desk	1
Tube filler Loesh (FRG)	2	refrigerator 170 litres	1	shelf 2x3 m	1
Graco pump (USA)	1				
Double tank with stirrer 100 l	1				
Suppository moulds, sets of 150 pcs each, for 3 sizes	15				

C.

Technical inspection

To be completed with:

Friabilator	1
Dissolution tester	1
UNICAM JR--1025 (FRG)	1
UNICAM UV-SP -1700 (FRG)	1

The present condition of the wash room furnishing (D) is satisfactory.

The in-process store D will be used as handling area only.

In conclusion of the present Chapter the above list will be, together with the equipment of the pavilion for the production of tablets, included in Schedule VI-2 and an estimate of the investment costs will be made.

The technologies chosen are of the conventional type and due to the comparatively small volumes of the lots produced and cheap manpower no highly mechanized equipment is envisaged. The project provides for a proportionally balanced flow of materials as given in the paragraph on "Project lay-out" at the beginning of this Chapter.

As regards the location of manufacturing equipment, it can best be seen from the drawing Fig. VI/3,10.

The assembly and erection of the machine equipment is, as usual, included in the price of the equipment supplied, and it is carried out by experts of the supplier. In this respect an inspection by and co-operation with foreign experts is absolutely necessary, as has already been recommended (preferably with UNIDO assistance).

As we know only the prices of imported machines cif Hamburg, in the next lines we are obliged to calculate an estimation of transport cost Hamburg-Lusaka.

For the estimate of the cost of transport of imported machines approximate weigts of the individual equipment items have been calculated, based on manufacturers' data:

Item description	Manufacturer	pcs	Weight in kg
Ion exchanger station	Struers	1	1,500.-
Servac pH	Hoefliger-Karg,FRG	2	8,000.-
Type RU16 tableting machine	Kilian, FRG	1	650.-
Wurster 18	Kilian, FRG	1	1,800.-
Type RT-324 tableting machine	Kilian, FRG	1	800.-
Machine for the production of capsules	Zanussi,Italy	1	1,100.-
Diosna 100	Diosna, FRG	1	450.-
Diosna 300	Diosna, FRG	1	1,200.-
Frewit granulator	Frewit, Switzerland	4	800.-
Type NRD-39-K tableting machine	Kilian, FRG	2	3,600.-
Type FG-120 granulator	Glatt, FRD	2	3,500.-
Sifter 1200	Algaier, FRG	1	600.-
Homogenizer	Küpper, GDR	1	1,500.-
Sifter 600	Algaier, FRG	2	400.-
Gryomix Brogli 300	Brogli, FRG	1	800.-
Tube-filling machine	Loesch, FRG	2	800.-
Tanks, various types	Brogli ,FRG		5,000.-
Other equipment			3,000.-
		Total	35,400.- kg

The cost of transport of 1 ton of machines from Hamburg to Dar-es-Salam (Čechofracht Praha tariffs) is US $ 201.30, i.e. 153.60 K.

The cost of transport of 1 ton of machines from Dar-es-Salam to Lusaka (the Zambia-Tanzania Road Services Ltd tariffs) is 71.20 K.

The cost of transport of 35.5 tons of machine equipment will total 9,700.- K, from which the sum in US $ will amount to 7,150 $. This cost will be included in Schedule VI-3.

Schedule VI - 2/1

ESTIMATE OF INVESTMENT COST

Equipment

Project component: Pavilion for the manufacture of tablets

No	Quantity	Unit		Local	Foreign	Unit cost in thous.	Cost		
							Foreign $	Local K	Total K
1			Production equipment:						
	1	pc	Ion exchange sation	-	1	135	135000	-	103006
	2	pcs	Servac pH	-	2	475,2	950440	-	752186
	1	pc	Erveka Robot	-	1	13	13000	-	9919
	1	pc	Kilian RU-16	-		27,1	27155	-	20719
	3	pcs	Tank 150 l with mixer	-	3	11,2	33606		25641
	1	pc	Wuster 18	-	1	54,7	54711	-	41745
	1	pc	Kilian RT - 324	-	1	71,2	71283	-	54389
	1	pc	Zanussi machine for capsules	-	1	147,3	147300	-	112380
	1	pc	Diosna 100	-	1	32,1	32111	-	24501
	1	pc	Hot air drier, 2 m^3	-	1	33,9	33944	-	25899
	3	pcs	Frewit granulator	-	3	8,7	26298	-	20065
	2	pcs	Kilian NRD-39-H	-	2	81,4	162932	-	124317
	2	pcs	Fluid granulator FG 120	-	2	81,4	162932	-	124317
	1	pc	Sifter Algaier1200	-	1	13,3	13328	-	10169
	1	pc	Diosna 300	-	1	40,7	40733	-	31079
	2	pcs	Sifter Algaier 600	-	2	8,1	16324	-	12455
	1	pc	Küpper	-	1	27,5	27500	-	20983
	2	pcs	Duplicator 100 l	-	2	9,5	19144	-	14607
2			Auxiliary equipment:						
	1	pc	Milipore 200 mm	-	1	2,7	2715	-	2071
	1	pc	Friabilator	-	1	1	1020	-	778
	1	pc	Dissolition tester	-	1	4,2	4200	-	3204
	1	pc	Uni-glatt	-	1	14,2	14256	-	10877
	80	pcs	Barrels 50 - 100 l	80	Packing of raw materials no price				
	1	pc	Kitchen-type mixer	1	-	1 K	-	1000	1000
	1	pc	Tilting equipment	-	1	8,8	8800	-	6714
	4	pcs	Apothecary scales 200 g	-	4	0,20	80	-	61
	2	pcs	Balance, 5 kg	-	2	0,50	100	-	76
	2	pcs	Balance, 25 kg	-	2	0,10	200	-	152

ESTIMATE OF INVESTMENT COST

Equipment

Project component: Pavilion for the manufacture of tablets

No	Quantity	Unit		Local	Foreign	Unit cost in thous.	Cost		
							Foreign g	Local K	Total K
	3	pcs	Balance, 50 kg	-	3	0,17	510	-	389
	1	pc	Balance, 200 kg	-	1	0,25g	250	-	191
	1	pc	Balance, 300 kg	-	1	0,35	350	-	267
3			Other equipment						
	14	pcs	Writing desk	14	-	0,27 K	-	3864	3864
	114	pcs	Chair	114	-	0,09 K	-	10602	10602
	14	pcs	Shelf 6x4 m	14	-	0,19 K	-	2660	2660
	1	pc	Shelf 12x3 m	1	-	0,30 K	-	300	300
	14	pcs	Working desk	14	-	0,16 K	-	2240	2240
	60	pcs	Polyethylene drum - 50 l	60	-	0,02 K	-	1080	1080
	60	pcs	Containers	60	-	0,02 K	-	900	900
	6	pcs	Typewriter	6	-	0,89 K	-	5370	5370
	9	pcs	Electric calculator	9	-	0,50 K	-	4500	4500
	10	pcs	Office cabinet	10	-	0,17 K	-	1760	1760
	1	set	Locksmith s equipment	1	-	2,7K	-	2720	2720
	2	pcs	Sink 250 l	2	-	0,13K	-	260	260
	50	pcs	Wardrobe	50	-	0,04K	-	2000	2000
	16	pcs	Bench,length 2m	16	-	0,09K	-	1440	1440
	10	pcs	Dining table	10	-	0,15K	-	1500	1500
	2	pcs	Electric hotplate	2	-	0,07K	-	140	140
	2	pcs	Conference table	2	-	0,39K	-	780	780
	4	pcs	Study desk, small	4	-	0,21K	-	840	840
	2	pcs	Armchair	2	-	0,35K	-	700	700
	1	pc	Slide projector	1	-	0,21K	-	210	210
	1	pc	TV set	1	-	0,45K	-	450	450
4			Elementary reserve set of spare parts, replaceables, and tools. The norm for 2years operation-5% of the purchase price of the machines				100011		76344
			Total /rounded up to thousands/				2100000	45000	1650000

ESTIMATE OF INVESTMENT COST

Equipment

Project component: Manufacture of liquids, cintments and suppositories

No	Quantity	Unit	Item description	Local	Foreign	Unit cost in thous	Cost		
							Foreign $	Local K	Total K
1			Production machinery						
	1	pc	Tank 100 l		1	9,57	9572		7275
	2	pcs	Tank 300 l		2	11,20	22404		17094
	1	pc	Tank 500 l		1	13,64	13646		10412
	1	pc	Tank 1000 l		1	15682			11965
	1	pc	Homorex mixer		1	20,00	20000		15260
	2	pcs	Seitz filter		2	10,18	20366		15539
	4	pcs	Liquid filler ONAZZI		4	4,15	16600		12666
	1	pc	Frewit sifter		1	8,76	8766		6688
	1	pc	Criomix Brogli 300		1	44,31	44311		33809
	1	pc	Collovelox homogenizer		1	21,04	21045		16057
	2	pcs	Tube filler Loesch		2	54,30	108600		82862
	1	pc	Graco pump		1	9,50	9504		7252
	1	pc	Tank with heater and mixer		1	13,50	13500		10301
	15	pcs	Suppository moulds		15	0,10	1500		1145
2			Auxiliary equipment:						
	1	pc	Apothecary scales, 200 g		1	0,02	20		15
	5	pcs	Balance, 5 kg		5	0,05	250		191
	2	pcs	Balance, 300 kg		2	0,10	200		153
	1	pc	Friabilator		1	1,02	1020		778
	1	pc	Dissolution tester		1	4,20	4200		3192
	1	pc	UNICAM JR-1025		1	7,67	7671		5853
	1	pc	UNICAM UV-SP-1700		1	7,94	7943		6061
	2	pcs	Milipore 200 mm		2	2,71	5430		4143
	2	pcs	Pump		2	0,30	600	458	269336
	1	pc	Refrigerator 170 l	1		1,20K		1200	1200
3			Other equipment:						
	2	pcs	Writing desk	2		0,27K		512	512
	22	pcs	Chair	22		0,09K		2046	2046
	1	pc	Shelf 2x3 m	1		0,15K		150	150
	9	pcs	Working desk	9		0,16K		1440	1440

ESTIMATE OF INVESTMENT COST

Equipment

Project component: Manufacture of liquids, ointments and suppositories

No	Quantity	Unit	Item description	Local	Foreign	Unit cost in thous	Cost		
							Foreign $	Local K	Total K
4			Elementary reserve set of spare parts. The norm for 2 years operation - 5 % of the purchase price of the machines						
			Total / rounded up to thousands/				353000	5000	275000

Schedule VI - 3

SUMMARY SHEET - INVESTMENT COST				
Equipment				
Project component		Investment cost carried over		
nO	Description	Foreign $	Local K	Total K
1	Tablets pavilion	2 100 000	45 000	1 650 000
2	Manufacture of liquid forms	353 000	5 000	275 000
3	Cost of transport	7 000	2 000	10 000
	Total	2 460 000	52 000	1 935 000

Schedule VI - 4

ESTIMATE OF INVESTMENT COST

Civil engineering works

Project component A : Tablets pavilion Project component B : Shop for liquids

No	Quantity	Unit	Item description	Local	Foreign	Unit cost K	Cost		
							Foreign $	Local K	Total K
			A : Tablets Pavilion						
1			Investigations and projecting works	L	-			50 000	50 000
2			Site preparation and construction of the building including special civil engineering works and air-conditioning	L	-	45		450000	450 000
3			Outdoor works	L	-			30 000	30 000
			B : Shop for liquids						
3	140	m^2	Dividing the manufacture shop by light glass partitions	L	-	20		2 8000	2 800
						Total		532 800	532 800

Schedule VI - 5

SUMMARY SHEET - INVESTMENT COST				
Civil engineering works				
Project component		Investment cost carried over		
No	Description	Foreign	Local K	Total K
1	Pharmaceutical Pavilion - tablets	-	530 000	530 000
2	Liquid forms production shop	-	2 800	2 800
	Total / rounded up /	-	533 000	533 000

ESTIMATE OF PRODUCTION COST

Civil engineering works

No	Quantity	Unit	Item description	Local	Foreign	Unit cost	Cost		
							Foreign	Local K	Total K
1	300	M^2	Maintainance and repairs Site preparation and development Park arrangement	L	-		-	3000	3000
2			Buildings and special civil works estimated at 1% per year of the total value of 450 000 K	L	-		-	4500	4500
			Total/rounded up/				-	8000	8000

Schedule VI - 7

SUMMARY SHEET -, PRODUCTION COST				
Civil engineering works				
Project component		Production cost carried over		
No	Description	Foreign	Local K	Total K
1	Pharmaceutical Pavilion - tablets /Civil engineering works/	-	8000	8000
	Total	-	8000	8000

VII. PLANT ORGANIZATION AND OVERHEAD COSTS

Cost centres

As follows from the considerations discussed in Chapter V of this Study, the authors suggest to solve the problem of introducing the manufacture of pharmaceutical preparations in the Republic of Zambia by extending the facilities of the existing Medical Stores Ltd., Lusaka, in the form of building a pharmaceutical pavilion for the manufacture of tablets and capsules, and complementing the existing facilities with equipment for the manufacture of liquid medicament forms, ointments and suppositories. This solution has been recommended as the most advantageous from the viewpoint of minimizing not anly investment costs but also overhead costs by establishing direct links with the existing organization and distribution network of the Medical Stores Ltd. This circumstance has also governed the technical solution itself. It is therefore opportune at this point to deal briefly with the present organizational set-up of the Medical Stores Ltd., which can graphically be represented by a chart (Fig. VII/1).

In the present organization chart a nucleus of the production division can be found, even if with considerably fewer employees than envisaged in our project:

Department	Number of employees as on April 31,1980 (persons)
Sales and Purchasing	60
Accounts	22
Personnel	39
Stores	45
Transport	28
Manufacturing	20
Total	214

Taking into consideration the envisaged scale of production, it would be inreasonable not to make full use of the existing organizational set-up. The authors therefore recommend to conceive the whole manufacturing division of the Medical Stores as a single production and cost centre with the following organization lay-out, which proceeds from the technical solution:

1) General Manager
2) Production Manager
3) The other units of Medical Stores
4) Secretary
5) Production plan detailing

See Fig. VII/2

6) Technical inspection
7) Technologist
8) Purchasing
9) Manufacture of tablets and capsules
10) Manufacture of liquid medicament forms
11) Accounts centre

Details as to the personnel relating to the above chart can be found in Chapter VIII. In keeping with the calculations in Chapter IV we assume it will be possible to make full use of the present overhead costs on transport, storage (with the exception of additionally required store workers - discussed in Chapter IV, calculated in Chapter VIII) and distribution in ensuring the manufacturing operations so that they are not included in the calculations here. The part of administrative expenses on salaries and wages is brought forward directly from Schedules VII-2 and VIII-4 into Schedule X-11.

Overhead costs

We will present here an estimate of the remaining overhead costs for the whole production centre running on full capacity (medium costs in 1988) and we will itemize this estimate:

a) sources of overhead costs

overhead consumption of electric power follows up on Chapter IV, where direct costs were estimated to total 50 000 K/year. In addition, the following consumption must be included in the calculation:

air-conditioning	ca 30 kW/hour
maintenance	ca 3 kW
blowers	ca 10 kW
technologists	ca 1 kW
social amenities	ca 2 kW
lighting, etc.	ca 2 kW
total	ca 48 kW/hour x 8 = 384 kW/shift
	x 261 working days = 100.224 kW/h/year

at a price of 0.17 K one kW/h this represents a yearly cost of 17 000 K.

Technical considerations speak in favour of turning on the machinery for 261 days a year even with reduced human attendance (see Chapter VIII/10, where the calculation of the surcharge holds only for the human factor of production and it cannot be carried over into overhead charges).

- the consumption of water is taken in the estimate as an overhead input of the whole production centre and it is not subdivided here; according to the estimates given in Chapter VI it will make ca 18 m^3 per shift, i.e. ca 5 000 m^3 per year. The price of water has been regulated by the water tariff as from Jan.1, 1980 and according to Head b - TF-2 applying to industrial consumers in the Industrial area of Lusaka the yearly cost will be ca 1 000 K.

b) office supplies - a rough estimate of the planned material consumption is 500 K while telephone, teleprint and telegram fees are estimated at 2 500 K, making a total

c) wastes disposal - with the necessary of removing larger wastes twice a week to the refuse dump (see Chapter V) it is necessary to calculate, according to the Ohan. Transport Ltd tariff 0.10 K per ton and km for external transport: 2 000 km x 2 tons x 0.10 K/year, i.e. ca 500 K

d) capital property tax in Zambia has been fixed at 1.4% per year, which at the price of the envisaged investment will amount to ca 42 000 K

e) maintenance costs have been included in Schedule VI-7 and they have been brought forward here in the amount of 8 000 K. Personnel costs from Schedule VIII-2 have been brought forward directly into Schedule X-11.

f) Personnel costs of technical inspection have been brought forward directly from Chapter VIII into Chapter X, while costs on electric power and water have been itemized above. The other material costs (such as the consumption of reagents, chemical glass and special aids) are estimated at ca 15 000 K

g) travelling expenses - only a rough estimate of travelling expenses required for administrative purposes can be given here and it is

ca 10 000 K

Calculated here, however, is aslo the daily transport of workers over a distance of 20 km on average; with a tariff of 0.10 K/km this makes

ca 1 000 K

h) insurance - estimates have been made according to current insurance rates per year, and they are:

for buildings worth 0.5 million K	4 000 K
for machinery worth 1.6 million K	15 000 K
for the difference in the value of materials necessary for the manufacture and the materials kept up to now in store (the value from Chapter IV for 4 months), which makes ca 3 million K	32 000 K
total insurance premius	51 000 K

i) depreciation - in the Republic of Zambia the following yearly depreciation rates have been laid down for industrial enterprises:

on buildings - 2%, i.e. from 0.5 million K	- 10 000 K
on machines - 10%, i.e. from 1.2 million K	-120 000 K
on furniture -25%, i.e. from 0.1 million K	- 25 000 K
on engines -25%, i.e. from 0.3 million K	- 75 000 K
total	240 000 K

According to the Supreme Court ruling the whole yearly rate is applied even if the investment is made only towards the end of the fiscal year.

k) In keeping with the regulations of the WHO good manufacturing practice the workers in pharmaceutical industry must be provided with regulation work clothing. We therefore calculate the respective yearly cost as follows:

4 pcs work clothing at 25 K each for 80 employees	8 000 K
cost of maintaining the clothing	2 000 K
total	10 000 K

l) In the Republic of Zambia there is the so-called

Sale Tax, which is a tax levied on purchased imported goods. This tax has a progressive scale which follows from the progressive import tariffs and is built on them. The basis of calculation is obtained by multiplying the cif price with a complex system of coefficients (ranging from 1.562 to 2.750). The Sale Tax amounts to 10% of the basis calculated in the above way. Furthermore, for granting the Import Licence the Board of Trade must be paid a tax of 2% of the licence turnover.

Since imports of drugs are duty-free, we have recommended in Chapter IV duty-free imports of materials for the production of drugs in the state economy sector, analogously with the current duty exemption for the production of infusion solutions in Kabwe. For this reason we do not calculate this additional tax burden in overhead costs (in the negative case it would amount to ca 900 000 K a year).

The results of this analysis are summarized in the Schedule VII/1.

Table VII - 1

OVERHEAD COSTS	
Direct item description : The manufacture of tablets, capsules, liquids, ointments and suppositories as a single cost center	
Direct items	thousand K
1. Maintananee	8
2. Insurance	51
3. Other sources of overhead costs	16
4. Office supplies	3
5. Wastes disposal	1
6. Property tax	42
7. Technical inspection laboratory	15
8. Travelling expenses	11
9. Work clothing	10
10. Depreciations	240
Total	397

V I I I. M A N P O W E R

Following up on the organizational solution of the manufacturing division of Medical Stores Ltd, analysed in Chapter VII, we present hore only a brief recapitulation of the proposed organization:

The manufacturing section itself is conceived as an independent cost centre with the following internal organization:

See Fig. VII/1

1) Production manager 1
2) Secretary 1
3) Production plan detailing 2
4) Technical inspection 5 + 2
5) Head of tablets and capsules production section 1
6) Technologist 1 + 1
7) Head of liquid forms, ointments and suppositories production section 1
8) Purchasing 2
9) Acconting
10) Adjustment shop foreman 1
11) Tablets production shop foreman 1
12) Liquids production shop foreman 1
13) Ointments and suppositories production shop foreman 1
14) Direct workers in adjustment shop
15) Direct workers in tablets production shop
16) Maintenance 3
17) Air-conditioning and ventilation 2
18) Ion exchanger station 1
19) Direct workers in liquids production shop
20) Direct workers in ointments and suppositories production shop

L a b o u r

Selection of labour

A. Fixed men

		Qualification requirement
Maintenance men	3 persons	skilled
Air-conditioning and ventilation technician	1	skilled
Ion exchanger station	1	trained
Total	5 persons	

B. Direct workers

The budget of direct workers has been divided into 2 sections:

B-1 Direct workers necessary to man the machines according to project directives:

Manufacture of tablets and capsules:

	Number of workers	Qualification
Servac PH attendance	3	trained
Wurster 18 attendance	2	trained
Attendance of antibiotic capsule and tablet pressing mechine	2	trained
Attendance of antibiotic granulating and kneading machine	2	trained
Attendance of NRD 39 H tableting machines	2	trained
Attendance of VSG-120 fluid granulator	2	trained
Attendance of Frewit and Diosna granulators	2	trained
Trituration preparation	1	trained
Manufacture of liquid forms: Homorex attendance	1	trained

Attendance of dissolving tanks and filtration equipment	1	trained
Manufacture of ointments and suppositories:		
Multihomo Brogli attendance	1	trained
Loesch tube-fillers attendance	1	trained
Total	20 workers	

B-2: Direct workers, whose number depends directly on the amount of production.

With reference to the conclusions of previous Chapters we assume a continuously increasing production for the years 1985 - 2000 in mass units of the individual manufacture groupings as follows:

Medicament form	1980	1985	1986	1987	1988	1989	1980	1995	2000
Tablets in million pcs	288	430	860	910	965	1056	1120	1500	2000
Capsules in million pcs	46	70	140	148	157	166	177	240	320
Liquid medicament forms in thousand litres	127	190	380	403	427	453	478	640	800
Ointments in tons	165	24	48	51	54	57	60	80	110
Suppositories in thousand pcs	330	490	980	1040	1100	1170	1240	1650	2200
Value of production in million K	5.1	7.5	15.0	15.9	16.9	17.9	18.9	25.3	33.8

This increase in production will have to be accompanied by direct workers being continuously hired for the following types of work (the calculation has been made for only one shift till 1990; afterwards the manning of positions as under C-1 is changed - see further calculation):

No	Activity description	Average output per worker per shift
1	Manual adjustment work-tablets and capsules	400 000 tablets or capsules
2	Supply of packing material for liquids	1 000 pcs
3	Filling of liquids	1 000 litres
4	Manual adjustment of liquids	500 litres
5	Supply of semiproducts for the production of ointments and suppositories	250 kg
6	Tube-filling attendance	7 000 pcs
7	Manual adjustment of tubes	6 000 pcs
8	Pouring of suppositories	1 000 pcs
9	Manual adjustment of suppositories	1 000 pcs

From the calculation of the envisaged growth of capacities the following growth in the requirement of direct workers of B-2 category arises:

	Year (persons) 1985	1986	1990
1. Tablets adjustment	6	12	16
2. Supply of packing material for liquids	1	2	3
3. Filling of liquids	1	2	3
4. Manual adjustment of liquids	2	4	6
5. Supply of semiproduct for ointments&suppositories	1	1	2

6. Tube-filling attendance	1	3	4
7. Manual adjustment of tubes	2	4	6
8. Pouring of suppositories	1	2	3
9. Manual adjustment of suppositories	1	2	3
Total	16	32	46

C. Store workers:

In keeping with the calculation in Chapter IV it will be necessary to complement the existing store personnel by engaging additionally

1 skilled store-keeper
2 trained workers

To simplify the calculation they have been included among the workers of the production centre.

Skill requirements and level of training of labour

The requirements on the qualification and prior practice of employees is basically given by the WHO recommendations for good manufacturing practice so that in our case 63 workers must have professional training background. The working procedures in the pharmaceutical industry are very demanding. We expect that in the production shop of liquid medicament forms the existing team of 20 workers will be taken over; out of these the production foreman is a university graduate and 2 workers are engaged in technical inspection (one of them is university graduate).

In our opinion, however, this working team is not on a level compatible with the introduction of completely new technologies on modern machinery. We therefore recommend to pro-

vide possibilities for 3 years' training of category B-1 workers in operating pharmaceutical machines and of 3 maintenance workers of pharmaceutical machines in some pharmaceutical manufacturing firm of world reputation. The best way would be to send these people as workers to some big pharmaceutical plant on the basis of an agreement between the Government of the Republic of Zambia and the respective manufacturers. At present, for example, 60 Laotian citizens are being given training in Czechoslovak pharmaceutical plants where they work under the same conditions as Czechoslovak workers; this has been made possible on the basis of an inter-government agreement. Under such a scheme the investor is only required to pay for the air tickets, which at an average price of an air ticket over a distance of 8000 km makes 46 x 15000 K, i.e. a total of 69000 K.

S t a f f

Selection of staff

From the proposed organization the first manpower distribution follows:

D. Fixed employees:			Required schooling
Production foreman	1	person	univ(ersity)
Secretary	1		sec(ondary)
Production planner	1		sec
Purchaser	2		sec
Accountant	2		sec
Chief controller	1		univ
Secretary	1		sec
Technical inspectors	3		univ
Inspection laboratory assistants	3		sec
Technologist	1		univ
Technologist's lab assistants	1		sec
Production foreman, tablets	1		univ
Adjustment shop foreman	1		univ
Tablets shop foreman	1		univ
Production foreman, liquid forms	1		univ
Liquids shop foreman	1		univ
Ointments and suppositories shop foreman	1		univ
Air-conditioning and ventilation	1		univ
total	25	persons	

Skill requirements and level of training of staff

Pharmaceutical university education must be required

from 13 employsse,

secondary technical education
from 12 employees,
4 workers be skilled in mechanical engineering or electrical engineering branch.

In addition to the training of workers we recommend to provide training for

1 production foreman
1 chief controller
1 technologist
1 production foreman, tablets
1 production foreman, liquid forms
1 purchaser
1 planner
4 foreman

- - - - - - - - - - - -

i.e. a total of 11 employees of the production centre management, in the form of at least 5-6 months' stay with the same firm where the workers will be trained. In the case of these employees it cannot be expected that they will earn their keep and earn money to cover the expenses with their training, as is the case with the previous category. This stay can be arranged only on the basis of intergovernment agreement on scientific and technical aid in the field of pharmaceutical industry and it will necessitate these expenditures:

air tickets	21 x 1500 K, i.e. a total of 32 000 K
accommodation and board allowance	21 x 182 x 40 US $, i.e. a total of about 153 000 US $

The total costs on training and stays (labour & staff) as suggested above will amount (in rounded figures) to a total of 100 000 K and 150 000 US $;

they will be brought forward into the schedule part of Chapter IX;

we recommend to consider the possibility of paying the above sum from UNIDO funds.

We further recommend, for the whole period of costruction and the period of production debugging, the assistance of 4 to 5 UNIDO experts, highly skilled professionals from pharmaceutical industry; without such assistance the realization of the whole project is, in our opinion, unrealistic.

We also recommend a short visit (about one month) of the general manager of Medical Stores Ltd to some pharmaceutical companies of world reputation, to study plants operating under conditions similar to those of the proposed production centre.

Cost estimate (labour and staff)

On the basis of data contained in the collective agreement we have calculated the surcharge to wages and salaries:

Actual working days in a year:

Number of days in a year	(3x365 + 1x366):4	365.25
Excepting Sundays and Saturdays (365.25 : 7) x 2		104.36
		260.89
	rounded up to	261 days

Unproductive working days:

Public holidays	7	
Annual leave	ca 25	
Sick leave (acc.to statistics)	ca 16	
Training	ca 7	
Other	ca 4	
		- 59 days
Number of actual working days in a year		202 days

The calculation of the surcharge following from:

a) unproductive working days

$\frac{59}{202} \times 100$ 29%

b) Social security:

Housing allowance	ca	2%
Provident Account (the part payed for by employer)		5%

c) Social security for unproductive working days: 7% from 29% 2%

d) Subsidies

for annual leave	ca 25 days	
for public holidays	7 days	
	32 days	
$\frac{32}{202} \times 100 =$		15%
Total surcharge		53%

Since in the present collective agreement not all the wages and salaries of employee categories envisaged for the proposed pharmaceutical production centre are given, we have, applying a comparative approach, made our own estimate of the category classification so that the labour

running costs estimate can be calculated (data from the production of infusion solutions in General Pharmaceuticals in Kabwe have been used as basis):

		Gross monthly income in K, approximately
I.	Chief production foreman	800
II.	Chief of inspection, technologist, production foreman,	700
III.	Foreman, technical inspectors	600
IV.	Air-conditioning and ventilation engineer	500
V.	Laboratory assistant, planner, purchaser, accountant	300
VI.	Secretary	150
VII.	Maintenance men	200 (=1.08/h)
VIII.	Store keeper	100 (=0.54/h)
IX.	Category B-1 workers (fixed)	130 (=0.70/h)
X.	Category B-2 workers (variable)	100 (=0.54/h)

Summary recapitulation of the required manpower for the proposed production:

A. Fixed workers:	5 persons
B-1 and C Direct workers of overhead nature	23 persons
B-2 Direct workers at full capacity (in 1988)	39 persons
D. Fixed employees	25 persons
Total	92 persons

These calculations are brough forward into the respective schedules VIII-1, VIII-2, VIII-3, and VIII-4.

The Annex 1 brings under the Chapter VIII basic provisions of a collective agreement of National Union of Commercial and Industrial Workers and the management of Medical Stores Ltd.

Schedule VIII - 1

MANNING TABLE	Labour - local				
Department	Wage categories / No. of workers/				
	VII	VIII	IX	X	Total
Tablets			16	14	30
Liquids			2	10	12
Ointments and suppositories			2	15	17
Store/newly arisen need/		3			3
Air-conditioning and ventilation main - tenance	4				4
Ion exchange station			1		1
Total	4	3	21	39	67

Schedule VIII - 2

ESTIMATE OF PRODUCTION COSTS	Wages - local					
	Variable costs wage categories /No. of workers/		Fixed costs wage categories /No. of workers/			
	X		VII	VIII	IX	
Total number of workers	39		4	3	21	
Working hours per day	8,5		8,5	8,5	8,5	
Working days per year	261		261	261	261	
Working hours per year	2218		2218	2218	2218	
Wages per hour	0,54		1,08	0,54	0,70	
Wages per year	1841		3660	1841	2373	
Total in thousand K		71				70

Schedule VIII - 3

MANNING TABLE	Staff - local						
Function	Salary categories / No. of staff/						
	I	II	III	IV	V	VI	Total
Chief production foreman	1						
Chief of inspection		1					
Technologist		1					
Foreman /production/		2					
Foreman			4				
Technical inspector			3				
Air-conditioning and ventilation engineer				1			
Production planner					2		
Purchaser					2		
Inspection lab assistant					3		
Technologist lab assistant					1		
Secretary						2	
Total	1	4	7	1	10	2	25

Schedule VIII - 4

ESTIMATE OF PRODUCTION COSTS	Salaries - local						
	Salary categories /No. of staff /						
	I	II	III	IV	V	VI	
Total numbers of employees	1	4	7	1	10	2	25
Working months per year	12	12	12	12	12	12	
Man-months per year	12	48	84	12	120	24	
Salaries per months	800	700	600	500	300	150	
Surcharge /53%/	424	371	318	265	159	78	
Salaries per year	14688	51408	77112	9180	60080	5472	
Total in thousand K							218

IX. IMPLEMENTATION SCHEDULING

Data and activities

The realization stage of the project will be affected positively by its technical solution. The new construction will take the form of extending the existing facilities and organization. The individual organization elements, especially in the field of administration and management, have already been established and it will be possible to make full use of them when implementing the project, which will positively affect and simplify our considerations as to creating a staff entrusted with the realization; also affected will be the expenses connected with such activities. On these grounds we have chosen a simple form of working out the implementation plan and flow chart.

By way of introduction, let us recapitulate the basis technical data, which have been treated in depth in the preceding Chapters.

Selection of project implementation programme and time schedule

Selection of project implementation programme and time schedule

a) Preparatory stage:

No	A c t i v i t y	Estimated duration
1	Working out the Feasibility Study	4 months
2	Reviewing the Feasibility Study and its approval	2 months
3	Decision on implementation	1 month
	b) Site and plot:	
4	Choise of site	-
5	Selection of building contractor	1 week
6	Elaboration of the construction project	4 weeks
7	Administrative procedure on granting approval by local authorities	8 weeks
	c) Construction of pharmaceutical pavilion	
8	Total construction period of the pavilion	16 months
9	Reconstruction of existing facilities (glass partilion walls)	2 months
	d) Machinery	
10	Detailed planning of equipment, inviting tenders	3 months
11	Evaluation of tenders and concluding contracts on deliveries	1 month
12	Creating the assembly and erection staff	3 months
13	Maximum terms for the delivery of machinery	13 months
14	Assembly and erection work	10 months

	e) Organizing the centre	
15	Setting up the centre management	1 month
16	Recruitment and training of workers and technicians	3 months
17	Negotiating the training of workers and technicians	3 months
	f) Supply system	
18	Examination of the manufacturing programme and setting down a detailed manufacturing plan	2 months
19	Examination of material norms, setting down the plan of purchases	2 months
20	Negotiating tenders with suppliers	4 months
21	Placing orders with suppliers	1 month
22	Supplying raw materials into the store, at most	6 months
	g) Financing system arrangements	
23	Negotiating the financing of the investment section of the project	1 month
24	Negotiating the financing of working capital, implemantation	the whole construction period
25	h) Production debugging	1 year

Project implementation programme and a time schedule is also expressed graphically in Fig.IX/1.

Cost estimate of project implementation

An estimate of the costs connected with the implementation will be tabulated in Schedule IX-1:

Not included in the chart of the estimate of investment costs is the assistance of UNIDO experts, which has been suggested in previous Chapters. The beginning of this assistance is assumed to be simultaneous with the creation of the Centre Management Staff, i.e. starting with the 6th month of the flow chart initiation. (Fig.IX/1)

Schedule IX - 1

ESTIMATE OF INVESTMENT COST

Project implementation

No	Quantity	Unit	Item description	Local	Foreign	Unit cost	Cost		
							Foreign $	Local K	Total K
1			Management of project implementation : Salaries for implementation management for 26 months, 3 persons		F	1000 $	26 000		19 800
				L		600 K		31 200	31 200
2			Detailed planning, tenders etc. - salaries for 1 planning officer and 1 purchasing officer, for 17 months	L		300 K		10 200	10 200
			Estimated administrative expenses	L				5 000	5 000
3			Construction supervision salaries under No 1. - administrative expenses	L				3 000	3 000
4			Training of workers - taken over from the Chapter VIII	L		1500K		69 000	69 000
			ditto, technicians	L		1500K		32 000	32 000
					F	40$	153 000		116 800
5			Other preliminary expenses - reserve	L				5 000	5 000
						Total	179 000	155 400	292 000

Explanation to the Schedule IV-1

The monthly salary of US $ 1 000 corresponds roughly to salaries of foreign experts with university education working in Zambia in 1980; this was verified at the Ministry of Health of the Republic of Zambia, Lusaka, when studying local conditions in October 1980.

X. FINANCIAL AND ECONOMIC EVALUATION

Financial evaluation

Due to nature of our project, as formulated in Chapter II of the present Study, this Chapter X has been elaborated in strict observation of the methods as laid down in the "Manual for the Preparation of Industrial Feasibity Studies", UNIDO publication No E.78.II.B.5 of 1978, with the respective schedule forms being used for the tabulation.

The following fundamental conclusion can be drawn from the analysis made as mentioned above:

1) From the very beginning, the envisaged production shows profit which ranges from 41.3 to 50.8% of the total sales.

2) At a current taxation and distribution of this mass of profit it can be expected that in the sphere of working capital the project will be able, together with a long-term credit, finance itself from the 7th year after initiation of production.

3) The time investment return has been determined by simple calculation to just under 5 years:

Total investment costs 2 850 000 K

	Yearly net profit + + interests + depreciation	Returnable amount	Balance at the end of the year
Year 1	-	0	2 850
2	-	0	2 850
3	-	0	2 850
4	1 900	1 900	1 950
5	4 000	4 000	-

4) The simple rate of profit in the 7th year of investment (full capacity) for the total investment costs is

$$R = \frac{\text{net profit}}{\text{total investment costs}} \times 100 = \frac{4300 \times 100}{2850} = 150.8\%$$

5) The project rentability calculated as the ratio of the profit to the costs makes in the 7th year of investment (full capacity)

$$\frac{4300 \times 100}{8600} = 50\%$$

These parameters are usual in the pharmaceutical industry and therefore we have not undertaken any further steps and present values tabulated in schedules.

Project financing

The financial standing of existing Medical Stores Ltd was not very favourable in the last year.

	1979/80 K 000	1978/79 K 000
Turnover	14 649	14 422
Profit before tax	1 275	867
Profit before tax as turnover percentage	8.7%	6.0%

At K 14.6 million the turnover of the Company during the year under review was only marginally better than of the previous year. Profit-wise, however, there was some improvement which had been brought about by the larger availability of imported stocks and strict vigilance on costs. The supply position improved considerably during the year due to arrivals, towards the end of the year, of imports effected under the British Loan. The capitalization and transfer of assets to the Company have not yet been finalized by the Government. As a result, the Company is unable to raise finance from Banks to improve its services. On the other hand, Government departments and Ministries owed the Company a total of K 7.9 million as at 31 st March, 1980, of which K 7.2 million was due from the Ministry of Health. Because of this, the liquidity position of Medical Stores Ltd was deteriorating very rapidly through the year and it will be very difficult to find sources of project financing.

Project financing

It is practically out of the question to finance the project by a normal bank long-term loan (2o years' pay-back period, 8-9% interest), notwithstanding that the project will be profitable thus early:

	Year								
Profit before tax (K 000) estimation	1	2	3	4	5	6	7	8	9
	-	-	-	3100	7200	7750	8300	8900	9500

According to the public policy of the Republic of Zambia the source of long-term finance is available at government-to-government level. This can take the form of general bilateral credit or tied credit, which may be related to the purchase of machinery and equipment from a particular country or even from a particular source. For technical reasons, this procedure (see Chapter VI) is very difficult.

Another way is to earn a long-term credit from International Development Association (50 years'pay-back period, without interest, charge 3.1%).

Short-term loans can be had from the Development Bank of Zambia (10% interest, limit 60%), the rest from a Governmental grant - this loan to finance working capital will be repaid during the years since sufficient cash surplus will have already accumulated.

Cost of the project:
Total initial investment outlay amounts to:

Fixed investment costs	Currency		
	foreign thou $	local thou K	total thou K
Initial investment fixed costs	2 460	525	2 403

Working capital	-	5 134	5 134
Pre-production capital expenditures	256	155	351
Total	2 716 $ (=2074 K)	5 814	7 888

The financing of the total initial investment outlay is envisaged as follows (in K 1000):

sources	Fixed investment	Working capital	Total
Short-term borrowing (Development Bank)	-	3 000	3 000
Long-term borrowing (International Development Association)	2 403	-	2 403
Governmental grant	271	2 134	2 405
UNIDO technical assistance	80	-	80
Total	2 754	5 134	7 888

Schedule X-1/1

INITIAL FIXED INVESTMENT COSTS

Item	Investment category	From schedule	Foreign currency $ thous.	Local currency K thous.	Total K thous.
1	Land	V-1	-	15	15
2	Site preparation	VI-7	-	8	8
3	Structures and civil work	VI-5	-	533	533
4	Incorporated fixed assets	VI-1	-	-	-
5	Plant machinery and equipment	VI-3	2460	52	1935
6	Total initial fixed investment costs		2460	608	2491

Schedule X - 1/2

FIXED INVESTMENT COSTS (over time)

in thousand

Period	Construction period									start-up and full capacity	Replacement investment			Total		
Year	1			2			3			4 - 9	10(2nd shift					
Currency	FC	LC	Tt	FC	LC	Tt	FC	LC	Tt		FC	LC	Tt	FC	LC	Tt
1. Land		15	15												15	15
2. Site preparation		8	8													
3. Structures and civil works		50	50		400	400		80	80						530	
4. Inc. fixed assets																
5. Plant and machinery	300		229	2000		1527	160	52	174		300	100	329	2760	152	
Total fixed investment costs	300	73	302	2000	400	1927	160	132	254		300	100	329	2760	705	

FC - Foreign currency $, LC - Local currency K, Tt - Total K

Schedule X - 2/1

PREPRODUCTION CAPITAL EXPENDITURES, BY CATEGORY

Item	Category	From schedule	Foreign currency $	Local currency K	Total K
1	Pre-investment studies and preparatory investigation	II-1	77000	-	59000
2	Project implementation	IX-1	179000	155000	292000
	Total		256000	155000	351000

Schedule X - 2/2

PREPRODUCTUION CAPITAL EXPENDITURE, BY YEAR

in thousand

Period	Construction												Start up and full production	Total		
Year	Preconstruct.			1			2			3			4 - 10			
Currency	FC	LC	Tt	FC	LC	Tt	FC	LC	Tt	FC	LC	Tt		FC	LC	Tt
Assignment report	14		11											14		11
Feasibility study	63		48											63		48
Project implementation				62	55	103	62	24	69	55	76	120		179	155	292
Total	77		59	62	55	103	62	24	69	55	76	120		256	155	351

FC - Foreign currency in $
LC - Local currency in Kwacha
Tt - Total in Kwacha

Explanation to the Schedule X-2-2

To simplify the calculation in Chapter X, the sum of 2 850 000 K does not include costs on the Feasibility Study covered by UNIDO in the amount of US $ 63 000 (see Schedule X-2-2); from the preceding summary it is clear that this amount, which is equal to 48 000 K, does not, basically, affect the calculation.

Schedule X - 3/1

CALCULATION OF WORKING CAPITAL

I. Minimum requirements of current assets and liabilities

(a)	Accounts receivable:	30 days at production costs minus depreciation and interests
(b)	Inventory:	
	Local materials	30 days
	Imported materials	180 days
	Spare parts (see VI-2)	180 days
	Work in progress	20 days at factory costs
	Finished products	20 days at factory costs plus administrative overheads
(c)	Cash in hand:	15 days - see separate calculation X - 3/2
(d)	Accounts payable:	30 days for raw materials and utilities

Depreciations (by Zambian law) :	Machines	10% yearly
	Buildings	2%
	Others	25%

Schedule X - 3/1

II. ANNUAL PRODUCTION - COST ESTIMATE

in thousand Kwacha

Period	Constr.		Start up		Full capacity				2nd shift
Year	1	3	4	5	6	7	8	9	10
Production programm	0	0	44%	89%	94%	100%	106%	112%	118%
			7500K	15000K	15900K	16900K	17900K	18900K	20000K
Imported raw materials			3000	6200	6600	7000	7400	7800	8300
Local raw materials			400	450	450	450	500	600	600
Labour			300	320	340	359	370	380	390
Utilities			30	40	50	50	60	70	80
Maintenance - spare parts			-	35	35	35	35	35	35
Repair			5	5	5	5	5	5	5
Overhead costs			397	397	397	397	397	397	397
Operating costs			4132	7447	7877	8296	8767	9287	9807
Financial costs - interests, material investment			413	745	788	830	877	929	981
Depreciation			87	87	87	87	87	87	87
Total production costs			4632	8279	8752	9213	9731	10303	L0875

Interests for financing of materials - 10%
investment - variant No I (3,5%)

Schedule X - 3/2

CALCULATION OF WORKING CAPITAL : WORKING CAPITAL REQUIREMENTS

Item	X	Y	Requirements /Kwacha thousand/						
			Start-up years		Full capacity years				
			4	5	6	7	8	9	10
I. Current assets									
A.Accounts receivable	30	12	344	620	656	691	730	774	817
B.Inventory									
a/imported raw materials	180	2	1500	3100	3300	3500	3700	3900	4150
b/local raw materials	30	12	33	38	38	38	42	50	50
c/spare parts	180	2		18	18	18	18	18	18
d/work-in-progress	20	18	230	414	438	461	487	516	545
e/finished products	20	18	230	414	438	461	487	516	545
C.Cash in hand/see V/	15	24	40	56	59	61	64	66	70
D.Current assets			2377	4660	4947	5230	5528	5840	6195
II.Current liabilities									
A.Accounts payable	30	12	-286	-558	-592	-625	-663	-706	-748
III.Working capital									
A.Net working capital			2091	4102	4355	4605	4865	5134	5447
B.Increase in working capital			[illegible]	+2011	+253	+ 250	+ 260	+ 269	+ 313

Cash balance

Item	X	Y	4	5	6	7	8	9	10
IV.Total production costs			4632	8279	8752	9213	9731	10303	10875
less: Raw materials			3400	6650	7050	7450	7900	8400	8900
Utility			30	40	50	50	60	70	80
Depreciation			240	240	240	240	240	240	240
	15	24	962	1349	1412	1473	1531	1593	1655
V.Required cash balance			40	56	59	61	64	66	70

X - Minimum days of coverage Y - Coefficient of turnover

Schedule X - 4

ESTIMATE OF PAYMENTS (yearly in thousand Kwacha)

Item	Year						
	4	5	6	7	8	9	10
1.Salaries and wages	300	32	340	359	370	380	390
2.Basic raw materials	3400	6650	7050	7480	7900	8700	8900
3.Other materials and inputs and costs	932	1327	1362	1404	1461	1523	1585
4.Undistributed profit tax (48%)	1376	3226	3431	3690	3920	4126	4380
5.Import licence tax (2%)	60	124	132	140	148	156	166
6.Original capital tax (1,4%)	35	35	35	35	35	35	35
Total for a year	6103	11394	12350	13078	13834	14620	15456
Monthly(1-3,5-12 month)	391	677	740	780	823	871	920
in April :	1802	3938	4206	4505	4778	5032	5335

There is good cause to believe that the payments will be extended uniformly in months, consequent to the character of pharmaceutical production, with the exception of profit tax and capital tax (April).

Schedule X - 5

ESTIMATED MONTHLY RECEIPTS AND PAYMENTS /full capacity - year 7/

Month /year 7/	Receipts	Payments	Deficit	Surplus	Aggregated deficit
April	1410	4505	3095		3095
May	1410	780		630	2465
June	1410	780		630	1835
July	1410	780		630	1205
August	1410	780		630	575
September	1410	780		630	+ 55
October	1410	780		630	
November	1410	780		630	
December	1390	780		610	
January	1410	780		630	
February	1410	780		630	
March	1410	780		630	
Total	16900	13085		6910	3815
Year NO 8 : April	1490	4778	3288		0

Schedule X - 6/1

TOTAL INITIAL INVESTMENT COSTS

	Investment category	Foreign curreney Thousand $	Local currency Thousand K	Total Thousand K
1	Initial fixed investment costs	2460	608	2491
2	Pre-production capital expenditures	256	155	351
3	Working capital at full capacity /year 7/		4605	4605
	Total	2716	5368	7447

Schedule X-6/2. TOTAL INVESTMENT COSTS

F= foreign curr.(1000$), L= local (1000 Kwacha), T= total (1000 Kwacha)

PERIOD:	CONSTRUCTION			START UP		FULL CAPACITY				T O T A L		
YEAR:	1	2	3	4	5	6	7	8	9			
CURRENCY:	F-L-T	F-L-T	F-L-T	F-L-T	F-L-T	F-L-T	F-L-T	F-L-T	F-L-T	F ($)	L (K)	T (K)
1. FIXED INVESTMENT COSTS	0300 0073 0302	2000 0400 1927	0160 0052 0174							2 460	608	2 491
2. PRE-PRODUCTION CAPITAL EXPENDITURES (0 year + 1.year- see 10-2/2)	0139 0055 0162	0062 0024 0069	0055 0076 0120							256	155	351
3. WORKING CAPITAL INCREASE				0 2091 2091	0 1011 1011	0 0253 0253	0 0250 0250	0 0260 0260	0 0269 0269		4 605	4 605
T O T A L	0439 0128 0592	2062 0425 1996	0215 0128 0294	0 2091 2091	0 1011 1011	0 0253 0253	0 0250 0250	0 0260 0260	0 0269 0269	2 716	5 368	7 447

Schedule X - 7/1

TOTAL INITIAL ASSETS

Item	Investment category	Foreign currency Thousand $	Local currency Thousand K	Total Thousand K
1	Initial fixed investment costs	2460	608	2491
2	Pre-production capital expenditures	256	155	351
3	Current assets /at full capacity, year 7/	4320	1730	5230
	Total	7036	2493	8072

Schedule X-7/2. TOTAL ASSETS

F= foreign curr.(1000$), L= local (1000 Kwacha), T= total (1000 Kwacha)

PERIOD :	CONSTRUCTION			START-UP		FULL CAPACITY				TOTAL		
YEAR :	1	2	3	4	5	6	7	8	9			
CURRENCY :	F-L-T	F-L-T	F-L-T	F-L-T	F-L-T	F-L-T	F-L-T	F-L-T	F-L-T	F ($)	L (K)	T (K)
1. FIXED INVESTMENT COSTS	0300 0073 0300	2000 0400 1927	0160 0052 0174							2 460	608	2 491
2. PRE-PRODUCTION CAPITAL EXPENDITURES	0139 0055 0161	0062 0024 0069	0055 0076 0120							256	155	351
3. CURRENT ASSETS INCREASE				1970 0877 2377	2100 0700 2283	0262 0087 0287	0290 0100 0283	0300 0110 0298	0310 0120 0312	4 320	1 730	5 230
T O T A L	0439 0128 0461	2062 0424 1996	0215 0128 0294	1970 0877 2377	2100 0700 2283	0262 0087 0287	0290 0100 0283	0300 0110 0298	0310 0120 0312	7 036	2 493	8 072

Schedule X - 8/1

SOURCES OF FINANCE

Item	Sources of finance /in round numbers/	Local currency Thousand K	Foreign currency Thousand $	Total Thousand K
1	Promoters :			
	UNIDO-assistance equity capital		102	80
	Governmental-grant equity capital	2814		2814
2	Financial institutions:			
	International Development Assotiation - loan		2614	1994
3	Commercial banks	3000		3000
	Total	5814	2716	7888

Schedule X-8/2. SOURCES OF INITIAL FUNDS

F= foreign curr.(1000$), L= local (1000 Kwacha), T= total (1000 Kwacha)

PERIOD :	CONSTRUCTION			START-UP		FULL CAPACITY				TOTAL		
YEAR :	1	2	3	4	5	6	7	8	9			
CURRENCY :	F-L-T	F-L-T	F-L-T	F-L-T	F-L-T	F-L-T	F-L-T	F-L-T	F-L-T	F ($)	L (K)	T (K)
EQUITY CAPITAL	0100 0076	0525 0525		2091 2091	0202 0202					100	2 818	2 894
LOANS	0240 0202 0385	2000 1471	0376 0294		1809 1809	0250 0250	0250 0250	0260 0260	0275 0275	2 616	2 996	4 994
T O T A L	0340 0202 0461	2000 0525 1996	0376 0294	2091 2091	2011 2011	0250 0250	0250 0250	0260 0260	0275 0275	2 716	5 814	7 888

Schedule X-8/3. CASH-FLOW TABLE FOR FINANCIAL PLANNING (1000 Kwacha)

PERIOD :	CONSTRUCTION			START-UP		FULL CAPACITY				SALVAGE VALUE IN LAST YEAR	TOTAL
YEAR :	1	2	3	4	5	6	7	8	9		
PRODUCTION PROGRAMME :				7500 K	15000 K	15900 K	16900 K	17900 K	18900 K		
(%)	0 %	0 %	0 %	44 %	98 %	94 %	100 %	106 %	112 %		
A. COSTS: CASH INFLOW	461	1996	294	9591	17011	16150	17150	18160	19175		99 [illegible]
1.FINANCIEL RESOURCES TOTAL	461	1996	294	2091	2011	250	250	260	275		7 [illegible]
2.SALES REVENUE				7500	15000	15900	16900	17900	18900		92 [illegible]
B. CASH OUTFLOW	461	1996	294	8691	14916	14450	15093	13791	14383	3291	80 [illegible]
1.TOTAL ESSETS	461	1996	294	2377	2283	287	283	298	312	3291	8 [illegible]
2.OPERATING COSTS				4392	7761	8143	8951	9046	9325		47 258
3.DEBT SERVICE:											
BANK TERM LOANS - INTERESTS				72	72	70	69	67	66		416
SUPPLIER'S CREDIT INTERESTS				300	300	200	100	30	30		960
REPAYMENTS:											
SUPPLIER'S CREDIT					1000	2000	2000				5 000
BANK TERM LOANS				50	50	50	50	50	50		[illegible]
4.CORPORATE TAX				1500	3450	3700	4000	4300	4600		21 [illegible]
C. SURPLUS / DEFICID				1000	2095	1700	2057	4339	4822	3291	19 304
D. CUMULATIVE CASH-BALANCE				1000	3095	4795	6852	11191	16013	19304	

Schedule A - B

NET INCOME STATEMENT

In thousand Kwacha (rounded up)

Period	Start up		Full capacity			
Year	4	5	6	7	8	9
Programme	44%	89%	94%	100%	106%	112%
Costs :						
1. Sales	7500	15000	15900	16900	17900	18900
2. Production costs	- 4400	- 7800	- 8150	- 8600	- 9000	- 9300
3. Taxable profit	3100	7200	7750	8300	8900	9600
4. Tax (48%)	1500	3450	3700	4000	4300	4600
5. Net profit	1600	3750	4050	4300	4600	5000
6. Distribution	681	1532	2562	2459	472	390
7. Accumulated undistributed net profit	919	3173	4625	6466	10594	15204
Ratios :						
Gross profit - sales (%)	41,3	48,0	48,7	49,1	49,7	50,8
Net profit - sales (%)	21,3	25,0	25,5	25,5	25,7	26,4

Schedule X - 10

PROJECTED BALANCE SHEET

in thousand Kwacha

Period	Construction			Start-up		Full capacity			
Year	1	2	3	4	5	6	7	8	9
A. Assets (total)	461	2457	2633	5761	9990	11728	13819	18207	23092
1. Current assets (total)									
(a) Cash balance				1000	3095	4795	6852	11191	16013
(b) Current assets				2377	4660	4947	5230	5528	5840
2. Fixed assets	461	2457	2633	2384	2235	1986	1737	1488	1239
3. Losses									
B. Liabilities (total)	461	2457	2633	5761	9990	11728	13819	18207	23092
1. Current liability									
2. Short + Medium term loans	385	1856	2032	2150	3959	4209	4459	4719	4994
3. Equity capital	76	601	601	2692	2894	2894	2894	2894	2894
4. Reserves				919	3137	4625	6466	10594	15204

Schedule X-11

TOTAL PRODUCTION COSTS /at full capacity year 7/ in thousand Kwacha

No	Cost item	Foreign currency $	Local currency K	Total K
1	Direct materials and inputs /IV-2/	8937	747	7463
2	Direct manpower /VIII -2, 4/	-	359	359
3	Factory overheads /VII-1/	-	157	157
4	Financial overhead costs			
	short term 10% interests	-	300	300
	long term 3,1%	-	72	72
5	Depreciation	-	240	240
	Total production costs	8937	1875	8591

Schedule X-12. PRODUCTION - COST

F= foreign curr.(1000$), L= local (1000 Kwacha), T= total (1000 Kwacha)

PERIOD :	START-UP						FULL CAPACITY											
YEAR :	4			5			6			7			8			9		
PRODUCTION PROGRAMME :	44 %			89 %			94 %			100 %			106 %			112 %		
CURRENCY :	F	L	T	F	L	T	F	L	T	F	L	T	F	L	T	F	L	T
1. DIRECT MATERIALS	3932	328	3283	7953	664	6642	8400	702	7015	8937	747	7463	9473	791	7917	10009	836	8328
2. DIRECT MANPOWER		340	340		350	350		359	359		359	359		360	360		360	360
3. FACTORY OVERHEADS		157	157		157	157		157	157		157	157		157	157		157	157
4. FINANCIAL OVERHEAD COSTS		372	372		372	372		372	372		372	372		372	372		372	372
5. DEPRECIATION		240	240		240	240		240	240		240	240		240	240		240	240
T O T A L	3932	1437	4392	7953	1783	7761	8400	1830	8143	8937	1875	8591	9473	1920	9046	10009	1965	9457

Schedule X-14 Cash-flow table and calculation of present value for a project with outside financing

Period	Construction			Start-up		Full capacity				Salvage value in last year	TOTAL
Year	1	2	3	4	5	6	7	8	9		
Production programme	0	0	0	44%	89%	94%	100%	106%	112%		
Data in Kwache											
Current											
A. Cash inflows											
1.Sales revenue	-	-	-	7500	15000	15900	16900	17900	18900	-	92100
B. Cash out flows /total/	-310	-1927	-254	-6314	-12683	-14163	-14810	-13493	-14071	+1051	-76974
1.Total investment costs	-310	-1927	-254								- 2491
a/Equity funds	-310	-1927	-254								- 2491
b/Repayment of supplier's credit					-1000	-2000	-2000				- 5000
c/Repayment of bank term-loans				-50	-50	-50	-50	-50	-50		- 300
d/Bank-term loans interests				-72	-72	-70	-69	-67	-66		-416
e/Interests of supplier's credit				-300	-300	-200	-100	-30	-30		
2.Operating costs				-4292	-7761	-8143	-8591	-9046	-9325		-47258
3.Corporate tax				-1500	-3450	-3700	-4000	-4300	-4600		-21550
C. Net cash flow /A-B/	-310	-1927	-254	1186	2317	1737	2090	4407	4829	1051	15126
D. Present value /at15%/	-269	-1459	-168	677	1152	751	785	1440	1219	260	4388

Explanation to the Schedule X-14

The Schedule has been prepared according to the UNIDO manual - No E.78.II.B.5, p 217. With regard to the specific nature of the project - extension of the existing Government controlled company - it does not, however, provide all the essential information.

XI. APPENDIX

AN APPROACH TO THE DEVELOPMENT OF HOSPITAL PHARMACY IN ZAMBIA

This part of the Feasibility Study is beyond the scope of the agreed contract and forms a separate chapter whose aim is to point to the suitability of adopting a complex approach to the solution of the pharmaceutical situation in the given country. To the authors' knowledge a network of hospital pharmacies has never been the subject of any Feasibility Study so far. This is, in fact, the first attempt in this field and thus the following paragraphs do not quite tally with the instructions required in the case of a Feasibility Study. Moreover, it is very difficult to apply to health establishments, governed by completely different economy and basically different operation, the same models as to industrial establishments.

Nevertheless, we believe that the subsequent deliberation upon the development of hospital pharmacies in Zambia can, in its present shape, serve as a basis for practical implementation and, in possible later cases and against the background of experiences gained, a procedure may be adopted similar to the one applied in industrial studies.

We emphasize once more, however, that the following pages are no longer in the nature of a Feasibility Study and they are to be understood as an aid in considering the introduction of hospital pharmacies in Zambia. In the hands of an expert, a pharmacist, Chapter XI can represent a realistic starting point in building a network of hospital pharmacies. We recommend that, given the positive response of the Goverment of Zambia, a specialist (a pharmacist) should be sent to Zambia for whom the above data will be sufficient for practical implementation.

Project background

It is in the interest of the community that the proposed construction of a pharmaceutical plant in Lusaka be purposefully and meaningfully combined with a considered check on the consumption of the drugs manufactured. If it is assumed that industrial production of drugs in Zambia will be in the hands of the Government and if it is understood that drugs from this plant will flow into Governmental health establishments, then it is imperative that at the end of the route - from manufacture to the patient - be a Government- controlled outlet - a hospital pharmacy with adequate personnel and technical facilities.

There are 72 hospitals of four categories in Zambia (1979):

A. "Central Hospitals" are tree in number: two are situated at Kitwe and Ndola and the third is at the University Teaching Hospital (UTH) at Lusaka.

B. "General Hospitals"; these are located at the provincial headquarters and at the district headquarters of Choma and Mbala and are administered by Junior Medical Superintendents. They provide the major specialities of general surgery, gynecology and obstetrics.

C. "Special Hospitals" are represented by three hospitals (Liteta Leproserium, Kabwe; Chainama Mental Hospital, Lusaka; Ndola Children's Hospital).

D. "District Hospitals" are situated at the district headquarters (other than Choma and Mbala). They are also referral centres for patients from Health Centres and a place for training health workers.

The total number of hospitals is as follows:

A - 3
B - 9
C - 3
D - 57

The number of beds/cots in all hospitals amounted in 1975 to 15 000.

If the flow of drugs from the manufacturing plant via the gross distributors right to the patient treated in a hospital of some of the above categories is to be systematic and under professional supervision, then it is necessary to provide adequate types of hospital pharmacies adjoining the hospitals of a given category. It is only by combining the manufacture and gross distribution of drugs with a network of hospital pharmacies that the government will be in a position to organize purposefully the consumption of drugs and to rationalize pharmacotheraly since the supervision by qualified pharmacists over the drugs entrusted to them and their reports on actual consumption will significantly affect production in the pharmaceutical plant in Lusaka. The state will thus benefit from this "closed circuit" whose existence is bound to influence considerably the economy of medicament therapy.

Market and capacity

Production programme

The task of the proposed hospital pharmacies would not consist in only distributing ready-made medicaments but also manufacturing a reasonable amount of medicaments.

It is clear that the proposed pharmaceutical plant in Lusaka and the present imports of RMMs connot cover all the requirements, especially in the case of higher-category hospitals and consequntly more demanding specializations. It would be therefore of advantage if hospital pharmacies - similarly to those in European and American hospitals - were on such a technical level as to be able to produce specific medicaments for immediate use, and to respond readily to local requirements of medicament therapy. In the case of the highest-category hospitals the pharmacy must be able to produce specific infusion solutions which are not included in the production programme of the pharmaceutical plant in Kabwe.

The fact that such a pharmacy would be capable of preparing its own medicaments to comply with the requirements of the medical staff conveniently complements the range of RMMs produced in Zambian pharmaceutical plants (in Lusaka and in Kabwe) and those imported from abroad. They are especially medicaments which the Zambian pharmaceutical industry cannot manufacture because

a) the requirements of the field are too low,

b) these medicaments represent typical small-scale production,

c) the stability does not allow industrial production,

d) these medicaments are prescribed only randomly.

Capacity

Hospital pharmacies in Zambia may be devided according to the specialization of professional services they render to the community within a hospital in which the pharmacy is an integral part and constitute one of the departmente

Class A Hospital pharmacy (Central Hospital)
Class B Hospital pharmacy (General Hospital)
Class C Hospital pharmacy (Special Hospital)
Class D Hospital pharmacy (District Hospital)

The determination of a hospital pharmacy class depends on the man power which can be calculated in accordance with equation in the chapter Manpower, in other words the pharmacy class in proportion to the number of hospital beds and the number of out-patients.

Class A pharmacy offers services to central hospitals and must bear highly specialised professional requirements and must possess all essential facilities necessary for manufacturing of most of the dosage forms and possibly the preparation and sterilization of injectable solutions and products. Class A hospital pharmacy is understood to be the professional centre of the pharmaceutical professional life in the whole of the province.

Class B hospital pharmacies are established in the relevant hospital in a province and should cover services of highly specialised professional demands in the

same manner as class A pharmacies but short of the preparation of and sterilization of sterile and injectable solutions. Class B pharmacies supply lower classes with their requirements of preparations manufactured in the pharmacy and distributed to these smaller pharmacies.

Class C hospital pharmacies are attached to hospitals of corresponding size and are expected to undertake the preparation of all kinds of dosage forms according to medical prescriptions.

Class D hospital pharmacies are connected to hospital of relatively small size to answer the basic demands only. This class of pharmacies serve for handing out of ready made and prepacked medicine without-undertaking the manufacture of any medicaments, and a trained pharmacy technician may be responsible for the pharmacy work.

Location and site

The distribution of hospitals according to the above categories and in agreement with the map published by the Ministry of Health in Lusaka in 1979 is as follows (in alphabetical order):

A. Central Hospitals:
   Kitwe
   Lusaka
   Ndola

B. General Hospitals:
   Chipata
   Choma
   Kabwe
   Kasama
   Livingstone
   Mansa
   Mbala
   Mongu
   Solwezi

C. Special Hospitals:
   Liteba
   Lusaka
   Ndola

D. District Hospitals:
   Chikankata
   Chililambobwe
   Chilonga
   Chitambo
   Chingolo
   Chinsali
   Chitokoloki
   Francis

Gwembe
Ibenze
Isoke
Yembo
Kabompo
Kabwe
Kafue
Kalabo
Kalene
Kaluski
Kaoma
Kasabu
Kashikishi
Katondwe
Kitwe
Laloma
Luampa
Luanshya
Lubwe
Lukulu
Lundazi
Luwingu
Macha
Mangango
Mbereshi
Minga
Monze
Mpanshya
Mpika
Mporokoso
Mrongwe

Mufulura
Mtendere
Mukinge
Mumbwa
Mwami
Mwandi
Mwinilunga
Namwala
Nyanje
Nyimba
Petanke
Semanga
Serenje
Sesheke
Siawonga
Sichili
Yuka
Zambezi

The geographic distribution of pharmacies of all the four categories is shown in the map in FigXI/land corresponds with the distribution of adequate hospitals (see the preceding list).

Project engineering

The current concept of a complete hospital pharmacy department consists of the following areas: /1/ a waiting room, /2/ an office for the chief pharmacist, /3/ a room for the staff, /4/ and out-patient dispensing unit, /5/ manufacturing and bulk compounding unit area, /6/ pharmacy store rooms /7/ cleaning rooms for equipment and apparatus /8/ analysis and control room /9/ the sterile preparation unit,/10/ the alcohol.and volatile liquids area /11/ the narcotic vaults and such other rooms depending of the size of the hospital and class of the pharmacy notwithstanding the importance of the library and drug information centre. The need for a reliable local source of drug information within a medical community is of inestimable importance in rendering effective clinical care to the patient.

If the hospital provides out-patient services, then if possible, pharmacy facilities should be located either in or immediately adjacent to the out-patient department. In general, the in-patient pharmacy appears to be reasonably well situated to render services required of it where, possibly, all sections of the in-patient pharmacy storage, dispensing, manufacturing, parenteral solutions are seperated, that they be in direct vertical relationship if possible. This concept of direct vertical relationship should be extended between the pharmacy and the various divisions of the hospital utilizing pharmacy services.

The follwing are guide lines as to the general regulations for construction of pharmacies and modification to suit particular circumstances may be introduced in case of need.

The specific conditions in hospital pharmaceutical services in the Zambia allow an extraordinary and original solution as far as the design of individual hospital pharmacies of all classes is concerned. Taking into account the fact that with the exception of the capital Khartoum there are no hospital pharmacies in the country at all, there is ample space for initiation of special and practical ideas.

Hospital pharmacies of all classes are designed with respect to the contents of previcus paragraphs and in a form of an independent pavilion attached to the given hospital and projected according to all specific constructional and technical demands which are typical for pharmaceutical laboratories. The designs are solved on the basis of so-called sectional units.

There exists a n u c l e u s in the form of the smallest class D Hospital Dispensary as the basic unit. By addition of other proper rooms to the mentioned nucleus class C Hospital Pharmacy originates. Further increase by addition of a set of suitable rooms brings class B Hospital Pharmacy which can be extended by means of the department for preparation of parenteral solutions and some other rooms so that class A Hospital Pharmacy originates.

The sectional arrangement of hospital pharmacies enables easy extension of the given pharmacy class if new conditions arise which necessitate the upgrading of the respective hospital pharmacy class. (See Fig. XI/1-8).

All constructional and technical details are incorporated in the following chapters dealing with regulations Zambian hospital pharmacies. The regulations are based on the literature sources.

Tab. 2 Pharmacy classes (sqm)

Working rooms	A	B	C	D
(U) Waiting room	22	22	22	22
(P) Prescription room	14	14	14	14
(D) Dispensing room	21	21	0	0
(G) Galenical laboratory	22	22	0	0
(C) Control laboratory	11	11	0	0
(S) Scullery	13	13	0	0
(S_1)Clean scullery	12	0	0	0
(ST)Sterilization room	22	0	0	0
(A) Aseptic room	13	0	0	0
(F) Hygienic filter	7	0	0	0
(T) Adjusting room	8	0	0	0
Store rooms				
(R) Store room I.	21	21	21	0
(R_1)Store room II.	22	22	22	0
(E) Store room for sterile solutions	10	0	0	0
Sther rooms				
(H) Chief pharmacist's room	16	0	0	0
(Z) Room for employees	20	0	0	0
(N) Cloak room I.	5	5	5	5
(N_1)Cloak room II.	5	0	0	0
WC I.	1,5	1,5	1,5	1,5
WC II.	1,5	0	0	0
Shower bath I.	1,5	1,5	1,5	1,5
Shower bath II.	1,5	0	0	0
(I) Passage I.	10	5	5	5
(I_1)Passage II.	10	10	5	0

Deviations of ± 10% are allowed

I. STANDARDS FOR CONSTRUCTION OF PHARMACIES

General rules
Building requirements
Pharmacy accomodation
- Working rooms
- Store rooms
- Cuthouses
- Communications

Joinery and finishing
- Floors
- Walls
- Windows
- Doors

Technical requirements
- Water supply
- Drainage
- Gas
- Air-conditioming
- Electricity

General rules

The purpose of recommendations

a) to make clear and to unify all principles of pharmacy designs

b) to forward specifications for construction of pharmacies

c) to create uniform pressupositions for pharmacy designs

d) to create pressupositions for typization

e) to make the designs, constructions and reconstructions of pharmaceutical establishments more economical

Building requirements

Hospital pharmacies and dispensaries are in principle attached to a hospital.

Hospital pharmacies and dispensaries must be located in the ground floor with a possibility to use possibly the first floor

It is recommended to build hospital pharmacies and dispensaries in a form of independent one-storeyed pavilions

The building plot must guarantee the economy of expenses appropriated to the project

The plot must guarentee direct and sufficient light and ventilation of all working rooms. There must be no other buildings within the distance of minimum 12 m

The plot markee for a hospital pharmacy or dispensary must posseas the following requisities:

a) accessability to the public drainage
b) accessability to the public water supply net-work
c) continuous supply with electricity from the public electricity mains
d) accessability to the public telephone net

The passages for pedestrians, established on the plot of a hospital pharmacy or dispensary must be at least 120 cm broad, paved or graveled

Pharmacy accomodation

Hospital pharmacies and dispensaries consist of the following three units

a) working rooms
b) store rooms
c) other utility rooms

Working rooms

W a i t i n g r o o m is a room designated for pharmacy visitors waiting for handing out or filling up of their medicaments

D i s p e n s i n g r o o m is a room which adjoins the waiting room and which serves for receipt of prescriptions and for handing out of medicaments. It is separated from the waiting room by and expedition window

P r e s c r i p t i o n r o o m is a laboratory specifically designed for preparation of medicaments extemporaneously, according to physicians'prescriptions

G a l e n i c a l l a b o r a t o r y serves for stock preparation of medicaments and galenics in large quantities

C o n t r o l l a b o r a t o r y is reserved for analytical examination of chemicals, galenics and medicaments

S c u l l e r y serves to basic cleaning of bottles, apparatus, utensils, tools, package material atc.

C l e a n s c u l l e r y is a room for cleaning of bottles, ampoules, utensils atc. in pyrogenfree water

A s e p t i c r o o m serves for preparation of parenteral solutions or other medicaments under aseptic or sterile conditions

H y g i e n i c f i l t e r is a set of three small rooms through which the employees enter the aseptic room. The hygienic filter consists of

a) cloak room I. for taking off working suit
b) shower bath and lavatory
c) cloak room II. for puting on sterile working suit

S t e r i l i z a t i o n r o o m is a room assembling all necessary apparatus for sterilizing of parenteral solutions and other medicaments

A d j u s t i n g r o o m is a room for optical control of parenteral solutions and for their labeling.

Store - rooms

S t o r e r o o m (I, II) gives the possibility to stock all medicaments, galenics, vegetable drugs, sanitary supplies, etc.

S t o r e r o o m (III) serves for stocking of parenteral solutions and sterile medicaments only

Other rooms

C h i e f p h a r m a c i s t's r o o m is an office for the senior pharmacist

R o o m f o r e m p l o y e e s serves for the spell of employees as well as for working sessions

C l o a k r o o m (I, II) represents a sort of hygienical filter as it is expected thet all employees will change their private cloths for working ones before entering the working rooms of the pharmacy

S h o w e r b a t h and W C are automatically attached to the cloak room

In addition to working rooms, store rooms and out-houses it is necessary to make reference to

Communications (entrances)

In order to observe hygienic requirements, hospital pharmacies and dispensaries of all types must have 3 entrances

a) entrance for patients
b) entrance for employees
c) entrance for receipt of goods

All classes of hospital pharmacies must be equiped with a distinct, good visible signboard indicating pharmaceutical services. This signboard has to be situsted in the proximity of the entrance for patients

In the wall near the entrance for patients there must be a small window for handing out of medicaments during the night emergency service

It is recommended to build a verandah to shelter the entrance for patients from sun or rain

All passages in the pharmacy must be at least 120 cm broad

Joinery, finishing

The height of all working rooms must be as least 3 m. The height of store rooms and passages should not be lower than 2,50 m

Floors

It is recommended to choose such materials for floors which would be easily cleaned, desinfected, which resist chemicals, which do not soak, which are not slippery

The kinds of floor material for hospital pharmacies and dispensaries are to be found in Table XI/1.

Walls, ceilings

The walls and ceilings must have smooth and plain surface

The recommended plasters are to be found in Table XI/1.

With exception of the waiting room and dispensary in all working rooms the walls have to be connected with floors by means of round junctions to facilitate cleaning.

Facing tiles in rooms indicated in the Table XI/1 are understood up to the height 180 cm, with exception of the aseptic room, which is provided with facing it les up to the ceiling

Windows

Windows in the aseptic room must be dustproof and unopenable

Windows in store rooms are recommended to be protected by bars

All windows - with exception of those in the aseptic room - are recommended to be protected by regulating Venetian blinds

Doors

The doors must be sufficiently broad, i.e. doors leading into laboratories and store rooms at least 90 cm, doors leading into outhouses at least 70 cm

The doors in laboratories must be openable in the outside direction

The entrance for patients and the entrance for receipt of goods must have two shutters and must be at-least 130 cm broad

The door leaves must be plain, without any profiles and their frame must be of metal. In rooms in which materials are transported the doors are without door-steps

The entrance doors are recommended to be fitted with copper-sheet up to the height 10 cm from the bottom

The doors leading into the aseptic room must be dust-proof

Technical requirements

The pharmacies of all types must be fitted with

a) water
b) drainage
c) gas
d) air conditioning
e) electricity

Water supply

Drink water only is allowed in hospital pharmacies and dispensaries

The consumption of water is supposed to be 300 l for one employee per day. When sterile solutions are prepared the consumption is higher, according to the production capacity

Hospital pharmacies of all classes must be equiped with a boiler for hot water

II. STANDARDS FOR ASEPTIC AND STERILE WORK

The object of the regulations is to prevent contamination of the material used in preparation of sterile medicaments Hospital Pharmacies.

Division of working accomodation

The rooms are divided in accordance with the demand of aseptic or sterile work

a) the aseptic working place: there must not be more than 800 non-pathogenic microorganisms per 1 cubic meter of sir

b) the sterile working place: absence of living mi organisms or their spors must be ascertsined

Each working place, aseptic or sterile, must be separ ted from other working rooms by a special hygienic fi ter, where at must 2 000 non-pathogenic microorganisms pel 1 cubic meter of air may be found.

Construction of working places

The aseptic and sterile workplaces are to be equipped with special overpressure climatization apparatus.

The walls and the floors must be plain, provided with smooth surface without cracks, which may be easily cleaned. The junction of walls and foors must be made round to facilitate cleaning. Floors must be poreless (film of PVP or other suitable plastic).

Windows and doors are to be furnished with proper airtight packing.

Drainage

The outflow of sewage must be placed under the lowest floor of the pharmacy

The drainage pipes leading from the scullery and clean scullery must be made of stoneware and must be chemicalproof.

Gas

Gas is distributed from gas cylinders or generators air-conditioning, ventilation

Window fans, ceiling fans, coolers, air conditioning apparatus and special air conditioning have to be installed according to indications in the Table XI/1

Electricity

In hospital pharmacies of all classes electricity must be installed according to the regulations valid in Zambia

Class A and B hospital pharmacies must be equiped with 380 V electric plug.

The entrance for patients must be provided with an electric bell and with an illuminated signboard indicating the pharmacy (see fig. 11).

Telephone is compulsory in pharmacies of all classes

Internal telephone lines are recommended for the rooms indicated in the Table XI/1

A separate cloakroom for taking off street clothing is demanded as well a separate cloakroom for special dresses for work in aseptic or sterile conditions. Between these two cloakrooms there must be a lavotory and shower bath with warm and cold water.

Equipment of workplaces

The tables and other furniture must be most simple, provided with plain, smooth and washable surface. The construction must facilitate the cleaning under-neath the furniture. The material (metal, glass, plastic) must be well suited for routine desinfection.

The washbasins must be furnished with taps equipped with lengthened lever to be managed with the elbow. There must be a vessel containing liquid soap and desinfectants.

The workrooms and hygienic filter must be equipped with suitable devices enabling sterilization and desinfection of the space and equipment.

a) UV lights for sterilization of air by wave length of 2400 - 2800 A. UV lights are to be fixed on the ceiling and directly over the workplaces

b) Overpressure climatization by means of which the rooms are supplied with air which is free of microorganisms

Cleaning aids and apparatus must be reserved for sterile and aseptic workplaces only and are not to be moved to other rooms

Working regulations

In aseptic or sterile milieu workers specially trained are engaged only.

Rooms determined for work under aseptic or sterile conditions must not be used for other purposes

Before the work in aseptic or sterile milieu starts, necessary arrangements must be carried out. All workers of the department take aprt in these arrangements, which commence at least 2 hours before the operation starts

The rooms are carefully cleaned and then they are desinfected by spraying or evaporation of a suitable desinfectant for 15 - 20 minutes

When spraying it is necessary to see to it that the particles of the desinfectant encroach not only upon the walls, ceilings and floors but also upon the whole equipment and aerial space

After the desinfection starts, all utensils, tools etc., necessary for the work are assembled in the rooms to prevent letar contamination by bringing any material from outside

The necessary ingredients are supplied, as a rule, after the desinfection is over

After the completion of the preparation all utensils, tools, atc. are removed from the aseptic or sterile rooms, Cleaning of the rooms is carried out on a wet way, during which UV lights must be switched off

After the cleaning is over, the rooms and all necessary utensils, tools, etc. are prepared for the next day in accordance with the above mentioned points

It is necessary to carry out total cleaning of all premises once a week. Walls, floors, ceilings, windows, doors, furniture and equipment are properly washed by means of a solution of detergent and afterwards by means of a solution of desinfectant in suitable concentration.

After the total cleaning it is necessary to control the action of the climatization and to renew or change the filters

No personnel enters the rooms reserved and prepared for aseptic or sterile work without proper washing and without changing clothes for protective ones.

After entering the hygienic filter the personnel put off the dress normally used and while in underwear and special shoes cross over into the lavatory.

After proper washing under running hot water with the use of soap. After showering, the employee crosses over into the cloak-room where he /she washes the hands again in the way usually used in surgical theatres brush for 5 minutes. The employee puts on the protective clothes assisted by other co-worker. After dressing the employee enters directly the aseptic or sterile workplace.

The head of the department is supposed to supply the workers with adequate quantity of protective clothes and aids consisting of white long trousers, white shirt, surgical overall, protective cap and mask and white rubber shoes. Towels in the lavatory must be changed after every shift and every worker must possess his owntowel.

The worker dressed in the protective clothes must abide with following regulations: the underwear must not overlap, the hair must be covered carefully and the face mask

must be well fixed. The workers are not allowed to have objects in their pockets, which are of no connection with their work. White surgical overalls must have long closed sleeves, caps are expected to have dimensions of approx. 80 x 80 cm and are to be made of compact cotton as well as the face mask which must be fixed by a couple of tapes

After washing the protective clothes must be wrapped and sterilized. White rubber shoes have to be desinfected daily.

It is prohibited to eat, drink or smoke in aseptic or sterile rooms

After entering the aseptic or sterile rooms the worker must abstain from all movements. During the work he/she is expected not do adjust the clothes and not to speak much. All working processes are to be carried out quietly without unnecessary hurry. During the work-time he must not leave the workplace. If he/she does so he/she must comply with all washing procedure as it is stated above all over again.

During the work only the head of the department is allowed to enter the workrooms, of course under the eame conditions which are described above

Adherance to regulations

The current control of the air in workrooms is carried out at the beginning and in the middle of aech week and also after the change of the filter in the climatization apparatus.

All apparatus and other technical equipment must be maintained regularly

The observance of the regulations by workers during the work must be very carefully controlled by the head of the department

Before any personnel is asigned for work in sterile department he/she must undergo a health exmination to assure the employer of his/her suitability for work in aseptic or sterile conditions. The medical examination is made regularly from time to time. The worker is subjected to medical examination even in case of a comparatively slight illness (common cold, gastrointestinal diseases, etc.).

III. T E C H N I C A L E Q U I P M E N T

The technical equipment for Zambian Hospital Pharmacies and Dispensaries is divided into three parts:

a) machinery, apparatus
b) utensils, tools,
c) glass, porcelain.

The items under a), b), and c) are selected with special regard to Zambian conditions and with the aim to provide the hospital pharmacies of all classes with adequate equipment.

The items a) mechinery and apparatus and b) utensils and tools which are in the following list indicated by "o" are basic and inevitable while the other devices in these two chapters are recommendable only.

There are two lists of equipment, one containing the summary of all items, while the other divides all items into individual working rooms of the respective class of a hospital pharmacy.

Machines, apparatus

	A	B	C	D
A Apparatus for filling ampoules	1	0	0	0
Apparatus for closing of injectione	1	0	0	0
0 Apparatus for filling of injection solutions	1	0	0	0
0 Ultraviolet light	4	0	0	0
0 Electric hot plate	4	2	1	0
Homogenizer for powders	1	1	0	0
Roller mixer	1	1	0	0
Automatic device for dividing of powder	1	1	0	0
Pill making machine	1	1	1	0
0 Sealing apparatus for powders	2	1	1	0
0 Water jet pump	2	2	1	0
0 Microscope universal	1	1	0	0
0 pH meter with electrodes	1	1	0	0
0 Polarimeter	1	1	0	0
0 Refractometer Abbe	1	1	0	0
0 Analytical balance automatic	1	0	0	0
0 Analytical balance simple	0	1	0	0
0 Mohr-Westphal balance	1	1	0	0
0 Refrigerator 200 l	2	2	1	0
0 Refrigerator 200 l	1	1	1	1
Laboratory stirring motor	1	1	1	1
Apparatus for filling liquids	1	1	0	0
Universal high speed mixer	1	1	0	0
0 Tablet press (hand operated)	0	1	0	0

	A	B	C	D
O Tablet press (electr.operated)	1	0	0	0
O Gas oven	1	1	0	0
Bottle washing apparatus	1	0	0	0
O Water still, electr. heated	1	1	1	0
O Water still, for apyrogenic water	2	0	0	0
O Hot air sterilizer	2	1	0	0
O High pressure steam sterilizer	1	0	0	0
Vertical autoclave	1	0	0	0
Cork washing apparatus	1	0	0	0
Universal aseptic box	1	0	0	0
Timer	3	0	0	0
Printing machine small type writer	1	0	0	0
O Prescription balance 1 000 g	6	4	2	0
Prescription balance 500 g	1	1	0	0
O Prescription balance 50 g	4	2	2	0
O Automatic balance 2 kg	1	1	1	0
Automatic balance 20 kg	1	1	0	0
Balance for rapid weihing	1	0	0	0
O Water baths rings	4	3	1	0
<u>Utensils, tools</u>				
O Blas making gas burner	1	1	1	0
O Mortar stainless				
ø 120 mm	12	8	2	0
ø 140 mm	17	11	2	0
ø 200 mm	1	0	0	0
ø 260 mm	1	0	0	0
O Pestle stailess				
length 130 mm	12	8	2	0
length 150 mm	17	11	2	0

		A	B	C	D
	length 200 mm	1	0	0	0
	length 260 mm	1	1	0	0
0	Spatula stainless steel				
	length 140 mm	14	12	3	0
	length 200 mm	19	12	7	
	length 260 mm	4	2	2	
	Double spoon horn 140 mm	5	3	1	
	Box for sterilization				
	200 x 175 x 185 mm	1	0	0	0
	Shovel stainless small large	3	0	0	0
0	Double spoon				
	length 140 mm	14	6	2	0
	length 180 mm	13	6	2	0
	length 230 mm	2	0	0	0
	length 300 mm	4	3	1	0
	Spray	1	0	0	0
	Retort stand acc. Bunsen	3	2	0	0
	Crucible stainless 500 ml	1	1	1	0
	Forceps	4	3	1	0
0	Prescription sieve (set)	2	2	1	0
	Wire gauze with asbestos layer	8	5	1	0
	Laboratory infrared heater	1	1	1	0
0	Box for sterilization of wor-				
	king clothes stainless steel	1	0	0	0
	Eyes (platin wire)	1	1	0	0
0	Burette holder double sided	3	2	0	0
0	Test tube holder	2	1	0	0
0	Brush for test tubes	2	1	0	0
0	Brush for pipettes	2	1	0	0
0	Brush for flasks	2	1	0	0

	A	B	C	D
Crucible	5	3	0	0
Crucible tongs	1	1	0	0
0 Knife for cutting glass	1	1	0	0
0 Stand for pipettes	1	1	0	0
Triangle for crucibles	3	2	0	0
0 Tripod for poiling	2	2	0	0
0 Pot stainless steel				
capacity 2 000 ml	1	1	0	0
capacity 5 000 ml	3	1	0	0
Cart	3	1	0	0
Siphon of plastic	1	1	0	0
0 Vessel for dist. water				
stainless steel apparatus	1	1	0	0
Cork press	1	1	0	0
0 Control lamp	2	0	0	0
Wire basket for injection				
Bottles 500 ml	30	0	0	0
1 000 ml	10	0	0	0
Glass, porcelain ware				
Erlenmayer flask narrow mouth				
50 ml	5	3	0	0
100 ml	7	5	1	0
200 ml	5	3	0	0
250 ml	2	2	1	0
500 ml	1	1	0	0
1 000 ml	3	0	0	0
5 000 ml	3	0	0	0
Volumetric flask without stopper				
50 ml	1	0	0	0
100 ml	1	0	0	0

	A	B	C	D
250 ml	1	0	0	0
1 000 ml	2	0	0	0
2 000 ml	2	0	0	0
6 000 ml	2	0	0	0
Filter flask				
100 ml	4	2	0	0
500 ml	3	1	0	0
1 000 ml	3	1	0	0
2 000 ml	3	1	0	0
5 000 ml	2	0	0	0
Beaker with spout				
50 ml	12	10	2	0
100 ml	17	11	1	0
250 ml	13	7	0	0
600 ml	3	1	0	0
1 000 ml	4	2	0	0
Sintered glass filter funnel				
G3 Ø 30 mm, cap. 40 ml	2	0	0	0
11G3 Ø 40 mm, cap. 70 ml	2	0	0	0
17G3 Ø 65 mm, cap. 160 ml	2	0	0	0
25G3 Ø 90 mm, cap. 520 ml	5	2	0	0
25G2 Ø 90 mm, cap. 450 ml	2	2	0	0
HA40 S 3 cap. 70 ml	10	10	0	0
34 S 30=4	3	1	0	0
Pressure filter acc. Graber	1	0	0	0
Overpressure filter bacterial	1	0	0	0
Glass vessel for dist. water cap. 50l	1	0	0	0
Bottle acc. to Woulff with two necks cap. 1 000 ml	3	0	0	0

	A	B	C	D
Porcelaine measuring vessel				
350 ml	1	0	0	0
500 ml	1	0	0	0
1 000 ml	1	0	0	0
2 000 ml	1	0	0	0
Chemical thermometer				
0 - 100°C	3	2	1	0
100 - 250°C	1	0	0	0
0 - 150°C	1	1	0	0
0 - 300°C	1	1	0	0
Porcelain mortar with pestle				
Ø 120 mm	4	3	1	0
140 mm	9	7	3	0
160 mm	3	1	0	0
250 mm	3	2	0	0
300 mm	1	1	0	0
460 mm	1	1	0	0
Glass rods	20	13	5	1
Graduated measuring cylinder				
25 ml	2	0	1	0
100 ml	5	2	2	0
150 ml	2	0	0	0
250 ml	5	2	1	0
1 000 ml	4	1	0	0
Petri dish Ø 50 mm	1	1	0	0
Ø 100 mm	1	1	0	0
Erlenmayer flask with stopper				
50 ml	3	3	0	0
100 ml	2	2	0	0
Glass funnel				
Ø 45 mm	5	5	2	0
100 mm	4	4	2	0
150 mm	1	1	0	0
200 mm	3	3	0	0

	A	B	C	D
Fraction flask 100 ml	2	1	0	0
Erlenmayer flask, wide neck				
100 ml	12	7	0	0
200 ml	10	5	0	0
500 ml	2	2	0	0
2 000 ml	2	2	0	0
Measuring flask with stopper				
50 ml	5	3	0	0
100 ml	10	5	0	0
250 ml	5	3	0	0
1 000 ml	3	1	0	0
Burette with stop cock graduated				
10 ml	3	2	0	0
25 ml	5	3	0	0
50 ml	3	2	0	0
Glass capilary	5 kg	3 kg	0	0
Burette acc. to Bang 1 ml	1	1	0	0
2 ml	1	1	0	0
Watch glasses	100	100	0	0
Separating funnels				
Ø 50 ml	2	2	0	0
100 ml	2	2	0	0
Pipette graduated				
5 ml	5	3	0	0
10 ml	5	3	0	0
Pipette with one mark				
1 ml	2	1	0	0
2 ml	2	1	0	0
5 ml	5	3	0	0
10 ml.	5	3	0	0
25 ml	3	1	0	0
50 ml	3	1	0	0

	A	B	C	D
Measuring cylinder				
10 ml	2	1	0	0
25 ml	2	1	0	0
100 ml	2	1	0	0
50 ml	2	1	0	0
Porcelaine suction filter funnel				
Ø 150 mm	1	1	0	0
250 mm	1	1	0	0
Filtering funnel acc. to Buechner				
Ø 60 ml	1	1	0	0
130 ml	2	1	0	0
200 ml	2	1	0	0
Mesuring pitcher cylindrical with graduation				
250 ml	1	1	1	0
500 ml	1	1	1	0

Dispensing room

	A	B	C	D
Refrigerator	1	1	1	1

Prescription room

Erlenmayer flask narrow				
100 ml	2	2	1	0
250 ml	2	2	1	0
500 ml	1	1	0	0

	A	B	C	D
Homogenizer for powders				
Beaker with spout				
50 ml	2	2	2	0
100 ml	2	2	1	0
250 ml	1	1	0	0
600 ml	1	0	0	0
Spatula, stainless				
length 140 mm	5	5	3	0
200 mm	15	10	5	0
Automatic device for dividing of powders	1	1	0	0
Water bath	2	1	0	0
Double spoon				
length 140 mm	10	5	2	0
180 mm	10	5	2	0
Double spoon of horn				
length 140 mm	1	1	0	0
Petri dish				
Ø 70 mm	2	0	0	0
Mortar stainless				
Ø 120 mm	8	5	2	0
140 mm	8	5	2	0
180 mm	1	0	0	0
Pestle, stainless				
length 130 mm	8	5	2	0
length 150 mm	8	5	2	0
Porcelain mortar with pestle				
Ø 120 mm	3	3	1	0
140 mm	8	6	3	0
160 mm	1	0	0	0
Crucible, stainless 500 ml	1	1	1	0

	A	B	C	D
Pill machine	1	1	1	0
Retort stand acc. to Bunsen	1	0	0	0
Seal aaparatus for powders (30 openings)	1	1	1	0
Timer	1	0	0	0
Gas burner	0	0	1	0
Glass funnel				
Ø 45 mm	0	0	2	0
100 mm	0	0	2	0
Measuring pitcher cylindrical with graduation				
250 ml	0	0	1	0
500 ml	0	0	1	0
Graduated cylinder				
25 ml	0	0	1	0
100 ml	0	0	2	1
250 ml	0	0	1	0
Prescription sieve (set)	1	1	1	0
Wire gauze with asbestos layer	1	1	1	0
Chemical thermometer 0-100°C	1	1	1	0
Glass rods assorted Ø	5	5	5	0
Automatic balance 2 kg	1	1	1	0
Prescription balance 50 kg	2	2	2	0
Prescription balance 1 000 kg	3	2	2	0
Electric hot plate	2	1	1	0
Water jet pump	1	1	1	0
Laboratory infrared heater	1	1	1	0
Water still	0	0	1	0
Prescription counter for preparation of eye medicaments				
Erlenmayer flask with stopper				
50 ml	3	3	0	0
100 ml	2	2	0	0

	A	B	C	D
Filtering flask 100 ml	2	2	0	0
Sintering glass filter funnel				
HA 40 s 3, Ø 40 mm	10	10	0	0
Beaker with spout				
50 ml	5	5	0	0
100 ml	3	3	0	0
Spatula of horn 140 mm	2	1	0	0
Spatula stainless 140 mm	2	2	0	0
Box for sterilization				
200 x 175 x 175	2	2	0	0
Double spoon, stainless				
length 140 mm	2	1	0	0
180 mm	1	1	0	0
Petri dish				
Ø 50 mm	1	1	0	0
100 mm	1	1	0	0
Forceps	1	1	0	0
Porcelain mortar with pestle				
Ø 120 mm	1	1	0	0
160 mm	1	1	0	0
Glass funnel				
Ø 45 mm	5	5	0	0
100 mm	2	2	0	0
Retort stand with rod 750 mm	1	1	0	0
Glass rods asst Ø	5	5	0	0
Prescription balance 50 kg	1	1	0	0
Prescription balance 500 kg	1	1	0	0
Galenical laboratory				
Erlenmayer flask wide				
100 ml	2	2	0	0
500 ml	2	2	0	0
2 000 ml	2	2	0	0

	A	B	C	D
Filtering flask				
500 ml	1	1	0	0
1 000 ml	1	1	0	0
2 000 ml	1	1	0	0
Sintered glass filter funnel capacity 450 ml, Ø 90 ml				
25G2	2	2	0	0
25G3	2	2	0	0
Pots stainless				
2 000 ml	1	1	0	0
5 000 ml	1	1	0	0
Beaker with spout				
100 ml	1	1	0	0
250 ml	1	1	0	0
600 ml	1	1	0	0
1 000 ml	1	1	0	0
Gas burner acc. to Bunsen	1	1	0	0
Spatula, stainless	5	5	0	0
Porcelain suction filter				
Ø 150 mm	1	1	0	0
250 mm	1	1	0	0
Water bath	2	2	0	0
Double spoon				
length 300 mm	2	2	0	0
Double spoon of horn	2	1	0	0
Laboratory stirring motor	1	0	0	0
Porcelain mortar with pestle				
Ø 250 mm	2	2	0	0
300 mm	1	1	0	0
460 mm	1	1	0	0

	A	B	C	D
Filtering funnel acc. to				
Buechner Ø 60 mm	1	1	0	0
130 mm	1	1	0	0
200 mm	1	1	0	0
Glass funnel				
Ø 100 mm	2	2	0	0
200 mm	2	2	0	0
Apparatus for filling of liquide	1	1	0	0
Measuring pitcher cylindrical with graduation				
250 ml	1	1	0	0
500 ml	1	1	0	0
Seal apparatus				
Universal high speed electric mixer	1	1	0	0
Timer	1	1	0	0
Prescription sieve (set)	1	1	0	0
Wire gauze asbestos layer	2	1	0	0
Retort stand acc. to Bunsen	1	1	0	0
Tablet press (hand operated)	0	1	0	0
Tablet press (electr.operated)	1	0	0	0
Chemical thermometer 0-100°C	1	1	0	0
Tripod	1	1	0	0
Automatic balance 20 kg	1	1	0	0
Prescription balance 50 kg	1	1	0	0
Prescription balance 1 000 kg	1	1	0	0
Graduated cylinder				
100 ml	3	2	0	0
250 ml	3	2	0	0
1 000 ml	2	1	0	0

	A	B	C	D
Electric hot plate	1	1	0	0
Gas oven	1	1	0	0
Water jet pump	1	1	0	0
Roller mixer	1	1	0	0
Control laboratory				
Fraction flask 100 ml	2	1	0	0
Erlenmayer flask narrow neck				
50 ml	5	3	0	0
100 ml	5	3	0	0
200 ml	5	3	0	0
Erlenmayer flask wide neck				
100 ml	10	5	0	0
200 ml	10	5	0	0
Measuring flask with stopper				
50 ml	5	3	0	0
100 ml	5	3	0	0
250 ml	5	3	0	0
1 000 ml	3	1	0	0
Titration flask				
100 ml	10	5	0	0
250 ml	10	5	0	0
500 ml	3	1	0	0
Burette with stop cock				
10 ml	3	2	0	0
25 ml	5	3	0	0
50 ml	3	2	0	0
Desiccator compl. Ø 150 mm	1	1	0	0
Eyes (platin wire)	1	1	0	0
Burette holder double sided	3	2	0	0
Test tube holder	2	1	0	0

	A	B	C	D
Filter funnel sintered				
34S 30=4	3	1	0	0
Beaker with spout				
50 ml	5	3	0	0
100 ml	10	5	0	0
250 ml	10	5	0	0
1 000 ml	2	1	0	0
Gas burner Bunsen	2	1	0	0
Glass capillary	5 kg	3 kg	0	0
Brush for test tube	2	1	0	0
Brush for pipettes	2	1	0	0
Brush for flasks	2	1	0	0
Crucible	5	3	0	0
Crucible tongs	1	1	0	0
Basket for test tubes	1	1	0	0
Weighing boat 75 mm	2	1	0	0
Double spoon, stainless				
130 mm	2	2	0	0
190 mm	2	2	0	0
Burette acc. to Bang				
1 ml	1	1	0	0
2 ml	1	1	0	0
Microscope universal	1	1	0	0
Watch glasses	100	100	0	0
pH meter with electrodes	1	1	0	0
Polarimeter	1	1	0	0
Refractometer Abbe	1	1	0	0
Analytical balance automatic	1	0	0	0
Analytical balance simple	0	1	0	0
Balance for rapid weighing	1	0	0	0

	A	B	C	D
Mohr-Westphal balance	1	1	0	0
Prescription balance 1 000 kg	1	1	0	0
Separating funnels				
Ø 50 mm	2	2	0	0
100 mm	2	2	0	0
Knife for cutting glass	1	1	0	0
Forceps	2	1	0	0
Pipette graduated				
5 ml	5	3	0	0
10 ml	5	3	0	0
Pipette with one mark				
1 ml	2	1	0	0
2 ml	2	1	0	0
5 ml	5	3	0	0
10 ml	5	3	0	0
25 ml	3	1	0	0
50 ml	3	1	0	0
Wire gauze with asbestos	5	3	0	0
Stand for pipettes	1	1	0	0
Retort stand acc.Bunsen	1	1	0	0
Wash bottle 500 ml	1	1	0	0
Wash bottle polyethylene 250 ml	1	1	0	0
Chemical thermometer				
0 - 150°C	1	1	0	0
0 - 300°C	1	1	0	0
Triangle for crucibles	3	2	0	0
Tripod for boiling	1	1	0	0
Glass rod assorted Ø	5	3	0	0

	A	B	C	D
Measuring cylinder				
10 ml	2	1	0	0
25 ml	2	1	0	0
50 ml	2	1	0	0
100 ml	2	1	0	0
Aseptic room				
Universal aseptic box	1	0	0	0
Erlenmayer flask narrow				
1 000 ml	3	0	0	0
5 000 ml	3	0	0	0
Volumetric flask without stopper				
50 ml	1	0	0	0
100 ml	1	0	0	0
250 ml	1	0	0	0
1 000 ml	2	0	0	0
2 000 ml	2	0	0	0
6 000 ml	2	0	0	0
Filtering flask				
100 ml	2	0	0	0
500 ml	2	0	0	0
1 000 ml	2	0	0	0
2 000 ml	2	0	0	0
5 000 ml	2	0	0	0
Sintered glass filter funnel				
3G3, Ø 30 mm, cap. 40 ml	2	0	0	0
11G3, Ø 40 mm, cap. 70 ml	2	0	0	0
17G3, Ø 65 mm, cap. 160 ml	2	0	0	0
25G3, Ø 90 mm, cap. 520 ml	3	0	0	0

	A	B	C	D
15103, Ø 175 mm, cap. 2 700 ml	2	0	0	0
Pressure liter acc. to Grabar	1	0	0	0
Overpressure filter bacterial	1	0	0	0
Beaker with spout				
100 ml	1	0	0	0
250 ml	1	0	0	0
600 ml	1	0	0	0
1 000 ml	1	0	0	0
Glass making gas burner	1	0	0	0
Spatula, stainless				
length 140 mm	2	0	0	0
200 mm	2	0	0	0
260 mm	2	0	0	0
Glass vessel for dist.water 50l	1	0	0	0
Box for sterilization				
200 x 175 x 175	1	0	0	0
Bottle acc. to Woulff with two necks 1 000 ml	3	0	0	0
Shovel, stainless, small	3	0	0	0
large	3	0	0	0
Double spoon				
length 140 mm	2	0	0	0
180 mm	2	0	0	0
230 mm	2	0	0	0
300 mm	1	0	0	0
Laboratory stirring motor	1	0	0	0
Glass funnel acc. to Buechner				
Ø 80 mm	1	0	0	0
Ø 130 mm	1	0	0	0
200 mm	1	0	0	0

	A	B	C	D
Porcelain measuring vessel				
350 ml	1	0	0	0
500 ml	1	0	0	0
1 000 ml	1	0	0	0
2 000 ml	1	0	0	0
Apparatus for filling of ampoules	1	0	0	0
Apparatus for closing of injection flasks	1	0	0	0
Apparatus for filling of injection solutions	1	0	0	0
Spray	1	0	0	0
Timer	1	0	0	0
Filtering flask				
3 000 ml	1	0	0	0
5 000 ml	1	0	0	0
Retort stand acc. to Bunsen	1	0	0	0
Chemical thermometer				
0 - 100°C	1	0	0	0
100 - 250°C	1	0	0	0
Porcelain mortar with pestle				
Ø 120 mm	1	0	0	0
140 mm	1	0	0	0
160 mm	1	0	0	0
250 mm	1	0	0	0
Mortar stainless				
Ø 120 mm	1	0	0	0
140 mm	1	0	0	0
200 mm	1	0	0	0
260 mm	1	0	0	0

	A	B	C	D
Pestle, stainless				
length 130 mm	1	0	0	0
150 mm	1	0	0	0
200 mm	1	0	0	0
260 mm	1	0	0	0
Glass rod assorted Ø	5	0	0	0
Prescription balance 1 000 g	1	0	0	0
Prescription balance 50 g	1	0	0	0
Graduated measuring cylinder				
25 ml	2	0	0	0
100 ml	2	0	0	0
150 ml	2	0	0	0
250 ml	2	0	0	0
1 000 ml	2	0	0	0
Electric hot plate	1	0	0	0
Ultraviolet light	3	0	0	0
Sterilization room				
Double door high pressure steam stabilizer	1	0	0	0
Vertical cylindrical autoclave	1	0	0	0
Hot air sterilizer	1	0	0	0
Water still for apyrogenic water	1	0	0	0
Cart	1	0	0	0
Adjusting room				
Control lamp	2	0	0	0
Printing machine small	1	0	0	0
Scullery				

	A	B	C	D
Stainless vessel for dist.water	1	1	0	0
Cork press	1	1	0	0
Bottless washing up apparatus	1	0	0	0
Water still	1	1	0	0
Water still for apyrogenic water	1	0	0	0
Hot air sterilizer	1	1	0	0
Cart	1	0	0	0
Clean scullery				
Pot, stainless 5 000 ml	2	0	0	0
Cork washing up apparatus	1	0	0	0
Ultraviolet light	2	0	0	0
Hygienic filter				
Vessel for sterilization of working clothes	2	0	0	0
Ultraviolet radiator	1	0	0	0
Store room				
Dessicator Ø 250 ml	1	1	1	0
Spatula, stainless				
length 200 mm	2	2	2	0
260 mm	2	2	2	0
Double spoon 300 mm	1	1	1	0
Automatic balance 20 kg	1	1	0	0
Cart	1	1	0	0
Siphon of plastic	1	1	0	0
Funnel				
Ø 150 mm	1	1	0	0
200 mm	1	1	0	0
Hefrigenerator 200 l	2	2	1	0

IV. S E C T I O N A L F U R N I T U R E

The sectional furniture is a cabinet type furniture of which the units can be located close to one another, or on top of each other and out of smaller units a whole cabinet type furniture can be built up as requited. The individual units are designed for various functions and can afford the possibility of addition or reshuffling of the units in a very short time, thus the sectional furniture offers flexibity and is not one rigid piece of furniture that cannot be changed but it is a set of selected multipurpose units which fits in with the needs of the environment. The units do not require much space and is easy to assemble according to the ground plan. The individual units can be arranged in combination both horizontically or vertically and this make the required furniture of a pharmacy of the required size and type and merits the sectional furniture units can be summed up as follows:

1. The individual units as well as a whole set of them do comply with the measurements and theoretical calculations set out in the previous chapters.

2. Any pharmacy of whatever size of type can be furnished with sectional units.

3. Sectional furniture units can be manufactured easily according to the technical drawings.

4. Sectional furniture insures uniformity of pharmacy furnishings and gives the pharmacy the professional expression.

The specific sectional pharmacy furniture consists of

a) multipurpose working desks
b) multipurpose cabinets

a) Working desks:

Type:	Dimensions:
A 1	150 x 60 x 90
A 2	150 x 60 x 90
A 3	60 x 60 x 90
A 4	150 x 0 x 90

b) Cabinets:

Type:	Dimensions:
B 1	90 x 15 x 90
B 2	90 x 30 x 90
B 3	90 x 45 x 90
B 4	60 x 15 x 90
B 5	60 x 30 x 90
B 6	60 x 45 x 90
B 7	90 x 30 x 60
B 8	90 x 45 x 60
B 9	60 x 30 x 60
B 10	60 x 45 x 60
B 11	60 x 60 x 180

Basic technical requirements

All working desks and sets of cabinets are equipped with metal legs 300 mm high.

The basic dimensions of all units of the sectional furniture are included (in fig. 12-15).

The bodies of all working desks and cabinets, i. e. side walls, back walls, tops, bottoms are made of wood suitable for local climatic conditions. The thickness of wood should be 22 mm.

The upper surfaces of working desks are covered by suitable plastic material resisting to hest and chemicals.

The legs are made of steel tubes the outer diameter of which is 30 mm, the thickness of walls 2 mm.

The legs are provided with metal foot, adjustable by means of a screw. The metal legs are chromium plated.

The outer dimensions must be strictly observed in order to enable easy adjustability of individual furniture units.

The surface of the sectional furniture must be plain and smooth.

The individual units must be perfectly stable.

By horizontal as well as vertical assembly of the individual units the desired set can be made. All units must be mutualy fixed by means of proper srews. For better stability it is recommendable to join the bottoms of the units by strips of iron band.

The drawers of the same dimensions must be mutualy interchangeable as well as the sliding doors.

Coating is carried out by means of synthetic paints. It is allways desirable to paint the sectional pharmacy furniture in white.

The tops of working desks must be made of black plastic materials.

Furniture equipment of individual classes of Hospital Pharmacies and Dispensaries

Class A:	A 1 - 3x	B 1 - 4x
	A 2 - 5x	B 2 -12x
	A 3 - 1x	B 3 -33x
	A 4 - 6x	B 4 - 1x
		B 7 -16x
		B 8 -47x
		B 9 - 1x
		B 10 - 2x
		B 11 - 5x

Metal revolving stool 19x
Metal double door cabinet 2x
Metal wardrobes + chairs for 17 persons
Set of sitting room furniture
Set of office furniture
Waiting room chairs 4x

Class B:	A 1 - 2x	B 1 - 4x
	A 2 - 5x	B 2 -12x
	A 4 - 3x	B 3 -28x
		B 4 - 1x
		B 7 -19x
		B 8 -28x
		B 9 - 1x
		B 10 - 2x
		B 11 - 5x

Metal revolving stool 12x
Metal wardrobes + chairs for 14 persons
Waiting room chairs 4x

Class C:

A 1 - 2x	B 1 - 1x
A 2 - 1x	B 2 - 6x
A 4 - 1x	B 3 - 10x
	B 4 - 1x
	B 7 - 10x
	B 8 - 10x
	B 9 - 1x
	B 11 - 5x

Metal revolving stool 6x
Metal wardrobes + chairs for 7 persons
Waiting room chair 4x

Class D:

A 2 - 1x	B 2 - 6x
	B 7 - 6x
	B 11 - 3x

Metal revolving stool 2x
Metal wardrobes + chairs for 4 persons
Waiting room chair

Specification of pharmacy sectional furniture according to individual rooms

(U) Waiting room
(P) Prescription romm

Chairs
A 1 - 2x
B 1 - 4x
B 4 - 1x
B 7 - 4x
B 9 - 1x
B 11 - 2x
Metal rev.stool 3x

(D) Dispensing room	A 2 - 1x B 2 - 6x B 7 - 6x B 11 - 3x Metal rev.stool 1x
(G) Galenical laboratory	A 2 - 4x B 8 - 8x B 10 - 2x Metal rev.stool 3x
(C) Control laboratory	B 8 - 6x B 2 - 6x Metal rev.stool 2x
(S) Scullery	A 4 - 2x Metal rev.stool 1x
(S_1) Clean scullery	A 4 - 1x Metal rev.stool 1x
(ST) Sterilization room	A 4 - 2x Metal rev.stool 2x
(A) Aseptic room	Metal double-door cabinet 2x Metal rev.stool 2x
(T) Adjusting room	A 1 - 1x A 3 - 1x B 7 - 6x Metal rev.stool 1x
(R) Store room I.	A 4 - 1x B 3 - 10x B 8 - 10x Metal rev.stool 1x

(R_1)	Store room II.	B 3 - 18x B 8 - 18x
(E)	Store room for sterile solutions	B 3 - 5x B 8 - 5x
(H)	Chief pharmacist's room	Set of office furniture
(Z)	Room for employees	Set of sitting room furniture
(N)	Cloak room I.	Metal wardrobes + chairs
(N_1)	Cloak room II.	Metal wardrobes + chairs

The arrangement of pharmacy sectional furniture in individual rooms of Zambian Hospital Pharmacies and Dispenseries can be clearly seen (in the fig. 9).

M a n p o w e r

An estimate of need for workers in the proposed four types of hospital pharmacies can be seen from the following Table:

	Type A hospital pharmacy	Type B hospital pharmacy	Type C hospital pharmacy	Type D hospital pharmacy
Pharmacists	7	2	1	0
Pharmaceutical technicians	14	4	2	1
Secretary	1	0	0	0
Helpers	5	1,5	1	0
Total	27	7,5	4	1

These figures have been determined-because of lack of exact particulars as the number of beds, percentage of compounded medicines etc. - empirically only.

A specific calculation of manpower allocation to hospital pharmacies must be derived from local conditions, which, however, have not been studied in connection with the present Feasibility Study.

For completeness we give here the calculations which hold for

a) Czechoslovakia

b) the Sudan

as for a)

To be able to determine the number of qualified pharmacist for a given pharmacy in a hospital, health centre or a policlinic, the number of physician there - in must be known. From empirical results established by the pharma-

ceutical development centre in Prague, it has found that by multiplying 0.175 which is a coefficient obtained as result of statistical research of the centre by the number of physicians would give the total number of qualified pharmacists, once the number of qualified pharmacists is known, the number of technicians can be determined by multiplying the number of qualified pharmacists by 0.88 a coefficient arrived at experimentally. The number of helpers or meanial personnel can be determined in the same manner by multiplying the number of pharmacists by 0.22 also a coeficient which gives the number of pharmacists helping hands respectively.

If Ph = 0.175 x M
T = (0.175 x M) 0.88
W = (0.175 x M) 0.22

where Ph. refers to qualified pharmacists, T. to pharm. technicians, W. to helpers and M. to physicians.

The following example explains the procedure if it is supposed that in a certain hospital there are 20 physicians then:

Pharmacists are	0.175 x 20	= 3.5, approximately 4
Technicians	(0.175 x 20) 0.88	=3.08, approximately 3
Working hands	(0.175 x 20) 0.22	=0.77, approximately 1

The above figure would be the pharmacy man-power in this hospital and would undertake all pharmacy tasks.

as for b)

For the Sudan the following formula has been determined

$$PhAH = \frac{0.114\ N\ (5m + n + 6240\ B)}{10^6}$$

where.Number of patients who visit the hospital pharmacy for recieving medicines per anum is designated by "N".

The percentage of ready-made medicines in the prescription referred to as "n".

The percentage of compounded medicines "m".

The number of hospital beds in the particular hospital "B".

The PhAH value obtained stands in this case for the total number of workers. To calculate each category individually the following equation is appred

$$Ph = \frac{Ph\ AH}{2.46}$$

Ph = number of qualified pharmacists
PhAH = total number of all categories
The number of pharmacy technician in determined thus.

T = technician = PhAH - Ph

The number of other helpers is obtained in this manner:
W = non-professional personnel = 0.75 Ph.

An example:

It is required to determine the number of pharmacy personnel, and the number of each category of the staff. The factors are as follow:

number of beds 260 (b)

anual visitors to the pharmacy 303231 (N)
presupposed % of medicine compounded (30%) (m)
presupposed % of ready-made medicines (70%) (n)

$$PhAH = \frac{0.114 \cdot 303\,231\,(5.30 + 70) + 6\,420 \cdot 260}{10^6} =$$

$$= \frac{7\,605\,026 + 1\,622\,400}{10^6} =$$

$$= \frac{9\,227\,426}{1\,000\,000} = 9.22$$

$$Ph = \frac{9.22}{2.46} = 3.78 \text{ say for convenience } 4$$

The number of technicians (T)

$9.22 - 3.78 = 5.44$ say 5

The number of other personnel (W)

$3.78 \cdot 0.75 = 2.83$ say 3

With regard to the total number of hospital pharmacies in the country, Zambia needs these total numbers of university trained pharmacists, pharmaceutical technicians and helpers.

	Pharmacists	Pharmaceutical technicians	Helpers
Type A Hospital Pharmacies	21	42	16
Type B Hospital Pharmacies	18	36	14
Type C Hospital Pharmacies	3	6	3
Type D Hospital Pharmacies	0	57	0
Grand Total	42	141	33

In case of implementing this scheme we recommend to engage for the first 2-3 years of type A pharmacy operation UNIDO. experts, i.e. 1 pharmacist and 1 pharmaceutical technician.

Categories of pharmacy employees are as follows:

I.	Chief pharmacist	Salary	700 K	monthly
II.	Deputy chief pharmacist	Salary	600 K	monthly
III.	Chief of the sterilisation department	Salary	600 K	monthly
IV.	Chief of the manufacturing department	Salary	600 K	monthly
V.	Pharmacist	Salary	500 K	monthly
VI.	Pharmaceutical technician	Salary	300 K	monthly
VII.	Secretary	Salary	150 K	monthly
VIII.	Helper	Wage	100 K	monthly

(The salaries and the wage are derived from the analogous salaries and wages valid in the pharmaceutical industry - see chapter VIII.).

For particulars see Schedule XI - 2 and 3

In connection with personnel recruitment it is necessary to take into consideration the fact that the demand for workers will not be instantaneous, to one specific date, but that the development of hospital pharmacies and consequently the growth in the number of personnel will be gradual, depending on the funds that the Ministry of Health of Zambia will allocate for these purposes. For the beginning it would be of advantage - as stated above - to build prototypes of all the four pharmacy types, with adequate personnel provisions.

Financial evaluation

- Financial evaluation

With reference to the information obtained from the contractors Lewis Construction Ltd in connection with the project of the pharmaceutical plant in Lusaka we have established that the cost of 1 m^3 built-up space is 48.46 K (at the 1980 price level). From this it follows that the construction of hospital pharmacies designed in the case of Zambia as separate pavillions attached to hospitals of the respective categories would require sums which are incorporated in Schedule XI- 5 and 8

The technical equipment of these pharmacies, i.e. machines, apparatuses, glass, porcelain, must be - without exception - imported from abroad. The prices for complete equipment of pharmacies of all four classes are to be seen in Schedule XI -6

As for as the pharmacy sectional laboratory furniture is concerned, the individual elements may be essily produced in Zambia. For the reason the ScheduleXI-7presents prices in Kwacha, which are derived from contemporary prices valid in Czechoslovakia (see also Schedule XI - 1). Summary sheets (Schedule XI - 8) bring total costs of Pharmacies A- D and total cost of the complete pharmacy network in Zambia.

It is highly recommendable to construct for the first stage of development of Zambian hospital pharmacies one pharmacy of the class A, B, C and D as an example.

Schedule XI - 1

HOSPITAL PHARMACY LABORATORY EQUIPMENT

No	Item description	Unit cost		Pharmacy Class									
				A		B		C		D		Total	
		ES	LK	pcs	K	pcs	K	pcs	K	pcs	K	pcs	Kwacha
1	A 1	213	163	3	489	2	326	2	326	-	-	7	1141
2	A 2	191	146	5	730	5	730	1	146	1	146	12	1752
3	A 3	82	63	1	63	-	-	-	-	-	-	1	63
4	A 4	150	115	6	690	3	345	1	150	-	-	10	1185
5	B 1	21	16	4	64	4	64	1	16	-	-	9	144
6	B 2	28	21	12	252	12	252	6	126	6	126	36	756
7	B 3	39	30	33	990	28	840	10	300	-	-	71	2130
8	B 4	30	23	1	23	1	23	1	23	1	23	3	69
9	B 5	43	33	-	-	-	-	-	-	-	-	-	-
10	B 6	59	45	-	-	-	-	-	-	-	-	-	-
11	B 7	52	40	18	720	19	760	10	400	6	210	53	2090
12	B 8	64	46	48	2160	28	1288	10	460	-	-	86	3910
13	B 9	30	23	1	23	1	23	1	23	-	-	3	69
14	B 10	60	46	2	92	2	92	-	-	-	-	4	184
15	B 11	166	128	5	640	5	640	5	640	3	384	18	2304
16	Metal revolving chair	14	11	19	203	12	129	6	64	2	22	39	418
17	Metal double door cabinet	53	40	2	81	-	-	-	-	-	-	2	81
18	Metal wardrobes	35	27	17	562	14	463	7	231	4	132	42	1388
19	Chair (metal)	8	6	17	108	14	84	7	42	4	24	42	258
20	Sitting room (complet)	450	346	1	346	-	-	-	-	-	-	1	346
21	Office furniture	400	307	1	307	-	-	-	-	-	-	1	307
22	Chair	15	12	4	46	4	46	4	46	4	46	16	184
	Total				8591		6105		2993		1090		18779

Schedule XI - 2

MANNING TABLE

Pharmacy Class	Function	Category							
		I	II	III	IV	V	VI	VII	VIII
A	Chief pharmacist	1							
	Deputy chief pharmacist		1						
	Chief of the sterilization department			1					
	Chief of the manufacturing department				1				
	Pharmacist					3			
	Pharmaceutical technician						14		
	Secretary							1	
	Helper								5
B	Chief pharmacist	1							
	Pharmacist					1			
	Pharmaceutical technician						4		
	Helper								1,5
C	Pharmacist	1							
	Pharmaceutical technician						2		
	Helper								1
D	Pharmaceutical technician						1		

Schedule XI - 3

ESTIMATE OF PRODUCTION COSTS - Salaries and wages

Pharmacy Class		Categories								
		I	II	III	IV	V	VI	VII	VII	
A	Number of employees	1	1	1	1	3	14	1	5	27
	Working months/year	12	12	12	12	12	12	12	12	
	Man-months/year	12	12	12	12	36	168	12	60	
	Salaries per month	700	600	600	600	500	300	150	100	
	Surcharge/53%/	371	318	318	318	265	159	79	53	
	Salaries per year	12852	11016	11016	11016	27540	77102	2748	9180	
B	Number of employees	1				1	4		1,5	7,5
	Working months/year	12				12	12		12	
	Man-months/year	12				12	48		18	
	Salaries per month	700				500	300		100	
	Surcharge/53%/	371				265	159		53	
	Salaries per year	12852				9180	22032		2751	
C	Number of employees					1	2		1	4
	Working months/year					12	12		12	
	Man-months/year					12	24		12	
	Salaries per month					500	300		100	
	Surcharge/53%/					265	159		53	
	Salaries per year					9180	11016		1836	
D	Number of employees						1			1
	Working months/year						12			
	Man-months/year						12			
	Salaries per month						300			
	Surcharge/53%/						159			
	Salaries per year						5508			

Schedule XI - 4

SUMMARY SHEET - ESTIMATE OF PRODUCTION COSTS			
Salaries and wages per year /Kwacha/			
Pharmacy class	Unit cost/year	Number of units	Cost per all units/year
A	162470	3	487410
B	46818	9	421362
C	21032	3	63096
D	5508	57	313956
	Total	72	1285824

Schedule XI - 5

ESTIMATE OF [illegible] COST

Civil engineering works

Construction of Pharmacy Class A - D Pavillions

No	Number of units	Item description	Unit cost	Cost		
				Foreign $	Local K	Total K
1	3	Pharmacy Class A	60284 K	-	180853	180853
2	9	Pharmacy Class B	31644 K	-	284796	284796
3	3	Pharmacy Class C	19093 K	-	57279	57279
4	57	Pharmacy Class D	9304 K	-	530328	530328
			Total			1053255

Schedule XI - 6

ESTIMATE OF INVESTMENT COST

Equipment

Pharmacy Class A - D

No	Number of units	Item description	Unit cost	Cost		
				Foreign $	Local K	Total K
1	3	Pharmacy Class A	269285 $	807855	-	616392
2	9	Pharmacy Class B	89512 $	805608	-	614682
3	3	Pharmacy Class C	21981 $	65943	-	50313
4	57	Pharmacy Class D	2456 $	139992	-	106818
			Total			1388205

Schedule XI - 7

ESTIMATE OF INVESTMENT COST

Sectional laboratory furniture

Pharmacy Class A - D

No	Number of units	Item description	Unit cost	Cost		
				Foreign $	Local K	Total K
1	3	Pharmacy Class A	8591 K	-	25773	25773
2	9	Pharmacy Class B	6105 K	-	54945	54945
3	3	Pharmacy Class C	2993 K	-	8979	8979
4	57	Pharmacy Class D	1090 K	-	62130	62130
		Total				151827

Schedule XI - 6

SUMMARY SHEET - Civil engineering works, equipment, laboratory furniture

No	Item description	Cost		
		Foreign $	Local K	Total K
1	Pharmacy Class A	269285	56375	274570
2	Pharmacy Class B	89512	37749	108047
3	Pharmacy Class C	21981	22085	38510
4	Pharmacy Class D	2456	10394	12203
	Total	-	-	-

Schedule XI - 9

SUMMARY SHEET - Civil engineering works, equipment, sectional furniture				
No	Item description	Cost		
		Foreign $	Local K	Total K
1	3 Pharmacies Class A	807855	206636	823018
2	9 Pharmacies Class B	805608	339741	954423
3	3 Pharmacies Class C	65943	66256	116571
4	57 Pharmacies Class D	139992	592458	699276
	Total			2593288

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

FEASIBILITY STUDY ON LOCAL MANUFACTURE OF DRUGS IN ZAMBIA

ANNEX 1.

POLYTECHNA SPOFA

PRAGUE - CZECHOSLOVAKIA 1981

UNITED NATIONS

INDUSTRIAL DEVELOPMENT ORGANIZATION

DRAFT FINAL REPORT

FEASIBILITY STUDY ON LOCAL MANUFACTURE OF DRUGS IN ZAMBIA

ANNEX 1.

Project No. DP/ZAM/78/008

POLYTECHNA SPOFA

PRAGUE - CZECHOSLOVAKIA

DECEMBER 1980

I. E X E C U T I V E S U M M A R Y

II. PROJECT BACKGROUND AND HISTORY

III. MARKET AND PLANT CAPACITY

Table III/1

Freqency analysis of diseases (1977)

No.	Diagnosis	%	Hospitals			Health Centres			Grand total
			in-patients	out-patients	total	in-patients	out-patients	total	
1.	Respiratory diseases	18,83	42529	491101	533630	24131	1446065	1470196	2003786
2.	Digestive abdominal disorders	18,22	38414	487770	526184	24503	1388402	1412905	1939089
3.	Infections and Parasitic diseases, excluding gastroenteric and respiratory	11,78	10090	292603	302693	11400	939648	951048	1253741
4.	Injuries and accidents	9,50	37726	248943	296669	9575	714917	724492	1011161
5.	Diseases of skin	7,16	16668	172404	189072	6998	565772	572770	761942
6.	Malaria	6,50	42375	183390	225765	31381	434171	465552	691317
7.	Eye disorders	4,76	3487	127884	131371	3793	371934	375727	507098
8.	Ear disorders	2,14	1403	53624	55027	1034	171206	172240	227267
9.	Veneral diseases	1,52	2478	59664	62142	1309	98171	99480	161622
10.	Disorders of teeth	1,52	985	60061	61046	851	100056	100907	161953
11.	Genito-urinary diseases	1,21	18417	45307	63724	1729	63255	64984	128708
12.	Measles	1,05	19093	21756	40849	15121	56051	71172	112021
13.	Bilharzia	0,67	3330	19178	22508	2008	46755	48763	71271
14.	Malnutrition	0,58	10683	18204	28887	2968	30316	33284	62171

15.	Anaemia	0,51	10225	13045
16.	Whooping cough	0,28	1383	7503
17.	Tuberculosis	0,12	5838	1682
18.	Leprosy	0,02	792	357
19.	All other diseases	13,63	77851	444175
		100,00	343767	2748657

Table III/1 (cont.

23270	3232	27893	31125	54395
8886	1533	19065	20598	29484
7520	586	5113	5699	13219
1149	86	844	930	2079
522026	14902	914214	929116	1451142
3092424	157110	7393848	7550958	10.643 382

Selected drugs designed for industrial manufacture in Zambia and their relation to the most frequent diseases (see also Table III/1)

1. Respiratory diseases:	Aminophylline
	Codeine
	Ephedrine
	Salbutamol
	Pholcodine Linct.
	Belladona and Ephedrine Mixt.
2. Digestive/Abdominal Disorders:	Glycerine supp.
	Diphenoxylate
	Magnesium hydroxide Mixt.
	Propantheline
	Sodium bicarbonate
3. Injections/Parasitic Diseases (Excl. Gastroenteric & Respiratory):	Antibiotics
	Niridazole
	Piperazine
4. Diseases Skin:	Hydrocortizone
	Benzoic acid
	Benzyl benzoate
	Chlorhexedine
5. Malarie:	Chloroquine
	Pyrimethamine
6. Eye disordes:	Betamethazon
	Chloramphenicol
	Acetazolamid
7. Veneral disease:	Antibiotics
	Sulphonamides
8. Genito-urinary diseases:	Furosemide

9. Measles:	
10. Bilharzia:	Niridazole
11. Malnutrition:	Ascorbic acid Pyridoxine Vitamin capsules BPC
12. Anaemia:	Ferrous sulphate Folic acid
13. Whooping cough:	
14. Tuberculosis:	Isoniazid Thiacetazone
15. Leprosy:	Dapsone

Table III/3

Verification of the number of drugs given against the number of diseases reported

1) Number of newly reported cases of malaria

1975 - 597 000

1977 - 691 320

1979 - 620 000

Number of drug doses in tablets 32 927 000 (Chloroquinine, Darprin, Quinine)

in ampoules 907 000

33 834 000

Assuming an average yearly treatment with 55 doses each = 615 200 patients (615 163)

2) Number of respiratory diseases

1975 - 1 353 650

1977 - 1 913 400

1979 - 2 100 000

Number of drug doses per 1 treatment - 20;

Number of doses consumed - 37 883 000, i.e. for ca 1 895 000 patients (1 894 150)

From the above figures it is evident that the drugs consumed correspond with the published statistics of the sickness rate (Reports for the years 1973 - 1977, Ministry of Health, Zambia).

Table III/4

The selection of WHO essential drugs

accordiny to WHO - Geneva 1977 (for purposes of Zambia)

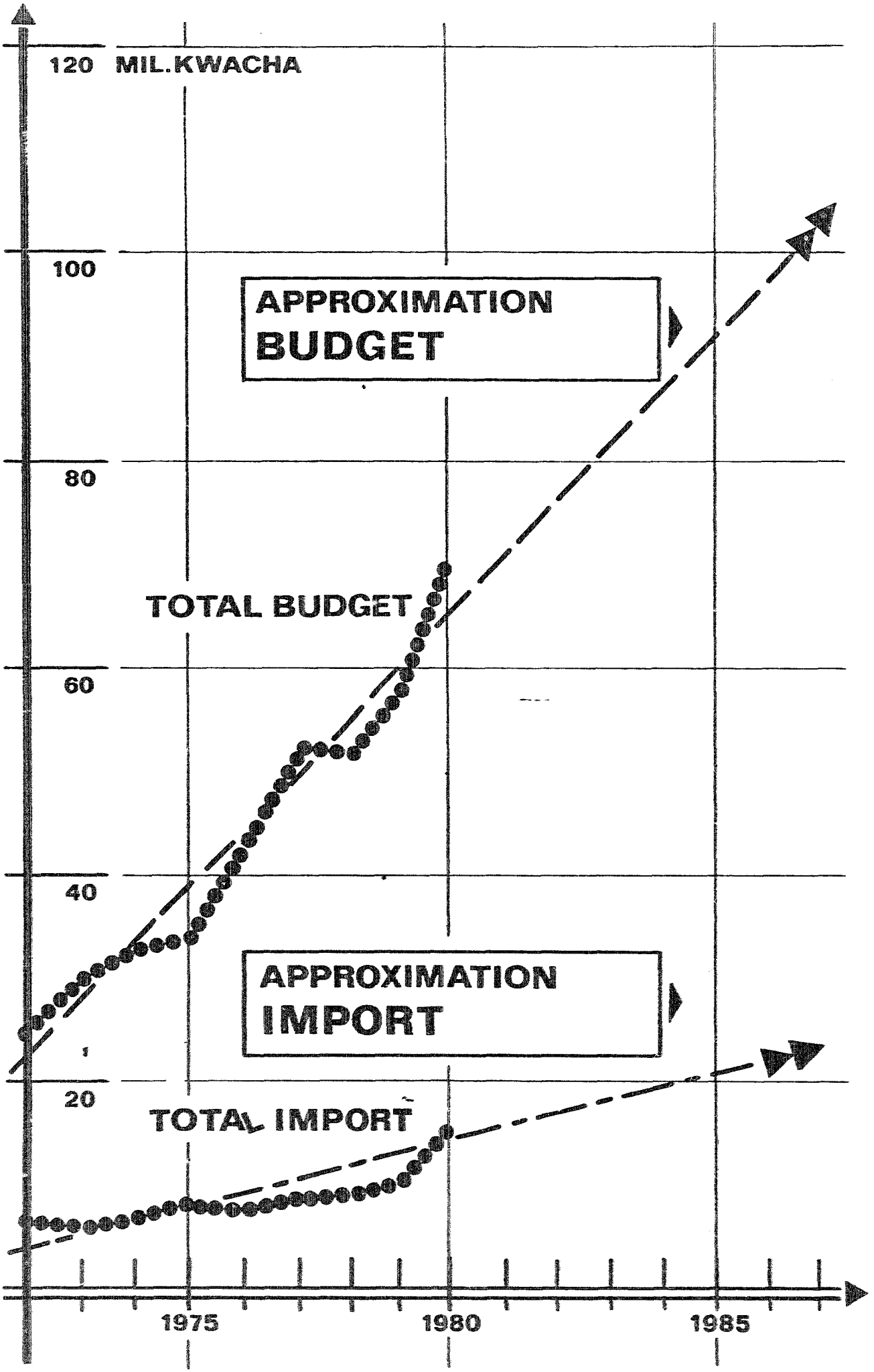
Analgesics, antipyretics	
	Acetylsalicylic acid
	Paracetamol
Antiinfective drugs	
Anthelmintic drugs	
	Piperazin
Antibacterial drugs	
	Ampicillin
	Benzylpenicillin
	Chloramphenicol
	Tetracyclin
	Sulfadimidine
Antileprotic drugs	
	Dapsone
Antiprotozozoal drugs	
Amoebicides	
	Metronidazol
Antimalarials	
	Chloroquin
	Pyrimethamine
Antischistosomals	
	Niridazole
Antitubeculosis drugs	
	Thiacetazon
	Isoniazid
Systematic antifungal drugs	
	Griseofulvin
Antiepileptics	
	Phenobarbital
Antiparkinsonism drugs	
	Trihexyphenidyl
Blood and Haematopoietic System Drugs	
Antianaemia drugs	
	Ferrous sulphate
	Folic acid

Table III/4 (cont.)

Cardiovascular drugs	
Antihypertensive drugs	Methyldopa
Cardiac glykosides	Digoxin
Antiarrhytmic drugs	Guinidine
Dermatological Preparations	
Antiinflammatory drugs	Hydrocortisone
Keratoplastic agent	Benzoic acid
Scabicides	Benzyl Benzoate
Diuretics	Furosemid Moduretic
Gastrointestinal Drugs	Diphenoxylate Propanthelin
Antiemetics	Promethazin
Hormones	Prednisolone
Ophtalmological Preparations	
Antiinfective	Sulfacetamid Betamethazone Chloramphenicol
Systemic	Acetazolamid
Psychoterapeutic Drugs	Amitryptilin Chlorpromazin Diazepam

Table III/4 (cont.)

Respiratory tract, drugs acting on the	
Antiasthmatic Drugs	Salbutamol Ephedrin Aminophylline
Antitussics	Codeine
Vitamines	Ascorbic acid Vitamin B compl. Pyridoxine


120 MIL.KWACHA
100
80
60
40
20
APPROXIMATION
BUDGET
TOTAL BUDGET
APPROXIMATION
IMPORT
TOTAL IMPORT
1975
1980
1985

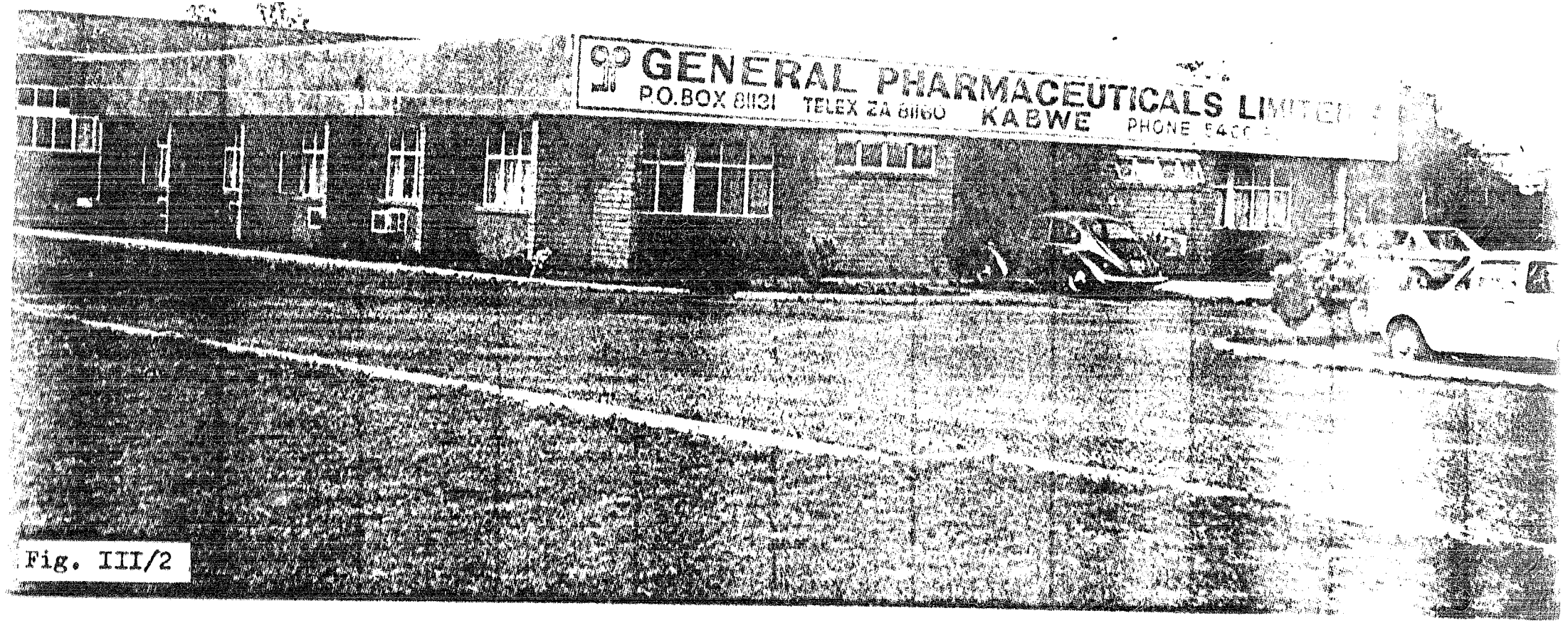
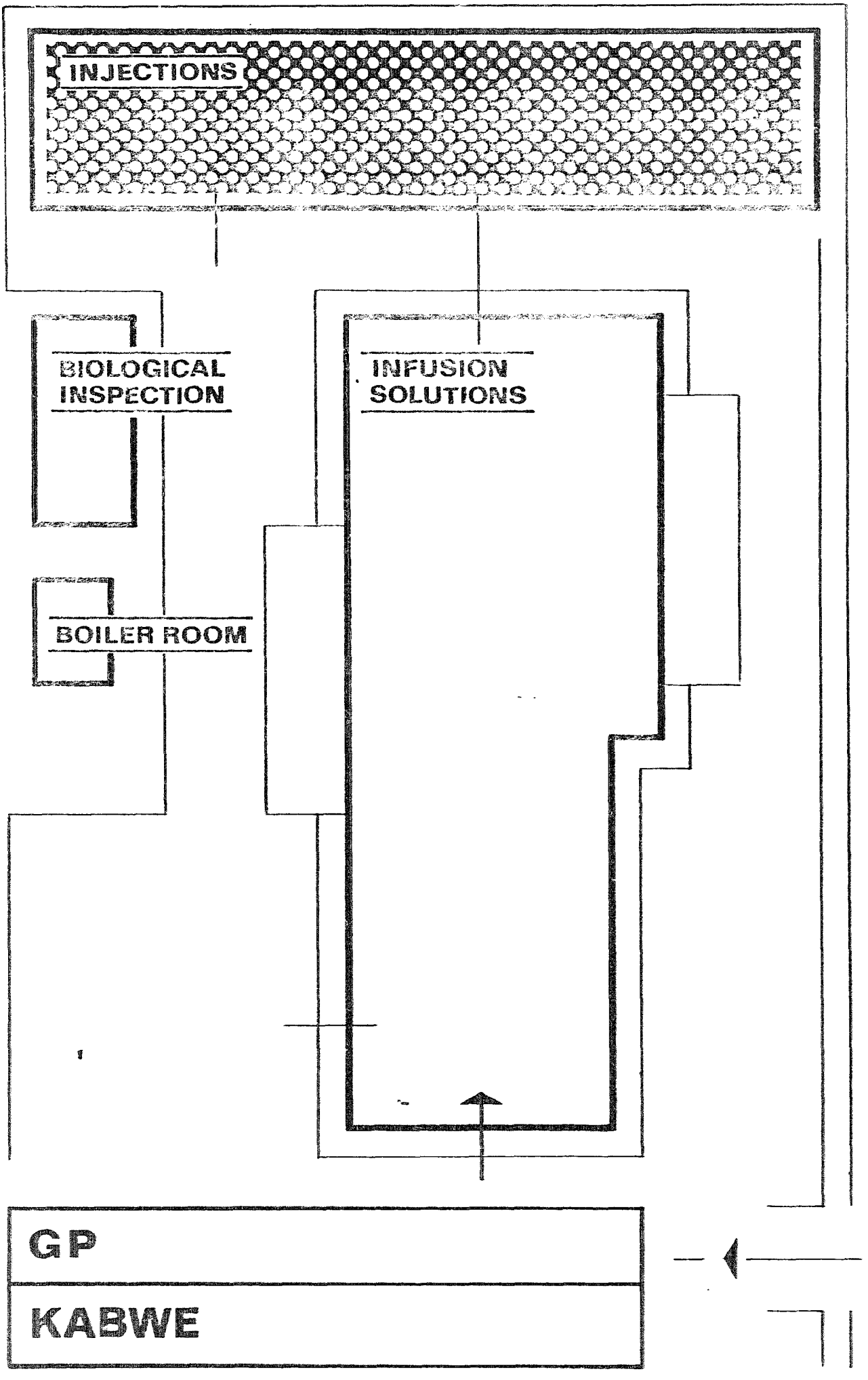


Fig. III/2


INJECTIONS
BIOLOGICAL INSPECTION
INFUSION SOLUTIONS
BOILER ROOM
GP
KABWE

IV. MATERIALS AND INPUTS

Table IV/1 Computer results

```
B1      T=00004 IS ON CR00002 USING 00005 BLKS R=0034

0001  FTN4
0002        PROGRAM GR011(),TRIDENI NOREM A PRIPRAVKU
0003  C
0004  C*****************************************************************************
0005  C
0006  C     PROGRAM FOR SORTING WORK FILES
0007  C     ING. J. NEZBEDA,ING. J. STRASIK
0008  C     RESEARCH INSTITUTE FOR PHARMACY AND BIOCHEMISTRY,PRAGUE
0009  C
0010  C*****************************************************************************
0011  C
0012        DIMENSION IDCB(144),NS1(18),NS2(18)
0013  C
0014        DATA NS1/2HGR,2HPR,2HPO,2HGR,101,0,2HGR,2HPR,2HIP,2HGR,101,3,
0015       *101,1,
0016       *1,1HV,1,3/
0017        DATA NS2/2HGR,2HSU,2HPO,2HGR,101,0,2HGR,2HSU,2HRO,2HGR,101,3,
0018       *101,1,
0019       *1,1HV,1,2/
0020  C
0021        CALL PURGE(IDCB,IER,6HSRTPOM,2HSR,101)
0022        CALL NAMF(IDCB,IER,6HGRPRIP,6HGRPRPO,2HGR,101)
0023        J=0
0024        CALL EXEC(20,0,NS1,18,I,I,J)
0025        CALL EXEC(23,6HSORT  ,-1,J)
0026        CALL PURGE(IDCB,IER,6HGRPRPO,2HGR,101)
0027  C
0028        CALL NAMF(IDCB,IER,6HGRSURO,6HGRSUPO,2HGR,101)
0029        J=0
0030        CALL EXEC(20,0,NS2,18,I,I,J)
0031        CALL EXEC(23,6HSORT  ,-1,J)
0032        CALL PURGE(IDCB,IER,6HGRSUPO,2HGR,101)
0033        STOP 77
0034        END
0035        END$
0036  ^
```

```
B2     T=00004 IS ON CR00002 USING 00009 BLKS R=0063

0001  FTN4
0002        PROGRAM GR012(),TISK NOREM PRIPRAVKU
0003  C
0004  C*****************************************************************
0005  C     PROGRAM FOR PRINT NEED OF MATERIALS FOR PREPARING
0006  C     OF 1 UNIT FINAL PRODUCT
0007  C     AUTORS:  ING. J. NEZBEDA, ING. J. STRASIK
0008  C     RESEARCH INSTITUTE FOR PHARMACY AND BIOCHEMISTRY,PRAGUE
0009  C
0010  C*****************************************************************
0011  C
0012        DIMENSION IDCB(656),JDCB(656),INAME(3),JNAME(3),IBUF(60),JBUF(60)
0013       *INAZEV(20),JNAZEV(15)
0014        INTEGER THES,FORMA
0015        DOUBLE PRECISION POTRBA,CENAUS,CENAKW
0016        DOUBLE PRECISION TEXT(3)
0017        DATA IDCBS/640/,INAME/2HGR,2HPR,2HIP/
0018        DATA JNAME/2HGR,2HSU,2HRO/
0019        DATA TEXT/6HMIL.TB,6H100 KG,6H100 L /
0020  C
0021        N=0
0022        CALL OPEN(IDCB,IER,INAME,0,2HGR,101,IDCBS)
0023        CALL ERROR(IER,IPR,1)
0024        CALL OPEN(JDCB,IER,JNAME,0,2HGR,101,IDCBS)
0025        CALL ERROR(IER,IPR,2)
0026  C
0027  10    N=N+1
0028        CALL SFILL(IBUF,1,120,40B)
0029        CALL READF(IDCB,IER,IBUF,60,LEN)
0030        IF(LEN.EQ.-1)GO TO 7777
0031        CALL ERROR(IER,IPR,3)
0032        CALL CODE
0033        READ(IBUF,1000)ICIS,THES,IJED,POTRBA,INAZEV
0034        WRITE(6,1001)ICIS,INAZEV,THES,TEXT(IJED),POTRBA
0035        WRITE(6,1004)
0036        IF(N.GT.1)GO TO 21
0037  20    CALL SFILL(JBUF,1,120,40B)
0038        CALL READF(JDCB,IER,JBUF,60,JEN)
0039        IF(JEN.EQ.-1)GO TO 7777
0040        CALL ERROR(IER,IPR,4)
0041        CALL CODE
0042        READ(JBUF,1002)JCIS,IPOR,KAT,JEDMNO,IAGR,NORMA,
0043       *CENAUS,CENAKW,JNAZEV
0044        CENAUS=CENAUS/14.32
0045  21    IF(JCIS.EQ.ICIS)GO TO 30
0046        GO TO 10
0047  30    WRITE(6,1003)IPOR,JNAZEV,KAT,IAGR,NORMA,JEDMNO,CENAUS,CENAKW
0048        GO TO 20
0049  7777  CALL CLOSE(IDCB)
0050        CALL CLOSE(JDCB)
0051        STOP 77
0052  1000  FORMAT(I3,2I2,F7.2,X,20A2)
0053  1001  FORMAT(1H1//,2X,"NO"3X"NAME OF THE FINAL PRODUCT"15X,
0054       *"GROUP"4X"UNIT"4X"NEED 1980"/
0055       *2X,72"-"/2X,I3,3X,20A2,I3,5X,A6,F12.2//)
0056  1002  FORMAT(2I3,3I2,F7.2,2F9.2,X,15A2)
0057  1003  FORMAT(I5,4X,15A2/25X,I3,I10,F11.2,I5,F8.2,F11.2)
0058  1004  FORMAT(2X"NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL "
0059       *"PRODUCTS:"/2X,72"="//
0060       *2X"NO"4X"NAME"13X,
0061       *"CATE-"4X"AGRE-"6X"NEED"2X"UNIT"6X"UNIT PRICE"/
0062       *25X"GORY"5X"GATION"17X"[US $]    [KWACHE]"
0063       */2X,72"="/)
```

```
83     T=00004 IS ON CR00002 USING 00008 BLKS R=0058

0001  FTN4
0002        PROGRAM GR013(),SPOJENI NOREM A PRIPRAVKU
0003  C
0004  C*****************************************************************************
0005  C
0006  C     PROGRAM FOR CONNECTION MATERIAL FILE WITH FILE OF FINAL
0007  C     PRODUCT
0008  C     ING. J. NEZBEDA, ING. J. STRASIK
0009  C     RESEARCH INSTITUTE FOR PHARMACY AND BIOCHEMISTRY PRAGUE
0010  C     -GRPRIP:GR:101- DO SOUBORU -GRSPOJ:GR:101-
0011  C
0012  C*****************************************************************************
0013  C
0014        DIMENSION IDCB(656),JDCB(656),KDCB(656),IBUF(32),JBUF(75)
0015        DIMENSION INAME(3),JNAME(3),KNAME(3),ISIZE(2)
0016        DATA IDCBS/640/,ISIZE/48,0/
0017        DATA INAME/2HGR,2HPR,2HIP/
0018        DATA JNAME/2HGR,2HSU,2HRO/
0019        DATA KNAME/2HGR,2HSP,2HOJ/
0020  C
0021        CALL PURGE(KDCB,IER,KNAME,2HGR,101)
0022        CALL CREAT(KDCB,IER,KNAME,ISIZE,3,2HGR,101,IDCBS)
0023        CALL ERROR(IER,IPR,1)
0024        CALL OPEN(IDCB,IER,INAME,0,2HGR,101,IDCBS)
0025        CALL ERROR(IER,IPR,2)
0026        CALL OPEN(JDCB,IER,JNAME,0,2HGR,101,IDCBS)
0027        CALL ERROR(IER,IPR,3)
0028        CALL OPEN(KDCB,IER,KNAME,0,2HGR,101,IDCBS)
0029        CALL ERROR(IER,IPR,4)
0030  C
0031  C---------  CTENI PRIPRAVKU
0032  C
0033    10  N=N+1
0034        CALL SFILL(IBUF,1,64,40B)
0035        CALL READF(IDCB,IER,IBUF,32,LEN)
0036        IF(LEN.EQ.-1)GO TO 7777
0037        CALL CODE
0038        READ(IBUF,1000)ICIS
0039  1000  FORMAT(I3)
0040        IF(N.GT.1)GO TO 21
0041  C
0042  C-----------    CTENI SUROVIN
0043  C
0044   20   CALL SFILL(JBUF,1,150,40B)
0045        CALL READF(JDCB,IER,JBUF,40,JEN)
0046        IF(JEN.EQ.-1)GO TO 7777
0047        CALL ERROR(IER,IPR,10)
0048        CALL CODE
0049        READ(JBUF,1000)JCIS
0050  21    IF(JCIS.EQ.ICIS)GO TO 30
0051        GO TO 10
0052  30    CALL SMOVE(IBUF,5,55,JBUF,69)
0053        CALL WRITF(KDCB,IER,JBUF,62)
0054        GO TO 20
0055  7777  CALL CLOSE(IDCB)
0056        CALL CLOSE(JDCB)
0057        CALL CLOSE(KDCB)
0058        STOP 77
0059        END
0060        ENDS
```

```
B4      T=00004 IS ON CR00002 USING 00004 BLKS R=0025

0001  FTN4
0002        PROGRAM GR014(),TRIDENI SPOJ. SOUBORU
0003  C
0004  C*****************************************************************************
0005  C     PROGRAM FOR SORTING OF MATERIAL FILE
0006  C
0007  C     ING. J. NEZBEDA, ING. J. STRASIK
0008  C     RESEARCH INSTITUTE FOR PHARMACY AND BIOCHEMISTRY, PRAGUE
0009  C
0010  C*****************************************************************************
0011  C
0012        DIMENSION IDCB(144),NS(22)
0013  C
0014        DATA NS/2HGR,2HHE,2HLP,2HGR,101,0,2HGR,2HSP,2HOJ,2HGR,101,3,
0015       *101,2,
0016       *1,1HV,20,15,
0017       *1,1HV,1,2/
0018  C
0019        CALL PURGE(IDCB,IER,6HSRTPGM,2HSR,101)
0020        CALL NAMF(IDCB,IER,6HGRSPOJ,6HGRHELP,2HGR,101)
0021  C
0022        J=0
0023        CALL EXEC(20,0,NS,22,I,I,J)
0024        CALL EXEC(23,6HSORT  ,-1,J)
0025        CALL PURGE(IDCB,IER,6HGRHELP,2HGR,101)
0026        STOP 77
0027        END
0028        END$
```

```
85     T=00004 IS ON CR00002 USING 00029 BLKS R=0214

0001  FTN4
0002        PROGRAM GR015(),VYVOJ SPOTREBY DO R. 2000
0003  C
0004  C*****************************************************************************
0005  C
0006  C     THIS PROGRAM IS DESIGNED FOR CALCULATION AND PRINT
0007  C     NEEDS OF MATERIALS TO YEAR 2000 FOR FARMACEUTICAL
0008  C     INDUSTRY IN REPUBLIC OF ZAMBIA
0009  C     IN COMPUTER HP 1000
0010  C     AUTORS: ING. J. NEZBEDA, ING. J. STRASIK
0011  C             RESEARCH INSTITUTE FOR PHARMACY AND BIOCHEMISTRY
0012  C             PRAGUE, CSSR
0013  C*****************************************************************************
0014  C
0015        DIMENSION IDCB(656),NAME1(3),NAME2(3),IBUF(75)
0016        REAL KOEF(10,9)
0017        INTEGER THES,SLOVA(3)
0018        DIMENSION NAZEV(15),NPRIP(15),NAZOLD(15)
0019        DOUBLE PRECISION SUMA(9),SSUMA(9),SOUC(9),SSOUC(9)
0020        DOUBLE PRECISION CENAUS,CENAKW,NORMA,POTRBA
0021        DOUBLE PRECISION VAHA(9),MNOZ(9)
0022        DOUBLE PRECISION IMPORT(9,5),TUZEM(9,5),SUCIN(9,2),SPOM(9,2)
0023        DOUBLE PRECISION TEXT(5)
0024        DOUBLE PRECISION SKOR1(9),SKOR2(9)
0025        COMMON NORAD,NUSTR,ILP
0026  C
0027        DATA NAME1/2HGR,2HKO,2HEF/,NAME2/2HGR,2HSP,2HOJ/
0028        DATA IDCBS/640/
0029        DATA IMPORT,TUZEM,SUCIN,SPOM/126*000/
0030        DATA TEXT/6HMIL.TB,6H100 KG,6H100 L /
0031        DATA SLOVA/2HKG,2H  ,2HLT/
0032        CALL RMPAR(IDCB)
0033        ILP=IDCB(1)
0034        IF(ILP.EQ.0)ILP=6
0035  C
0036  C------      NACTENI TABULKY KOEFICIENTU
0037  C
0038        K=0
0039        K=0
0040        CALL ERROR(IER,IPR,1)
0041  10    CALL SFILL(IBUF,1,150,40B)
0042        CALL READF(IDCB,IER,IBUF,75,LEN)
0043        IF(LEN.EQ.-1)GO TO 11
0044        K=K+1
0045        CALL CODE
0046        READ(IBUF,*)(KOEF(K,I),I=1,9)
0047        GO TO 10
0048  C
0049  C------      OTEVRENI SOUBORU SPOJENYCH NOREM
0050  C
0051  11    CALL CLOSE(IDCB)
0052        N=0
0053        KONEC=0
0054        N1=0
0055        NORAD=100
0056        CALL OPEN(IDCB,IER,NAME2,0,2HGR,101,IDCBS)
0057  20    N=N+1
0058        CALL SFILL(IBUF,1,150,40B)
0059        CALL READF(IDCB,IER,IBUF,75,LEN)
0060        IF(LEN.EQ.-1)GO TO 7777
0061        CALL ERROR(IER,IPR,10)
0062        CALL CODE
0063        READ(IBUF,1001)ICIS,IPUR,KAT,JEDMNO,IAGR,NORMA,CENAUS,CENAKW,
```

```
0065          CENAUS=CENAUS/14.32
0066    C     IF(THES.GT.K)WRITE(1,1000)N
0067          IF(N.EQ.1)GO TO 40
0068    C
0069    C-------      ZMENA NAZVU SUROVINY ?
0070    C
0071          DO 25 I=1,15
0072          IF(NAZEV(I).NE.NAZOLD(I))GO TO 30
0073    25    CONTINUE
0074          GO TO 50
0075    C
0076    C------------      TISK SOUCTU ZA SUROVINU
0077    C
0078     30   CALL PAGE
0079          IF(SOUC(1).LT.1D-1)GO TO 35
0080          WRITE(ILP,1004)VAHA,SOUC
0081          GO TO 36
0082    35    WRITE(ILP,1006)VAHA,SUMA
0083    36    CONTINUE
0084          NORAD=NORAD+5
0085    32    DO 31 I=1,9
0086          IF(KONEC.EQ.1)GO TO 33
0087          SSUMA(I)=SSUMA(I)+SUMA(I)
0088          SSOUC(I)=SSOUC(I)+SOUC(I)
0089    C
0090    C-------   BLOK PRO SUMACE
0091    C
0092    33    GO TO(100,200)KATOLD
0093    100   SUCIN(I,1)=SUCIN(I,1)+SUMA(I)
0094          SUCIN(I,2)=SUCIN(I,2)+SOUC(I)
0095          GO TO 300
0096    200   SPUM(I,1)=SPUM(I,1)+SUMA(I)
0097          SPUM(I,2)=SPUM(I,2)+SOUC(I)
0098    300   IF(SOUC(I).LT.1D-3)GO TO 310
0099          TUZEM(I,IAGOLD)=TUZEM(I,IAGOLD)+VAHA(I)
0100          TUZEM(I,5)=TUZEM(I,5)+SOUC(I)
0101          GO TO 320
0102    310   IMPORT(I,IAGOLD)=IMPORT(I,IAGOLD)+VAHA(I)
0103          IMPORT(I,5)=IMPORT(I,5)+SUMA(I)
0104    320   IF(KONEC.EQ.1)GO TO 7778
0105          SUMA(I)=0D0
0106          SOUC(I)=0D0
0107    31    VAHA(I)=0D0
0108    40    N1=N1+1
0109          IF(NORAD.LT.55)GOTO 55
0110          NORAD=100
0111       55, CALL PAGE
0112          WRITE(ILP,1002)N1,NAZEV,KAT,IAGR,SLOVA(JEDMNO),CENAUS,CENAKW
0113          NORAD=NORAD+5
0114    50    DO 51 I=1,9
0115          SUMA(I)=SUMA(I)+CENAUS*POTRBA*NORMA*KOEF(THES,I)
0116          SOUC(I)=SOUC(I)+CENAKW*POTRBA*NORMA*KOEF(THES,I)
0117          VAHA(I)=VAHA(I)+NORMA*POTRBA*KOEF(THES,I)
0118    51    MNOZ(I)=NORMA*POTRBA*KOEF(THES,I)
0119          CALL PAGE
0120          WRITE(ILP,1003)ICIS,NPRIP,MNOZ,THES,TEXT(IJED),POTRBA,NORMA
0121          NORAD=NORAD+2
0122          CALL SMOVE(NAZEV,1,30,NAZOLD,1)
0123          KATOLD=KAT
0124          IAGOLD=IAGR
0125          GO TO 20
0126    7777  CALL PAGE
0127          IF(SOUC(1).LT.1D-1)GO TO 7800
0128          WRITE(ILP,1004)VAHA,SOUC
```

```
7801  NORAD=NORAD+5
      DO 60 I=1,9
      SSUMA(I)=SSUMA(I)+SUMA(I)
60    SSOUC(I)=SSOUC(I)+SOUC(I)
      KONEC=1
      GO TO 32
7778  CALL PAGE
      WRITE(ILP,1005)SSUMA,SSOUC
      DO 9000 I=1,9
      SKOR1(I)=SUCIN(I,1)/1.31
      SKOR2(I)=SPOM(I,1)/1.31
9000  SSOUC(I)=SSOUC(I)+SSUMA(I)/1,31
      WRITE(ILP,1015)SSOUC
      CALL CLOSE(IDCB)
C
C------     TISK TABULKY
C
      WRITE(6,1007)
      WRITE(6,1008)SUCIN
      WRITE(6,1015)SKOR1
      WRITE(6,1009)SPOM
      WRITE(6,1015)SKOR2
      WRITE(6,1010)
      WRITE(6,1012)((IMPORT(I,J),I=1,9),J=1,4)
      WRITE(6,1013)(IMPORT(I,5),I=1,9)
      WRITE(6,1011)
      WRITE(6,1012)((TUZEM(I,J),I=1,9),J=1,4)
      WRITE(6,1014)(TUZEM(I,5),I=1,9)
      CALL EXEC(3,1106B,-1)
      STOP 77
1001  FORMAT(2I3,2I2,I2,F7.2,2F9.2,X,15A2,8X,2I2,F7.2,X,15A2)
1002  FORMAT(///X,I3,X,15A2/6X,2I2,4X,A2,2F10.1/X,135"-")
1003  FORMAT(7X,I3,X,15A2,3X,9F10.1/10X,I3,2X,A6,2F8.2)
1004  FORMAT(X,135"-"/X"TOTAL  UNIT"T45,9F10.1/
     *X"TOTAL KWACH"T45,9F10.1/X,T45,90"=")
1005  FORMAT(//X,135"*"/X"TOTAL  US $"T45,9I10/X"TOTAL KWACH"T45,
     *9I10)
1016  FORMAT(X,135"*")
1006  FORMAT(X,135"-"/X"TOTAL UNIT"T45,9F10.1/X"TOTAL US $"T45,9I10,
     */X,T45,90"=")
1007  FORMAT(1H1///50X"TOTAL MATERIAL SHOW"/
     +X,135"-"/X,T51"1980",T61"1985",T71"1986",T81"1987"T91"1988"
     +T101"1989",T111"1990"T121"1995"T131"2000"/X,135"="//)
1008  FORMAT(5X"RAW MATERIALS"
     +/10X"TOTAL [ US $ ]"T45,9I10/
     +10X"TOTAL [KWACHA]"T45,9I10)
1009  FORMAT(5X"AUXILIERY MATERIALS"/
     +10X"TOTAL [ US $ ]"T45,9I10/
     +10X"TOTAL [KWACHA]"T45,9I10)
1010  FORMAT(//5X"IMPORT MATERIALS"/)
1012  FORMAT(10X"IN LOOSE"T25"KG"T45,9I10/
     +10X"IN FLUID"T25"L"T45,9I10/
     +10X"OINTMENT"T25"KG"T45,9I10/
     +10X"COMBUSTIBLES"T25"L"T45,9I10//)
1011  FORMAT(///5X"DOMESTIC MATERIALS"/)
1013  FORMAT(/10X"TOTAL   [ US $ ]"T45,9I10)
1014  FORMAT(/10X"TOTAL   [KWACHA]"T45,9I10)
1015  FORMAT(/10X"TOTAL US$+KWACHA IN KWACHAS"T45,9I10/45X,90"-"//)
      END
C
C=============================================================================
C
      SUBROUTINE PAGE
      COMMON NORAD,NOSTR,ILP
      IF(NORAD.LT.60)RETURN
      NOSTR=NOSTR+1
```

```
0197          WRITE(ILP,100)NDSTR
0198   100    FORMAT(1H1,//X,T50"TOTAL NEED OF MATERIALS"T127"PAGE"I4/
0199         +X,135"-"/2X"NO NAME OF THE MATERIAL"T51"1980",T61"1985"
0200         +T71"1986"T81"1987"T91"1988"T101"1989"T111"1990"T121"1995"
0201         +T131"2000"/X,135"="/)
0202          NOKAD=7
0203          RETURN
0204          END
0205          END$
```

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
1	ACETAZOLAMIDE TBL. 250 MG	1	MIL.TB	11.35

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	ACETAZOLAMIDE	1	1	252.00	1	34.92	0.00
2	MAIZE STARCH	2	1	51.00	1	0.00	1.19
3	TALK	2	1	5.00	1	0.00	1.11
4	MAGNESIUM STEARATE	2	1	2.00	1	1.96	0.00
5	MILK SUGAR	2	1	197.00	1	.98	0.00

NO	NAME OF THE FINAL PRODUCT
2	ASCONBIC ACID TBL. 50 MG

NEED OF MATERIALS FOR PREPARING OF 1 UNIT

NO	NAME	CATE-GORY	AGRE-GATION
1	ASCORBIC ACID	1	1
2	MILK SUGAR	2	1
3	MAIZE STARCH	2	1
4	GELATINE	2	1
5	CASTOR OIL	2	2
6	TALK	2	1
7	ALUMINIUM STEARATE	2	1

GROUP	UNIT	NEED 1980
2	MIL.TB	8.00

FINAL PRODUCTS:

NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
50.00	1	10.47	0.00
35.00	1	.98	0.00
32.00	1	0.00	1.19
23.00	1	3.24	0.00
1.00	1	5.73	0.00
3.00	1	0.00	1.11
0.00	1	1.75	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
3	ASCORBIC ACID TBL. 200 MG	2	MIL.TB	7.10

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	ASCORBIC ACID	1	1	203.00	1	10.47	0.00
2	MILK SUGAR	2	1	140.00	1	.98	0.00
3	MAIZE STARCH	2	1	130.00	1	0.00	1.19
4	GELATINE	2	1	9.00	1	3.24	0.00
5	CASTOR OIL	2	2	4.00	1	5.73	0.00
6	TALK	2	1	12.00	1	0.00	1.11
7	ALUMINIUM STEARATE	2	1	0.00	1	1.75	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
4	ASPIRIN TBL. 300 MG	1	MIL.TB	34.00

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	ACETYLOSALIC. ACID	1	1	302.00	1	1.22	0.00
2	MAIZE STARCH	2	1	47.00	1	0.00	1.19
3	TALK	2	1	20.00	1	0.00	1.11

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
5	AMITRIPTYLIN TBL. 10 MG	1	MIL.TB	.31

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE [US $]	UNIT PRICE [KWACHE]
1	AMITRIPTYLIN HCL	1	1	10.00	1	74.79	0.00
2	MILK SUGAR	2	1	85.00	1	.98	0.00
3	MAIZE STARCH	2	1	20.00	1	0.00	1.19
4	GELATINE	2	1	2.00	1	3.24	0.00
5	CALCIUM STEARATE	2	1	1.00	1	1.82	0.00
6	TALK	2	1	1.00	1	0.00	1.11
7	AEROSIL 200	2	2	0.00	1	4.32	0.00
8	METHYLCELULOSE	2	1	2.00	1	8.66	0.00
9	METHYLENCHLORID	2	2	90.00	1	.54	0.00
10	ISOPROPYLALCOHOL	2	4	90.00	1	.70	0.00

NO	NAME OF THE FINAL PRODUCT
6	AMITRIPTYLIN TBL. 25 MG

NEED OF MATERIALS FOR PREPARING

NO	NAME	CATE-GORY
1	AMITRIPTYLIN HCL	1
2	MILK SUGAR	2
3	MAIZE STARCH	2
4	GELATINE	2
5	CALCIUM STEARATE	2
6	TALK	2
7	AEROSIL 200	2
8	METHYLCELULOSE	2
9	METHYLENCHLORID	2
10	ISOPROPYLALCOHOL	2

GROUP	UNIT	NEED 1980
1	MIL.TB	.75

OF 1 UNIT FINAL PRODUCTS:

AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	(KWACHE)
1	25.00	1	74.79	0.00
1	212.00	1	.98	0.00
1	52.00	1	0.00	1.19
1	5.00	1	3.24	0.00
1	4.00	1	1.82	0.00
1	4.00	1	0.00	1.11
2	0.00	1	4.32	0.00
1	4.00	1	8.66	0.00
2	180.00	1	.54	0.00
4	180.00	1	.70	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
7	CHLOROQUINE TBL. 250 MG	1	MIL.TB	31.30

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	CHLOROQUINE	1	1	252.00	1	4.89	0.00
2	MAIZE STARCH	2	1	51.00	1	0.00	1.19
3	TALK	2	1	5.00	1	0.00	1.11
4	MAGNESIUM STEARATE	2	1	2.00	1	1.96	0.00
5	MILK SUGAR	2	1	192.00	1	.98	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
8	CHLORPROMAZINE TBL. 10 MG	1	MIL.TB	.75

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE [US $]	UNIT PRICE [KWACHE]
1	CHLORPROMAZINE HCL	1	1	10.00	1	47.64	0.00
2	MAIZE STARCH	2	1	25.00	1	0.00	1.19
3	TALK	2	1	2.00	1	0.00	1.11
4	MAGNESIUM STEARATE	2	1	1.00	1	1.96	0.00
5	MILK SUGAR	2	1	96.00	1	.98	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
9	CHLORPROMAZINE TBL. 125 MG	1	MIL.TB	5.00

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	CHLORPROMAZINE HCL	1	1	126.00	1	47.64	0.00
2	MAIZE STARCH	2	1	30.00	1	0.00	1.19
3	TALK	2	1	3.00	1	0.00	1.11
4	MAGNESIUM STEARATE	2	1	1.00	1	1.96	0.00
5	MILK SUGAR	2	1	140.00	1	.98	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
10	CODEINE COMP. BPC TBL.	1	MIL.TB	14.10

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	CODEIN PHOSPHOR.	1	1	8.00	1	32.12	0.00
2	ACETYLOSALIC. ACID	1	1	251.00	1	1.22	0.00
3	PHENACETIN	1	1	251.00	1	1.30	0.00
4	TALK	2	1	6.00	1	0.00	1.11
5	MAGNESIUM STEARATE	2	1	3.00	1	1.96	0.00
6	PARAFINE	2	1	3.00	1	0.00	.93
7	PARAFINE	2	1	78.00	1	0.00	.93

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
11	COTRIMOXAZOL TBL. BP	3	MIL.TB	2.30

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	SULPHAMETHOXAZOL	1	1	402.00	1	148.04	0.00
2	TRIMETOPRIN	1	1	40.00	1	91.76	0.00
3	TALK	2	1	5.00	1	0.00	1.11
4	MAGNESIUM STEARATE	2	1	2.00	1	1.96	0.00
5	MAIZE STARCH	2	1	52.00	1	0.00	1.19

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
12	DAPSONE IBL. 10 MG	1	MIL.TB	1.75

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	DAPSONE	1	1	10.00	1	53.07	0.00
2	MILK SUGAR	2	1	85.00	1	.98	0.00
3	MAIZE STARCH	2	1	20.00	1	0.00	1.19
4	GELATINE	2	1	2.00	1	3.24	0.00
5	CALCIUM STEARATE	2	1	1.00	1	1.82	0.00
6	TALK	2	1	1.00	1	0.00	1.11
7	AEROSIL 200	2	2	0.00	1	4.32	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
13	DAPSONE TBL. 25 MG	1	MIL.TB	3.30

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	DAPSONE	1	1	25.00	1	53.07	0.00
2	MILK SUGAR	2	1	212.00	1	.98	0.00
3	MAIZE STARCH	2	1	52.00	1	0.00	1.19
4	GELATINE	2	1	5.00	1	3.24	0.00
5	CALCIUM STEARATE	2	1	4.00	1	1.82	0.00
6	TALK	2	1	4.00	1	0.00	1.19
7	AEROSIL 200	2	2	0.00	1	4.32	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
14	DAPSONE TBL. 100 MG	1	MIL.TB	1.40

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	DAPSONE	1	1	102.00	1	53.07	0.00
2	MILK SUGAR	2	1	162.00	1	.98	0.00
3	MAIZE STARCH	2	1	30.00	1	0.00	1.19
4	GELATINE	2	1	1.00	1	3.24	0.00
5	CALCIUM STEARATE	2	1	1.00	1	1.82	0.00
6	TALK	2	1	3.00	1	0.00	1.11
7	AEROSIL 200	2	2	0.00	1	4.32	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
15	DIAZEPAM TBL. 2 MG	1	MIL.TB	3.75

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	DIAZEPAM	1	1	2.00	1	237.43	0.00
2	MAIZE STARCH	2	1	30.00	1	0.00	1.19
3	TALK	2	1	1.00	1	0.00	1.11
4	MAGNESIUM STEARATE	2	1	0.00	1	1.96	0.00
5	GELATINE	2	1	1.00	1	3.24	0.00
6	MILK SUGAR	2	1	114.00	1	.98	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
16	DIAZEPAM TBL. 5 MG	1	MIL.TB	3.55

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	DIAZEPAM	1	1	5.00	1	237.43	0.00
2	MAIZE STARCH	2	1	30.00	1	0.00	1.19
3	TALK	2	1	1.00	1	0.00	1.11
4	MAGNESIUM STEARATE	2	1	0.00	1	1.96	0.00
5	GELATINE	2	1	1.00	1	3.24	0.00
6	MILK SUGAR	2	1	111.00	1	.98	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
17	DIPHENOXYLATE TBL. 2,5 MG	1	MIL.TB	1.55

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	DIPHENOXYLATE	1	1	2.00	1	164.80	0.00
2	MAIZE STARCH	2	1	30.00	1	0.00	1.19
3	TALK	2	1	1.00	1	0.00	1.11
4	MAGNESIUM STEARATE	2	1	0.00	1	1.96	0.00
5	GELATINE	2	1	1.00	1	3.24	0.00
6	MILK SUGAR	2	1	114.00	1	.98	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
18	DIGOXIN TBL. 0.25 MG	1	MIL.TB	.80

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	DIGOXINE	1	1	0.00	1	3701.12	0.00
2.	MAIZE STARCH	2	1	30.00	1	0.00	1.19
3	TALK	2	1	1.00	1	0.00	1.11
4	MAGNESIUM STEARATE	2	1	0.00	1	1.96	0.00
5	GELATINE	2	1	1.00	1	3.24	0.00
6	MILK SUGAR	2	1	116.00	1	.98	0.00
7	CHLOROFORM	2	2	3.00	1	1.12	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
19	EPHEDRINE TBL. 30 MG	1	MIL.TB	3.25

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	EPHEDRINE CHLORID	1	1	30.00	1	36.31	0.00
2	MILK SUGAR	2	1	118.00	1	.98	0.00
3	MAGNESIUM STEARATE	2	1	2.00	1	1.96	0.00
4	MAIZE STARCH	2	1	17.00	1	0.00	1.19

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
20	FERROUS SULPHATE TBL. 200 MG	1	MIL.TB	4.60

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	FERROUS SULPHATE	1	1	203.00	1	1.82	0.00
2	TALK	2	1	2.00	1	0.00	1.11
3	MAGNESIUM STEARATE	2	1	1.00	1	1.96	0.00
4	GELATINE	2	1	1.00	1	3.24	0.00
5	MAIZE STARCH	2	1	42.00	1	0.00	1.19

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
21	FOLIC ACID TBL. 5 MG	2	MIL.TB	8.22

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	FOLIC ACID	1	1	5.00	1	111.73	0.00
2	MILK SUGAR	2	1	19.00	1	.98	0.00
3	MAIZE STARCH	2	1	5.00	1	0.00	1.19
4	GELATINE	2	1	0.00	1	3.24	0.00
5	TALK	2	1	0.00	1	0.00	1.11
6	CALCIUM STEARATE	2	1	0.00	1	1.82	0.00
7	METHYLCELULOSE	2	1	1.00	1	8.66	0.00
8	METHYLENCHLORID	2	2	40.00	1	.54	0.00
9	ISOPROPYLALCOHOL	2	4	40.00	1	.70	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
22	FUROSEMID TBL. 40 MG	1	MIL.TB	1.30

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	FUROSEMID	1	1	41.00	1	59.78	0.00
2	MILK SUGAR	2	1	26.00	1	.98	0.00
3	MAIZE STARCH	2	1	4.00	1	0.00	1.19
4	TALK	2	1	3.00	1	0.00	1.11
5	CALCIUM STEARATE	2	1	3.00	1	1.82	0.00
6	SOLUBLE STARCH	2	1	3.00	1	1.86	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
23	GRISEOFULVIN TBL. 125 MG	1	MIL.TB	1.10

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATEGORY	AGREGATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	GRISEOFULVIN	1	1	126.00	1	50.98	0.00
2	TALK	2	1	2.00	1	0.00	1.11
3	MAGNESIUM STEARATE	2	1	1.00	1	1.96	0.00
4	GELATINE	2	1	1.00	1	3.24	0.00
5	AEROSIL 200	2	2	0.00	1	4.32	0.00
6	MAIZE STARCH	2	1	25.00	1	0.00	1.19
7	MILK SUGAR	2	1	93.00	1	.98	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
24	ISONIAZID TBL. 100 MG	1	MIL.TB	.80

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	ISONIAZID	1	1	101.00	1	7.68	0.00
2	MAIZE STARCH	2	1	17.00	1	0.00	1.19
3	TALK	2	1	2.00	1	0.00	1.11
4	CALCIUM STEARATE	2	1	1.00	1	1.82	0.00
5	METHYLPARABENE	2	1	0.00	1	5.31	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
25	MAGNESIUM TRISILICATE TBL.	1	MIL.TB	12.80

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	MAGNESIUM TRISILIC.	1	1	252.00	1	2.43	0.00
2	ALUMINIUM HYDROXID	1	1	121.00	1	1.54	0.00
3	PEPPERMINT OIL	1	2	3.00	1	13.90	0.00
4	MAIZE STARCH	2	1	50.00	1	0.00	1.19
5	GELATINE	2	1	5.00	1	3.24	0.00
6	TALK	2	1	2.00	1	0.00	1.11
7	MAGNESIUM STEARATE	2	1	1.00	1	1.96	0.00
8	MILK SUGAR	2	1	64.00	1	.98	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
26	METHYLDOPA TBL. 250 MG	1	MIL.TB	.65

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	METHYLDOPA	1	1	252.00	1	49.58	0.00
2	MAIZE STARCH	2	1	25.00	1	0.00	1.19
3	GELATINE	2	1	1.00	1	3.24	0.00
4	TALK	2	1	2.00	1	0.00	1.19
5	MAGNESIUM STEARATE	2	1	1.00	1	1.96	0.00
6	MILK SUGAR	2	1	17.00	1	.98	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
27	METRONIDAZOL TBL. 200 MG	3	MIL.TB	1.70

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	METRONIDAZOL	1	1	201.00	1	23.60	0.00
2	MAIZE STARCH	2	1	101.00	1	0.00	1.19
3	MILK SUGAR	2	1	173.00	1	.98	0.00
4	GELATINE	2	1	4.00	1	3.24	0.00
5	TALK	2	1	4.00	1	0.00	1.11
6	MAGNESIUM STEARATE	2	1	4.00	1	1.96	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
28	NIRIDAZOLE TBL. 100 MG	1	MIL.TB	1.90

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	NIRIDAZOLE	1	1	101.00	1	43.99	0.00
2	MAIZE STARCH	2	1	25.00	1	0.00	1.19
3	TALK	2	1	2.00	1	0.00	1.11
4	MAGNESIUM STEARATE	2	1	1.00	1	1.96	0.00
5	GELATINE	2	1	1.00	1	3.24	0.00
6	MILK SUGAR	2	1	118.00	1	.98	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
29	NIRIDAZOLE TBL. 500 MG	1	MIL.TB	1.90

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	NIRIDAZOLE	1	1	503.00	1	43.99	0.00
2	MAIZE STARCH	2	1	60.00	1	0.00	1.19
3	TALK	2	1	6.00	1	0.00	1.11
4	MAGNESIUM STEARATE	2	1	3.00	1	1.96	0.00
5	GELATINE	2	1	3.00	1	3.24	0.00
6	MILK SUGAR	2	1	24.00	1	.98	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
30	PARACETAMOL TBL. 500 MG	1	MIL.TB	35.50

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	PARACETAMOL	1	1	505.00	1	13.97	0.00
2	ALCOHOL 99,6%	2	4	64.00	1	0.00	.86
3	METHYLENCHLORID	2	4	106.00	1	.54	0.00
4	AVICEL PH 101	2	1	64.00	1	7.12	0.00
5	TALK	2	1	6.00	1	0.00	1.11
6	CALCIUM STEARATE	2	1	6.00	1	1.82	0.00
7	SOLUBLE STARCH	2	1	12.00	1	1.86	0.00
8	METHYLCELULOSE	2	1	12.00	1	8.66	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
31	PENICILIN V TBL. 125 MG	3	MIL.TB	4.00

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	PHENOXYMETHYLPENICILIN CALC.	1	1	126.00	1	37.01	0.00
2	MILK SUGAR	2	1	81.00	1	.98	0.00
3	MAIZE STARCH	2	1	6.00	1	0.00	1.19
4	MAGNESIUM STEARATE	2	1	2.00	1	1.96	0.00
5	TALK	2	1	4.00	1	0.00	1.11
6	GELATINE	2	1	2.00	1	3.24	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
32	PHENOBARBITAL TBL. 15 MG	1	MIL.TB	5.80

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	PHENOBARBITAL	1	1	15.00	1	17.18	0.00
2	MILK SUGAR	2	1	23.00	1	.98	0.00
3	MAIZE STARCH	2	1	23.00	1	0.00	1.19
4	TALK	2	1	1.00	1	0.00	1.11
5	GELATINE	2	1	0.00	1	3.24	0.00
6	CALCIUM STEARATE.	2	1	1.00	1	1.84	0.00
7	SOLUBLE STARCH	2	1	0.00	1	1.86	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
33	PHENOBARBITAL TBL. 30 MG	1	MIL.TB	.75

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	PHENOBARBITAL	1	1	31.00	1	17.18	0.00
2	MILK SUGAR	2	1	21.00	1	.98	0.00
3	MAIZE STARCH	2	1	21.00	1	0.00	1.19
4	TALK	2	1	1.00	1	0.00	1.11
5	GELATINE	2	1	0.00	1	3.24	0.00
6	CALCIUM STEARATE	2	1	1.00	1	1.82	0.00
7	SOLUBLE STARCH	2	1	0.00	1	1.86	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
34	PIPERAZINE TBL. 500 MG	1	MIL.TB	.05

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	PIPERAZINE CITR.	1	1	505.00	1	3.21	0.00
2	MAIZE STARCH	2	1	60.00	1	0.00	1.19
3	TALK	2	1	6.00	1	0.00	1.11
4	MAGNESIUM STEARATE	2	1	3.00	1	1.96	0.00
5	GELATINE	2	1	3.00	1	3.24	0.00
6	MILK SUGAR	2	1	24.00	1	.98	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
35	PHENYLBUTAZONE TBL. 100 MG	1	MIL.TB	1.90

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	PHENYLBUTAZONE	1	1	101.00	1	15.43	0.00
2	SUGAR	2	1	11.00	1	0.00	.43
3	MILK SUGAR	2	1	57.00	1	.98	0.00
4	MAIZE STARCH	2	1	38.00	1	0.00	1.19
5	GELATINE	2	1	5.00	1	3.24	0.00
6	SOLUBLE STARCH	2	1	2.00	1	1.86	0.00
7	TALK	2	1	4.00	1	0.00	1.11
8	CALCIUM STEARATE	2	1	2.00	1	1.82	0.00
9	GLYCEROL	2	2	1.00	1	0.00	1.76
10	ALCOHOL 99,6%	2	4	0.00	1	0.00	.86

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
36	PHENYLBUTAZONE TBL. 200 MG	1	MIL.TB	2.10

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	PHENYLBUTAZONE	1	1	203.00	1	15.43	0.00
2	SUGAR	2	1	22.00	1	0.00	.43
3	MILK SUGAR	2	1	119.00	1	.98	0.00
4	MAIZE STARCH	2	1	76.00	1	0.00	1.19
5	GELATINE	2	1	11.00	1	3.24	0.00
6	SOLUBLE STARCH	2	1	4.00	1	1.86	0.00
7	TALK	2	1	9.00	1	0.00	1.11
8	CALCIUM STEARATE	2	1	4.00	1	1.82	0.00
9	GLYCEROL	2	2	2.00	1	0.00	1.76
10	ALCOHOL 99,6%	2	4	1.00	1	0.00	.86

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
37	POTASSIUM SLOW RELEAS TBL.	1	MIL.TB	.70

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	POTASSIUM CHLORIDE	1	1	500.00	1	1.12	0.00
2	EUDRAGIT	2	1	75.00	1	1.82	0.00
3	ISOPROPYLALCOHOL	2	4	150.00	1	.70	0.00

NU	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
38	PYRIMETHAMINE TBL. 25 MG	1	MIL.TB	1.70

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	PYRIMETHAMINE	1	1	25.00	1	224.16	0.00
2	MILK SUGAR	2	1	212.00	1	.98	0.00
3	MAIZE STARCH	2	1	52.00	1	0.00	1.19
4	GELATINE	2	1	5.00	1	3.24	0.00
5	CALCIUM STEARATE	2	1	4.00	1	1.82	0.00
6	TALK	2	1	4.00	1	0.00	1.11
7	AEROSIL 200	2	2	0.00	1	4.32	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
39	PROMETHAZINE TBL. 10 MG	1	MIL.TB	.85

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	PROMETHAZINE HCL	1	1	10.00	1	35.93	0.00
2	MILK SUGAR	2	1	121.00	1	.98	0.00
3	MAIZE STARCH	2	1	15.00	1	0.00	1.19
4	GELATINE	2	1	0.00	1	3.24	0.00
5	CALCIUM STEARATE	2	1	0.00	1	1.82	0.00
6	TALK	2	1	1.00	1	0.00	1.11
7	AERUSIL 200	2	2	0.00	1	4.32	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
40	PROMETHAZINE TBL. 25 MG	1	MIL.TB	2.00

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	PROMETHAZINE HCL	1	1	25.00	1	35.93	0.00
2	MILK SUGAR	2	1	212.00	1	.98	0.00
3	MAIZE STARCH	2	1	52.00	1	0.00	1.19
4	GELATINE	2	1	5.00	1	3.24	0.00
5	CALCIUM STEARATE	2	1	4.00	1	1.82	0.00
6	TALK	2	1	4.00	1	0.00	1.11
7	AEROSIL 200	2	2	0.00	1	4.32	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
41	PROPANTHELIN TBL. 15 MG	1	MIL.TB	1.40

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE [US $]	UNIT PRICE [KWACHE]
1	PROPANTHELINE BR	1	1	15.00	1	272.70	0.00
2	MAIZE STARCH	2	1	15.00	1	0.00	1.19
3	TALK	2	1	1.00	1	0.00	1.11
4	MAGNESIUM STEARATE	2	1	0.00	1	1.96	0.00
5	GELATINE	2	1	0.00	1	3.24	0.00
6	MILK SUGAR	2	1	116.00	1	.98	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
42	PREDNISOLONE TBL. 5 MG	1	MIL.TB	1.25

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	PREDNISOLONE	1	1	5.00	1	1117.32	0.00
2	MAIZE STARCH	2	1	15.00	1	0.00	1.19
3	TALK	2	1	1.00	1	0.00	1.11
4	MAGNESIUM STEARATE	2	1	0.00	1	1.96	0.00
5	GELATINE	2	1	0.00	1	3.24	0.00
6	MILK SUGAR	2	1	126.00	1	.98	0.00

NO	NAME OF THE FINAL PRODUCT
43	PYRIDOXIN TBL. 50 MG

NEED OF MATERIALS FOR PREPARING OF 1 UNIT

NO	NAME	CATE-GORY	AGRE-GATION
1	PYRIDOXIN HCL 100%	1	1
2	MAIZE STARCH	2	1
3	TALK	2	1
4	MAGNESIUM STEARATE	2	1
5	GELATINE	2	1
6	MILK SUGAR	2	1

GROUP	UNIT	NEED 1980
2	MIL.TB	.75

FINAL PRODUCTS:

NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
51.00	1	51.33	0.00
15.00	1	0.00	1.19
1.00	1	0.00	1.11
0.00	1	1.96	0.00
0.00	1	3.24	0.00
81.00	1	.98	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
44	QUINIDIN SULF. TBL. 200 MG	1	MIL.TB	.80

NEED OF MATENIALS FOR PREPARING OF 1 UNIT FINAL PRUDUCTS:

NO	NAME	CATE-GURY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	QUINIDIN SULPH.	1	1	202.00	1	129.19	0.00
2	MAIZE STARCH	2	1	40.00	1	0.00	1.19
3	TALK	2	1	4.00	1	0.00	1.11
4	MAGNESIUM STEARATE	2	1	2.00	1	1.96	0.00
5	GELATINE	2	1	2.00	1	3.24	0.00
6	MILK SUGAR	2	1	148.00	1	.98	0.00
7	AEROSIL 200	2	2	1.00	1	4.32	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
45	SULFADIMIDIN TBL. 500 MG	3	MIL.TB	11.20

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	SULPHADIMIDINE	1	1	500.00	1	13.27	0.00
2	MAIZE STARCH	2	1	71.00	1	0.00	1.19
3	ALCOHOL 99,6%	2	4	3.00	1	0.00	.86
4	TALK	2	1	6.00	1	0.00	1.11
5	CALCIUM STEARATE	2	1	6.00	1	1.82	0.00
6	SOLUBLE STARCH	2	1	6.00	1	1.86	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
46	SALBUTAMOL TBL. 2 MG	1	MIL.TB	.60

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	SALBUTAMOLE	1	1	2.00	1	1055.87	0.00
2	MAIZE STARCH	2	1	30.00	1	0.00	1.19
3	TALK	2	1	1.00	1	0.00	1.11
4	MAGNESIUM STEARATE	2	1	0.00	1	1.96	0.00
5	GELATINE	2	1	1.00	1	3.24	0.00
6	MILK SUGAR	2	1	114.00	1	.98	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
47	AMINOPHYLIN TBL. 100 MG	1	MIL.TB	18.10

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	THEUPHYLINAETHYLENDIAMIN	1	1	101.00	1	15.91	0.00
2	MILK SUGAR	2	1	6.00	1	.98	0.00
3	MAIZE STARCH	2	1	38.00	1	0.00	1.19
4	GELATINE	2	1	2.00	1	3.24	0.00
5	PARAFINE	2	1	1.00	1	0.00	.93
6	PARAFIN LIQ.	2	2	0.00	1	0.00	.91
7	SULUBLE STARCH	2	1	4.00	1	1.86	0.00
8	TALK	2	1	2.00	1	0.00	1.11

NO	NAME OF THE FINAL PRODUCT
48	THIACETAZONE 25+IZONIAZID 66 TBL.

NEED OF MATERIALS FOR PREPARING OF 1 UNIT

NO	NAME	CATE-GORY	AGRE-GATION
1	THIACETAZONE	1	1
2	ISONIAZID	1	1
3	MAIZE STARCH	2	1
4	TALK	2	1
5	CALCIUM STEARATE	2	1
6	METHYLPARABENE	2	1

GROUP	UNIT	NEED 1980
1	MIL.TB	.85

FINAL PRODUCTS:

NEED	UNIT	UNIT PRICE (US $)	(KWACHE)
25.00	1	8.80	0.00
66.00	1	7.68	0.00
17.00	1	0.00	1.19
2.00	1	0.00	1.11
1.00	1	1.82	0.00
0.00	1	5.31	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
49	THIACETAZONE 150+IZONIAZID 300 TBL.	1	MIL.TB	6.40

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	THIACETAZONE	1	1	150.00	1	8.80	0.00
2	ISONIAZID	1	1	300.00	1	7.68	0.00
3	MAIZE STARCH	2	1	32.00	1	0.00	1.19
4	TALK	2	1	4.00	1	0.00	1.11
5	CALCIUM STEARATE	2	1	2.00	1	1.82	0.00
6	METHYLPARABENE	2	1	0.00	1	5.51	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
50	TRIHEXYPHENYDIL TBL. 2 MG	1	MIL.TB	1.00

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	TRIHEXYPHENYDIL	1	1	2.00	1	129.19	0.00
2	MAIZE STARCH	2	1	30.00	1	0.00	1.19
3	TALK	2	1	1.00	1	0.00	1.11
4	MAGNESIUM STEARATE	2	1	0.00	1	1.96	0.00
5	GELATINE	2	1	1.00	1	3.24	0.00
6	MILK SUGAR	2	1	114.00	1	.98	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
51	TRIHEXYPHENYDIL TBL. 5 MG	1	MIL.TB	.30

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	TRIHEXYPHENYDIL	1	1	5.00	1	129.19	0.00
2	MAIZE STARCH	2	1	30.00	1	0.00	1.19
3	TALK	2	1	1.00	1	0.00	1.11
4	MAGNESIUM STEARATE	2	1	0.00	1	1.96	0.00
5	GELATINE	2	1	1.00	1	3.24	0.00
6	MILK SUGAR	2	1	111.00	1	.98	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
52	B-KOMPLEX TBL.	2	MIL.TB	1.50

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	THIAMIN HCL 100%	1	1	3.00	1	33.87	0.00
2	PYRIDOXIN HCL 100%	1	1	1.00	1	51.33	0.00
3	RIBOFLAVIN	1	1	2.00	1	160.61	0.00
4	NICOTINAMIDE	1	1	20.00	1	6.98	0.00
5	CA-PANTOTHENATE	1	1	3.00	1	12.57	0.00
6	MILK SUGAR	2	1	16.00	1	.98	0.00
7	MAIZE STARCH	2	1	13.00	1	0.00	1.19
8	GELATINE	2	1	0.00	1	3.24	0.00
9	CALCIUM STEARATE	2	1	0.00	1	1.82	0.00
10	TALK	2	1	0.00	1	0.00	1.11
11	ALCOHOL 99,6%	2	4	2.00	1	0.00	.86
12	HYDROCHLORIC ACID	2	2	0.00	1	.45	0.00
13	METHYLCELULOSE	2	1	4.00	1	8.66	0.00
14	METHYLENCHLORID	2	2	90.00	1	.54	0.00
15	ISOPROPYLALCOHOL	2	4	90.00	1	.70	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
53	AMPICILIN CPS. 250 MG	3	MIL.TB	4.10

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	AMPICILIN TRIHYDRATE	1	1	303.00	1	290.50	0.00
2	MAIZE STARCH	2	1	6.00	1	0.00	1.19
3	STEARINIC ACID	2	1	6.00	1	6.98	0.00
4	TALK	2	1	3.00	1	0.00	1.11
5	AEROSIL 200	2	2	0.00	1	4.32	0.00
6	CAPSULES	2	1	1.00	2	1815.64	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
54	CHLORAMPHENICOL CPS. 250 MG	3	MIL.TB	2.50

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	D-CHLORAMPHENICOL	1	1	252.00	1	34.22	0.00
2	MAIZE STARCH	2	1	6.00	1	0.00	1.19
3	STEARINIC ACID	2	1	6.00	1	6.98	0.00
4	TALK	2	1	3.00	1	0.00	1.11
5	AEROSIL 200	2	2	0.00	1	4.32	0.00
6	CAPSULES	2	1	1.00	2	1815.64	0.00

NO	NAME OF THE FINAL PRODUCT
55	MULTIVITAMIN BP CPS.

NEED OF MATERIALS FOR PREPARING OF 1 UNIT

NO	NAME	CATE-GORY	AGRE-GATION
1	VITAMIN D	1	1
2	VITAMIN A	1	1
3	RIBOFLAVIN	1	1
4	THIAMIN HCL 100%	1	1
5	NICOTINAMIDE	1	1
6	MAIZE STARCH	2	1
7	STEARINIC ACID	2	1
8	TALK	2	1
9	CAPSULES	2	1

GROUP	UNIT	NEED 1980
2	MIL.T8	21.50

FINAL PRODUCTS:

NEED	UNIT	UNIT PRICE (US $)	(KWACHE)
0.00	1	7.96	0.00
1.00	1	34.92	0.00
0.00	1	160.61	0.00
1.00	1	33.87	0.00
1.00	1	6.98	0.00
28.00	1	0.00	1.19
1.00	1	6.98	0.00
1.00	1	0.00	1.11
1.00	2	1815.64	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
56	TETRACYCLINE CPS. 250 MG	3	MIL.TB	18.10

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	TETRACYCLINE HCL	1	1	252.00	1	34.92	0.00
2	MAIZE STARCH	2	1	6.00	1	0.00	1.19
3	STEARINIC ACID	2	1	6.00	1	6.98	0.00
4	TALK	2	1	3.00	1	0.00	1.11
5	AEROSIL 200	2	2	0.00	1	4.32	0.00
6	CAPSULES	2	1	1.00	2	1815.64	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
57	AMPICILIN MIXT.	1	100 L	43.00

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	AMPICILIN TRIHYDRATE	1	1	1.00	1	290.50	0.00
2	CORRIGENT	2	1	5.00	1	.78	0.00

NO	NAME OF THE FINAL PRODUCT
58	BELLAD. +EPHEDR. MIXT. BPC

NEED OF MATERIALS FOR PREPARING OF 1 UNIT

NO	NAME	CATE-GORY	AGRE-GATION
1	BELLADONE TINCT.	1	2
2	EPHEDRINE CHLORID	1	1
3	POTASSIUM IODIDE	1	1
4	ANISE WATER	1	2
5	BENZOIC ACID	1	1
6	SUGAR	2	1

GROUP	UNIT	NEED 1980
1	100 L	11.00

FINAL PRODUCTS:

NEED	UNIT	UNIT PRICE (US $)	(KWACHE)
3.00	3	2.44	0.00
0.00	1	36.31	0.00
1.00	1	13.62	0.00
2.00	3	1.16	0.00
0.00	1	3.14	0.00
6.00	1	0.00	.43

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
59	CHLORPROMAZIN ELIXIR	1	100 L	18.00

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCT(S)

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	CHLORPROMAZINE HCL	1	1	0.00	1	47.64	0.00
2	CORRIGENT	2	1	5.00	1	.78	0.00

NO	NAME OF THE FINAL PRODUCT
60	FE-SULFAT MIXT. BPC

NEED OF MATERIALS FOR REPARING OF 1 UNIT

NO	NAME	CATE-GORY	AGRE-GATION
1	FERROUS SULPHATE	1	1
2	ASCURBIC ACID	1	1
3	ORANGE SYRUP	2	2
4	CHLOROFORM	2	4

GROUP	UNIT	NEED 1980
1	100 L	20.00

FINAL PRODUCTS:

NEED	UNIT	UNIT PRICE (US $)	(KWACHE)
3.00	1	1.82	0.00
0.00	1	10.47	0.00
5.00	3	.86	0.00
1.00	1	1.12	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
61	LIN. METHYLSALICYLATE	1	100 L	15.00

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATEGORY	AGREGATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	METHYLSALICYLATE	1	2	25.00	1	3.91	0.00
2	ARACHIS OIL	2	2	75.00	1	0.00	1.45

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
62	PROMETHAZINE ELIXIR	1	100 L	65.00

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATEGORY	AGREGATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	PROMETHAZINE HCL	1	1	0.00	1	35.93	0.00
2	CORRIGENT	2	1	5.00	1	.78	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
63	SODIUM BICARBON. MIXT. BPC	1	100 L	24.00

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	SODIUM BICARBONATE	1	1	1.00	1	.74	0.00
2	GINGER SYRUP	2	2	4.00	3	6.42	0.00
3	SUGAR	2	1	28.00	1	0.00	.43
4	CHLORUFORM	2	4	1.00	1	1.12	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
64	PARACETAMOL ELIXIR	1	100 L	60.00

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	PARACETAMOL	1	1	2.00	1	13.97	0.00
2	CHLOROFORM	2	4	2.00	1	1.12	0.00
3	RASPBERRY JUICE	2	2	2.00	3	2.06	0.00
4	ALCOHOL 95%	2	4	10.00	1	0.00	.86
5	PROPYLENEGLYCOL	2	2	10.00	3	.91	0.00
6	SUGAR	2	1	22.00	1	0.00	.43
7	GLYCEROL	2	2	51.00	1	0.00	1.76

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
65	METHYLSALICYLATE OINT.	1	100 KG	50.00

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	METHYLSALICYLATE	1	2	50.00	1	3.91	0.00
2	WHITE WAX	2	2	25.00	1	6.77	0.00
3	WOOL FAT	2	2	25.00	1	1.40	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
66	PIPERAZINE CIT, SYRUP	1	100 L	37.00

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	PIPERAZINE CITR.	1	1	18.00	1	3.21	0.00
2	PEPPERMINT SPIRT	2	4	0.00	3	7.56	0.00
3	GLYCEROL	2	2	10.00	1	0.00	1.76
4	SUGAR	2	1	31.00	1	0.00	.43

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
67	SIMPLE LINCT. PEDIATR	1	100 L	240.00

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	SIMPLE LINCT.	1	2	25.00	3	8.48	0.00
2	SUGAR	2	1	21.00	1	0.00	.43

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
68	PHOLCODINE LINCTUS	1	100 L	210.00

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	CITRIC ACID	1	1	1.00	1	.84	0.00
2	PHOLCODINE	1	1	0.00	1	26.68	0.00
3	CHLOROFORM	2	2	7.00	1	1.12	0.00
4	SUGAR	2	1	6.00	1	0.00	.43

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
69	COTRIMOXAZOL SUSP.	3	100 L	32.50

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	SULPHAMETHOXAZOL	1	1	4.00	1	148.04	0.00
2	TRIMETOPRIN	2	1	0.00	1	91.76	0.00
3	SUGAR	2	1	6.00	1	0.00	.43

NO	NAME OF THE FINAL PRODUCT
70	CHLORAMPHENICOL SUSP.

NEED OF MATERIALS FOR PREPARING OF 1 UNIT

NO	NAME	CATE-GORY	AGRE-GATION
1	D-CHLORAMPHENICOL	1	1
2	SUGAR	2	1

GROUP	UNIT	NEED 1980
5	100 L	130.00

FINAL PRODUCTS:

NEED	UNIT	UNIT PRICE (US $)	(KWACHE)
12.00	1	34.22	0.00
6.00	1	0.00	.43

NO	NAME OF THE FINAL PRODUCT
71	MAGNESIUM HYDROX.MIXT.

NEED OF MATERIALS FOR PREPARING OF 1 UNIT

NO	NAME	CATE-GORY	AGRE-GATION
1	MAGNESIUM HYDROX.	1	1
2	CORRIGENT	2	1

GROUP	UNIT	NEED 1980
1	100 L	112.00

FINAL PRODUCTS:

NEED	UNIT	UNIT PRICE (US $)	(KWACHE)
2.00	1	1.54	0.00
2.00	1	.78	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
72	PHENOXYMETHYLPENICILIN SUSP.	3	100 L	8.50

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	PHENOXYMETHYLPENICILIN CALC.	1	1	1.00	1	37.01	0.00
2	SUGAR	2	1	6.00	1	0.00	.43

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
73	SULPHADIMIDINE SUSP.	3	100 L	72.00

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATEGORY	AGREGATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	SULPHADIMIDINE	1	1	10.00	1	13.27	0.00
2	TRAGACANTHI POWDER	2	1	4.00	1	45.37	0.00
3	BENZOIC ACID	2	1	0.00	1	3.14	0.00
4	RASPHBERRY SYRUP	2	2	20.00	1	.49	0.00
5	CHLOROFORM	2	2	1.00	1	1.12	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
74	BENZYLBENZOAT APPL.	1	100 KG	86.00

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATEGORY	AGREGATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	BENZYLBENZOATE	1	1	25.00	1	6.98	0.00
2	EMULGATORY WAX	2	1	2.00	1	3.49	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
75	SULFACETAMID EYE DROPS 10 %	1	100 L	6.50

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	SULFACETAMID NA	1	1	10.00	1	8.66	0.00
2	PROPYLENGLYCOL	2	2	5.00	1	9.08	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
76	CHLORAMPHENICOL EYE OINT. 1%	3	100 KG	3.70

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	D-CHLORAMPHENICOL	1	1	1.00	1	34.22	0.00
2	PROPYLENGLYCOL	2	2	5.00	1	9.08	0.00
3	VASELINE EYE	2	3	77.00	1	.86	0.00
4	WOOL FAT	2	3	15.00	1	1.40	0.00
5	WHITE WAX	2	3	2.00	1	6.77	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
77	BENZOIE ACID OINT. BPC	1	100 KG	90.00

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCT:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	BENZOIC ACID	1	1	6.00	1	3.14	0.00
2	SALICYLIC ACID	2	1	3.00	1	5.24	0.00
3	EMULGIFYING OINT.	2	3	91.00	1	5.45	0.00

NO	NAME OF THE FINAL PRODUCT
78	HYDROCORTIZON UINT. 1 %

NEED OF MATERIALS FOR PREPARING OF 1 UNIT

NO	NAME	CATE-GORY	AGRE-GATION
1	HYDROCORTIZONE ACET.	1	1
2	PROPYLENGLYCOL	2	2
3	VASELINE	2	3

GROUP	UNIT	NEED 1980
1	100 KG	7.00

FINAL PRODUCT(S):

NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1.00	1	733.24	0.00
5.00	1	9.08	0.00
84.00	1	.67	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
79	CHLORHEXIDIN OINT.	1	100 KG	54.00

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	CHLORHEXIDIN GLUCON.	1	1	1.00	1	24.44	0.00
2	EMULGATORY WAX	2	1	25.00	1	3.49	0.00
3	PARAFINE LIQ.	2	2	10.00	1	0.00	.91

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
80	AMINOPHYLLIN 100 MG SUP.	1	100 KG	.62

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE [US $]	UNIT PRICE [KWACHE]
1	THEOPHYLINAETHYLENDIAMIN	1	1	0.00	1	15.91	0.00
2	CACAO OIL	2	3	4.00	1	1.48	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
81	BI-SUBGAL. 300 MG SUP.	1	100 KG	.48

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	BISMUT-SUBGAL.	1	1	1.00	1	11.24	0.00
2	CACAO OIL	2	3	3.00	1	1.48	0.00

NO	NAME OF THE FINAL PRODUCT	GROUP	UNIT	NEED 1980
82	GLYCERINI SUP. 1G, 2G, 4G	1	100 KG	6.81

NEED OF MATERIALS FOR PREPARING OF 1 UNIT FINAL PRODUCTS:

NO	NAME	CATE-GORY	AGRE-GATION	NEED	UNIT	UNIT PRICE (US $)	UNIT PRICE (KWACHE)
1	SODIUM CARBONATE	1	1	4.00	1	.43	0.00
2	STEARINIC ACID	2	1	7.00	1	6.98	0.00
3	GLYCEROL	2	2	87.00	1	0.00	1.76

NO	NAME OF THE MATERIAL	1980	1985	1986	1987	1988	1989	1990	1995	2000
1	ACETAZOLAMIDE									
	1 1 KG 34.9 0.0									
	1 ACETAZOLAMIDE TBL. 250 MG	2860.2	4204.5	8409.0	8923.8	9438.7	10010.7	10611.3	14215.2	19020.3
	1 MIL.TB 11.35 252.00									
TOTAL UNIT		2860.2	4204.5	8409.0	8923.8	9438.7	10010.7	10611.3	14215.2	19020.3
TOTAL US $		99867	146805	293610	311586	329562	349536	370508	496341	664118
2	ACETYLOSALIC. ACID									
	1 1 KG 1.2 0.0									
	4 ASPIRIN TBL. 300 MG	10268.0	15094.0	30187.9	32036.2	33884.4	35938.0	38094.3	51032.0	68282.2
	1 MIL.TB 34.00 302.00									
	10 CODEINE COMP. BPC TBL.	3541.9	5206.6	10413.2	11050.8	11688.3	12396.7	13140.5	17603.3	23553.8
	1 MIL.TB 14.10 251.20									
TOTAL UNIT		13809.9	20300.6	40601.2	43086.9	45572.7	48334.7	51234.8	68635.3	91836.0
TOTAL US $		16877	24809	49617	52655	55693	59068	62612	83877	112230
3	AEROSIL 200									
	2 2 KG 4.3 0.0									
	5 AMITRIPTYLIN TBL. 10 MG	.1	.1	.3	.3	.3	.3	.3	.5	.6
	1 MIL.TB .31 .30									
	6 AMITRIPTYLIN TBL. 25 MG	.1	.1	.2	.2	.2	.3	.3	.4	.5
	1 MIL.TB .75 .10									
	12 DAPSONE TBL. 10 MG	.5	.8	1.5	1.6	1.7	1.8	1.9	2.6	3.5
	1 MIL.TB 1.75 .30									
	13 DAPSONE TBL. 25 MG	.3	.5	1.0	1.0	1.1	1.2	1.2	1.6	2.2
	1 MIL.TB 3.30 .10									
	14 DAPSONE TBL. 100 MG	.1	.2	.4	.4	.5	.5	.5	.7	.9
	1 MIL.TB 1.40 .10									
	23 GRISEOFULVIN TBL. 125 MG	.8	1.1	2.3	2.4	2.5	2.7	2.9	3.8	5.1
	1 MIL.TB 1.10 .70									
	38 PYRIMETHAMINE TBL. 25 MG	.2	.2	.5	.5	.6	.6	.6	.8	1.1
	1 MIL.TB 1.70 .10									
	39 PROMETHAZINE TBL. 10 MG	.1	.1	.2	.3	.3	.3	.3	.4	.6
	1 MIL.TB .85 .10									
	40 PROMETHAZINE TBL. 25 MG	.2	.3	.6	.6	.7	.7	.7	1.0	1.3
	1 MIL.TB 2.00 .10									
	44 QUINIDIN SULF. TBL. 200 MG	.8	1.2	2.4	2.5	2.6	2.8	3.0	4.0	5.3
	1 MIL.TB .80 1.00									
	53 AMPICILIN CPS. 250 MG	2.5	3.6	7.2	7.7	8.1	8.6	9.1	12.2	16.4
	3 MIL.TB 4.10 .60									

NO	NAME OF THE MATERIAL	1980	1985	1986	1987	1988	1989	1990	1995	2000
54	CHLORAMPHENICOL CPS. 250 MG 3 MIL.TB 2.50 .60	1.5	2.2	4.4	4.7	5.0	5.3	5.6	7.5	10.0
56	TETRACYCLINE CPS. 250 MG 3 MIL.TB 18.10 .60	10.9	16.0	31.9	33.9	35.8	38.0	40.3	54.0	72.2
TOTAL UNIT		18.0	26.5	52.9	56.2	59.4	63.0	66.8	89.5	119.8
TOTAL US $		78	114	228	242	256	272	288	386	517

4 ALCOHOL 95%
2 8 KG 0.0 .9

68	PARACETAMOL ELIXIR 1 100 L 60.00 10.00	600.0	882.0	1764.0	1872.0	1980.0	2100.0	2226.0	2982.0	3990.0
TOTAL UNIT		600.0	882.0	1764.0	1872.0	1980.0	2100.0	2226.0	2982.0	3990.0
TOTAL KWACH		516.0	758.5	1517.0	1609.9	1702.8	1806.0	1914.4	2564.5	3431.4

5 ALCOHOL 99,6%
2 4 KG 0.0 .9

30	PARACETAMOL TBL. 500 MG 1 MIL.TB 33.50 64.60	2164.1	3181.2	6362.5	6752.0	7141.5	7574.4	8028.8	10755.6	14391.3
35	PHENYLBUTAZONE TBL. 100 MG 1 MIL.TB 1.90 .80	1.5	2.2	4.5	4.7	5.0	5.3	5.6	7.6	10.1
36	PHENYLBUTAZONE TBL. 200 MG 1 MIL.TB 2.10 1.60	3.4	4.9	9.9	10.5	11.1	11.8	12.5	16.7	22.3
45	SULFADIMIDIN TBL. 500 MG 3 MIL.TB 11.20 3.00	33.6	49.4	98.8	104.8	110.9	117.6	124.7	167.0	223.4
52	B-KOMPLEX TBL. 2 MIL.TB 1.50 2.00	3.0	4.4	8.8	9.4	9.9	10.5	11.1	14.9	19.9
TOTAL UNIT		2205.6	3242.2	6484.4	6881.4	7278.4	7719.5	8182.7	10961.7	14667.1
TOTAL KWACH		1896.8	2788.3	5576.6	5918.0	6259.4	6638.8	7037.1	9427.1	12613.7

6 ALUMINIUM HYDROXID
1 1 KG 1.5 0.0

25	MAGNESIUM TRISILICATE TBL. 1 MIL.TB 12.80 121.10	1550.1	2278.6	4557.2	4836.2	5115.3	5425.3	5750.8	7703.9	10308.0
TOTAL UNIT		1550.1	2278.6	4557.2	4836.2	5115.3	5425.3	5750.8	7703.9	10308.0
TOTAL US $		2381	3501	7001	7430	7859	8335	8835	11836	15836

NO	NAME OF THE MATERIAL				TOTAL NEED OF MATERIALS 1980	1985	1986
7	ALUMINIUM STEARATE						
	2 1	KG	1.7	0.0			
	2	ASCORBIC ACID TBL. 50 MG			1.6	2.4	4.7
	2	MIL.TB	8.00	.20			
	3	ASCORBIC ACID TBL. 200 MG			5.7	8.3	16.7
	2	MIL.TB	7.10	.80			
TOTAL UNIT					7.3	10.7	21.4
TOTAL US $					13	19	37
8	AMITRIPTYLIN HCL						
	1 1	KG	74.8	0.0			
	5	AMITRIPTYLIN TBL. 10 MG			3.2	4.6	9.3
	1	MIL.TB	.31	10.20			
	6	AMITRIPTYLIN TBL. 25 MG			19.1	28.1	56.2
	1	MIL.TB	.75	25.50			
TOTAL UNIT					22.3	32.8	65.5
TOTAL US $					1667	2450	4901
9	AMPICILIN TRIHYDRATE						
	1 1	KG	290.5	0.0			
	53	AMPICILIN CPS. 250 MG			1243.1	1827.4	3654.8
	3	MIL.TB	4.10	303.20			
	57	AMPICILIN MIXT.			53.8	79.0	158.0
	1	100 L	43.00	1.25			
TOTAL UNIT					1296.9	1906.4	3812.8
TOTAL US $					376744	553814	1107628
10	ANISE WATER						
	1 2	LT	1.2	0.0			
	58	BELLAD. +EPHEDR. MIXT. BPC			22.0	32.3	64.7
	1	100 L	11.00	2.00			
TOTAL UNIT					22.0	32.3	64.7
TOTAL US $					26	37	75

1987	1988	1989	1990	1995	2000
5.0	5.3	5.6	5.9	8.0	10.6
17.7	18.7	19.9	21.1	28.2	37.8
22.7	24.0	25.5	27.0	36.2	48.4
40	42	44	47	63	85
9.9	10.4	11.1	11.7	15.7	21.0
59.7	63.1	66.9	71.0	95.1	127.2
69.5	73.5	78.0	82.7	110.8	148.2
5201	5501	5834	6184	8284	11085
3878.5	4102.3	4350.9	4612.0	6178.3	8266.7
167.7	177.4	188.1	199.4	267.1	357.4
4046.2	4279.7	4539.0	4811.4	6445.4	8624.2
1175442	1243256	1318605	1397722	1872420	2505350
68.6	72.6	77.0	81.6	109.3	146.3
68.6	72.6	77.0	81.6	109.3	146.3
80	84	89	95	127	170

TOTAL NEED OF MATERIALS

NO	NAME OF THE MATERIAL	1980	1985	1986
11	ANACHIS OIL			
	2 2 KG 0.0 1.5			
61	LIN. METHYLSALICYLATE	1125.0	1653.8	3307.5
	1 100 L 15.00 75.00			
TOTAL	UNIT	1125.0	1653.8	3307.5
TOTAL	KWACH	1631.3	2397.9	4795.9
12	ASCORBIC ACID			
	1 1 KG 10.5 0.0			
2	ASCORBIC ACID TBL. 50 MG	404.0	593.9	1187.8
	2 MIL.TB 8.00 50.50			
3	ASCORBIC ACID TBL. 200 MG	1441.3	2118.7	4237.4
	2 MIL.TB 7.10 203.00			
60	FE-SULFAT MIXT. BPC	2.0	2.9	5.9
	1 100 L 20.00 .10			
TOTAL	UNIT	1847.3	2715.5	5431.1
TOTAL	US $	19350	28445	56890
13	AVICEL PH 101			
	2 1 KG 7.1 0.0			
30	PARACETAMOL TBL. 500 MG	2144.0	3151.7	6303.4
	1 MIL.TB 33.50 64.00			
TOTAL	UNIT	2144.0	3151.7	6303.4
TOTAL	US $	15272	22449	44898
14	BELLADONE TINCT.			
	1 2 LT 2.4 0.0			
58	BELLAD. +EPHEDR. MIXT. BPC	33.0	48.5	97.0
	1 100 L 11.00 3.00			
TOTAL	UNIT	33.0	48.5	97.0
TOTAL	US $	81	119	237

1987	1988	1989	1990	1995	2000
3510.0	3712.5	3937.5	4173.8	5591.3	7481.2
3510.0	3712.5	3937.5	4173.8	5591.3	7481.2
5089.5	5383.1	5709.4	6051.9	8107.3	10847.8
1260.5	1333.2	1414.0	1498.8	2007.9	2686.6
4496.9	4756.3	5044.5	5347.2	7163.3	9584.6
6.2	6.6	7.0	7.4	9.9	13.3
5763.6	6096.1	6465.5	6853.5	9181.1	12284.5
60373	63856	67726	71789	96171	128679
6689.3	7075.2	7504.0	7954.2	10655.7	14257.6
6689.3	7075.2	7504.0	7954.2	10655.7	14257.6
47647	50396	53450	56657	75899	101556
103.0	108.9	115.5	122.4	164.0	219.4
103.0	108.9	115.5	122.4	164.0	219.4
252	266	282	299	401	536

TOTAL NEED OF MATERIALS

NO	NAME OF THE MATERIAL	1980	1985	1986
15	BENZOIC ACID			
	1 1 KG 3.1 0.0			
58	BELLAD. +EPHEDR. MIXT. BPC	2.2	3.2	6.5
	1 100 L 11.00 .20			
73	SULPHADIMIDINE SUSP.	14.4	21.2	42.3
	3 100 L 72.00 .20			
77	BENZOIE ACID OINT. BPC	300.0	441.0	882.0
	1 100 KG 50.00 6.00			
TOTAL UNIT		316.6	465.4	930.8
TOTAL US $		995	1463	2925
16	BENZYLBENZOATE			
	1 1 KG 7.0 0.0			
74	BENZYLBENZOAT APPL.	2150.0	3160.5	6321.0
	1 100 KG 86.00 25.00			
TOTAL UNIT		2150.0	3160.5	6321.0
TOTAL US $		15014	22071	44141
17	BISMUT-SUBGAL.			
	1 1 KG 11.2 0.0			
81	BI-SUBGAL. 300 MG SUP.	.7	1.1	2.1
	1 100 KG .48 1.50			
TOTAL UNIT		.7	1.1	2.1
TOTAL US $		8	12	24
18	CA-PANTOTHENATE			
	1 1 KG 12.6 0.0			
52	B-KOMPLEX TBL.	4.5	6.6	13.2
	2 MIL.TB 1.50 3.00			
TOTAL UNIT		4.5	6.6	13.2
TOTAL US $		57	83	166

1987	1988	1989	1990	1995	2000
6.9	7.3	7.7	8.2	10.9	14.6
44.9	47.5	50.4	53.4	71.6	95.8
936.0	990.0	1050.0	1113.0	1491.0	1995.0
987.8	1044.8	1108.1	1174.6	1573.5	2105.4
3104	3283	3482	3691	4945	6616
6708.0	7095.0	7525.0	7976.5	10685.5	14297.5
6708.0	7095.0	7525.0	7976.5	10685.5	14297.5
46844	49546	52549	55702	74619	99843
2.2	2.4	2.5	2.7	3.6	4.8
2.2	2.4	2.5	2.7	3.6	4.8
25	27	28	30	40	54
14.0	14.9	15.8	16.7	22.4	29.9
14.0	14.9	15.8	16.7	22.4	29.9
176	187	198	210	281	376

NO	NAME OF THE MATERIAL			TOTAL NEED OF MATERI 1980	1985
19	CACAO OIL				
2 3	KG	1.5	0.0		
80	AMINOPHYLLIN 100 MG SUP.			2.8	4.1
1	100 KG	.62	4.50		
81	BI-SUBGAL. 300 MG SUP.			1.7	2.5
1	100 KG	.48	3.50		
TOTAL UNIT				4.5	6.6
TOTAL US $				7	10
20	CALCIUM STEARATE				
2 1	KG	1.8	0.0		
5	AMITRIPTYLIN TBL. 10 MG			.5	.8
1	MIL.TB	.31	1.70		
6	AMITRIPTYLIN TBL. 25 MG			3.2	4.7
1	MIL.TB	.75	4.30		
12	DAPSONE TBL. 10 MG			3.0	4.4
1	MIL.TB	1.75	1.70		
13	DAPSONE TBL. 25 MG			14.2	20.9
1	MIL.TB	3.30	4.30		
14	DAPSONE TBL. 100 MG			2.1	3.1
1	MIL.TB	1.40	1.50		
21	FOLIC ACID TBL. 5 MG			2.5	3.6
2	MIL.TB	8.22	.30		
22	FUROSEMID TBL. 40 MG			4.2	6.1
1	MIL.TB	1.30	3.20		
24	ISONIAZID TBL. 100 MG			1.0	1.5
1	MIL.TB	.80	1.30		
30	PARACETAMOL TBL. 500 MG			201.0	295.5
1	MIL.TB	33.50	6.00		
32	PHENOBARBITAL TBL. 15 MG			8.7	12.8
1	MIL.TB	5.80	1.50		
33	PHENOBARBITAL TBL. 30 MG			.9	1.3
1	MIL.TB	.75	1.20		
35	PHENYLBUTAZONE TBL. 100 MG			4.2	6.1
1	MIL.TB	1.90	2.20		
36	PHENYLBUTAZONE TBL. 200 MG			9.4	13.9
1	MIL.TB	2.10	4.50		
38	PYRIMETHAMINE TBL. 25 MG			7.3	10.7
1	MIL.TB	1.70	4.30		
39	PROMETHAZINE TBL. 10 MG			.7	1.0
1	MIL.TB	.85	.80		
40	PROMETHAZINE TBL. 25 MG			8.6	12.6
1	MIL.TB	2.00	4.30		
45	SULFADIMIDIN TBL. 500 MG			67.2	98.8
3	MIL.TB	11.20	6.00		

1986	1987	1988	1989	1990	1995	2000
8.2	8.7	9.2	9.8	10.4	13.9	18.6
4.9	5.2	5.5	5.9	6.2	8.3	11.2
13.1	13.9	14.8	15.6	16.6	22.2	29.7
19	21	22	23	25	33	44
1.5	1.6	1.7	1.8	2.0	2.6	3.5
9.5	10.1	10.6	11.3	12.0	16.0	21.8
8.7	9.3	9.8	10.4	11.0	14.8	19.8
41.7	44.3	46.8	49.7	52.6	70.5	94.4
6.2	6.6	6.9	7.4	7.8	10.4	14.0
7.3	7.7	8.1	8.6	9.1	12.3	16.4
12.2	13.0	13.7	14.6	15.4	20.7	27.7
3.1	3.2	3.4	3.6	3.9	5.2	6.9
590.9	627.1	663.3	703.5	745.7	999.0	1336.6
25.6	27.1	28.7	30.5	32.3	43.2	57.9
2.6	2.8	3.0	3.2	3.3	4.5	6.0
12.3	13.0	13.8	14.6	15.5	20.8	27.8
27.8	29.5	31.2	33.1	35.1	47.0	62.8
21.5	22.8	24.1	25.6	27.1	36.3	48.6
2.0	2.1	2.2	2.4	2.5	3.4	4.5
25.3	26.8	28.4	30.1	31.9	42.7	57.2
197.6	209.7	221.8	235.2	249.3	334.0	446.9

NO NAME OF THE MATERIAL	1980	1985	1986	1987	1988	1989	1990	1995	2000
48 THIACETAZONE 25+IZONIAZID 66 T	1.1	1.6	3.2	3.4	3.6	3.9	4.1	5.5	7.3
1 MIL.TB .65 1.30									
49 THIACETAZONE 150+IZONIAZID 300	17.9	26.3	52.7	55.9	59.1	62.7	66.5	89.1	119.2
1 MIL.TB 6.40 2.80									
52 B-KOMPLEX TBL.	1.3	2.0	4.0	4.2	4.5	4.7	5.0	6.7	9.0
2 MIL.TB 1.50 .90									
TOTAL UNIT	359.1	527.8	1055.7	1120.3	1185.0	1256.8	1332.2	1784.6	2387.9
TOTAL US $	652	959	1917	2035	2152	2283	2420	3241	4337

21 CAPSULES
2 1 1815.6 0.0

53 AMPICILIN CPS. 250 MG	4.1	6.0	12.1	12.8	13.5	14.4	15.2	20.4	27.3
3 MIL.TB 4.10 1.00									
54 CHLORAMPHENICOL CPS. 250 MG	2.5	3.7	7.4	7.8	8.3	8.8	9.3	12.4	16.6
3 MIL.TB 2.50 1.00									
55 MULTIVITAMIN BP CPS.	21.5	31.6	63.2	67.1	71.0	75.3	79.8	106.9	143.0
2 MIL.TB 21.50 1.00									
56 TETRACYCLINE CPS. 250 MG	18.1	26.6	53.2	56.5	59.7	63.3	67.2	90.0	120.4
3 MIL.TB 18.10 1.00									
TOTAL UNIT	86.2	67.9	135.8	144.1	152.5	161.7	171.4	229.6	307.2
TOTAL US $	63883	123308	246615	261714	276813	293589	311205	416897	557820

22 CASTOR OIL
2 2 KG 5.7 0.0

2 ASCORBIC ACID TBL. 50 MG	9.6	14.1	28.2	30.0	31.7	33.6	35.6	47.7	63.8
2 MIL.TB 8.00 1.20									
3 ASCORBIC ACID TBL. 200 MG	34.1	50.1	100.2	106.3	112.5	119.3	126.4	169.4	226.6
2 MIL.TB 7.10 4.80									
TOTAL UNIT	43.7	64.2	128.4	136.3	144.1	152.9	162.1	217.1	290.5
TOTAL US $	250	368	735	780	825	875	928	1243	1663

23 CHLORHEXIDIN GLUCON.
1 1 KG 24.4 0.0

79 CHLORHEXIDIN OINT.	54.0	79.4	158.8	168.5	178.2	189.0	200.3	268.4	359.1
1 100 KG 54.00 1.00									
TOTAL UNIT	54.0	79.4	158.8	168.5	178.2	189.0	[illegible] 3	268.4	359.1
TOTAL US $	1320	1940	3880	4118	4355	4619	[illegible]	6560	8777

NO	NAME OF THE MATERIAL	1980	1985	1986	1987	1988	1989	1990	1995	2000
24	CHLOROFORM									
	2 2 KG 1.1 0.0									
18	DIGOXIN TBL. 0.25 MG	2.4	3.5	7.1	7.5	7.9	8.4	8.9	11.9	16.0
	1 MIL.TB .80 " 3.00									
60	FE-SULFAT MIXT. BPC	24.0	35.3	70.6	74.9	79.2	84.0	89.0	119.3	159.6
	1 100 L 20.00 1.20									
63	SODIUM BICARBON. MIXT. BPC	28.8	42.3	84.7	89.9	95.0	100.8	106.8	143.1	191.5
	1 100 L 24.00 1.20									
64	PARACETAMOL ELIXIR	120.0	176.4	352.8	374.4	396.0	420.0	445.2	596.4	798.0
	1 100 L 60.00 2.00									
68	PHOLCODINE LINCTUS	1575.0	2315.3	4630.5	4914.0	5197.5	5512.5	5843.3	7827.8	10473.7
	1 100 L 210.00 7.50									
73	SULPHADIMIDINE SUSP.	72.0	105.8	211.7	224.6	237.6	252.0	267.1	357.8	478.8
	3 100 L 72.00 1.00									
TOTAL UNIT		1822.2	2678.6	5357.3	5685.3	6013.3	6377.7	6760.4	9056.3	12117.6
TOTAL US $		2036	2993	5986	6352	6719	7126	7553	10119	13539
25	CHLOROQUINE									
	1 1 KG 8.9 0.0									
7	CHLOROQUINE TBL. 250 MG	7887.6	11594.8	23189.5	24609.3	26029.1	27606.6	29263.0	39201.8	52452.5
	1 MIL.TB 31.30 252.00									
TOTAL UNIT		7887.6	11594.8	23189.5	24609.3	26029.1	27606.6	29263.0	39201.8	52452.5
TOTAL US $		38557	56678	113357	120297	127237	134948	143045	191627	256402
26	CHLORPROMAZINE HCL									
	1 1 KG 47.6 0.0									
8	CHLORPROMAZINE TBL. 10 MG	7.7	11.2	22.5	23.9	25.2	26.8	28.4	38.0	50.9
	1 MIL.TB .75 10.20									
9	CHLORPROMAZINE TBL. 125 MG	631.0	927.6	1855.1	1968.7	2082.3	2208.5	2341.0	3136.1	4196.1
	1 MIL.TB 5.00 126.20									
59	CHLORPROMAZIN ELIXIR	9.0	13.2	26.5	28.1	29.7	31.5	33.4	44.7	59.8
	1 100 L 18.00 .50									
TOTAL UNIT		647.7	952.0	1904.1	2020.7	2137.2	2266.8	2402.8	3218.8	4306.9
TOTAL US $		30854	45355	90710	96264	101818	107988	114468	153344	205178

NO NAME OF THE MATERIAL	1980	1985	1986	1987	1988	1989	1990	1995	2000
27 CITRIC ACID 1 1 KG .8 0.0									
68 PHOLCODINE LINCTUS 1 100 L 210.00 1.00	210.0	308.7	617.4	655.2	693.0	735.0	779.1	1043.7	1396.5
TOTAL UNIT	210.0	308.7	617.4	655.2	693.0	735.0	779.1	1043.7	1396.5
TOTAL US $	176	259	517	549	581	616	653	875	1170
28 CODEIN PHOSPHOR. 1 1 KG 32.1 0.0									
10 CODEINE COMP. BPC TBL. 1 MIL.TB 14.10 8.30	117.0	172.0	344.1	365.1	386.2	409.6	434.2	581.6	778.2
TOTAL UNIT	117.0	172.0	344.1	365.1	386.2	409.6	434.2	581.6	778.2
TOTAL US $	3759	5526	11092	11729	12406	13158	13947	18684	25000
29 CORRIGENT 2 1 KG .8 0.0									
57 AMPICILIN MIXT. 1 100 L 43.00 5.00	215.0	316.1	632.1	670.8	709.5	752.5	797.7	1068.6	1429.7
59 CHLORPROMAZIN ELIXIR 1 100 L 18.00 5.00	90.0	132.3	264.6	280.8	297.0	315.0	333.9	447.3	598.5
62 PROMETHAZINE ELIXIR 1 100 L 65.00 5.00	325.0	477.8	955.5	1014.0	1072.5	1137.5	1205.8	1615.3	2161.2
71 MAGNESIUM HYDROX.MIXT. 1 100 L 112.00 2.70	302.4	444.5	889.1	943.5	997.9	1058.4	1121.9	1502.9	2011.0
TOTAL UNIT	932.4	1370.6	2741.3	2909.1	3076.9	3263.4	3459.2	4634.0	6200.5
TOTAL US $	729	1072	2144	2275	2407	2552	2706	3624	4850
30 D-CHLORAMPHENICOL 1 1 KG 34.2 0.0									
54 CHLORAMPHENICOL CPS. 250 MG 3 MIL.TB 2.50 252.10	630.3	926.5	1852.9	1966.4	2079.8	2205.9	2338.2	3132.3	4191.2
70 CHLORAMPHENICOL SUSP. 3 100 L 130.00 12.10	1573.0	2312.3	4624.6	4907.8	5190.9	5505.5	5835.8	7817.8	10460.4
76 CHLORAMPHENICOL EYE OINT. 1% 3 100 KG 3.70 1.00	3.7	5.4	10.9	11.5	12.2	12.9	13.7	18.4	24.6

NO	NAME OF THE MATERIAL			TOTAL NEED OF MAT 1980	1985
TOTAL UNIT				2207.0	3244.2
TOTAL US $				75517	111010
31	DAPSONE				
1 1	KG	53.1	0.0		
12	DAPSONE TBL. 10 MG			17.9	26.2
1	MIL.TB	1.75	10.20		
13	DAPSONE TBL. 25 MG			84.8	124.7
1	MIL.TB	3.30	25.70		
14	DAPSONE TBL. 100 MG			142.8	209.9
1	MIL.TB	1.40	102.00		
TOTAL UNIT				245.5	360.8
TOTAL US $				13027	19150
32	DIAZEPAM				
1 1	KG	237.4	0.0		
15	DIAZEPAM TBL. 2 MG			7.9	11.6
1	MIL.TB	3.75	2.10		
16	DIAZEPAM TBL. 5 MG			18.5	27.1
1	MIL.TB	3.55	5.20		
TOTAL UNIT				26.3	38.7
TOTAL US $				6253	9192
33	DIGOXINE				
1 1	KG	3701.1	0.0		
18	DIGOXIN TBL. 0.25 MG			.2	.3
1	MIL.TB	.80	.26		
TOTAL UNIT				.2	.3
TOTAL US $				770	1132
34	DIPHENOXYLATE				
1 1	KG	164.8	0.0		
17	DIPHENOXYLATE TBL. 2.5 MG			4.0	5.9
1	MIL.TB	1.55	2.60		

1986	1987	1988	1989	1990	1995	2000
6488.4	6885.7	7282.9	7724.3	8187.8	10968.5	14676.2
222020	235613	249207	264310	280169	375320	502189
52.5	55.7	58.9	62.5	66.2	88.7	118.7
249.3	264.6	279.9	296.8	314.6	421.5	564.0
419.8	445.5	471.2	499.8	529.8	709.7	949.6
721.7	765.8	810.0	859.1	910.7	1219.9	1632.3
38300	40645	42990	45595	48331	64745	86631
23.2	24.6	26.0	27.6	29.2	39.1	52.4
54.3	57.6	60.9	64.6	68.5	91.7	122.8
77.4	82.2	86.9	92.2	97.7	130.9	175.1
18383	19508	20634	21885	23198	31076	41581
.6	.6	.7	.7	.8	1.0	1.4
.6	.6	.7	.7	.8	1.0	1.4
2263	2402	2540	2694	2856	3826	5119
11.8	12.6	[illegible]	14.1	15.0	20.0	26.8

NO	NAME OF THE MATERIAL	1980	1985	1986	1987	1988	1989	1990	1995	2000
	TOTAL UNIT	4.0	5.9	11.8	12.6	13.3	14.1	15.0	20.0	26.8
	TOTAL US $	664	976	1953	2072	2192	2325	2464	3301	4417

35 EMULGATORY WAX
2 1 KG 3.5 0.0

74 BENZYLBENZOAT APPL.	172.0	252.8	505.7	536.6	567.6	602.0	638.1	854.8	1143.8
1 100 KG 86.00 2.00									
79 CHLORHEXIDIN OINT.	1350.0	1984.5	3969.0	4212.0	4455.0	4725.0	5008.5	6709.5	8977.5
1 100 KG 54.00 25.00									
TOTAL UNIT	1522.0	2237.3	4474.7	4748.6	5022.6	5327.0	5646.6	7564.3	10121.3
TOTAL US $	5314	7812	15624	16580	17537	18600	19716	26412	35340

36 EMULGIFYING OINT.
2 3 KG 5.4 0.0

77 BENZOIC ACID OINT. BPC	4550.0	6680.5	13377.0	14196.0	15015.0	15925.0	16880.5	22613.5	30257.5
1 100 KG 50.00 91.00									
TOTAL UNIT	4550.0	6680.5	13377.0	14196.0	15015.0	15925.0	16880.5	22613.5	30257.5
TOTAL US $	24784	36432	72864	77325	81786	86742	91947	123174	164810

37 EPHEDRINE CHLORID
1 1 KG 36.3 0.0

19 EPHEDRINE TBL. 30 MG	98.2	144.3	288.6	306.2	323.9	343.5	364.1	487.8	652.7
1 MIL.TB 3.25 30.20									
58 BELLAD. +EPHEDR. MIXT. BPC	1.7	2.4	4.9	5.1	5.4	5.8	6.1	8.2	11.0
1 100 L 11.00 .15									
TOTAL UNIT	99.8	146.7	293.4	311.4	329.3	349.3	370.3	496.0	663.7
TOTAL US $	3624	5327	10655	11307	11959	12684	13445	18011	24100

38 EUDRAGIT
2 1 KG 1.8 0.0

37 POTASSIUM SLOW RELEAS TBL.	52.5	77.2	154.4	163.8	173.3	183.8	194.8	260.9	349.1
1 MIL.TB .70 75.00									
TOTAL UNIT	52.5	77.2	154.4	163.8	173.3	183.8	194.8	260.9	349.1
TOTAL US $	95	140	280	297	315	334	354	474	634

NO NAME OF THE MATERIAL	1980	1985	1986	1987	1988	1989	1990	1995	2000
39 FERROUS SULPHATE 1 1 KG 1.8 0.0									
20 FERROUS SULPHATE TBL. 200 MG 1 MIL.TB 4.60 203.00	933.8	1372.7	2745.4	2913.5	3081.5	3268.3	3464.4	4641.0	6209.8
60 FE-SULFAT MIXT. BPC 1 100 L 20.00 3.00	60.0	88.2	176.4	187.2	198.0	210.0	222.6	298.2	399.0
TOTAL UNIT	993.8	1460.9	2921.8	3100.7	3279.5	3478.3	3687.0	4939.2	6608.8
TOTAL US $	1804	2652	5305	5630	5954	6315	6694	8968	11999
40 FOLIC ACID 1 1 KG 111.7 0.0									
21 FOLIC ACID TBL. 5 MG 2 MIL.TB 8.22 5.10	41.9	61.6	123.3	130.8	138.3	146.7	155.5	208.4	278.8
TOTAL UNIT	41.9	61.6	123.3	130.8	138.3	146.7	155.5	208.4	278.8
TOTAL US $	4684	6886	13771	14614	15457	16394	17378	23280	31149
41 FUROSEMID 1 1 KG 59.8 0.0									
22 FUROSEMID TBL. 40 MG 1 MIL.TB 1.30 41.40	53.8	79.1	158.2	167.9	177.6	188.4	199.7	267.5	357.9
TOTAL UNIT	53.8	79.1	158.2	167.9	177.6	188.4	199.7	267.5	357.9
TOTAL US $	3217	4729	9458	10038	10617	11260	11936	15989	21394
42 GELATINE 2 1 KG 3.2 0.0									
2 ASCORBIC ACID TBL. 50 MG 2 MIL.TB 8.00 23.00	184.0	270.5	541.0	574.1	607.2	644.0	682.6	914.5	1223.6
3 ASCORBIC ACID TBL. 200 MG 2 MIL.TB 7.10 9.20	65.3	96.0	192.0	203.8	215.6	228.6	242.3	324.6	434.4
5 AMITRIPTYLIN TBL. 10 MG 1 MIL.TB .31 2.20	.7	1.0	2.0	2.1	2.3	2.4	2.5	3.4	4.5
6 AMITRIPTYLIN TBL. 25 MG 1 MIL.TB .75 5.50	4.1	6.1	12.1	12.9	13.6	14.4	15.3	20.5	27.4
12 DAPSONE TBL. 10 MG 1 MIL.TB 1.75 2.20	3.8	5.7	11.3	12.0	12.7	13.5	14.3	19.1	25.6

	... OF THE MATERIAL			1980	985
13	DAPSONE TBL. 25 MG			18.2	26.7
	1 MIL.TB	3.30	5.50		
14	DAPSONE TBL. 100 MG			2.1	3.1
	1 MIL.TB	1.40	1.50		
15	DIAZEPAM TBL. 2 MG			5.6	8.3
	1 MIL.TB	3.75	1.50		
16	DIAZEPAM TBL. 5 MG			5.3	7.8
	1 MIL.TB	3.55	1.50		
17	DIPHENOXYLATE TBL. 2.5 MG			2.3	3.4
	1 MIL.TB	1.55	1.50		
18	DIGOXIN TBL. 0.25 MG			1.2	1.8
	1 MIL.TB	.80	1.50		
20	FERROUS SULPHATE TBL. 200 MG			6.0	8.8
	1 MIL.TB	4.60	1.30		
21	FOLIC ACID TBL. 5 MG			3.3	4.8
	2 MIL.TB	8.22	.40		
23	GRISEOFULVIN TBL. 125 MG			1.4	2.1
	. MIL.TB	1.10	1.30		
25	MAGNESIUM TRISILICATE TBL.			64.0	94.1
	1 MIL.TB	12.80	5.00		
26	METHYLDOPA TBL. 250 MG			.8	1.2
	1 MIL.TB	.65	1.30		
27	METRONIDAZOL TBL. 200 MG			8.2	12.0
	3 MIL.TB	1.70	4.80		
28	NIRIDAZOLE TBL. 100 MG			2.5	3.6
	1 MIL.TB	1.90	1.30		
29	NIRIDAZOLE TBL. 500 MG			5.7	8.4
	1 MIL.TB	1.90	3.00		
31	PENICILIN V TBL. 125 MG			10.8	15.9
	3 MIL.TB	4.00	2.70		
32	PHENOBARBITAL TBL. 15 MG			4.1	6.0
	1 MIL.TB	5.80	.70		
33	PHENOBARBITAL TBL. 30 MG			.5	.7
	1 MIL.TB	.75	.60		
34	PIPERAZINE TBL. 500 MG			.2	.2
	1 MIL.TB	.05	3.00		
35	PHENYLBUTAZONE TBL. 100 MG			10.6	15.6
	1 MIL.TB	1.90	5.60		
36	PHENYLBUTAZONE TBL. 200 MG			23.5	34.6
	1 MIL.TB	2.10	11.20		
38	PYRIMETHAMINE TBL. 25 MG			9.4	13.7
	1 MIL.TB	1.70	5.50		
39	PROMETHAZINE TBL. 10 MG			.7	1.0
	1 MIL.TB	.85	.80		
40	PROMETHAZINE TBL. 25 MG			11.0	16.2
	1 MIL.TB	2.00	5.50		
41	PROPANTHELIN TBL. 15 MG			1.0	1.4
	1 MIL.TB	1.40	.70		
42	PREDNISOLONE TBL. 5 MG			.9	1.3
	1 MIL.TB	1.25	.70		
43	PYRIDOXIN TBL. 50 MG			.5	.8
	2 MIL.TB	.75	.70		
44	QUINIDIN SULF. TBL. 200 MG			1.6	2.4
	1 MIL.TB	.80	2.00		

1986	1987	1988	1989	1990	1995	2000
53.4	56.6	59.9	63.5	67.3	90.6	120.7
6.2	6.6	6.9	7.4	7.8	10.4	14.0
16.5	17.5	18.6	19.7	20.9	28.0	37.4
15.7	16.6	17.6	18.6	19.8	26.5	35.4
6.8	7.3	7.7	8.1	8.6	11.6	15.5
3.5	3.7	4.0	4.2	4.5	6.0	8.0
17.6	18.7	19.7	20.9	22.2	29.7	39.8
9.7	10.3	10.9	11.5	12.2	16.3	21.9
4.2	4.5	4.7	5.0	5.3	7.1	9.5
188.2	199.7	211.2	224.0	237.4	318.1	425.6
2.5	2.6	2.8	3.0	3.1	4.2	5.6
24.0	25.5	26.9	28.6	30.3	40.6	54.3
7.3	7.7	8.2	8.6	9.2	12.3	16.4
16.8	17.8	18.8	20.0	21.1	28.3	37.9
31.8	33.7	35.6	37.8	40.1	53.7	
11.9	12.7	13.4	14.2	15.1	20.2	
1.3	1.4	1.5	1.6	1.7	2.2	
.4	.5	.5	.5	.6	.7	
31.3	33.2	35.1	37.2	39.5	52.9	70.8
69.1	73.4	77.6	82.3	87.3	116.9	156.4
27.5	29.2	30.9	32.7	34.7	46.5	62.2
2.0	2.1	2.2	2.4	2.5	3.4	4.5
32.3	34.3	36.3	38.5	40.8	54.7	73.1
2.9	3.1	3.2	3.4	3.6	4.9	6.5
2.6	2.7	2.9	3.1	3.2	4.3	5.8
1.5	1.6	1.7	1.8	1.9	2.6	3.5
4.7	5.0	5.3	5.6	5.9	8.0	10.6

NO NAME OF THE MATERIAL	1980	1985	1986	1987	1988	1989	1990	1995	2000
46 SALBUTAMOL TBL. 2 MG	.9	1.3	2.6	2.8	3.0	3.2	3.3	4.5	6.0
1 MIL.TB .60 1.50									
47 AMINOPHYLIN TBL. 100 MG	39.8	58.5	117.1	124.2	131.4	139.4	147.7	197.9	264.8
1 MIL.TB 18.10 2.20									
50 TRIHEXYPHENYDIL TBL. 2 MG	1.5	2.2	4.4	4.7	5.0	5.3	5.6	7.5	10.0
1 MIL.TB 1.00 1.50									
51 TRIHEXYPHENYDIL TBL. 5 MG	.5	.7	1.3	1.4	1.5	1.6	1.7	2.2	3.0
1 MIL.TB .30 1.50									
52 B-KOMPLEX TBL.	1.3	2.0	4.0	4.2	4.5	4.7	5.0	6.7	9.0
2 MIL.TB 1.50 .90									
TOTAL UNIT	503.2	739.7	1479.5	1570.1	1660.6	1761.3	1867.0	2501.0	3346.4
TOTAL US $	1631	2397	4794	5087	5381	5707	6049	8104	10843
43 GINGEN SYRUP									
2 2 LT 6.4 0.0									
63 SODIUM BICARBON. MIXT. BPC	96.0	141.1	282.2	299.5	316.8	336.0	356.2	477.1	638.4
1 100 L 24.00 4.00									
TOTAL UNIT	96.0	141.1	282.2	299.5	316.8	336.0	356.2	477.1	638.4
TOTAL US $	617	907	1813	1924	2035	2159	2288	3065	4101
44 GLYCEROL									
2 2 KG 0.0 1.8									
35 PHENYLBUTAZONE TBL. 100 MG	2.3	3.4	6.7	7.1	7.5	8.0	8.5	11.3	15.2
1 MIL.TB 1.90 1.20									
36 PHENYLBUTAZONE TBL. 200 MG	4.8	7.1	14.2	15.1	15.9	16.9	17.9	24.0	32.1
1 MIL.TB 2.10 2.30									
64 PANACETAMOL ELIXIR	3060.0	4498.2	8996.4	9547.2	10098.0	10710.0	11352.6	15208.2	20349.0
1 100 L 60.00 51.00									
66 PIPERAZINE CIT, SYRUP	370.0	543.9	1087.8	1154.4	1221.0	1295.0	1372.7	1838.9	2460.5
1 100 L 37.00 10.00									
82 GLYCERINI SUP. 1G, 2G, 4G	597.2	877.9	1755.9	1863.4	1970.9	2090.3	2215.7	2968.3	3971.6
1 100 KG 6.81 87.70									
TOTAL UNIT	4034.3	5930.5	11861.0	12587.2	13313.3	14120.2	14967.4	20050.7	26828.4
TOTAL KWACH	7100.5	10437.7	20875.3	22153.4	23431.5	24851.6	26342.7	35289.2	47218.0
45 GRISEOFULVIN									
1 1 KG 51.0 0.0									
23 GRISEOFULVIN TBL. 125 MG	138.9	204.2	408.5	433.5	458.5	486.3	515.4	690.5	923.4
1 MIL.TB 1.10 126.30									

NO	NAME OF THE MATERIAL	1980	1985	1986	1987	1988	1989	1990	1995	2000
	TOTAL UNIT	138,9	204,2	408,5	433,5	458,5	486,3	515,4	690,5	923,9
	TOTAL US $	7082	10411	20822	22097	23372	24788	26275	35199	47097
46	HYDROCHLORIC ACID									
	2 2 KG .5 0.0									
52	B-KOMPLEX TBL.	.2	.2	.4	.5	.5	.5	.6	.7	1.0
	2 MIL.TB 1.50 .10									
	TOTAL UNIT	.2	.2	.4	.5	.5	.5	.6	.7	1.0
	TOTAL US $	0	0	0	0	0	0	0	0	0
47	HYDROCORTIZONE ACET.									
	1 1 KG 733.2 0.0									
78	HYDROCORTIZON OINT. 1 %	7.0	10.3	20.6	21.8	23.1	24.5	26.0	34.8	46.5
	1 100 KG 7.00 1.00									
	TOTAL UNIT	7.0	10.3	20.6	21.8	23.1	24.5	26.0	34.8	46.5
	TOTAL US $	5133	7545	15090	16014	16938	17964	19042	25509	34132
48	ISONIAZID									
	1 1 KG 7.7 0.0									
24	ISONIAZID TBL. 100 MG	81,0	119,1	238,3	252,8	267,4	283,6	300,7	402,8	538,9
	1 MIL.TB .80 101.30									
48	THIACETAZONE 25+IZONIAZID 66 T	56,1	82,5	164,9	175,0	185,1	196,4	208,1	278,8	373,1
	1 MIL.TB .85 66.00									
49	THIACETAZONE 150+IZONIAZID 300	1920,0	2822,4	5644,8	5990,4	6336,0	6720,0	7123,2	9542,4	12768,0
	1 MIL.TB 6.40 300.00									
	TOTAL UNIT	2057,1	3024,0	6048,0	6418,3	6788,6	7200,0	7632,0	10224,0	13680,0
	TOTAL US $	15802	23229	46458	49302	52147	55307	58626	78536	105084
49	ISOPROPYLALCOHOL									
	2 4 KG .7 0.0									
5	AMITRIPTYLIN TBL. 10 MG	27,9	41,0	82,0	87,0	92,1	97,7	103,5	138,7	185,5
	1 MIL.TB .31 90.00									
6	AMITRIPTYLIN TBL. 25 MG	135,0	198,5	396,9	421,2	445,5	472,5	500,9	671,0	897,7
	1 MIL.TB .75 180.00									

NO	NAME OF THE MATERIAL			TOTAL NEED OF MA 1980	1985
21	FOLIC ACID TBL. 5 MG			328,8	483,3
	2 MIL.TB	8,22	40,00		
37	POTASSIUM SLOW RELEAS TBL.			105,0	154,4
	1 MIL.TB	,70	150,00		
52	B-KOMPLEX TBL.			135,0	198,5
	2 MIL.TB	1,50	90,00		
TOTAL UNIT				731,7	1075,6
TOTAL US $				511	751

50 MAGNESIUM HYDROX.

1 1	KG	1,5	0,0

71	MAGNESIUM HYDROX.MIXT.			257,6	378,7
	1 100 L	112,00	2,30		
TOTAL UNIT				257,6	378,7
TOTAL US $				396	582

51 MAGNESIUM STEARATE

2 1	KG	2,0	0,0

1	ACETAZOLAMIDE TBL. 250 MG			28,4	41,7
	1 MIL.TB	11,35	2,50		
7	CHLOROQUINE TBL. 250 MG			78,3	115,0
	1 MIL.TB	31,30	2,50		
8	CHLORPROMAZINE TBL. 10 MG			,9	1,3
	1 MIL.TB	,75	1,20		
9	CHLORPROMAZINE TBL. 125 MG			7,5	11,0
	1 MIL.TB	5,00	1,50		
10	CODEINE COMP. BPC TBL.			42,3	62,2
	1 MIL.TB	14,10	3,00		
11	COTRIMOXAZOL TBL. BP			5,8	8,5
	3 MIL.TB	2,30	2,50		
15	DIAZEPAM TBL. 2 MG			3,0	4,4
	1 MIL.TB	3,75	,80		
16	DIAZEPAM TBL. 5 MG			2,8	4,2
	1 MIL.TB	3,55	,80		
17	DIPHENOXYLATE TBL. 2,5 MG			1,2	1,8
	1 MIL.TB	1,59	,80		
18	DIGOXIN TBL. 0.25 MG			,6	,9
	1 MIL.TB	,80	,80		
19	EPHEDRINE TBL. 30 MG			6,8	10,0
	1 MIL.TB	3,25	2,10		
20	FERROUS SULPHATE TBL. 200 MG			6,0	8,8
	1 MIL.TB	4,60	1,30		
23	GRISEOFULVIN TBL. 125 MG			1,4	2,1
	1 MIL.TB	1,10	1,30		

1986	1987	1988	1989	1990	1995	2000
966.7	1025.9	1085.0	1150.8	1219.8	1634.1	2186.5
308.7	327.6	346.5	367.5	389.6	521.9	698.2
396.9	421.2	445.5	472.5	500.9	671.0	897.7
2151.2	2282.9	2414.6	2561.0	2714.6	3636.5	4865.8
1502	1594	1686	1788	1896	2539	3398
757.3	803.7	850.1	901.6	955.7	1280.3	1713.0
757.3	803.7	850.1	901.6	955.7	1280.3	1713.0
1164	1235	1306	1385	1468	1967	2632
83.4	88.5	93.6	99.3	105.3	141.0	188.7
230.1	244.1	258.2	273.9	290.3	388.9	520.4
2.6	2.8	3.0	3.2	3.3	4.5	6.0
22.1	23.4	24.8	26.3	27.8	37.3	49.9
124.4	132.0	139.6	148.1	156.9	210.2	281.3
16.9	17.9	19.0	20.1	21.3	28.6	38.2
8.8	9.4	9.9	10.5	11.1	14.9	19.9
8.3	8.9	9.4	9.9	10.5	14.1	18.9
3.6	3.9	4.1	4.3	4.6	6.2	8.2
1.9	2.0	2.1	2.2	2.4	3.2	4.3
20.1	21.3	22.5	23.9	25.3	33.9	45.4
17.6	18.7	19.7	20.9	22.2	29.7	39.8
4.2	4.5	4.7	5.0	5.3	7.1	9.5

NO	NAME OF THE MATERIAL	1980	1985	1986	1987	1988	1989	1990	1995	2000
25	MAGNESIUM TRISILICATE TBL.	24.3	35.8	71.5	75.9	80.3	85.1	90.2	120.9	161.7
1	MIL.TB 12.80 1.90									
26	METHYLDOPA TBL. 250 MG	.8	1.2	2.5	2.6	2.8	3.0	3.1	4.2	5.6
1	MIL.TB .65 1.30									
27	METRONIDAZOL TBL. 200 MG	8.2	12.0	24.0	25.5	26.9	28.6	30.3	40.6	54.3
3	MIL.TB 1.70 4.80									
28	NIRIDAZOLE TBL. 100 MG	2.5	3.6	7.3	7.7	8.2	8.6	9.2	12.3	16.4
1	MIL.TB 1.90 1.30									
29	NIRIDAZOLE TBL. 500 MG	5.7	8.4	16.8	17.8	18.8	20.0	21.1	28.3	37.9
1	MIL.TB 1.90 3.00									
31	PENICILIN V TBL. 125 MG	9.2	13.5	27.0	28.7	30.4	32.2	34.1	45.7	61.2
3	MIL.TB 4.00 2.30									
38	PIPERAZINE TBL. 500 MG	.2	.2	.4	.5	.5	.5	.6	.7	1.0
1	MIL.TB .05 3.00									
41	PROPANTHELIN TBL. 15 MG	1.0	1.4	2.9	3.1	3.2	3.4	3.6	4.9	6.5
1	MIL.TB 1.40 .70									
42	PREDNISOLONE TBL. 5 MG	.9	1.3	2.6	2.7	2.9	3.1	3.2	4.3	5.8
1	MIL.TB 1.25 .70									
43	PYRIDOXIN TBL. 50 MG	.5	.8	1.5	1.6	1.7	1.8	1.9	2.6	3.5
2	MIL.TB .75 .70									
44	QUINIDIN SULF. TBL. 200 MG	1.6	2.4	4.7	5.0	5.3	5.6	5.9	8.0	10.6
1	MIL.TB .80 2.00									
46	SALBUTAMOL TBL. 2 MG	.5	.7	1.4	1.5	1.6	1.7	1.8	2.4	3.2
1	MIL.TB .60 .80									
50	TRIMEXYPHENYDIL TBL. 2 MG	.8	1.2	2.4	2.5	2.6	2.8	3.0	4.0	5.3
1	MIL.TB 1.00 .80									
51	TRIMEXYPHENYDIL TBL. 5 MG	.2	.4	.7	.7	.8	.8	.9	1.2	1.6
1	MIL.TB .30 .80									
TOTAL UNIT		241.4	354.8	709.6	753.1	796.5	844.8	895.5	1199.6	1605.1
TOTAL US $		472	694	1388	1473	1557	1652	1751	2346	3139

52 MAGNESIUM TRISILIC.
1 1 KG 2.4 0.0

25	MAGNESIUM TRISILICATE TBL.	3228.2	4745.4	9490.8	10071.9	10652.9	11298.6	11976.5	16044.0	21467.3
1	MIL.TB 12.80 252.20									
TOTAL UNIT		3228.2	4745.4	9490.8	10071.9	10652.9	11298.6	11976.5	16044.0	21467.3
TOTAL US $		7849	11532	23064	24476	25888	27457	29105	38990	52169

53 MAIZE STARCH
2 1 KG 0.0 1.2

1	ACETAZOLAMIDE TBL. 250 MG	578.8	850.9	1701.8	1806.0	1910.2	2026.0	2147.5	2876.9	3849.4
1	MIL.TB 11.35 51.00									
2	ASCORBIC ACID TBL. 50 MG	260.0	382.2	764.4	811.2	858.0	910.0	964.6	1292.2	1729.0
2	MIL.TB 8.00 32.50									

NO	NAME OF THE MATERIAL	TOTAL NEED OF MATERIALS 1980	1985	1986
3	ASCORBIC ACID TBL. 200 MG	923.0	1356.8	2713.6
	2 MIL.TB 7.10 130.00			
4	ASPIRIN TBL. 300 MG	1615.0	2374.1	4748.1
	1 MIL.TB 34.00 47.50			
5	AMITRIPTYLIN TBL. 10 MG	6.2	9.2	18.3
	1 MIL.TB .31 20.10			
6	AMITRIPTYLIN TBL. 25 MG	39.4	57.9	115.8
	1 MIL.TB .75 52.50			
7	CHLOROQUINE TBL. 250 MG	1596.3	2346.6	4693.1
	1 MIL.TB 31.30 51.00			
8	CHLORPROMAZINE TBL. 10 MG	18.8	27.6	55.1
	1 MIL.TB .75 25.00			
9	CHLORPROMAZINE TBL. 125 MG	150.0	220.5	441.0
	1 MIL.TB 5.00 30.00			
10	CHLORPROMAZINE TBL. 125 MG	390.0	573.3	1146.6
	1 MIL.TB 5.00 78.00			
11	COTRIMOXAZOL TBL. BP	120.8	177.5	355.0
	3 MIL.TB 2.30 52.50			
12	DAPSONE TBL. 10 MG	35.2	51.7	103.4
	1 MIL.TB 1.75 20.10			
13	DAPSONE TBL. 25 MG	173.3	254.7	509.4
	1 MIL.TB 3.30 52.50			
14	DAPSONE TBL. 100 MG	42.0	61.7	123.5
	1 MIL.TB 1.40 30.00			
15	DIAZEPAM TBL. 2 MG	112.5	165.4	330.8
	1 MIL.TB 3.75 30.00			
16	DIAZEPAM TBL. 5 MG	106.5	156.6	313.1
	1 MIL.TB 3.55 30.00			
17	DIPHENOXYLATE TBL. 2,5 MG	46.5	68.4	136.7
	1 MIL.TB 1.55 30.00			
18	DIGOXIN TBL. 0.25 MG	24.0	35.3	70.6
	1 MIL.TB .80 30.00			
19	EPHEDRINE TBL. 30 MG	55.6	81.7	163.4
	1 MIL.TB 3.25 17.10			
20	FERROUS SULPHATE TBL. 200 MG	193.2	284.0	568.0
	1 MIL.TB 4.60 42.00			
21	FOLIC ACID TBL. 5 MG	41.9	61.6	123.3
	2 MIL.TB 8.22 5.10			
22	FUROSEMID TBL. 40 MG	5.7	8.4	16.8
	1 MIL.TB 1.30 4.40			
23	GRISEOFULVIN TBL. 125 MG	27.5	40.4	80.9
	1 MIL.TB 1.10 25.00			
24	ISONIAZID TBL. 100 MG	13.7	20.1	40.2
	1 MIL.TB .80 17.10			
25	MAGNESIUM TRISILICATE TBL.	640.0	940.8	1881.6
	1 MIL.TB 12.80 50.00			
26	METHYLDOPA TBL. 250 MG	16.3	23.9	47.8
	1 MIL.TB .65 25.00			
27	METHONIDAZOL TBL. 200 MG	172.4	253.4	506.8
	3 MIL.TB 1.70 101.40			
28	NIRIDAZOLE TBL. 100 MG	47.5	69.8	139.7
	1 MIL.TB 1.90 25.00			
29	NIRIDAZOLE TBL. 500 MG	114.0	167.6	335.2
	1 MIL.TB 1.90 60.00			

1987	1988	1989	1990	1995	2000
2879.8	3045.9	3230.5	3424.3	4587.3	6137.9
5038.8	5329.5	5652.5	5991.7	8026.6	10739.7
19.4	20.6	21.8	23.1	31.0	41.4
122.8	129.9	137.8	146.1	195.7	261.8
4980.5	5267.8	5587.0	5922.3	7933.6	10615.8
58.5	61.9	65.6	69.6	93.2	124.7
468.0	495.0	525.0	556.5	745.5	997.5
1216.8	1287.0	1365.0	1446.9	1938.3	2593.5
376.7	398.5	422.6	448.0	600.1	803.0
109.7	116.1	123.1	130.5	174.8	233.9
540.5	571.7	606.4	642.8	861.1	1152.1
131.0	138.6	147.0	155.8	208.7	279.3
351.0	371.3	393.8	417.4	559.1	748.1
332.3	351.5	372.8	395.1	529.3	708.2
145.1	153.5	162.8	172.5	231.1	309.2
74.9	79.2	84.0	89.0	119.3	159.6
173.4	183.4	194.5	206.2	276.2	369.6
602.8	637.6	676.2	716.8	960.2	1284.8
130.8	138.3	146.7	155.5	208.4	278.8
17.8	18.9	20.0	21.2	28.4	38.0
85.8	90.8	96.2	102.0	136.7	182.9
42.7	45.1	47.9	50.8	68.0	91.0
1996.8	2112.0	2240.0	2374.4	3180.8	4256.0
50.7	53.6	56.9	60.3	80.8	108.1
537.8	568.9	603.3	639.5	856.7	1146.3
148.2	156.8	166.3	176.2	236.1	315.9
355.7	376.2	399.0	422.9	566.6	758.1

NO	NAME OF THE MATERIAL		1980	1985	1986	1987	1988	1989	1990	1995	2000
31	PENICILLIN V TBL. 125 MG		27.2	40.0	80.0	84.9	89.8	95.2	100.9	135.2	180.9
	3 MIL.TB	4.00 6.80									
32	PHENOBARBITAL TBL. 15 MG		138.0	202.9	405.8	430.7	455.5	483.1	512.1	686.1	918.0
	1 MIL.TB	5.80 23.80									
33	PHENOBARBITAL TBL. 30 MG		16.2	23.8	47.6	50.5	53.5	56.7	60.1	80.5	107.7
	1 MIL.TB	.75 21.60									
34	PIPERAZINE TBL. 500 MG		3.0	4.4	8.8	9.4	9.9	10.5	11.1	14.9	19.9
	1 MIL.TB	.05 60.00									
35	PHENYLBUTAZONE TBL. 100 MG		72.6	106.7	213.4	226.4	239.5	254.0	269.3	360.7	482.7
	1 MIL.TB	1.90 38.20									
36	PHENYLBUTAZONE TBL. 200 MG		160.6	236.2	472.3	501.2	530.1	562.3	596.0	798.4	1068.3
	1 MIL.TB	2.10 76.50									
38	PYRIMETHAMINE TBL. 25 MG		89.3	131.2	262.4	278.5	294.5	312.4	331.1	443.6	593.5
	1 MIL.TB	1.70 52.50									
39	PROMETHAZINE TBL. 10 MG		12.8	18.7	37.5	39.8	42.1	44.6	47.3	63.4	84.8
	1 MIL.TB	.85 15.00									
40	PROMETHAZINE TBL. 25 MG		105.0	154.4	308.7	327.6	346.5	367.5	389.6	521.9	698.2
	1 MIL.TB	2.00 52.50									
41	PROPANTHELIN TBL. 15 MG		21.0	30.9	61.7	65.5	69.3	73.5	77.9	104.4	139.6
	1 MIL.TB	1.40 15.00									
42	PREDNISOLONE TBL. 5 MG		18.8	27.6	55.1	58.5	61.9	65.6	69.6	93.2	124.7
	1 MIL.TB	1.25 15.00									
43	PYRIDOXIN TBL. 50 MG		11.3	16.5	33.1	35.1	37.1	39.4	41.7	55.9	74.8
	2 MIL.TB	.75 15.00									
44	QUINIDIN SULF. TBL. 200 MG		32.0	47.0	94.1	99.8	105.6	112.0	118.7	159.0	212.8
	1 MIL.TB	.80 40.00									
45	SULFADIMIDIN TBL. 500 MG		799.7	1175.5	2351.1	2495.0	2638.9	2798.9	2966.8	3974.4	5317.9
	3 MIL.TB	11.20 71.40									
46	SALBUTAMOL TBL. 2 MG		18.0	26.5	52.9	56.2	59.4	63.0	66.8	89.5	119.7
	1 MIL.TB	.60 30.00									
47	AMINOPHYLIN TBL. 100 MG		691.4	1016.4	2032.8	2157.2	2281.7	2420.0	2565.2	3436.4	4597.9
	1 MIL.TB	18.10 38.20									
48	THIACETAZONE 25+IZONIAZID 66 T		14.5	21.4	42.7	45.3	48.0	50.9	53.9	72.2	96.7
	1 MIL.TB	.85 17.10									
49	THIACETAZONE 150+IZONIAZID 300		209.9	308.6	617.2	655.0	692.7	734.7	778.8	1043.3	1396.0
	1 MIL.TB	6.40 32.80									
50	TRIHEXYPHENYDIL TBL. 2 MG		30.0	44.1	88.2	93.6	99.0	105.0	111.3	149.1	199.5
	1 MIL.TB	1.00 30.00									
51	TRIHEXYPHENYDIL TBL. 5 MG		9.0	13.2	26.5	28.1	29.7	31.5	33.4	44.7	59.8
	1 MIL.TB	.30 30.00									
52	B-KOMPLEX TBL.		19.5	28.7	57.3	60.8	64.4	68.3	72.3	96.9	129.7
	2 MIL.TB	1.50 13.00									
53	AMPICILIN CPS. 250 MG		26.7	39.2	78.4	83.1	87.9	93.3	98.9	132.5	177.2
	3 MIL.TB	4.10 6.50									
54	CHLORAMPHENICOL CPS. 250 MG		15.5	22.8	45.6	48.4	51.2	54.3	57.5	77.0	103.1
	3 MIL.TB	2.50 6.20									
55	MULTIVITAMIN BP CPS.		475.1	698.5	1396.9	1482.5	1568.0	1663.0	1762.8	2361.5	3159.7
	2 MIL.TB	21.50 22.10									
56	TETRACYCLINE CPS. 250 MG		112.2	165.0	329.9	350.1	370.3	392.8	416.3	557.7	746.3
	3 MIL.TB	18.10 6.20									
TOTAL UNIT			10695.2	15721.9	31443.8	33368.9	35294.0	37433.0	39679.0	53154.9	71122.8
TOTAL KWACH			12727.2	18709.0	37418.1	39709.0	41999.9	44545.3	47218.0	63258.3	84636.1

NO	NAME OF THE MATERIAL			TOTAL NEED OF MA	
				1980	1985
54	METHYLCELLULOSE				
2 1	KG	8.7	0.0		
5	AMITRIPTYLIN TBL. 10 MG			.7	1.0
1	MIL.TB	.31	2.30		
6	AMITRIPTYLIN TBL. 25 MG			3.4	5.0
1	MIL.TB	.75	4.50		
21	FOLIC ACID TBL. 5 MG			9.9	14.5
2	MIL.TB	8.22	1.20		
30	PARACETAMOL TBL. 500 MG			402.0	590.9
1	MIL.TB	33.50	12.00		
52	B-KOMPLEX TBL.			6.8	9.9
2	MIL.TB	1.50	4.50		
TOTAL UNIT				422.7	621.4
TOTAL US $				3660	5381
55	METHYLDOPA				
1 1	KG	49.6	0.0		
26	METHYLDOPA TBL. 250 MG			163.9	240.9
1	MIL.TB	.65	252.10		
TOTAL UNIT				163.9	240.9
TOTAL US $				8125	11943
56	METHYLENCHLORID				
2 2	KG	.5	0.0		
5	AMITRIPTYLIN TBL. 10 MG			27.9	41.0
1	MIL.TB	.31	90.00		
6	AMITRIPTYLIN TBL. 25 MG			135.0	198.5
1	MIL.TB	.75	180.00		
21	FOLIC ACID TBL. 5 MG			328.8	483.3
2	MIL.TB	8.22	40.00		
30	PARACETAMOL TBL. 500 MG			3577.8	5259.4
1	MIL.TB	33.50	106.80		
52	B-KOMPLEX TBL.			135.0	198.5
2	MIL.TB	1.50	90.00		
TOTAL UNIT				4204.5	6180.6
TOTAL US $				2290	3367

1986	1987	1988	1989	1990	1995	2000
2.1	2.2	2.4	2.5	2.6	3.5	4.7
9.9	10.5	11.1	11.8	12.5	16.8	22.4
29.0	30.8	32.6	34.5	36.6	49.0	65.6
1181.9	1254.2	1326.6	1407.0	1491.4	1997.9	2673.3
19.8	21.1	22.3	23.6	25.0	33.5	44.9
1242.7	1318.8	1394.9	1479.5	1568.2	2100.8	2811.0
10761	11420	12079	12811	13580	18192	24341

481.8	511.3	540.8	573.5	607.9	814.4	1089.7
481.8	511.3	540.8	573.5	607.9	814.4	1089.7
23886	25349	26811	28436	30142	40379	54029

82.0	87.0	92.1	97.7	103.5	138.7	185.5
396.9	421.2	445.5	472.5	500.9	671.0	897.7
966.7	1025.9	1085.0	1150.8	1219.8	1634.1	2186.5
10518.7	11162.7	11806.7	12522.3	13273.6	17781.7	23792.4
396.9	421.2	445.5	472.5	500.9	671.0	897.7
12361.2	13118.0	13874.9	14715.8	15598.7	20896.4	27959.9
6733	7145	7558	8016	8496	11382	15230

NO	NAME OF THE MATERIAL	1980	1985	1986	1987	1988	1989	1990	1995	2000
57	METHYLPARABENE									
	2 1 KG 5.3 0.0									
24	ISONIAZID TBL. 100 MG	.1	.1	.2	.2	.3	.3	.3	.4	.5
	1 MIL.TB .80 .10									
68	THIACETAZONE 25+IZONIAZID 66 T	.1	.1	.2	.3	.3	.3	.3	.4	.6
	1 MIL.TB .85 .10									
69	THIACETAZONE 150+IZONIAZID 300	1.3	1.9	3.8	4.0	4.2	4.5	4.7	6.4	8.5
	1 MIL.TB 6.40 .20									
TOTAL UNIT		1.4	2.1	4.2	4.5	4.8	5.1	5.4	7.2	9.6
TOTAL US $		8	11	23	24	25	27	28	38	51
58	METHYLSALICYLATE									
	1 2 KG 3.9 0.0									
61	LIN. METHYLSALICYLATE	375.0	551.3	1102.5	1170.0	1237.5	1312.5	1391.3	1863.8	2493.7
	1 100 L 15.00 25.00									
65	METHYLSALICYLATE OINT.	2500.0	3675.0	7350.0	7800.0	8250.0	8750.0	9275.0	12425.0	16625.0
	1 100 KG 50.00 50.00									
TOTAL UNIT		2875.0	4226.3	8452.5	8970.0	9487.5	10062.5	10666.3	14288.8	19118.7
TOTAL US $		11243	16527	33054	35078	37102	39351	41712	55878	74766
59	METRONIDAZOL									
	1 1 KG 23.6 0.0									
27	METRONIDAZOL TBL. 200 MG	342.5	503.5	1007.1	1068.8	1130.4	1198.9	1270.9	1702.5	2278.0
	3 MIL.TB 1.70 201.50									
TOTAL UNIT		342.5	503.5	1007.1	1068.8	1130.4	1198.9	1270.9	1702.5	2278.0
TOTAL US $		8085	11885	23771	25226	26682	28299	29997	40184	53767
60	MILK SUGAR									
	2 1 KG 1.0 0.0									
25	MAGNESIUM TRISILICATE TBL.	821.8	1208.0	2416.0	2563.9	2711.8	2876.2	3048.7	4084.1	5464.7
	1 MIL.TB 12.80 68.20									
TOTAL UNIT		821.8	1208.0	2416.0	2563.9	2711.8	2876.2	3048.7	4084.1	5464.7
TOTAL US $		803	1181	2362	2507	2651	2812	2981	3993	5343

NO	NAME OF THE MATERIAL	1980	1985	1986	1987	1988	1989	1990	1995	2000
61	MILK SUGAR 2 1 KG 1.0 0.0									
1	ACETAZOLAMIDE TBL. 250 MG 1 MIL.TB 11.35 197.50	2241.6	3295.2	6590.4	6993.9	7397.4	7845.7	8316.4	11140.9	14906.8
2	ASCORBIC ACID TBL. 50 MG 2 MIL.TB 8.00 35.00	280.0	411.6	823.2	873.6	924.0	980.0	1038.8	1391.6	1862.0
3	ASCORBIC ACID TBL. 200 MG 2 MIL.TB 7.10 140.00	994.0	1461.2	2922.4	3101.3	3280.2	3479.0	3687.7	4940.2	6610.1
5	AMITRIPTYLIN TBL. 10 MG 1 MIL.TB .31 85.10	26.4	38.8	77.6	82.3	87.1	92.3	97.9	131.1	175.4
6	AMITRIPTYLIN TBL. 25 MG 1 MIL.TB .75 212.70	159.5	234.5	469.0	497.7	526.4	558.3	591.8	792.8	1060.8
7	CHLOROQUINE TBL. 250 MG 1 MIL.TB 31.30 192.50	6025.3	8857.1	17714.2	18798.8	19883.3	21088.4	22353.7	29945.5	40067.9
8	CHLORPROMAZINE TBL. 10 MG 1 MIL.TB .75 96.30	72.2	106.2	212.3	225.3	238.3	252.8	268.0	359.0	480.3
9	CHLORPROMAZINE TBL. 125 MG 1 MIL.TB 5.00 140.50	702.5	1032.7	2065.4	2191.8	2318.3	2458.8	2606.3	3491.4	4671.6
12	DAPSONE TBL. 10 MG 1 MIL.TB 1.75 85.10	148.9	218.9	437.8	464.6	491.5	521.2	552.5	740.2	990.4
13	DAPSONE TBL. 25 MG 1 MIL.TB 3.30 212.70	701.9	1031.8	2063.6	2190.0	2316.3	2456.7	2604.1	3488.5	4667.7
14	DAPSONE TBL. 100 MG 1 MIL.TB 1.40 162.00	226.8	333.4	666.8	707.6	748.4	793.8	841.4	1127.2	1508.2
15	DIAZEPAM TBL. 2 MG 1 MIL.TB 3.75 114.10	427.9	629.0	1258.0	1335.0	1412.0	1497.6	1587.4	2126.5	2845.4
16	DIAZEPAM TBL. 5 MG 1 MIL.TB 3.55 111.00	394.1	579.3	1158.5	1229.4	1300.4	1379.2	1461.9	1958.4	2620.4
17	DIPHENOXYLATE TBL. 2.5 MG 1 MIL.TB 1.55 114.10	176.9	260.0	520.0	551.8	583.6	619.0	656.1	879.0	1176.1
18	DIGOXIN TBL. 0.25 MG 1 MIL.TB .80 116.00	92.8	136.4	272.8	289.5	306.2	324.8	344.3	461.2	617.1
19	EPHEDRINE TBL. 30 MG 1 MIL.TB 3.25 118.80	386.1	567.6	1135.1	1204.6	1274.1	1351.4	1432.4	1918.9	2567.6
21	FOLIC ACID TBL. 5 MG 2 MIL.TB 8.22 19.50	160.3	235.6	471.3	500.1	529.0	561.0	594.7	796.6	1065.9
22	FUROSEMID TBL. 40 MG 1 MIL.TB 1.30 26.40	34.3	50.5	100.9	107.1	113.3	120.1	127.3	170.6	228.2
23	GRISEOFULVIN TBL. 125 MG 1 MIL.TB 1.10 93.00	102.3	150.4	300.8	319.2	337.6	358.0	379.5	508.4	680.3
26	METHYLDOPA TBL. 250 MG 1 MIL.TB .65 17.80	11.6	17.0	34.0	36.1	38.2	40.5	42.9	57.5	76.9
27	METRONIDAZOL TBL. 200 MG 3 MIL.TB 1.70 173.80	295.5	434.3	868.7	921.8	975.0	1034.1	1096.2	1468.4	1964.8
28	NIRIDAZOLE TBL. 100 MG 1 MIL.TB 1.90 118.70	225.5	331.5	663.1	703.7	744.2	789.4	836.7	1120.9	1499.8
29	NIRIDAZOLE TBL. 500 MG 1 MIL.TB 1.90 24.80	47.1	69.3	138.5	147.0	155.5	164.9	174.8	234.2	313.3
31	PENICILIN V TBL. 125 MG 3 MIL.TB 4.00 81.00	324.0	476.3	952.6	1010.9	1069.2	1134.0	1202.0	1610.3	2154.6

NO NAME OF THE MATERIAL	1980	1985	1986	1987	1988	1989	1990	1995	2000
32 PHENOBARBITAL TBL. 15 MG	138.0	202.9	405.8	430.7	455.5	483.1	512.1	686.1	918.0
1 MIL.TB 5.80 23.80									
33 PHENOBARBITAL TBL. 30 MG	16.2	23.8	47.6	50.5	53.5	56.7	60.1	80.5	107.7
1 MIL.TB .75 = 21.60									
34 PIPERAZINE TBL. 500 MG	1.2	1.8	3.6	3.9	4.1	4.3	4.6	6.2	8.2
1 MIL.TB .05 24.80									
35 PHENYLBUTAZONE TBL. 100 MG	109.3	160.6	321.2	340.9	360.5	382.4	405.3	543.0	726.5
1 MIL.TB 1.90 57.50									
36 PHENYLBUTAZONE TBL. 200 MG	250.9	368.9	737.8	783.0	828.1	878.3	931.0	1247.2	1668.8
1 MIL.TB 2.10 119.50									
38 PYRIMETHAMINE TBL. 25 MG	361.6	531.5	1063.1	1128.2	1193.2	1265.6	1341.5	1797.1	2404.6
1 MIL.TB 1.70 212.70									
39 PROMETHAZINE TBL. 10 MG	103.2	151.7	303.4	322.0	340.5	361.2	382.8	512.9	686.2
1 MIL.TB .85 121.40									
40 PROMETHAZINE TBL. 25 MG	425.4	625.3	1250.7	1327.2	1403.8	1488.9	1578.2	2114.2	2828.9
1 MIL.TB 2.00 212.70									
41 PROPANTHELIN TBL. 15 MG	163.4	240.2	480.3	509.7	539.2	571.8	606.1	812.0	1086.5
1 MIL.TB 1.40 116.70									
42 PREDNISOLONE TBL. 5 MG	158.4	232.8	465.6	494.1	522.6	554.3	587.6	787.1	1053.2
1 MIL.TB 1.25 126.70									
43 PYRIDOXIN TBL. 50 MG	61.3	90.1	180.1	191.2	202.2	214.5	227.3	304.5	407.5
2 MIL.TB .75 81.70									
44 QUINIDIN SULF. TBL. 200 MG	118.8	174.6	349.3	370.7	392.0	415.8	440.7	590.4	790.0
1 MIL.TB .80 148.50									
46 SALBUTAMOL TBL. 2 MG	68.5	100.6	201.3	213.6	225.9	239.6	254.0	340.2	455.3
1 MIL.TB .60 114.10									
47 AMINOPHYLIN TBL. 100 MG	119.5	175.6	351.2	372.7	394.2	418.1	443.2	593.7	794.6
1 MIL.TB 18.10 6.60									
50 TRIMEXYPHENYDIL TBL. 2 MG	114.1	167.7	335.5	356.0	376.5	399.4	423.3	567.1	758.8
1 MIL.TB 1.00 114.10									
51 TRIMEXYPHENYDIL TBL. 5 MG	33.3	49.0	97.9	103.9	109.9	116.6	123.5	165.5	221.4
1 MIL.TB .30 111.00									
52 B-KOMPLEX TBL.	24.5	35.9	71.9	76.3	80.7	85.6	90.7	121.5	162.6
2 MIL.TB 1.50 16.30									
TOTAL UNIT	16524.9	24291.6	48583.1	51557.6	54532.1	57837.0	61307.3	82128.6	109890.4
TOTAL US $	16156	23749	47497	50405	53313	56545	59937	80293	107435

62 NICOTINAMIDE
1 1 MG 7.0 0.0

52 B-KOMPLEX TBL.	30.0	44.1	88.2	93.6	99.0	105.0	111.3	149.1	199.5
2 MIL.TB 1.50 20.00									
55 MULTIVITAMIN BP CPS.	161.3	237.0	474.1	503.1	532.1	564.4	598.2	801.4	1072.3
2 MIL.TB 21.50 7.50									
TOTAL UNIT	191.3	281.1	562.3	596.7	631.1	669.4	709.5	950.5	1271.8
TOTAL US $	1336	1963	3927	4167	4407	4674	4955	6638	8881

NO NAME OF THE MATERIAL	1980	1985	1986	1987	1988	1989	1990	1995	2000
63 NIRIDAZOLE									
1 1 KG 44.0 0.0									
28 NIRIDAZOLE TBL. 100 MG	192.3	282.7	565.3	599.9	634.5	673.0	713.4	955.6	1278.7
1 MIL.TB 1.90 101.20									
29 NIRIDAZOLE TBL. 500 MG	956.1	1405.4	2810.9	2983.0	3155.1	3346.3	3547.1	4751.7	6357.9
1 MIL.TB 1.90 503.20									
TOTAL UNIT	1148.4	1688.1	3376.2	3582.9	3789.6	4019.3	4260.4	5707.3	7636.6
TOTAL US $	50521	74266	148533	157627	166721	176825	187434	251091	335967
64 ORANGE SYRUP									
2 2 LT .9 0.0									
60 FE-SULFAT MIXT. BPC	100.0	147.0	294.0	312.0	330.0	350.0	371.0	497.0	665.0
1 100 L 20.00 5.00									
TOTAL UNIT	100.0	147.0	294.0	312.0	330.0	350.0	371.0	497.0	665.0
TOTAL US $	86	126	253	268	283	301	319	427	571
65 PARACETAMOL									
1 1 KG 14.0 0.0									
30 PARACETAMOL TBL. 500 MG	16920.8	24873.6	49747.3	52793.1	55838.8	59223.0	62776.4	84096.6	112523.6
1 MIL.TB 33.50 505.10									
64 PARACETAMOL ELIXIR	144.0	211.7	423.4	449.3	475.2	504.0	534.2	715.7	957.6
1 100 L 60.00 2.40									
TOTAL UNIT	17064.8	25085.3	50170.7	53242.3	56314.0	59727.0	63310.6	84812.3	113481.2
TOTAL US $	238336	350354	700708	743608	786509	834176	884226	1184529	1584934
66 PARAFIN LIQ.									
2 2 KG 0.0 .9									
47 AMINOPHYLIN TBL. 100 MG	3.6	5.3	10.6	11.3	11.9	12.7	13.4	18.0	24.1
1 MIL.TB 18.10 .20									
TOTAL UNIT	3.6	5.3	10.6	11.3	11.9	12.7	13.4	18.0	24.1
TOTAL KWACH	3.3	4.8	9.7	10.3	10.9	11.5	12.2	16.4	21.9

NO NAME OF THE MATERIAL	1980	1985	1986	1987	1988	1989	1990	1995	2000
67 PARAFINE									
2 1 KG 0.0 .9									
10 CODEINE COMP. BPC TBL.	42.3	62.2	124.4	132.0	139.6	148.1	156.9	210.2	281.3
1 MIL.TB 14.10 3.00									
47 AMINOPHYLIN TBL. 100 MG	19.9	29.3	58.5	62.1	65.7	69.7	73.9	99.0	132.4
1 MIL.TB 18.10 1.10									
TOTAL UNIT	62.2	91.4	182.9	194.1	205.3	217.7	230.8	309.2	413.7
TOTAL KWACH	57.9	85.0	170.1	180.5	190.9	202.5	214.6	287.5	384.7
68 PARAFINE LIQ.									
2 2 KG 0.0 .9									
79 CHLORHEXIDIN OINT.	540.0	793.8	1587.6	1684.8	1782.0	1890.0	2003.4	2683.8	3591.0
1 100 KG 50.00 10.00									
TOTAL UNIT	540.0	793.8	1587.6	1684.8	1782.0	1890.0	2003.4	2683.8	3591.0
TOTAL KWACH	491.4	722.4	1444.7	1533.2	1621.6	1719.9	1823.1	2442.3	3267.8
69 PEPPERMINT OIL									
1 2 KG 13.9 0.0									
25 MAGNESIUM TRISILICATE TBL.	39.7	58.3	116.7	123.8	130.9	138.9	147.2	197.2	263.9
1 MIL.TB 12.80 3.10									
TOTAL UNIT	39.7	58.3	116.7	123.8	130.9	138.9	147.2	197.2	263.9
TOTAL US $	551	811	1621	1720	1820	1930	2046	2741	3667
70 PEPPERMINT SPIRT									
2 4 LT 7.6 0.0									
66 PIPERAZINE CIT, SYRUP	18.5	27.2	54.4	57.7	61.1	64.8	68.6	91.9	123.0
1 100 L 37.00 .50									
TOTAL UNIT	18.5	27.2	54.4	57.7	61.1	64.8	68.6	91.9	123.0
TOTAL US $	140	205	411	436	461	489	519	695	930

NO	NAME OF THE MATERIAL	TOTAL NEED OF MATE 1980	1985
71	PHENACETIN		
	1 1 KG 1.3 0.0		
	10 CODEINE COMP. BPC TBL.	3541,9	5206.6
	1 MIL.TB 14.10 251.20		
TOTAL UNIT		3541.9	5206.6
TOTAL US $		4601	6763
72	PHENOBARBITAL		
	1 1 KG 17.2 0.0		
	32 PHENOBARBITAL TBL. 15 MG	90.5	133.0
	1 MIL.TB 5.80 15.60		
	33 PHENOBARBITAL TBL. 30 MG	23.4	34.4
	1 MIL.TB .75 31.20		
TOTAL UNIT		113.9	167.4
TOTAL US $		1956	2876
73	PHENOXYMETHYLPENICILIN CALC.		
	1 1 KG 37.0 0.0		
	31 PENICILIN V TBL. 125 MG	506.0	743.8
	3 MIL.TB 4.00 126.50		
	72 PHENOXYMETHYLPENICILIN SUSP.	10.2	15.0
	3 100 L 8.50 1.20		
TOTAL UNIT		516.2	758.8
TOTAL US $		19105	28085
74	PHENYLBUTAZONE		
	1 1 KG 15.4 0.0		
	35 PHENYLBUTAZONE TBL. 100 MG	192.9	283.5
	1 MIL.TB 1.90 101.50		
	36 PHENYLBUTAZONE TBL. 200 MG	426.3	626.?
	1 MIL.TB 2.10 203.00		
TOTAL UNIT		619.2	910.2
TOTAL US $		9555	14046

1986	1987	1988	1989	1990	1995	2000
10413.2	11050.8	11688.3	12396.7	13140.5	17603.3	23553.8
10413.2	11050.8	11688.3	12396.7	13140.5	17603.3	23553.8
13526	14354	15182	16102	17068	22865	30594
266.0	282.3	298.6	316.7	335.7	449.7	601.7
68.8	73.0	77.2	81.9	86.8	116.3	155.6
334.8	355.3	375.8	398.6	422.5	566.0	757.3
5752	6104	6456	6847	7258	9723	13010
1487.6	1578.7	1669.8	1771.0	1877.3	2514.8	3364.9
30.0	31.8	33.7	35.7	37.8	50.7	67.8
1517.6	1610.5	1703.5	1806.7	1915.1	2565.5	3432.7
56169	59608	63047	66868	70880	94953	127049
567.0	601.7	636.4	675.0	715.5	958.5	1282.5
1253.3	1330.1	1406.8	1492.1	1581.6	2118.7	2834.9
1820.3	1931.7	2043.2	2167.0	2297.0	3077.2	4117.3
28093	29813	31533	33444	35450	47490	63543

NO	NAME OF THE MATERIAL	TOTAL NEED OF MA 1980	1985
75	PHOLCODINE		
	1 1 KG 26.7 0.0		
	68 PHOLCODINE LINCTUS	21.0	30.9
	1 100 L 210.00 .10		
TOTAL UNIT		21.0	30.9
TOTAL US $		560	823
76	PIPERAZINE CITR.		
	1 1 KG 3.2 0.0		
	34 PIPERAZINE TBL. 500 MG	25.3	37.1
	1 MIL.TB .05 505.20		
	66 PIPERAZINE CIT, SYRUP	691.9	1017.1
	1 100 L 37.00 18.70		
TOTAL UNIT		717.2	1054.2
TOTAL US $		2304	3386
77	POTASSIUM CHLORIDE		
	1 1 KG 1.1 0.0		
	37 POTASSIUM SLOW RELEAS TBL.	350.0	514.5
	1 MIL.TB .70 500.00		
TOTAL UNIT		350.0	514.5
TOTAL US $		391	575
78	POTASSIUM IODIDE		
	1 1 KG 13.6 0.0		
	58 BELLAD. +EPHEDR. MIXT. BPC	11.0	16.2
	1 100 L 11.00 1.00		
TOTAL UNIT		11.0	16.2
TOTAL US $		150	220

1986	1987	1988	1989	1990	1995	2000
61.7	65.5	69.3	73.5	77.9	104.4	139.6
61.7	65.5	69.3	73.5	77.9	104.4	139.6
1647	1748	1849	1961	2078	2784	3725
74.3	78.8	83.4	88.4	93.7	125.5	168.0
2034.2	2158.7	2283.3	2421.6	2566.9	3438.7	4601.1
2108.5	2237.5	2366.6	2510.1	2660.7	3564.3	4769.1
6773	7188	7602	8063	8547	11450	15320
1029.0	1092.0	1155.0	1225.0	1298.5	1739.5	2327.5
1029.0	1092.0	1155.0	1225.0	1298.5	1739.5	2327.5
1150	1220	1291	1369	1451	1944	2601
32.3	34.3	36.3	38.5	40.8	54.7	73.1
32.3	34.3	36.3	38.5	40.8	54.7	73.1
440	467	494	524	556	744	996

NO	NAME OF THE MATERIAL	1980	1985	1986	1987	1988	1989	1990	1995	2000
79	PREDNISOLONE									
	1 1 KG 1117.3 0.0									
	42 PREDNISOLONE TBL. 5 MG	6.4	9.4	18.7	19.9	21.0	22.3	23.7	31.7	42.4
	1 MIL.TB 1.25 5.10									
TOTAL UNIT		6.4	9.4	18.7	19.9	21.0	22.3	23.7	31.7	42.4
TOTAL US $		7123	10471	20941	22223	23506	24930	26426	35401	47367
80	PROMETHAZINE HCL									
	1 1 KG 35.9 0.0									
	39 PROMETHAZINE TBL. 10 MG	8.8	13.0	26.0	27.6	29.2	30.9	32.8	43.9	58.8
	1 MIL.TB .85 10.40									
	40 PROMETHAZINE TBL. 25 MG	51.0	75.0	149.9	159.1	168.3	178.5	189.2	253.5	339.1
	1 MIL.TB 2.00 25.50									
	62 PROMETHAZINE ELIXIR	19.5	28.7	57.3	60.8	64.4	68.3	72.3	96.9	129.7
	1 100 L 65.00 .30									
TOTAL UNIT		79.3	116.6	233.3	247.5	261.8	277.7	294.4	394.3	527.6
TOTAL US $		2851	4190	8381	8894	9407	9977	10576	14167	18956
81	PROPANTHELINE BR									
	1 1 KG 272.7 0.0									
	41 PROPANTHELIN TBL. 15 MG	21.6	31.7	63.4	67.3	71.1	75.5	80.0	107.2	143.4
	1 MIL.TB 1.40 15.40									
TOTAL UNIT		21.6	31.7	63.4	67.3	71.1	75.5	80.0	107.2	143.4
TOTAL US $		5879	8643	17285	18343	19402	20578	21812	29220	39097
82	PROPYLENEGLYCOL									
	2 2 LT .9 0.0									
	64 PARACETAMOL ELIXIN	600.0	882.0	1764.0	1872.0	1980.0	2100.0	2226.0	2982.0	3990.0
	1 100 L 60.00 10.00									
TOTAL UNIT		600.0	882.0	1764.0	1872.0	1980.0	2100.0	2226.0	2982.0	3990.0
TOTAL US $		545	801	1601	1699	1797	1906	2021	2707	3622

NO	NAME OF THE MATERIAL	1980	1985	1986	1987	1988	1989	1990	1995	2000
83	PROPYLENGLYCOL 2 2 KG 9.1 0.0									
75	SULFACETAMID EYE DROPS 10 % 1 100 L 6.50 5.00	32.5	47.8	95.6	101.4	107.3	113.8	120.6	161.5	216.1
76	CHLORAMPHENICOL EYE OINT. 1% 3 100 KG 3.70 5.00	18.5	27.2	54.4	57.7	61.1	64.8	68.6	91.9	123.0
78	HYDROCONTIZON OINT. 1 % 1 100 KG 7.00 5.00	35.0	51.5	102.9	109.2	115.5	122.5	129.9	174.0	232.7
TOTAL UNIT		86.0	126.4	252.8	268.3	283.8	301.0	319.1	427.4	571.9
TOTAL US $		781	1148	2295	2436	2576	2733	2896	3880	5192
84	PYRIDOXIN HCL 100% 1 1 KG 51.3 0.0									
43	PYRIDOXIN TBL. 50 MG 2 MIL.TB .75 51.20	38.4	56.4	112.9	119.8	126.7	134.4	142.5	190.8	255.4
52	B-KOMPLEX TBL. 2 MIL.TB 1.50 1.00	1.5	2.2	4.4	4.7	5.0	5.3	5.6	7.5	10.0
TOTAL UNIT		39.9	58.7	117.3	124.5	131.7	139.6	148.0	198.3	265.3
TOTAL US $		2048	3010	6021	6390	6758	7168	7598	10178	13619
85	PYRIMETHAMINE 1 1 KG 224.2 0.0									
38	PYRIMETHAMINE TBL. 25 MG 1 MIL.TB 1.70 25.50	43.3	63.7	127.4	135.3	143.1	151.7	160.8	215.4	288.3
TOTAL UNIT		43.3	63.7	127.4	135.3	143.1	151.7	160.8	215.4	288.3
TOTAL US $		9717	14285	28569	30318	32067	34011	36052	48296	64621
86	QUINIDIN SULPH. 1 1 KG 129.2 0.0									
44	QUINIDIN SULF. TBL. 200 MG 1 MIL.TB .80 202.50	162.0	238.1	476.3	505.4	534.6	567.0	601.0	805.1	1077.3
TOTAL UNIT		162.0	238.1	476.3	505.4	534.6	567.0	601.0	805.1	1077.3
TOTAL US $		20929	3 765	61531	[illegible]	[illegible]	73251	77646	104016	139176

NO NAME OF THE MATERIAL	1980	1985	1986	1987	1988	1989	1990	1995	2000
87 RASPBERRY JUICE									
2 2 LT 2.1 0.0									
64 PARACETAMOL ELIXIR	150.0	220.5	441.0	468.0	495.0	525.0	556.5	745.5	997.5
1 100 L 60.00 2.50									
TOTAL UNIT	150.0	220.5	441.0	468.0	495.0	525.0	556.5	745.5	997.5
TOTAL US $	309	454	908	964	1020	1082	1146	1536	2055
88 RASPHBERRY SYRUP									
2 2 KG .5 0.0									
73 SULPHADIMIDINE SUSP.	1440.0	2116.8	4233.6	4492.8	4752.0	5040.0	5342.4	7156.8	9576.0
3 100 L 72.00 20.00									
TOTAL UNIT	1440.0	2116.8	4233.6	4492.8	4752.0	5040.0	5342.4	7156.8	9576.0
TOTAL US $	708	1035	2069	2196	2323	2464	2612	3498	4681
89 RIBOFLAVIN									
1 1 KG 160.6 0.0									
52 B-KOMPLEX TBL.	3.0	4.4	8.8	9.4	9.9	10.5	11.1	14.9	19.9
2 MIL.TB 1.50 2.00									
55 MULTIVITAMIN BP CPS.	10.8	15.8	31.6	33.5	35.5	37.6	39.9	53.4	71.5
2 MIL.TB 21.50 .50									
TOTAL UNIT	13.8	20.2	40.4	42.9	45.4	48.1	51.0	68.3	91.4
TOTAL US $	2208	3246	6493	6890	7288	7730	8193	10976	14686
90 SALBUTAMOLE									
1 1 KG 1055.9 0.0									
46 SALBUTAMOL TBL. 2 MG	1.3	1.9	3.7	3.9	4.2	4.4	4.7	6.3	8.4
1 MIL.TB .60 2.10									
TOTAL UNIT	1.3	1.9	3.7	3.9	4.2	4.4	4.7	6.3	8.4
TOTAL US $	1330	1956	3911	4151	4390	4656	4936	6612	8847

NO NAME OF THE MATERIAL	1980	1985	1986	1987	1988	1989	1990	1995	2000
91 SALICYLIC ACID									
2 1 KG 5.2 0.0									
77 BENZOIC ACID OINT. BPC	150.0	220.5	441.0	468.0	495.0	525.0	556.5	745.5	997.5
1 100 KG 50.00 3.00									
TOTAL UNIT	150.0	220.5	441.0	468.0	495.0	525.0	556.5	745.5	997.5
TOTAL US $	786	1155	2310	2451	2593	2750	2915	3905	5224
92 SIMPLE LINCT.									
1 2 LT 6.5 0.0									
67 SIMPLE LINCT. PEDIATR	6000.0	8820.0	17640.0	18720.0	19800.0	21000.0	22260.0	29820.0	39900.0
1 100 L 240.00 25.00									
TOTAL UNIT	6000.0	8820.0	17640.0	18720.0	19800.0	21000.0	22260.0	29820.0	39900.0
TOTAL US $	50908	74835	149669	158832	167996	178177	188868	253012	338537
93 SODIUM BICARBONATE									
1 1 KG .7 0.0									
63 SODIUM BICARBON. MIXT. BPC	24.0	35.3	70.6	74.9	79.2	84.0	89.0	119.3	159.6
1 100 L 24.00 1.00									
TOTAL UNIT	24.0	35.3	70.6	74.9	79.2	84.0	89.0	119.3	159.6
TOTAL US $	18	26	52	55	59	62	66	88	118
94 SODIUM CARBONATE									
1 1 KG .4 0.0									
82 GLYCERINI SUP. 1G, 2G, 4G	30.0	44.0	88.1	93.5	98.9	104.9	111.2	148.9	199.3
1 100 KG 6.81 4.40									
TOTAL UNIT	30.0	44.0	88.1	93.5	98.9	104.9	111.2	148.9	199.3
TOTAL US $	13	19	38	40	43	45	48	64	86

NO NAME OF THE MATERIAL	1980	1985	1986	1987	1988	1989	1990	1995	2000
95 SOLUBLE STARCH									
2 1 KG 1.9 0.0									
22 FUROSEMID TBL. 40 MG	4.2	6.1	12.2	13.0	13.7	14.6	15.4	20.7	27.7
1 MIL.TB 1.30 3.20									
30 PARACETAMOL TBL. 500 MG	402.0	590.9	1181.9	1254.2	1326.6	1407.0	1491.4	1997.9	2673.3
1 MIL.TB 53.50 12.00									
32 PHENOBARBITAL TBL. 15 MG	.6	.9	1.7	1.8	1.9	2.0	2.2	2.9	3.9
1 MIL.TB 5.80 .10									
33 PHENOBARBITAL TBL. 30 MG	.1	.1	.2	.2	.2	.3	.3	.4	.5
1 MIL.TB .75 .10									
35 PHENYLBUTAZONE TBL. 100 MG	4.0	5.9	11.7	12.4	13.2	14.0	14.8	19.8	26.5
1 MIL.TB 1.90 2.10									
36 PHENYLBUTAZONE TBL. 200 MG	9.4	13.9	27.8	29.5	31.2	33.1	35.1	47.0	62.8
1 MIL.TB 2.10 4.50									
45 SULFADIMIDIN TBL. 500 MG	67.2	98.8	197.6	209.7	221.8	235.2	249.3	334.0	446.9
3 MIL.TB 11.20 6.00									
47 AMINOPHYLIN TBL. 100 MG	81.4	119.7	239.5	254.1	268.8	285.1	302.2	404.8	541.6
1 MIL.TB 18.10 4.50									
TOTAL UNIT	568.9	836.3	1672.6	1775.0	1877.4	1991.2	2110.6	2827.5	3783.2
TOTAL US $	1057	1553	3107	3297	3487	3699	3921	5252	7027
96 STEARINIC ACID									
2 1 KG 7.0 0.0									
53 AMPICILIN CPS. 250 MG	26.2	38.6	77.1	81.9	86.6	91.8	97.4	130.4	174.5
3 MIL.TB 4.10 6.40									
54 CHLORAMPHENICOL CPS. 250 MG	16.0	23.5	47.0	49.9	52.8	56.0	59.4	79.5	106.4
3 MIL.TB 2.50 6.40									
55 MULTIVITAMIN BP CPS.	129.0	189.6	379.3	402.5	425.7	451.5	478.6	641.1	857.8
2 MIL.TB 21.50 6.00									
56 TETRACYCLINE CPS. 250 MG	115.8	170.3	340.6	361.4	382.3	405.4	429.8	575.7	770.3
3 MIL.TB 18.10 6.40									
82 GLYCERINI SUP. 1G, 2G, 4G	53.8	79.1	158.2	167.9	177.5	188.3	199.6	267.4	357.8
1 100 KG 6.81 7.90									
TOTAL UNIT	340.9	501.1	1002.2	1063.5	1124.9	1193.1	1264.7	1694.2	2266.8
TOTAL US $	2380	3499	6998	7427	7855	6332	6831	11831	15830
97 SUGAR									
2 1 KG 0.0 .4									
35 PHENYLBUTAZONE TBL. 100 MG	20.9	30.7	61.4	65.2	69.0	73.2	77.5	103.9	139.0
1 MIL.TB 1.90 11.00									

NO NAME OF THE MATERIAL	1980	1985	1986	1987	1988	1989	1990	1995	2000
36 PHENYLBUTAZONE TBL. 200 MG	47.3	69.5	138.9	147.4	155.9	165.4	175.3	238.8	314.2
1 MIL.TB 2.10 22.50									
58 BELLAD. TEPHEDR. MIXT. BPC	68.2	100.3	200.5	212.8	225.1	238.7	253.0	339.0	453.5
1 100 L 11.00 6.20									
63 SODIUM BICARBON. MIXT. BPC	672.0	987.8	1975.7	2096.6	2217.6	2352.0	2493.1	3339.8	4468.8
1 100 L 24.00 28.00									
64 PARACETAMOL ELIXIR	1320.0	1940.4	3880.8	4118.4	4356.0	4620.0	4897.2	6560.4	8778.0
1 100 L 60.00 22.00									
66 PIPERAZINE CIT, SYRUP	1165.5	1713.3	3426.6	3636.4	3846.2	4079.3	4324.0	5792.5	7750.6
1 100 L 37.00 31.50									
67 SIMPLE LINCT. PEDIATR	5040.0	7408.8	14817.6	15724.8	16632.0	17640.0	18698.4	25048.8	33516.0
1 100 L 240.00 21.00									
68 PHOLCODINE LINCTUS	1302.0	1913.9	3827.9	4062.2	4296.6	4557.0	4830.4	6470.9	8658.3
1 100 L 210.00 6.20									
69 COTRIMOXAZOL SUSP.	201.5	296.2	592.4	628.7	665.0	705.3	747.6	1001.5	1340.0
3 100 L 32.50 6.20									
70 CHLORAMPHENICOL SUSP.	806.0	1184.8	2369.6	2514.7	2659.8	2821.0	2990.3	4005.8	5359.9
3 100 L 130.00 6.20									
72 PHENOXYMETHYLPENICILIN SUSP.	52.7	77.5	154.9	164.4	173.9	184.4	195.5	261.9	350.5
3 100 L 8.50 6.20									
TOTAL UNIT	10696.0	15723.2	31446.4	33371.7	35297.0	37436.2	39662.3	53159.4	71128.7
TOTAL KWACH	4599.3	6761.0	13521.9	14349.8	15177.7	16097.6	17063.4	22858.5	30585.4

98 SULFACETAMID NA
1 1 KG 8.7 0.0

75 SULFACETAMID EYE DROPS 10 %	65.0	95.6	191.1	202.8	214.5	227.5	241.2	323.1	432.2
1 100 L 6.50 10.00									
TOTAL UNIT	65.0	95.6	191.1	202.8	214.5	227.5	241.2	323.1	432.2
TOTAL US $	563	827	1655	1756	1857	1970	2088	2797	3743

99 SULPHADIMIDINE
1 1 KG 13.3 0.0

45 SULFADIMIDIN TBL. 500 MG	5600.0	8232.0	16464.0	17472.0	18480.0	19600.0	20776.0	27832.0	37240.0
3 MIL.TB 11.20 500.00									
73 SULPHADIMIDINE SUSP.	720.0	1058.4	2116.8	2246.4	2376.0	2520.0	2671.2	3578.4	4788.0
3 100 L 72.00 10.00									
TOTAL UNIT	6320.0	9290.4	18580.8	19718.4	20856.0	22120.0	23447.2	31410.4	42028.0
TOTAL US $	83855	123266	246533	261627	276721	293492	311101	416758	557634

NO NAME OF THE MATERIAL	1980	1985	1986	1987	1988	1989	1990	1995	2000
100 SULPHAMETHOXAZOL 1 1 KG 148.0 0.0									
11 COTRIMOXAZOL TBL. BP	924.8	1359.5	2719.0	2885.5	3051.9	3236.9	3431.1	4596.4	6150.1
3 MIL.TB 2.30 402.10									
69 COTRIMOXAZOL SUSP.	133.3	195.9	391.8	415.7	439.7	466.4	494.4	662.3	886.1
3 100 L 32.50 4.10									
TOTAL UNIT	1058.1	1555.4	3110.8	3301.2	3491.7	3703.3	3925.5	5258.7	7036.2
TOTAL US $	156643	230265	460531	488727	516922	548251	581146	778516	1041677
101 TALK 2 1 KG 0.0 1.1									
1 ACETAZOLAMIDE TBL. 250 MG	56.8	83.4	166.8	177.1	187.3	198.6	210.5	282.0	377.4
1 MIL.TB 11.35 5.00									
2 ASCORBIC ACID TBL. 50 MG	24.8	36.5	72.9	77.4	81.8	86.8	92.0	123.3	164.9
2 MIL.TB 8.00 3.10									
3 ASCORBIC ACID TBL. 200 MG	88.0	129.4	258.8	274.7	290.5	308.1	326.6	437.6	585.5
2 MIL.TB 7.10 12.40									
4 ASPIRIN TBL. 300 MG	697.0	1024.6	2049.2	2174.6	2300.1	2439.5	2585.9	3464.1	4635.0
1 MIL.TB 34.00 20.50									
5 AMITRIPTYLIN TBL. 10 MG	.5	.8	1.5	1.6	1.7	1.8	2.0	2.6	3.5
1 MIL.TB .31 1.70									
6 AMITRIPTYLIN TBL. 25 MG	3.2	4.7	9.5	10.1	10.6	11.3	12.0	16.0	21.4
1 MIL.TB .75 4.30									
7 CHLOROQUINE TBL. 250 MG	156.5	230.1	460.1	488.3	516.5	547.8	580.6	777.8	1040.7
1 MIL.TB 31.30 5.00									
8 CHLORPROMAZINE TBL. 10 MG	1.9	2.8	5.5	5.8	6.2	6.6	7.0	9.3	12.5
1 MIL.TB .75 2.50									
9 CHLORPROMAZINE TBL. 125 MG	15.0	22.1	44.1	46.8	49.5	52.5	55.7	74.6	99.7
1 MIL.TB 5.00 3.00									
10 CODEINE COMP. BPC TBL.	84.6	124.4	248.7	264.0	279.2	296.1	313.9	420.5	562.6
1 MIL.TB 14.10 6.00									
11 COTRIMOXAZOL TBL. BP	11.5	16.9	33.8	35.9	38.0	40.3	42.7	57.2	76.5
3 MIL.TB 2.30 5.00									
12 DAPSONE TBL. 10 MG	3.0	4.4	8.7	9.3	9.8	10.4	11.0	14.8	19.8
1 MIL.TB 1.75 1.70									
13 DAPSONE TBL. 25 MG	14.2	20.9	41.7	44.3	46.8	49.7	52.6	70.5	94.4
1 MIL.TB 3.30 4.30									
14 DAPSONE TBL. 100 MG	4.2	6.2	12.3	13.1	13.9	14.7	15.6	20.9	27.9
1 MIL.TB 1.40 3.00									
15 DIAZEPAM TBL. 2 MG	5.6	8.3	16.5	17.5	18.6	19.7	20.9	28.0	37.4
1 MIL.TB 3.75 1.50									
16 DIAZEPAM TBL. 5 MG	5.3	7.8	15.7	16.6	17.6	18.6	19.8	26.5	35.4
1 MIL.TB 3.55 1.50									
17 DIPHENOXYLATE TBL. 2,5 MG	2.3	3.4	6.8	7.3	7.7	8.1	8.6	11.6	15.5
1 MIL.TB 1.55 1.50									

NO	NAME OF THE MATERIAL	1980	1985	1986	1987	1988	1989	1990	1995	2000
18	DIGOXIN TBL. 0.25 MG	1.2	1.8	3.5	3.7	4.0	4.2	4.5	6.0	8.0
	1 MIL.TB .80 1.50									
20	FERROUS SULPHATE TBL. 200 MG	11.5	16.9	33.8	35.9	38.0	40.3	42.7	57.2	76.5
	1 MIL.TB 4.60 2.50									
21	FOLIC ACID TBL. 5 MG	2.5	3.6	7.3	7.7	8.1	8.6	9.1	12.3	16.4
	2 MIL.TB 8.22 .30									
22	FUROSEMID TBL. 40 MG	4.2	6.1	12.2	13.0	13.7	14.6	15.4	20.7	27.7
	1 MIL.TB 1.30 3.20									
23	GRISEOFULVIN TBL. 125 MG	2.8	4.0	8.1	8.6	9.1	9.6	10.2	13.7	18.3
	1 MIL.TB 1.10 2.50									
24	ISONIAZID TBL. 100 MG	2.1	3.1	6.1	6.5	6.9	7.3	7.7	10.3	13.8
	1 MIL.TB .80 2.60									
25	MAGNESIUM TRISILICATE TBL.	32.0	47.0	94.1	99.8	105.6	112.0	118.7	159.0	212.8
	1 MIL.TB 12.80 2.50									
26	METHYLDOPA TBL. 250 MG	1.6	2.4	4.8	5.1	5.4	5.7	6.0	8.1	10.8
	1 MIL.TB .65 2.50									
27	METRONIDAZOL TBL. 200 MG	8.2	12.0	24.0	25.5	26.9	28.6	30.3	40.6	54.3
	3 MIL.TB 1.70 4.80									
28	NIRIDAZOLE TBL. 100 MG	4.8	7.0	14.0	14.8	15.7	16.6	17.6	23.6	31.6
	1 MIL.TB 1.90 2.50									
29	NIRIDAZOLE TBL. 500 MG	11.4	16.8	33.5	35.6	37.6	39.9	42.3	56.7	75.8
	1 MIL.TB 1.90 6.00									
30	PARACETAMOL TBL. 500 MG	201.0	295.5	590.9	627.1	663.3	703.5	745.7	999.0	1336.6
	1 MIL.TB 33.50 6.00									
31	PENICILIN V TBL. 125 MG	18.0	26.5	52.9	56.2	59.4	63.0	66.8	89.5	119.7
	3 MIL.TB 4.00 4.50									
32	PHENOBARBITAL TBL. 15 MG	8.7	12.8	25.6	27.1	28.7	30.5	32.3	43.2	57.9
	1 MIL.TB 5.80 1.50									
33	PHENOBARBITAL TBL. 30 MG	.9	1.3	2.6	2.8	3.0	3.2	3.3	4.5	6.0
	1 MIL.TB .75 1.20									
34	PIPERAZINE TBL. 500 MG	.3	.4	.9	.9	1.0	1.0	1.1	1.5	2.0
	1 MIL.TB .05 6.00									
35	PHENYLBUTAZONE TBL. 100 MG	8.6	12.6	25.1	26.7	28.2	29.9	31.7	42.5	56.9
	1 MIL.TB 1.90 4.50									
36	PHENYLBUTAZONE TBL. 200 MG	18.9	27.8	55.6	59.0	62.4	66.1	70.1	93.9	125.7
	1 MIL.TB 2.10 9.00									
38	PYRIMETHAMINE TBL. 25 MG	7.3	10.7	21.5	22.8	24.1	25.6	27.1	36.3	48.6
	1 MIL.TB 1.70 4.30									
39	PROMETHAZINE TBL. 10 MG	1.3	1.9	3.7	4.0	4.2	4.5	4.7	6.3	8.5
	1 MIL.TB .85 1.50									
40	PROMETHAZINE TBL. 25 MG	8.6	12.6	25.3	26.8	28.4	30.1	31.9	42.7	57.2
	1 MIL.TB 2.00 4.30									
41	PROPANTHELIN TBL. 15 MG	2.1	3.1	6.2	6.6	6.9	7.4	7.8	10.4	14.0
	1 MIL.TB 1.40 1.50									
42	PREDNISOLONE TBL. 5 MG	1.9	2.8	5.5	5.8	6.2	6.6	7.0	9.3	12.5
	1 MIL.TB 1.25 1.50									
43	PYRIDOXIN TBL. 50 MG	1.1	1.7	3.3	3.5	3.7	3.9	4.2	5.6	7.5
	2 MIL.TB .75 1.50									
44	QUINIDIN SULF. TBL. 200 MG	3.2	4.7	9.4	10.0	10.6	11.2	11.9	15.9	21.3
	1 MIL.TB .80 4.00									
45	SULFADIMIDIN TBL. 500 MG	67.2	98.8	197.6	209.7	221.8	235.2	249.3	334.0	446.9
	3 MIL.TB 11.20 6.00									
46	SALBUTAMOL TBL. 2 MG	.9	1.3	2.6	2.8	3.0	3.2	3.3	4.5	6.0
	1 MIL.TB .60 1.50									

NO	NAME OF THE MATERIAL			TOTAL NEED OF MA 1980	1985
47	AMINOPHYLIN TBL. 100 MG			41.6	61.2
	1 MIL.TB	18.10	2.30		
48	THIACETAZONE 25+IZONIAZID 66 T			2.2	3.2
	1 MIL.TB	.85	2.60		
49	THIACETAZONE 150+IZONIAZID 300			29.4	43.3
	1 MIL.TB	6.40	4.60		
50	TRIHEXYPHENYDIL TBL. 2 MG			1.5	2.2
	1 MIL.TB	1.00	1.50		
51	TRIHEXYPHENYDIL TBL. 5 MG			.5	.7
	1 MIL.TB	.30	1.50		
52	B-KOMPLEX TBL.			1.3	2.0
	2 MIL.TB	1.50	.90		
53	AMPICILIN CPS. 250 MG			13.1	19.3
	3 MIL.TB	4.10	3.20		
54	CHLORAMPHENICOL CPS. 250 MG			8.0	11.8
	3 MIL.TB	2.50	3.20		
55	MULTIVITAMIN BP CPS.			77.4	113.8
	2 MIL.TB	21.50	3.60		
56	TETRACYCLINE CPS. 250 MG			57.9	85.1
	3 MIL.TB	18.10	3.20		
TOTAL UNIT				1839.5	2704.1
TOTAL KWACH				2043.1	3003.4

102 TETRACYCLINE HCL

1	1	KG	34.9	0.0	
56	TETRACYCLINE CPS. 250 MG			4563.0	6707.6
	3 MIL.TB	18.10	252.10		
TOTAL UNIT				4563.0	6707.6
TOTAL US $				159323	234205

103 THEOPHYLINAETHYLENDIAMIN

1	1	KG	15.9	0.0	
47	AMINOPHYLIN TBL. 100 MG			1833.5	2695.3
	1 MIL.TB	18.10	101.30		
80	AMINOPHYLLIN 100 MG SUP.			.3	.5
	1 100 KG	.62	.50		
TOTAL UNIT				1833.8	2695.7
TOTAL US $				29172	42883

TERIALS

1986	1987	1988	1989	1990	1995	2000
122.4	129.9	137.4	145.7	154.4	206.9	276.8
6.5	6.9	7.3	7.7	8.2	11.0	14.7
86.6	91.9	97.2	103.0	109.2	146.3	195.8
4.4	4.7	5.0	5.3	5.6	7.5	10.0
1.3	1.4	1.5	1.6	1.7	2.2	3.0
4.0	4.2	4.5	4.7	5.0	6.7	9.0
38.6	40.9	43.3	45.9	48.7	65.2	87.2
23.5	25.0	26.4	28.0	29.7	39.8	53.2
227.6	241.5	255.4	270.9	287.2	384.7	514.7
170.3	180.7	191.1	202.7	214.9	287.9	385.2
5408.1	5739.2	6070.4	6438.3	6824.6	9142.3	12232.7
6006.8	6374.5	6742.3	7150.9	7580.0	10154.3	13586.7
13415.2	14236.6	15057.9	15970.5	16928.8	22678.2	30344.0
13415.2	14236.6	15057.9	15970.5	16928.8	22678.2	30344.0
468410	497088	525766	557630	591088	791835	1059496
5390.6	5720.6	6050.6	6417.4	6802.4	9112.6	12193.0
.9	1.0	1.0	1.1	1.2	1.5	2.1
5391.5	5721.6	6051.7	6418.4	6803.5	9114.2	12195.0
85767	91018	96269	102103	108230	144987	193996

NO NAME OF THE MATERIAL	1980	1985	1986	1987	1988	1989	1990	1995	2000
104 THIACETAZONE									
1 1 KG 8.8 0.0									
48 THIACETAZONE 25+IZONIAZID 66 T	21.3	31.2	62.5	66.3	70.1	74.4	78.8	105.6	141.3
1 MIL.TB .85 25.00									
49 THIACETAZONE 150+IZONIAZID 300	960.0	1411.2	2822.4	2995.2	3168.0	3360.0	3561.6	4771.2	6384.0
1 MIL.TB 6.40 150.00									
TOTAL UNIT	981.3	1442.4	2884.9	3061.5	3238.1	3434.4	3640.4	4876.8	6525.3
TOTAL US $	8638	12692	25384	26938	28492	30219	32032	42911	57415
105 THIAMIN HCL 100%									
1 1 KG 33.9 0.0									
52 B-KOMPLEX TBL.	4.5	6.6	13.2	14.0	14.9	15.8	16.7	22.4	29.9
2 MIL.TB 1.50 3.00									
55 MULTIVITAMIN BP CPS.	21.5	31.6	63.2	67.1	71.0	75.3	79.8	106.9	143.0
2 MIL.TB 21.50 1.00									
TOTAL UNIT	26.0	38.2	76.4	81.1	85.8	91.0	96.5	129.2	172.9
TOTAL US $	881	1294	2589	2747	2906	3082	3267	4377	5856
106 TRAGACANTHI POWDER									
2 1 KG 43.4 0.0									
73 SULPHADIMIDINE SUSP.	288.0	423.4	846.7	898.6	950.4	1008.0	1068.5	1431.4	1915.2
3 100 L 72.00 4.00									
TOTAL UNIT	288.0	423.4	846.7	898.6	950.4	1008.0	1068.5	1431.4	1915.2
TOTAL US $	12489	18359	36719	38967	41219	43713	46336	62072	83054
107 TRIHEXYPHENYDIL									
1 1 KG 129.2 0.0									
50 TRIHEXYPHENYDIL TBL. 2 MG	2.1	3.1	6.2	6.6	6.9	7.3	7.8	10.4	14.0
1 MIL.TB 1.00 2.10									
51 TRIHEXYPHENYDIL TBL. 5 MG	1.6	2.3	4.6	4.9	5.1	5.5	5.8	7.8	10.4
1 MIL.TB .30 5.20									
TOTAL UNIT	3.7	5.4	10.8	11.4	12.1	12.8	13.6	18.2	24.3
TOTAL US $	473	695	1390	1475	1560	1655	1754	2350	3144

NO	NAME OF THE MATERIAL				1980	1985
108	TRIMETOPRIN					
	1 1	KG	91.8	0.0		
	11 COTRIMOXAZOL TBL. BP				92.5	135.9
	3 MIL.TB		2.30	40.20		
	69 COTRIMOXAZOL SUSP.				13.0	19.1
	5 100 L		32.50	.40		
TOTAL UNIT					105.5	155.0
TOTAL US $					9677	14225
109	VASELINE					
	2 3	KG	.7	0.0		
	78 HYDROCORTIZON OINT. 1 %				588.0	864.4
	1 100 KG		7.00	84.00		
TOTAL UNIT					588.0	864.4
TOTAL US $					394	579
110	VASELINE EYE					
	2 3	KG	.9	0.0		
	76 CHLORAMPHENICOL EYE OINT. 1%				284.9	418.8
	3 100 KG		3.70	77.00		
TOTAL UNIT					284.9	418.8
TOTAL US $					245	360
111	VITAMIN A					
	1 1	KG	34.9	0.0		
	55 MULTIVITAMIN BP CPS.				32.3	47.4
	2 MIL.TB		21.50	1.50		
TOTAL UNIT					32.3	47.4
TOTAL US $					1126	1655

1986	1987	1988	1989	1990	1995	2000
271.0	288.5	305.1	323.6	343.0	459.5	614.9
38.2	40.6	42.9	45.5	48.2	64.6	86.4
310.1	329.0	348.0	369.1	391.3	524.1	701.3
28450	30192	31934	33869	35902	48095	64352
1728.7	1834.6	1940.4	2058.0	2181.5	2922.4	3910.2
1728.7	1834.6	1940.4	2058.0	2181.5	2922.4	3910.2
1159	1230	1301	1380	1462	1959	2621
837.6	888.9	940.2	997.1	1057.0	1416.0	1894.6
837.6	888.9	940.2	997.1	1057.0	1416.0	1894.6
719	764	808	856	908	1216	1627
94.8	100.6	106.4	112.9	119.6	160.3	214.5
94.8	100.6	106.4	112.9	119.6	160.3	214.5
3311	3513	3716	3941	4178	5596	7488

NO NAME OF THE MATERIAL	1980	1985	1986	1987	1988	1989	1990	1995	2000
112 VITAMIN D									
1 1 KG 0.0 0.0									
55 MULTIVITAMIN BP CPS.	6.4	9.5	19.0	20.1	21.3	22.6	23.9	32.1	42.9
2 MIL.TB 21.50 .30									
TOTAL UNIT	6.4	9.5	19.0	20.1	21.3	22.6	23.9	32.1	42.9
TOTAL US $	51	75	151	160	169	180	191	255	341
113 WHITE WAX									
2 2 KG 6.8 0.0									
65 METHYLSALICYLATE OINT.	1250.0	1837.5	3675.0	3900.0	4125.0	4375.0	4637.5	6212.5	8312.5
1 100 KG 50.00 25.00									
76 CHLORAMPHENICOL EYE OINT. 1%	7.4	10.9	21.8	23.1	24.4	25.9	27.5	36.8	49.2
3 100 KG 3.70 2.00									
TOTAL UNIT	1257.4	1848.4	3696.8	3923.1	4149.4	4400.9	4665.0	6249.3	8361.7
TOTAL US $	8517	12520	25041	26574	28107	29811	31599	42331	56640
114 WOOL FAT									
2 2 KG 1.8 0.0									
65 METHYLSALICYLATE OINT.	1250.0	1837.5	3675.0	3900.0	4125.0	4375.0	4637.5	6212.5	8312.5
1 100 KG 50.00 25.00									
76 CHLORAMPHENICOL EYE OINT. 1%	55.5	81.6	163.2	173.2	183.2	194.3	205.9	275.8	369.1
3 100 KG 3.70 15.00									
TOTAL UNIT	1305.5	1919.1	3838.2	4073.2	4308.2	4569.3	4843.4	6488.3	8681.6
TOTAL US $	1823	2680	5361	5689	6017	6382	6765	9062	12125
TOTAL US $	1853307	2724362	5448723	5782318	6115914	6486575	6875770	9210937	12328492
TOTAL KWACH	31067	45668	91336	96928	102520	108733	115257	154401	206594
TOTAL US$+KWACHA IN KWACHAS	1445805	2125333	4250667	4510912	4771157	5060318	5363937	7185652	9614603

	1984	1985	1986	1987	1988	19	1990	1995	2000
RAW MATERIALS									
TOTAL (US $)	1654115	2431549	4863099	5160839	5458580	5789403	6136767	8220953	10999865
TOTAL (KWACHA)	0	0	0	0	0	0	0	0	0
TOTAL US$+KWACHA IN KWACHAS	1262683	1856145	3712289	3939572	4166855	4419392	4684555	6275537	8396844
AUXILIERY MATERIALS									
TOTAL (US $)	199192	290132	580264	615790	651317	690790	732238	980922	1312502
TOTAL (KWACHA)	31067	45668	91336	96928	102520	108733	115257	154401	206594
TOTAL US$+KWACHA IN KWACHAS	152055	221475	442950	470069	497188	527321	558960	748796	1001910
IMPORT MATERIALS									
IN LOOSE KG	107280	157702	315404	334718	354025	375481	398010	533183	713413
IN FLUID L	17530	25769	51539	54694	57850	61356	65037	87125	116574
OINTMENT KG	7990	9827	19653	20856	22060	23397	24800	33223	44454
COMBUSTIBLES L	750	1103	2206	2341	2476	2626	2783	3728	4989
TOTAL (US $)	1853307	2721681	5443363	5776629	6109897	6480194	6869005	[illegible]	[illegible]
DOMESTIC MATERIALS									
IN LOOSE KG	23293	34241	68481	72674	76867	81525	86417	115766	154898
IN FLUID L	5703	8383	16767	17793	18820	19960	21158	28344	37925
OINTMENT KG	0	0	0	0	0	0	0	0	0
COMBUSTIBLES L	2806	4124	8248	8753	9258	9820	10409	13944	18657
TOTAL (KWACHA)	31067	45668	91336	96928	102520	108733	115257	154401	206594

V. LOCATION AND SITE

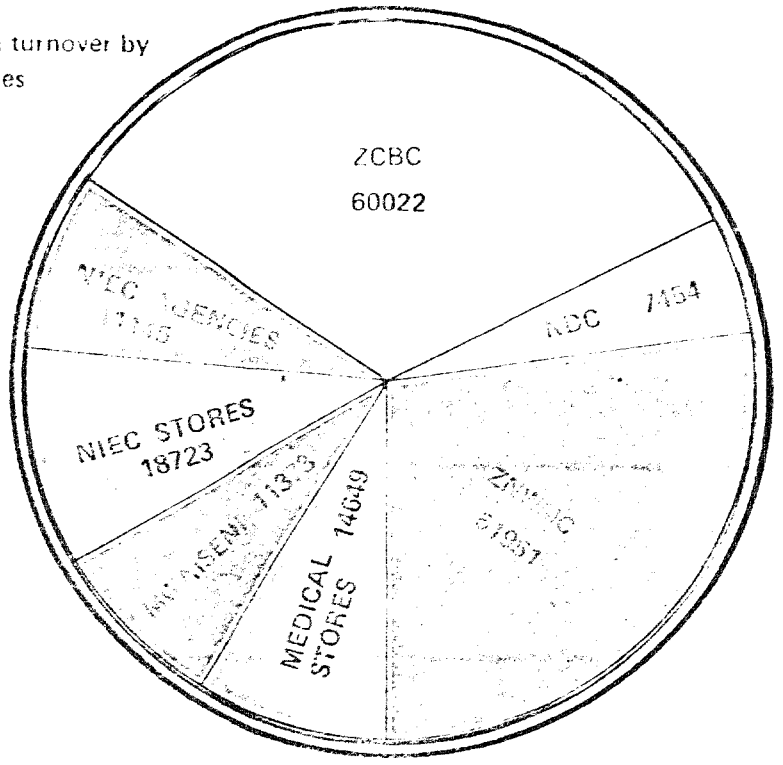
NIEC Ltd.

National Import and Export Corporation Limited

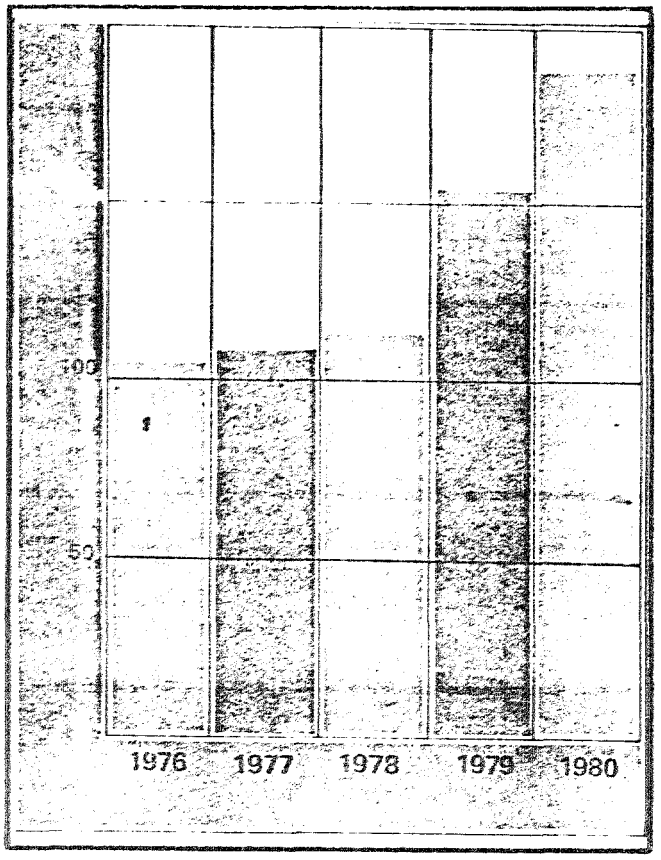
At a glance

Contributions to sales turnover by the operating companies

K'000



Group Sales Turnover (K million)



Pattern of sales turnover K million

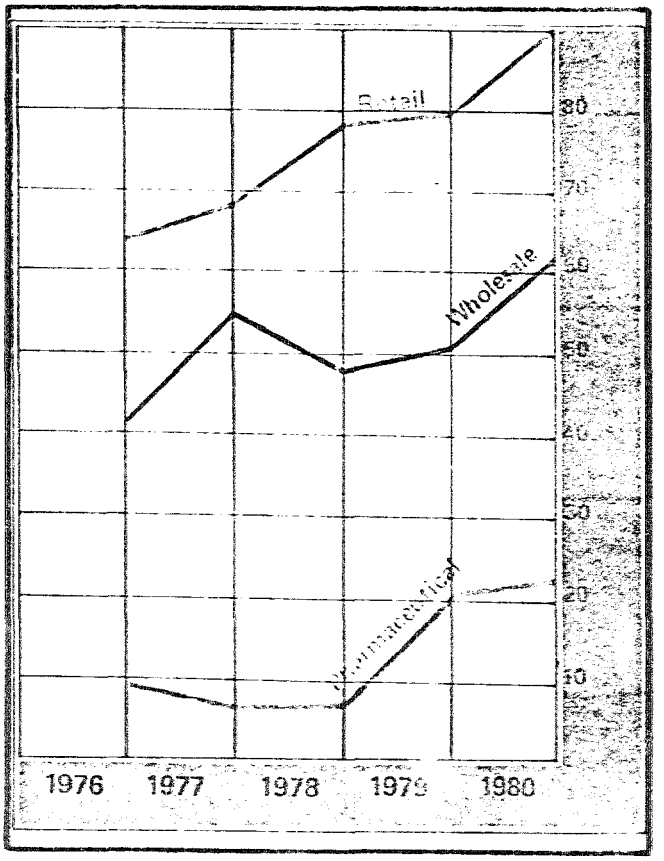


Table V/1

Table V/2

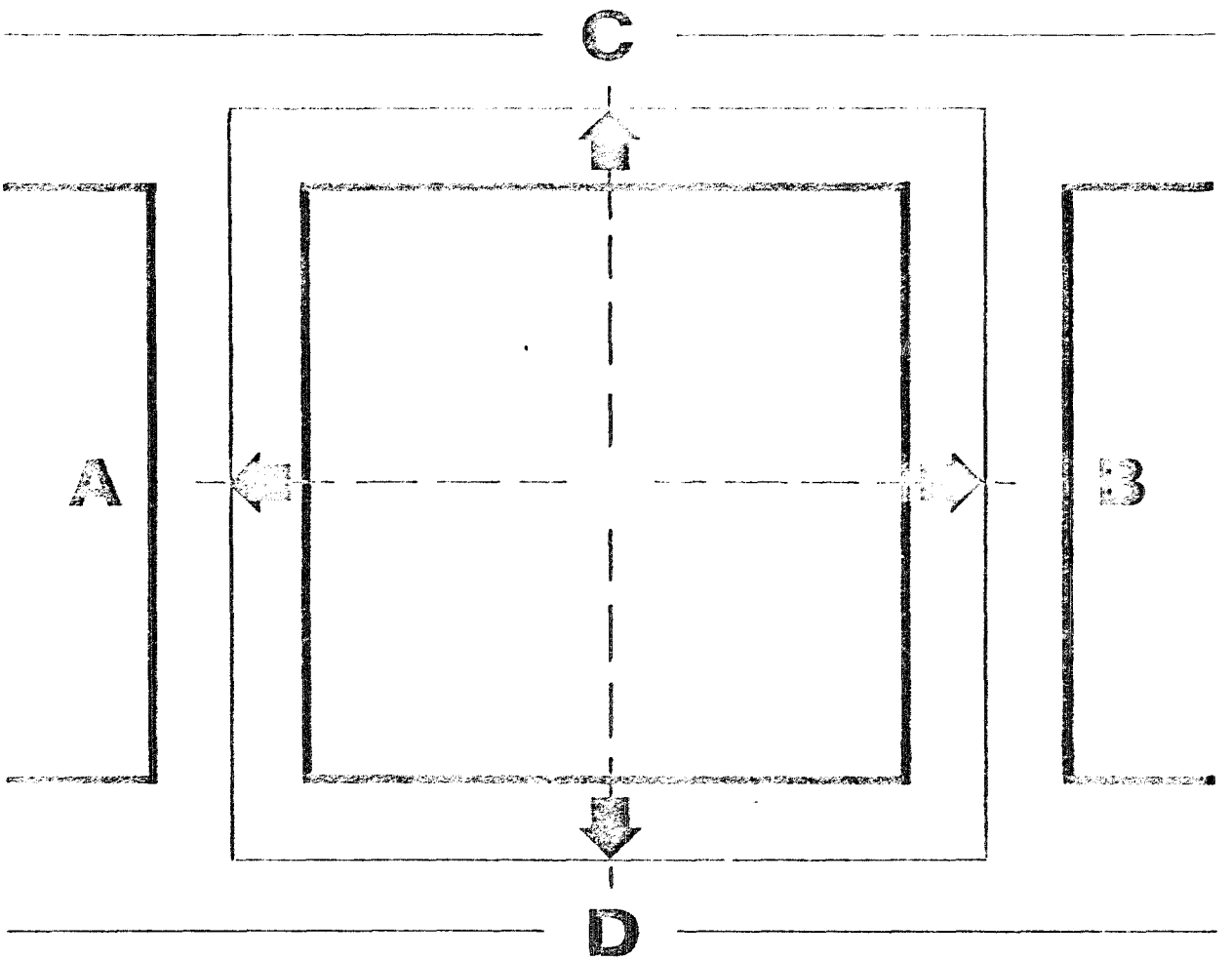
National Export and Export Corporation Limited

and its subsidiary companies

Year at a glance

	1980 K million	1979 K million
Turnover	167	144
Profit before tax	4,1	4,1
Profit after tax	1,1	3,0
Profit after tax attributable shareholders	0,3	0,3
Profit after tax attributable to holding Company	0,8	1,7
Net assets	40	40
Paid up share capital	9,8	9,8

FREEDOM WAY



LUMUMBA RD

A•B•C•D NO EXPANSION POSSIBILITIES

NDC
LUSAKA

Fig.V/1

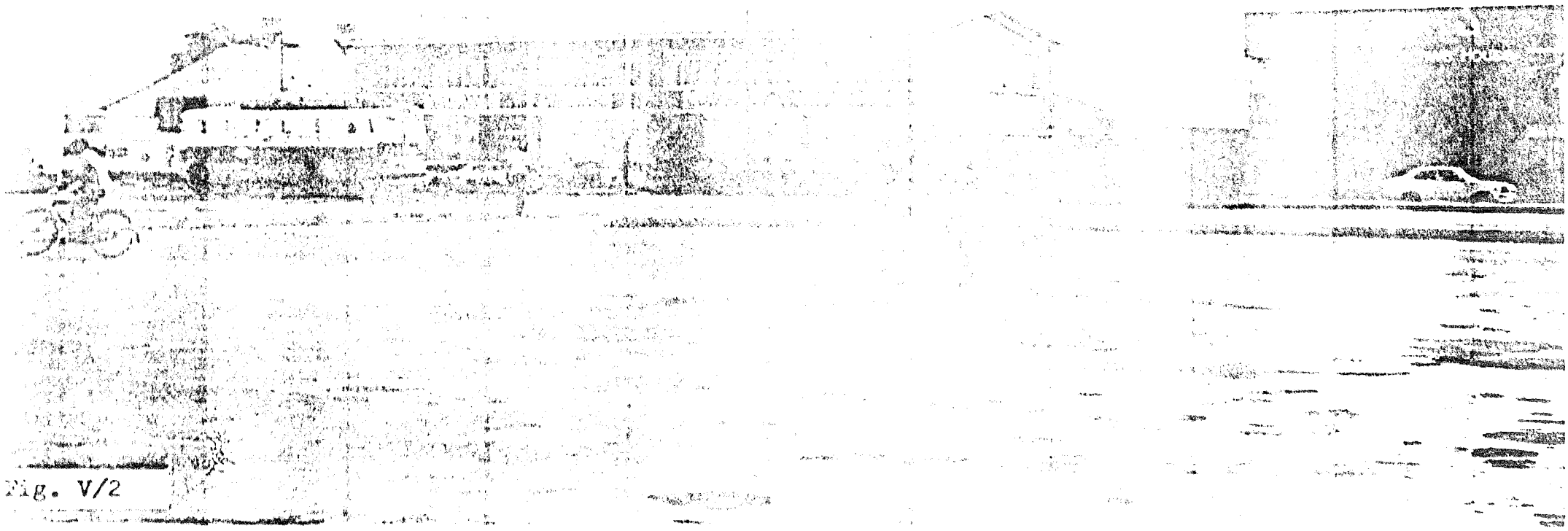
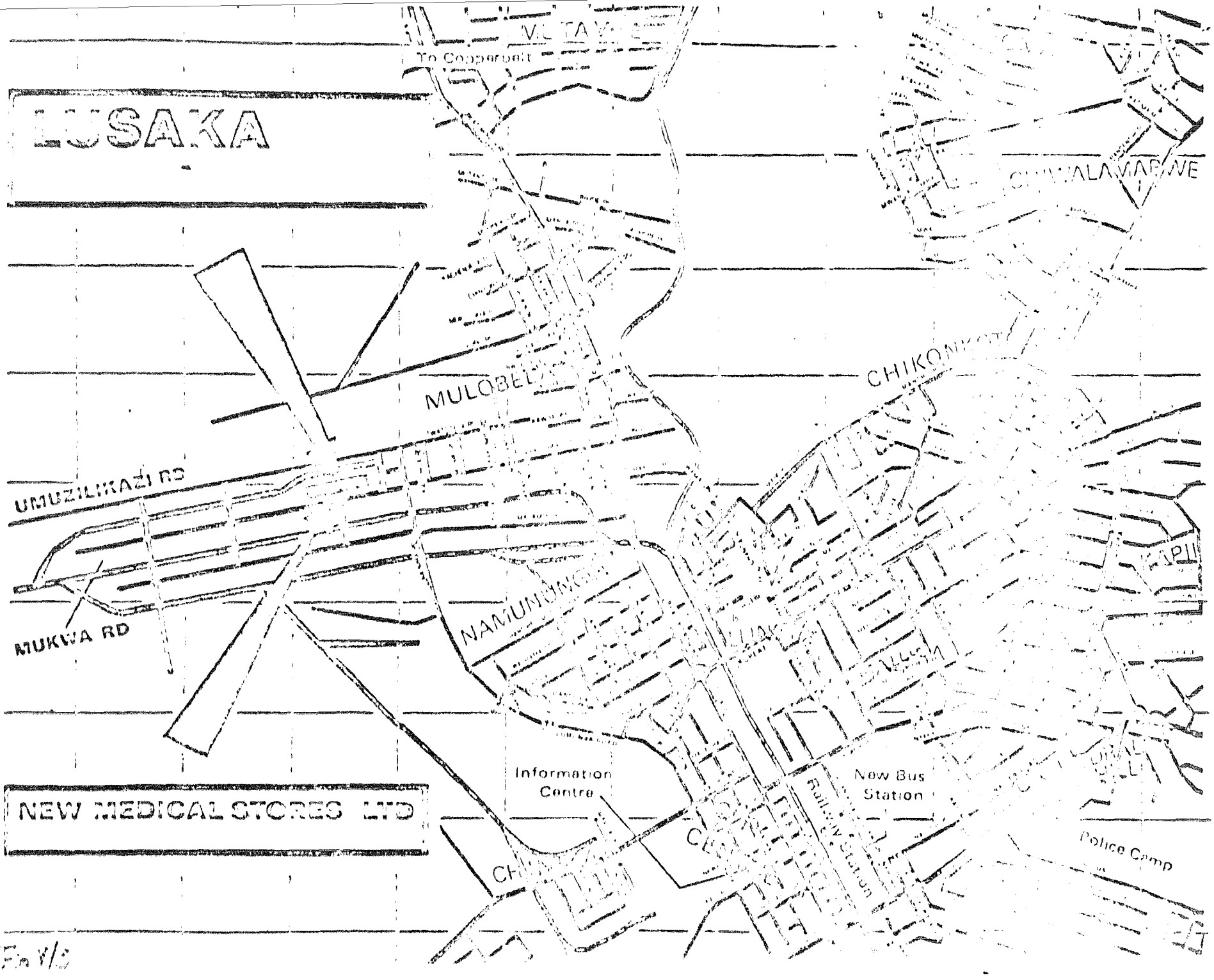


Fig. V/2


LUSAKA
To Copperbelt
MULOBEZI
CHIKONKOT
UMUZILIKAZI RD
MUKUWA RD
NAMUNUNGA
Information Centre
New Bus Station
Police Camp
NEW MEDICAL STORES LTD

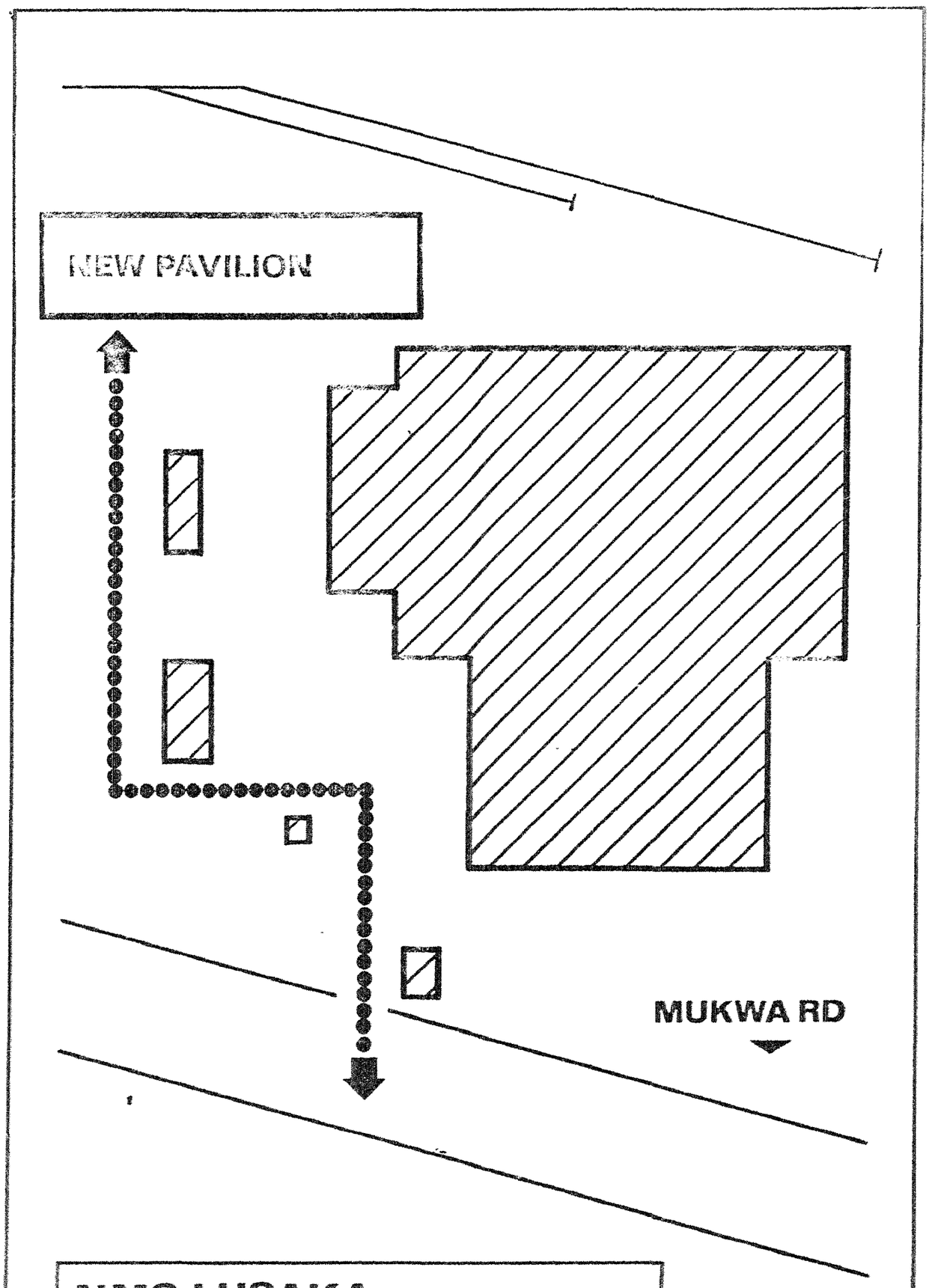

NEW PAVILION
MUKWA RD
NMS LUSAKA
PROVISIONAL COMMUNICATIONS

Fig. V/4

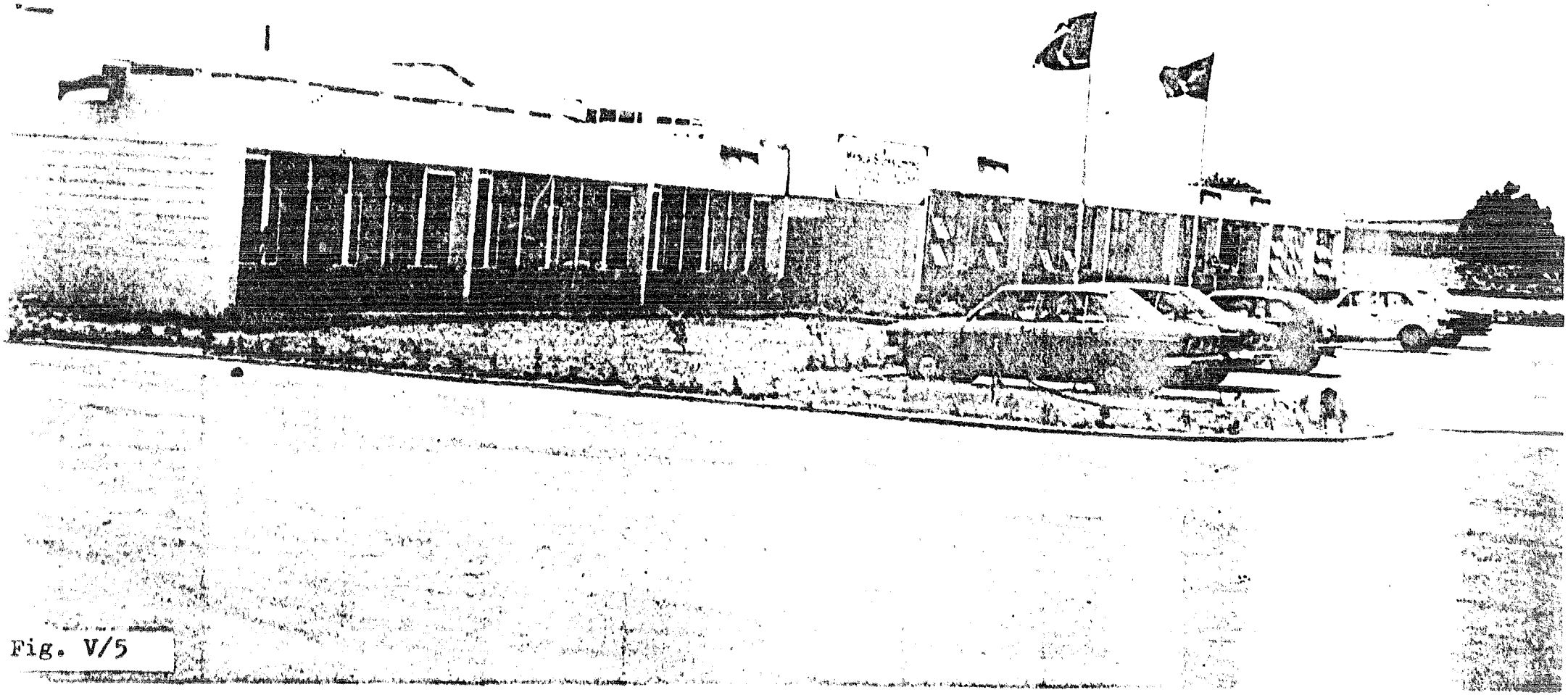


Fig. V/5

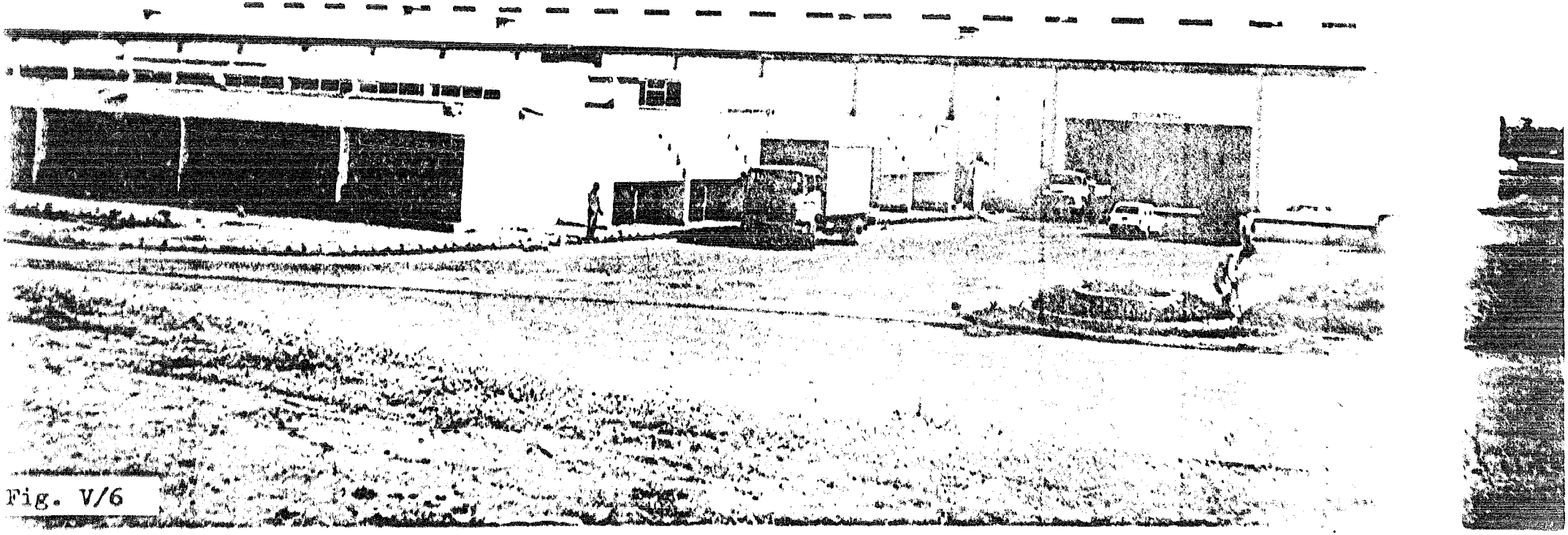
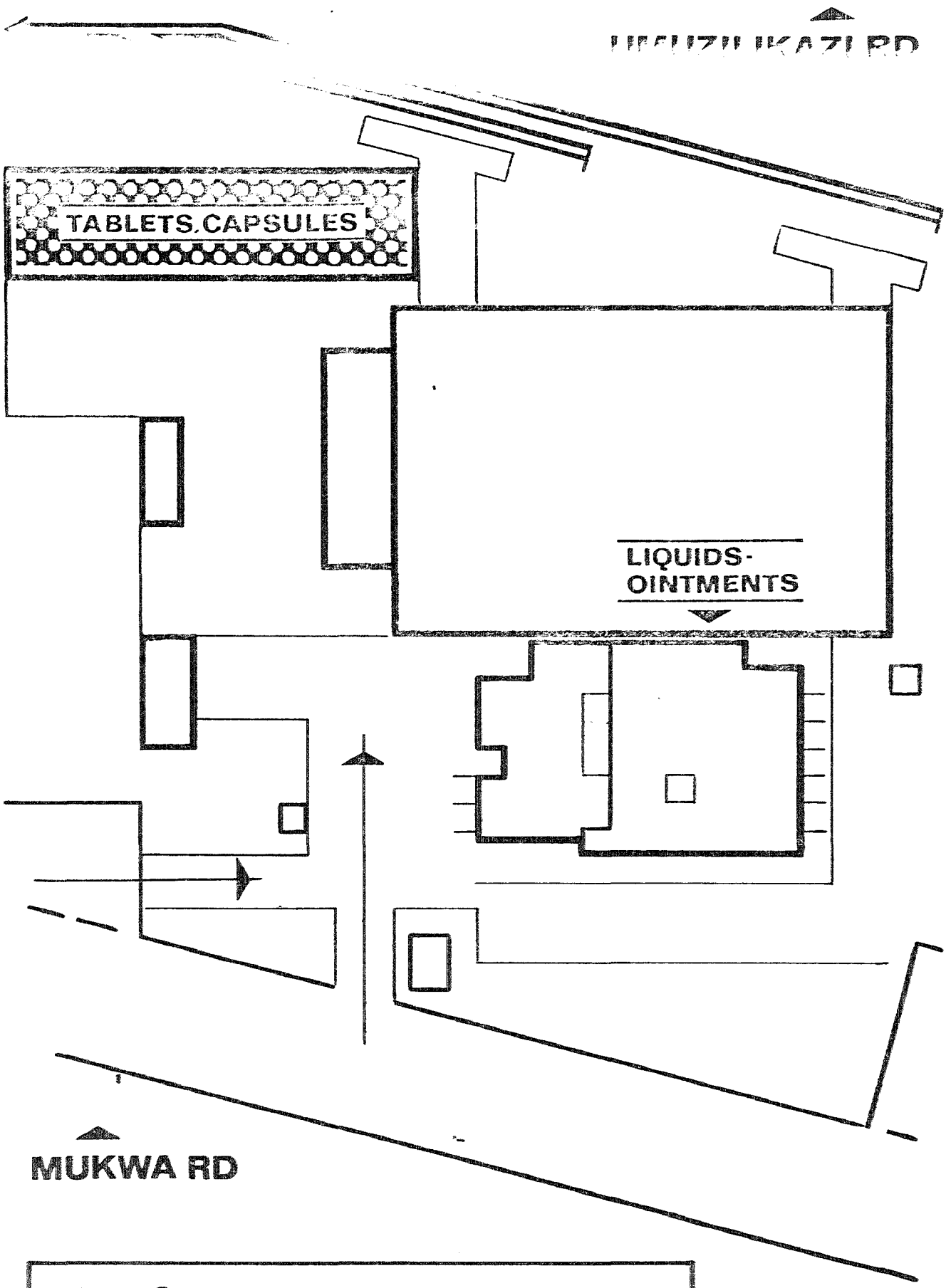


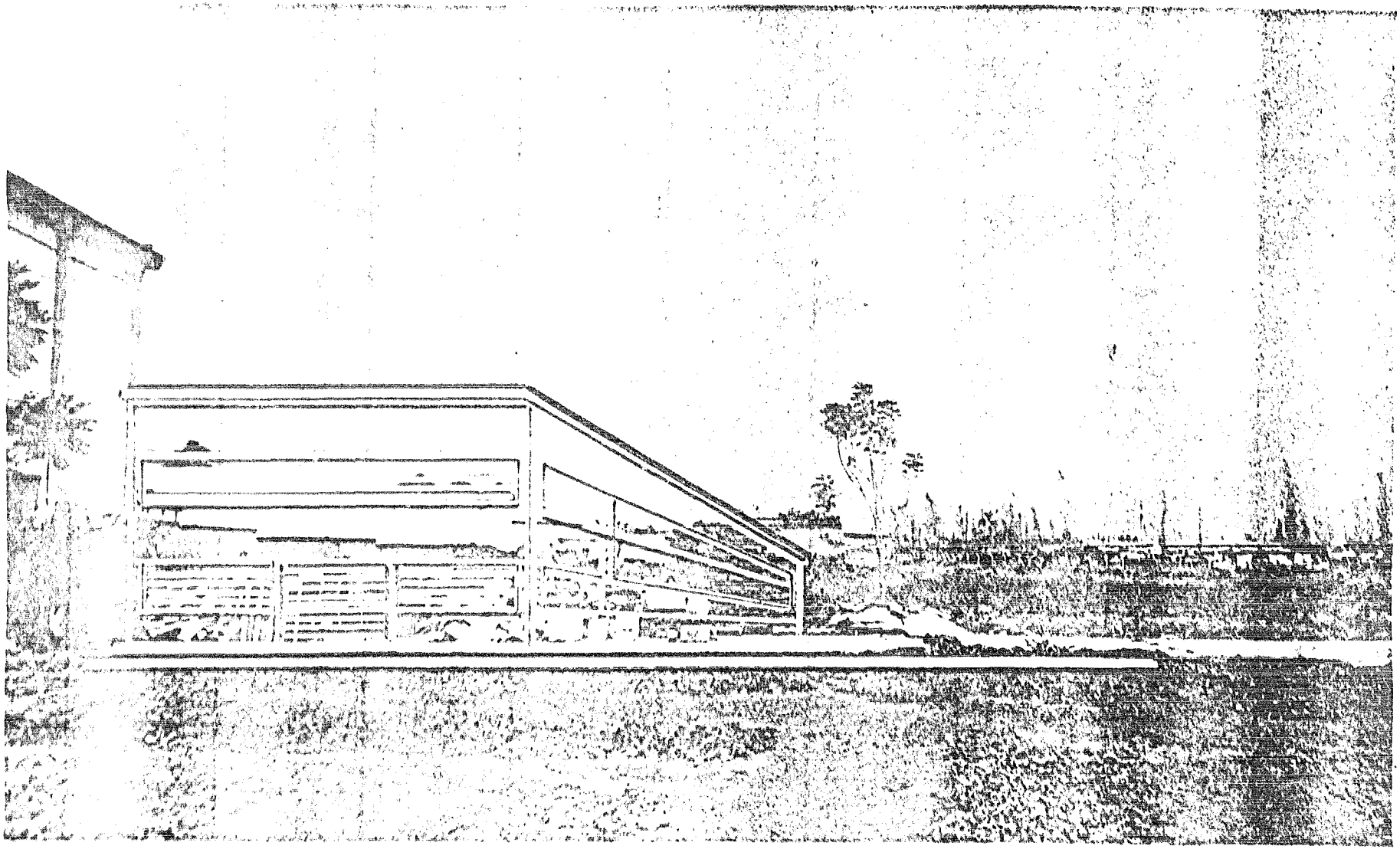
Fig. V/6



NMS
LUSAKA

Fig. V/7

NMS LUSAKA - NEW PAVILION



../6

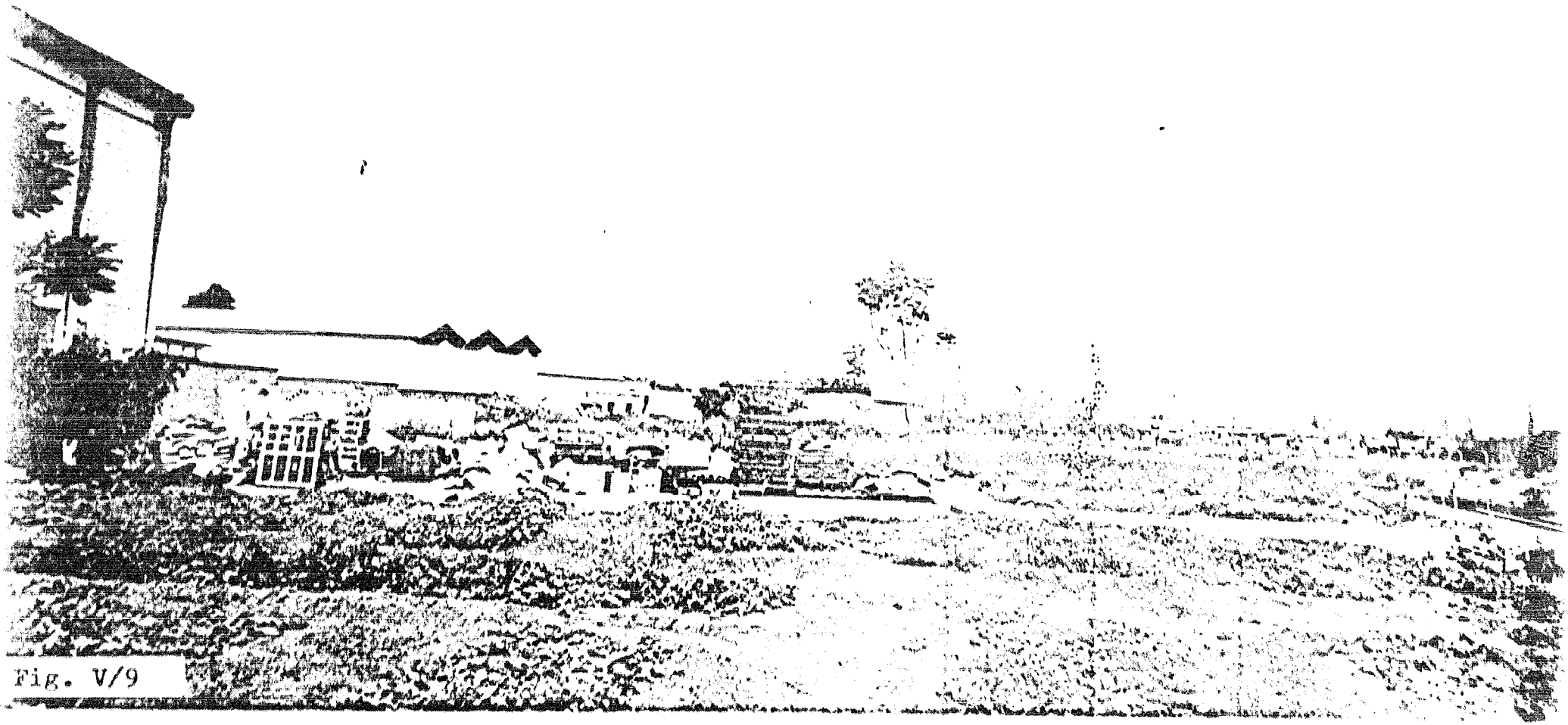


Fig. V/9

Fig. V/10

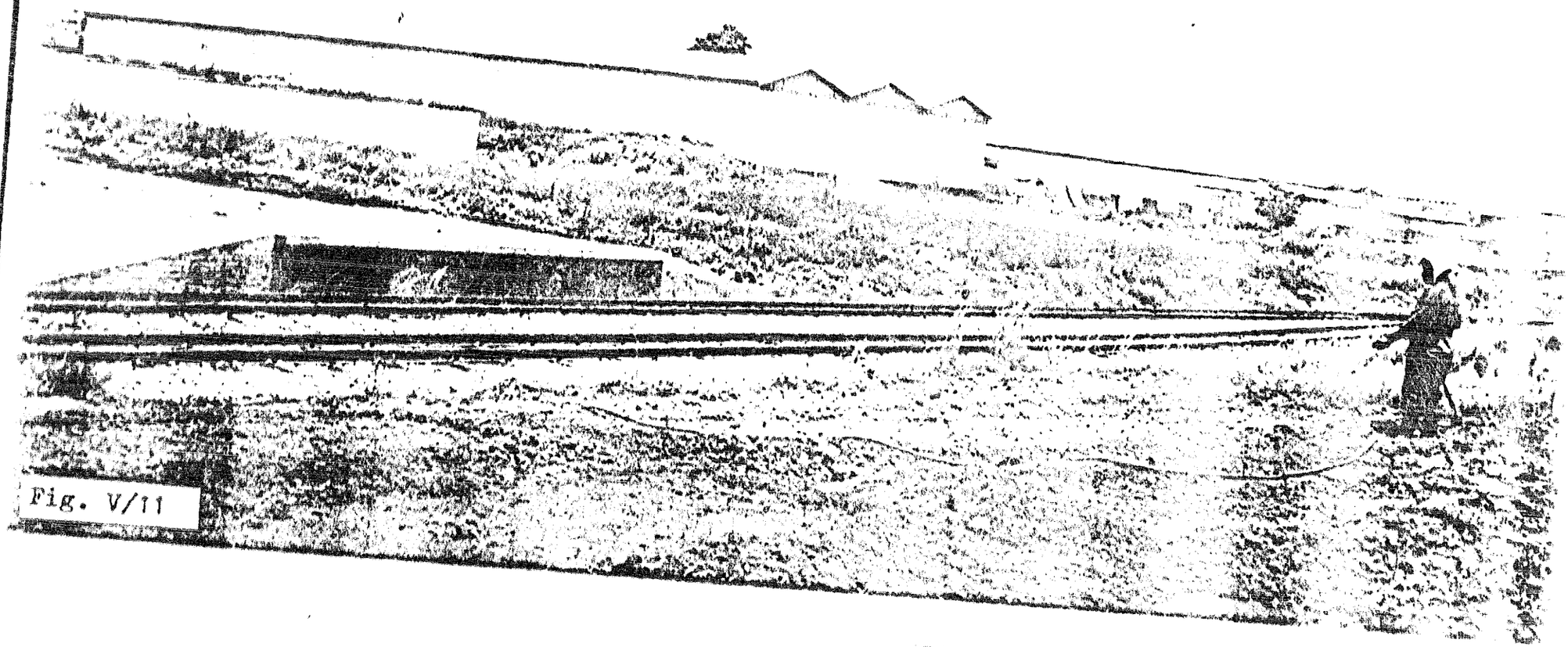


Fig. V/11

VI. PROJECT ENGINEERING

Fig VI/1	New pavillion, groud plan 1:600
Fig VI/2	New pavillion - situation
Fig VI/3	New pavillion - detailed ground plan 1:100
Fig VI/4-9	Liquids'shop - present state
Fig VI/10	Liquids'shop - detailed ground plan 1:100

Fig.VI/1 New Pavillion, ground plan 1:600

Fig.VI/2 New Pavillion - situation

Fig.VI/3 New Pavillion - detailed groun plan
1:100

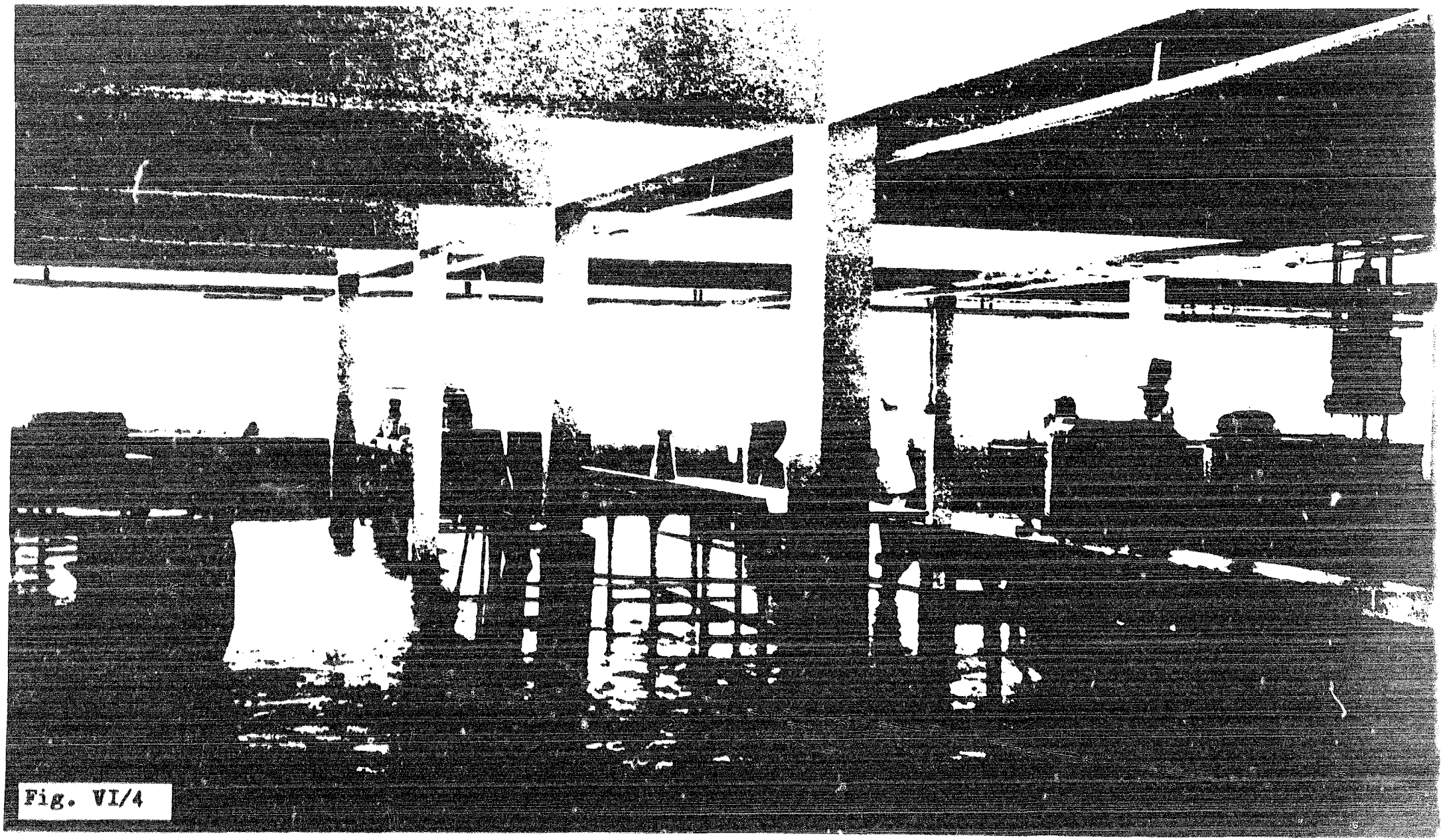


Fig. VI/4

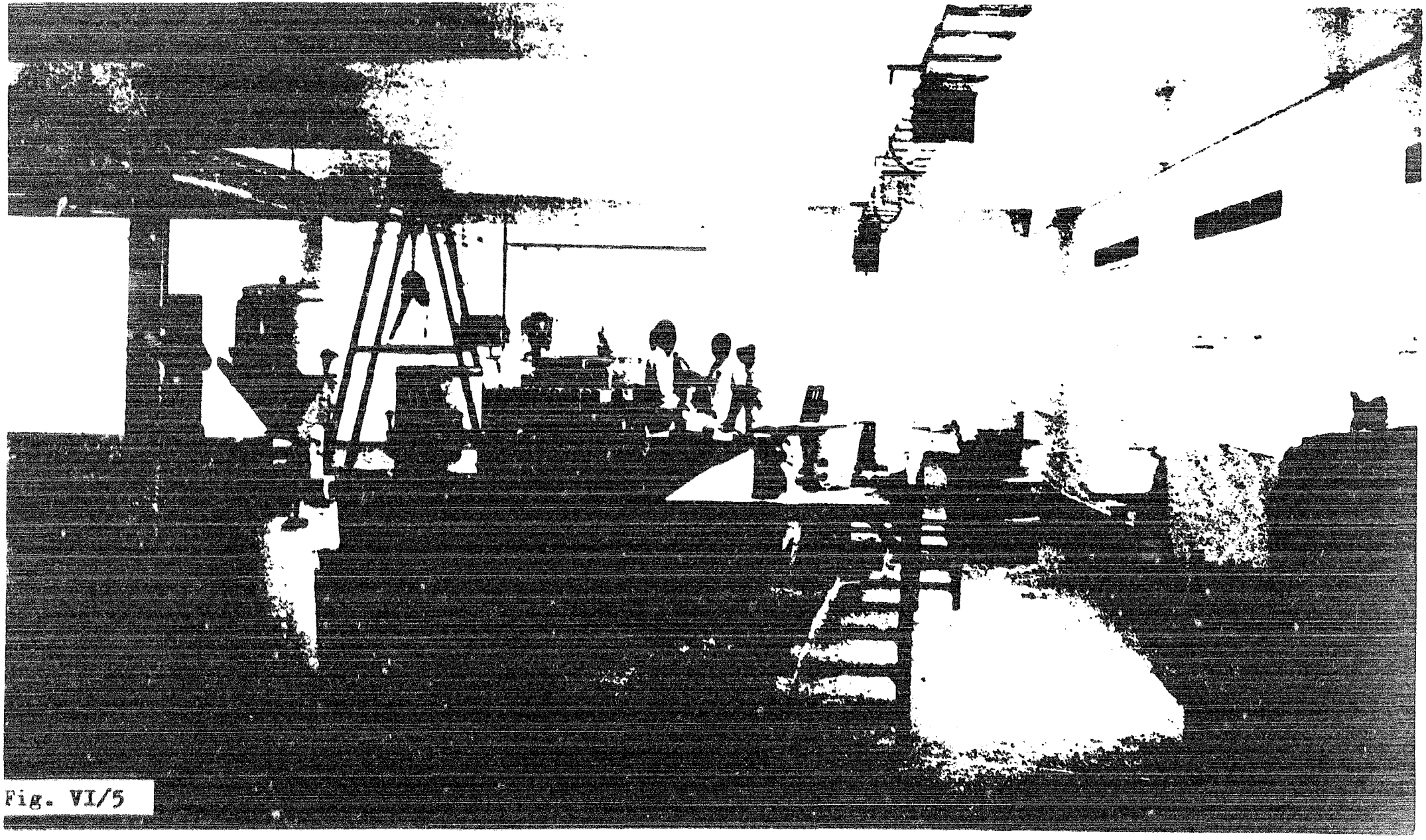


Fig. VI/5

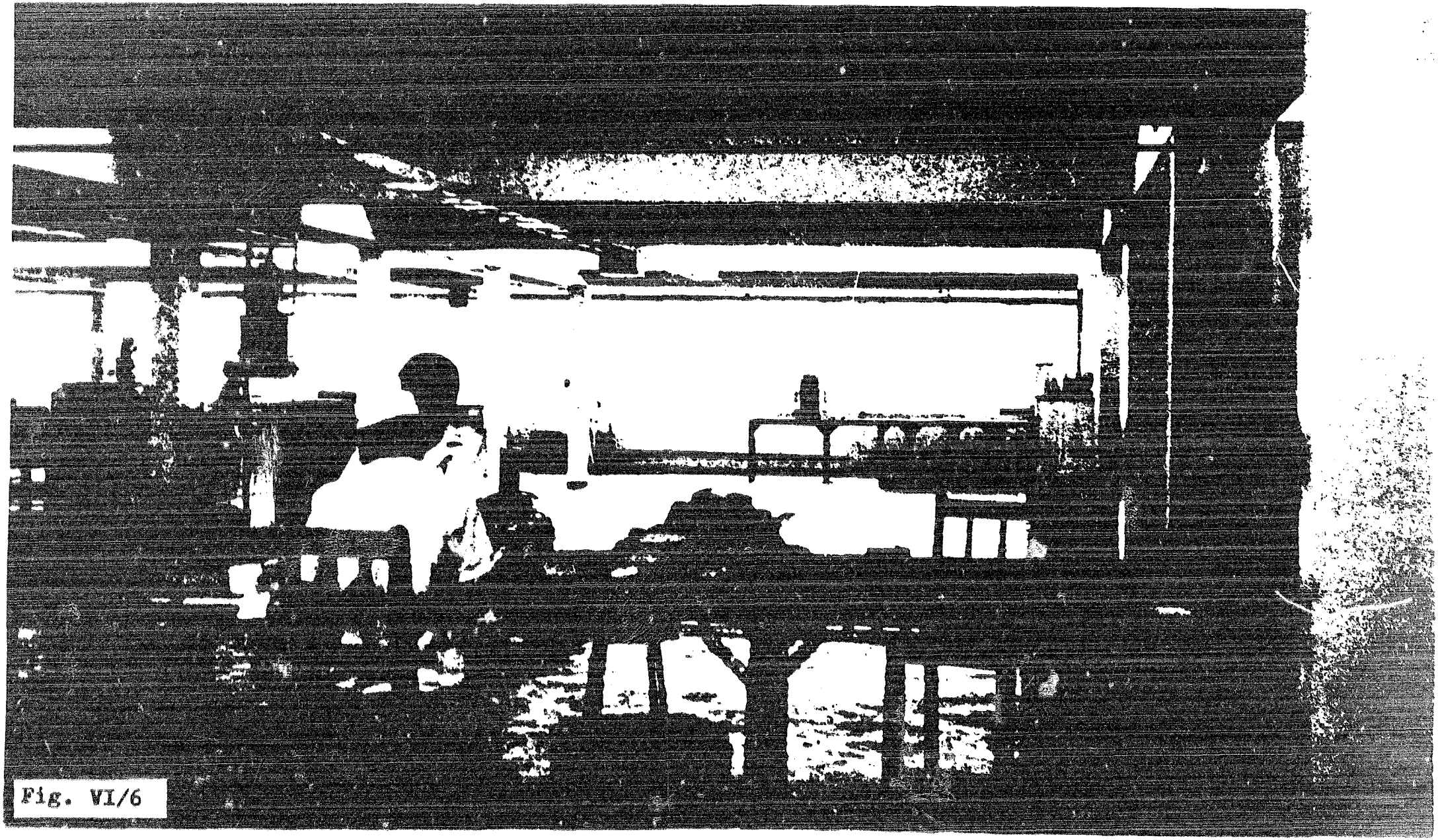


Fig. VI/6

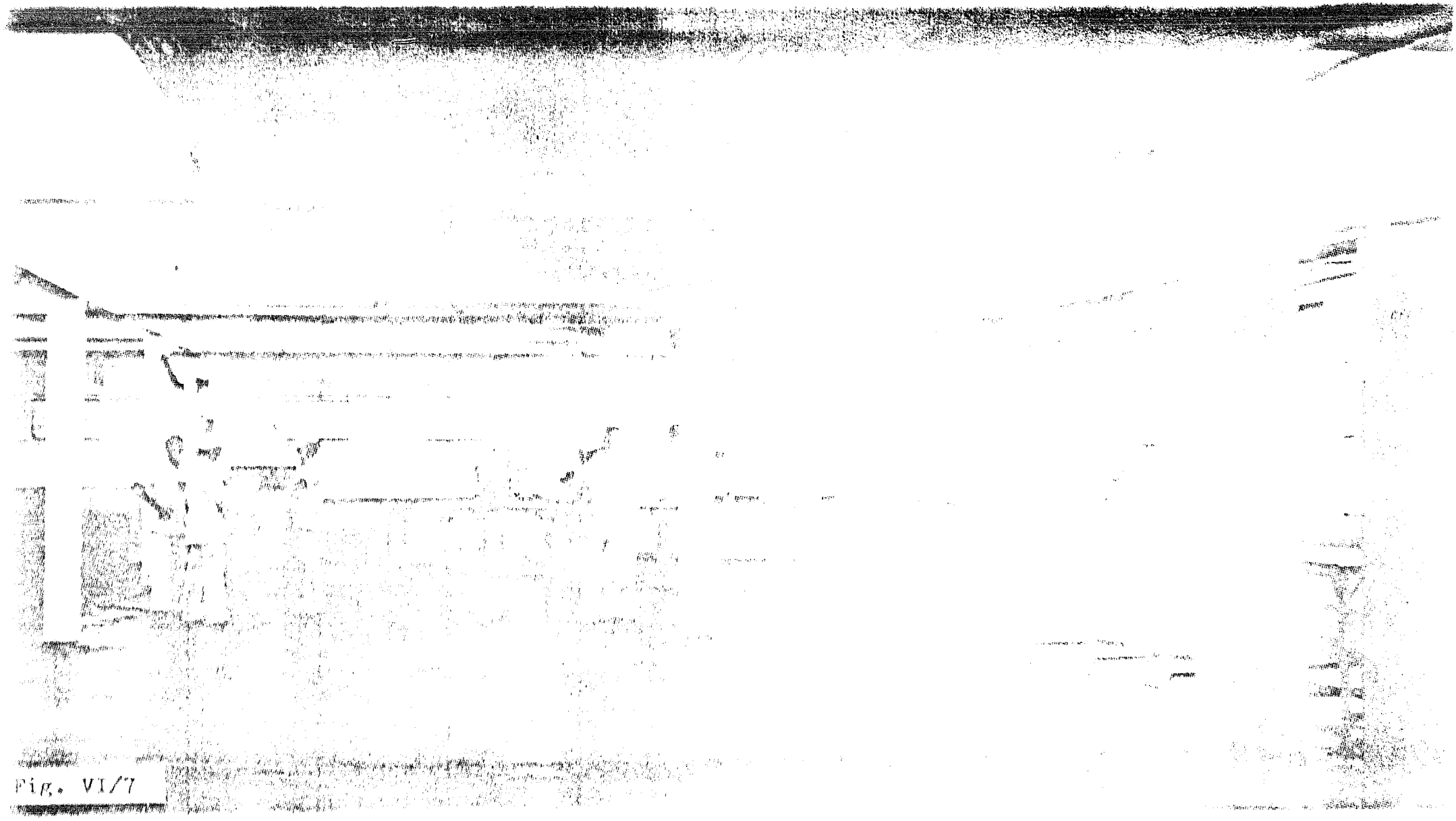


Fig. VI/7

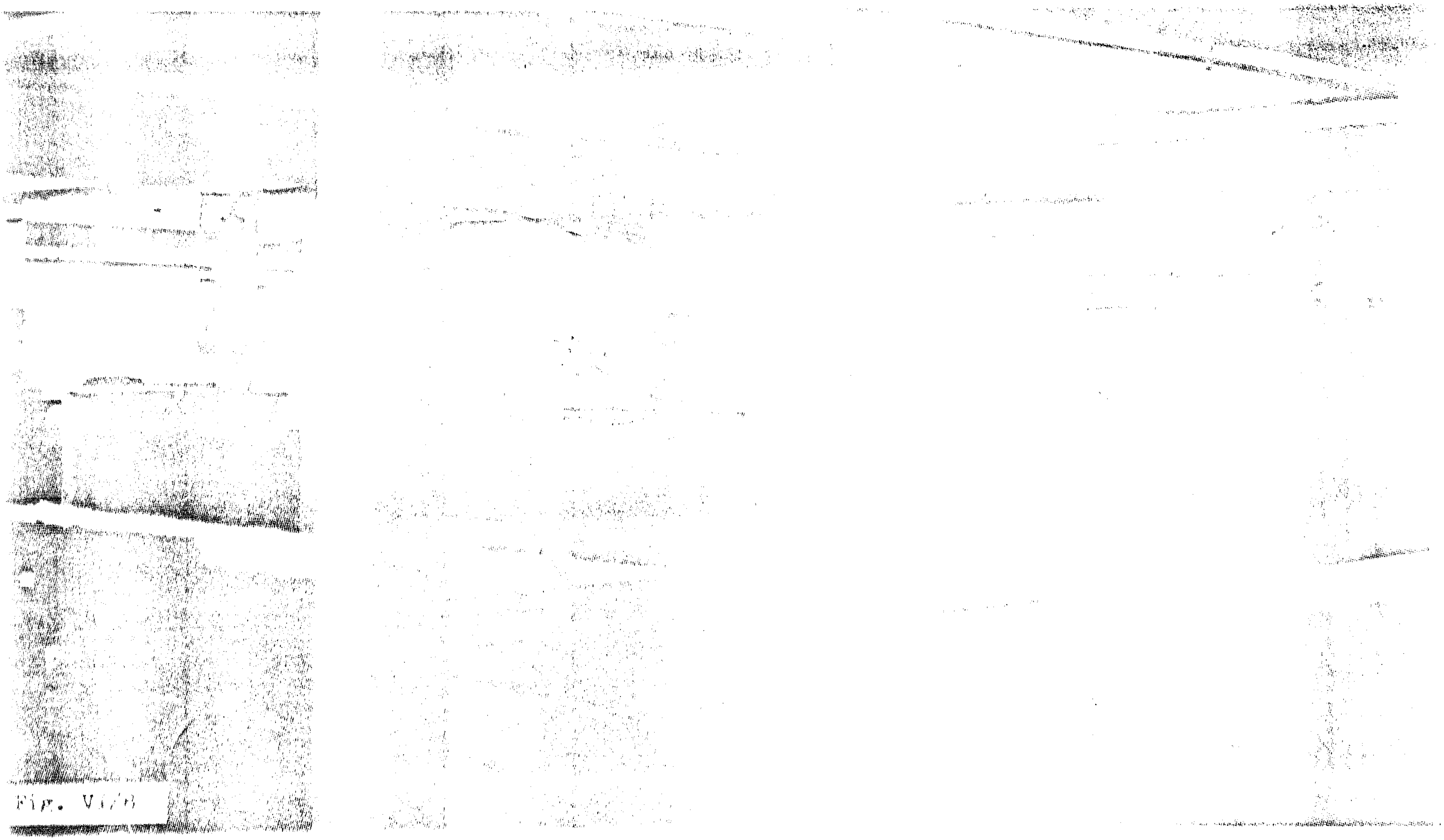


Fig. VI/8

Fig. V.10

NMS · ORGANISATION CHART

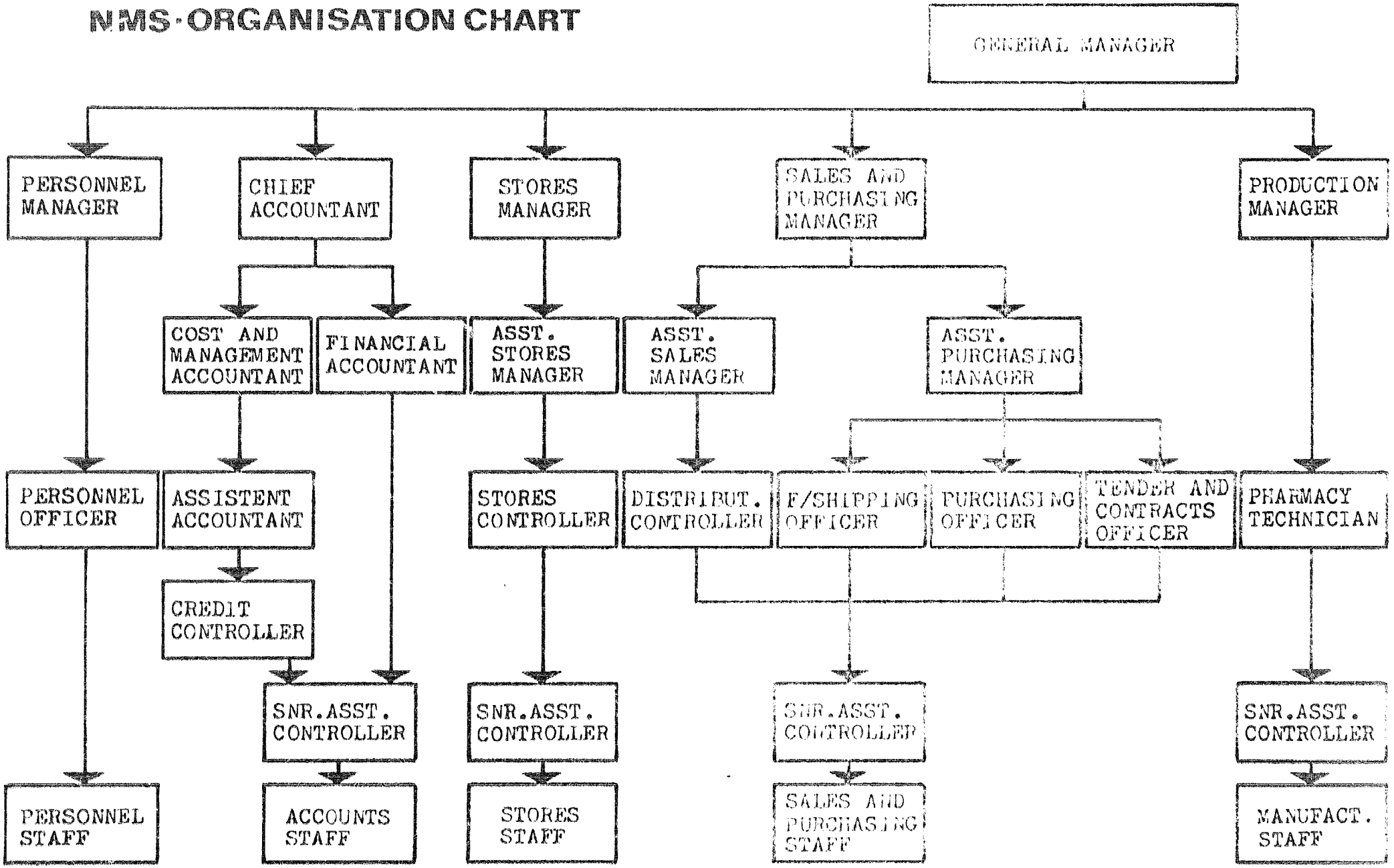
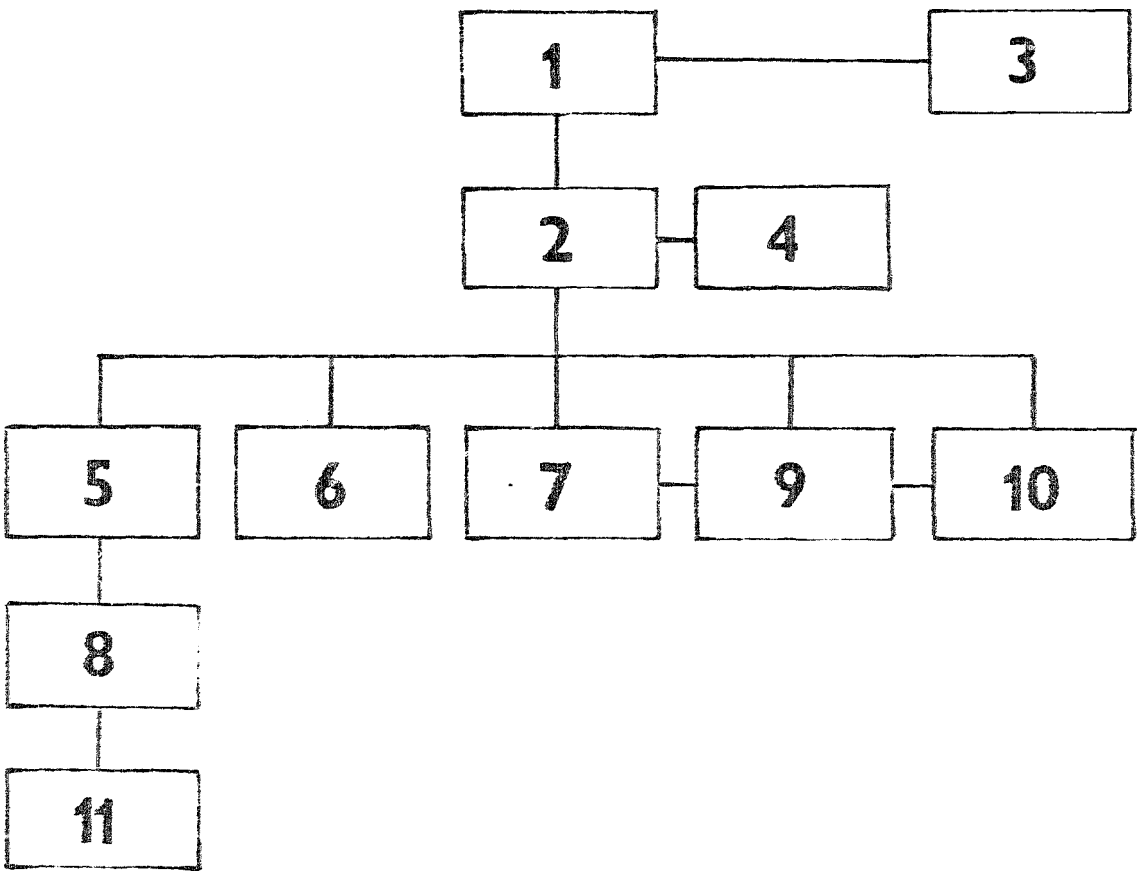


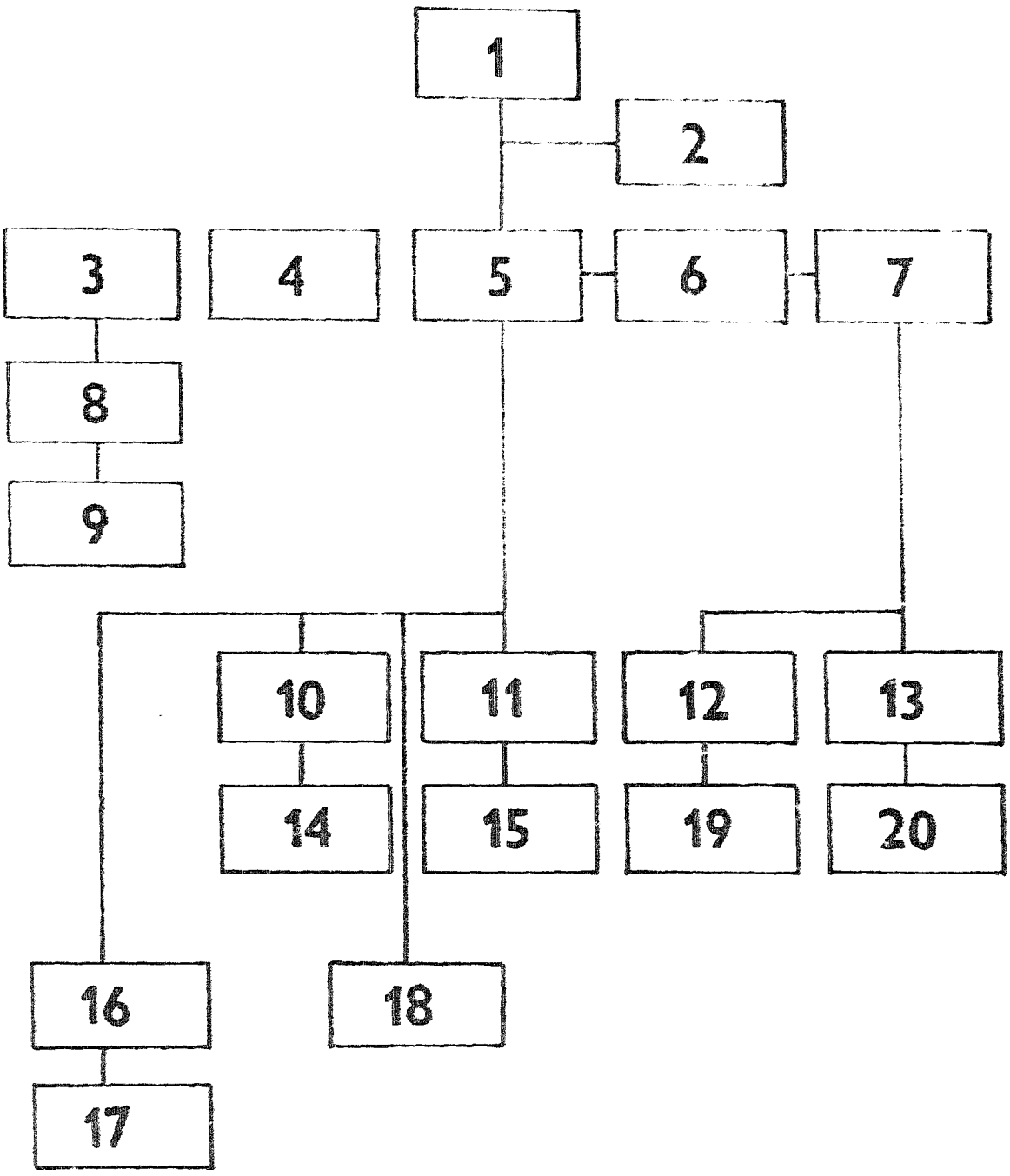
Fig. VII/2



For explanation see page VII/2

VIII. MANPOWER

Fig.VIII/1



For explanation see page VIII/1

Appendix to Chapter VIII

Workers of Medical Stores Ltd are organized in the National Union of Commercial and Industrial Workers, head office in Obote Avenue, Kitwe. All the labour relations and wage and salary conditions can be derived from this collective agreement entered into between the above National Union and the Management of Medical Stores Ltd. We therefore present here the basic provisions of this collective agreement (as registered in January, 1979).

1.00 Definitions - as used herein:

1.01 'Employer of labour' shall mean Medical Stores Ltd.

1.02 'Employee' shall mean all those who undertake to render service to the aforesaid employer of labour and are rockoned as such under the provisions of the Employment Act.

1.03 The 'Union' shall mean the National Union of Commerical and Industrial Workers, a Trade Union duly constituted and registered under the provisions of the Industrial Relations Act (Act No. 36 of 1971).

1.04 The 'Company' shall mean for the time being the establishment of the Medical Stores Limited, Lusaka, as a whole with all its departments.

2.00 Objectives

It is hereby realised and agreed that the advancement of employees and indeed their livelihood depends on the success of the Company. The Company expocts its employees to manifest loyalty and devotion and to maintain a high standard of efficiency and hard work. The Company in turn is concerned in the well being and security of all its employees. Both the Company and the Union hawe mutual obli-

gations which may be summarised as follows:

2.01 Determination of an equitable pay structure, in light of prevailing circumstances thus leading to the reduction of lost time through wage disputes.

2.02 Improvement in morale and industrial relations.

2.03 Increase in work output performance.

2.04 Reduction in labour turn-over, in particular by combating indiscipline such as indleness and absenteeism, etc.

2.05 Maintenance of a higt standard of safety.

3.00 Conditions of Service

It is hereby agreed that the following conditions of service shall not apply to employees on individual contracts of service. However this will not preclude the right of such contract holders from Union representation.

4.00 Recruitment Policy

It is the Company's policy to give priority for employment to Zambians. Where however, a suitable qualified Zambian is not available to fill a particular post, then non-Zambians may be offered the job, provided the policy complies with the relevant provisions of Zambian law.

5.00 Contract of Service by Month

The employee is employed by the Company on an oral or written contract of service provided that for the period of three months from the date of the employment, the employee shall be on probation. During the probationary period, notice of termination of contract of service shall be by giving twenty four hours'notice on either side. After proba-

tion, the employee shall be informed in writing by the Company of his confirmation or otherwise.

6.00 Termination of Employment

6.01 Notice of Termination - Except in cases of summary dismissals or during probationary period, thirty days' notice to terminate the contract shall be given or an amount equivalent to the basic salary for the period shall paid by either party in lieu of notice.

6.02 Redundancy - Where however, through force of circumstances it is necessary to reduce staff, Management will negotiate with the Union terms of redundancy taking into account the following factors in deciding who its employees will be redundant: skill, efficiency, length of service, diligence, loyalty and health. The Management shall undertake to inform the Union at least one month in advance of its intention to apply redundancy.

6.03 Redundancy Payments - Unless otherwise neeessitated by circumstances beyond Management's control, redundancy payments shall be computed as follows:

Length of Service	Redundancy Notice	Redundancy Pay
6 to 12 months	Two weeks	1 month
13 months to 6 years	1 month	2 months
6 years and above	2 months	3 months

Additionally, any other entitlement due, such as accrued leave, retirement benefits, ect. shall be honoured.

6.04 Retirement - The normal retirement age will be 55 years for men and 45 years for women. Applications for longer service will be at the discretion of Management. An employee

due to retire will be notified to that effect at least six months in advance.

6.05 Early Retirement - Some employees age more quickly than others, and before they reach normal retirement age, cease to be capable of performing the full duties of their jobs. In the event of such a situation, Management may, in consultation with the Union, retire the employee early, but this will not be a right on the part of the employee.

6.06 Benefits on Retirement - An employee who retires as stipulated in clause 6.04 or 6.05 and having served the Company for at least a minimum of ten years, will get a service bonus of 60 per cent of his monthly salary multiplied by the number of years served and shall be entitled to repatriation benefits (see clause 6.09) provided he was in receipt of K 1,800 per annum or less at the time of retirement.

6.07 Medical Discharge - When an employee is unable to continue in employment as a result of disablement due to an industrial accident or other injury, or as a result of sickness, he shall receive a termination payment amounting to three months' pay and repatriation to his home district or repatriation expenses subject to the provisions of the Employment Act.

6.08 Deceased Employee Benefits - The beneficiaries of the deceased employee shall be entitled to a lump sum equal to three times the deceased employee's substantive monthly rate of pay. Wife and dependant children under 18 years shall also be entitled to repatriation back to their home district.

6.09 Repatriation Benefits - Only employees retiring, being medically discharged and dependants of deceased employees will be entitled to repatriation benefits. Any

employee wanting to settle on the line of rail or other place other than his home district, may opt to get cash in lieu of the repatriation expenses and make his own arrangements provided that repatriation expenses were equal to the amount payable by public transport.

6.10 Certificate of Service - An employee leaving the Compaly's service will be given a certificate of service stating:

Name of employer.
Name of employee
Date of engagement
Date of discharge
Nature of employment
ZNPF Social Security No.
National Registration Card No.
Employer's number with ZNPF
A statement showing the amount of statutory contributions and any supplementary contributions paid by the employer to ZNPF.

7.00 Employee's Obligations

Any employee in the service of the Company shall be dependent for guidance on his supervisor and such other regulations which the employer issues from time to time. Employees shall carry out reasonable instructions given to them, behave in an orderly and lawful manner and shall treat other employees with respect required by common law. Employees who, therefore break the rules and regulations must be disciplined and should expect to be penalised. The following summary of rules shall apply:

7.01 The employee shall not at any time during the continuance of his employment engage in any activity which shall or might interfere with the duties of his employment.

7.02 The employee shall fulfit the job assigned to him with all diligence and punctuality. Moreover he shall devote maximum care to the articles and materials of the employer.

7.03 The employee will work on each day on which he is required by the employer to work and will perform such work as the employer may lawfully and in terms of his contract of service require him to perform, and will obey any lawful orders given to him.

7.04 The employee shall not object to the control of the articles and materials entrusted to him, nor shall he object to a personal soarch when entering or leaving his place work.

7.05 The employee shall refrain from any action which might endanger his safety and the safety of others in the premises. Moreover, he shall make use of the safety devices when performing his work.

7.06 The employee shall not remove from premises without permission, anything that beloungs to the employer..

7.07 Nothing contained in this Agreement shall in any way relieve the employee of his responsibilities under the Industrial Relations Act, in particular those relating to breach of contract by persons engaged in illegal strikes.

8.00 Medical Regulations

8.01 The employee shall submit to any medical examination which the employer may require at any time.

8.02 If the employee absents himself from work even for one day on account of sickness, he will be regarded as absent unless he has obtained a certificate from a registered medical practitioner/officer or other person recognised by the employer and will obey any instructions which may be given by such medical practitioner or recognised person relating to his illness or incapability or absence from and return to work. Female employees however are exempted in accordance with section 54 (2) of the Employment Act.

9.00 Accidents

All accidents occurring at the employee's place of work whether involving injury or not (minor or serious) must immediately be reported by the employee to the immediate supervisor and the head of department.

10.00 Communications

Where the employer is required to serve upon any employee written notice relating to his terms and conditions of service it shall be deemed to have been served if it shall have been handed to the employee or delivered to his last known place of abode or posted upon any board permanently kept by the employer for the purpose of communicating information to employees.

11.00 Redeployment of Employees

As a measure to raise efficiency it is hereby agreed by the employer and the Union that in some sections and departments it may be necessary to arrange for redeployment and retraining of employees due to change in the organisation or work.

12.00 Basic Salary/Wages

Shall mean the basic fixed monthly remuneratin for the type of work upon whieh the employee is employed excluding overtime payments, or premium payments, or any other allowances whatsoever.

12.01 During the period of the present Collective Agreement, the wages/salaries as set forth in Schedules A and B attached hereto shall apply.

12.02 The employee will normally be paid his salary for the month on the 21st day of the month expiring. If, however, such day falls on a Saturday and/or Sunday or any paid public holiday, the employee will be paid the day proceding that Saturday and /or Sunday or paid public holiday.

12.03 Subject to the conditions laid down in this Agreement relating to sick pay, leave pay and public holidays, the amployee will be paid only for the days actually worked.

13.00 Working Hours

The normal working week will consist of forty hours spread over a period od five days.

14.00 Paid Public Holidays

All employees will be entiled to the paid public holidays enjoyed by the Company without deduction in pay. The employee shall only be paid if he is not absent from duty the day before and the day after the paid holidays. For the time being, the only public holidays recognised by the Company to be observed as gazetted public holidays include:

New Year's Day
Good Friday

May Day (Labour Day)
Heroes Day
Unity Day
Independence Day
Christmas Day

15.00 Increment

An overall salary increase of 5 per cent of the basic wagw for the first year, and 5 per cent for the remaining one year of the duration of the Agreement shall be awarded to all employees in Scales S22, S21,S20, S19, S18, S17, S16, S15, S14, S13, S12, S11, S10 and S9 - effective from 1st April, 1978, and 1st of April 1979.

16.00 Promotion

Promotion from one grade to another is entirely at the diseretion of the Managent. If a new post or vacancy has to be filled, the employer will in principle give priority to the promotion of an existing employee over the engagement of a new employee, if in the sole opinion of the Management an employee qualifies in all respect for the vacancy. On being promoted to a higher grade, the employee will get the minimum basic wage/salary for that grade.

17.00 Demotion

Demotion will only be applied where in the opinion of the Company the employee is incompetent in the job. An employee will not be demoted to a grade or position lower than his previous substantive position.

18.00 Acting Allowance

An employee who is temporarily required to perform a job with higher rate of pay in the Union's field of representation for a month or more will receive an acting allowance equivalent to the difference between the minimum basic rate of pay or 10 per cent of the employee's substantive rate whichever is the greater.

19.00 Overtime

The employer and the Union agree to reduce overtime to a minimum. However the employee must work overtime when called upon to do so in order to maintain continuous operations or in the event of a break-down or emergency.

19.01 Any work executed at the request of the employer on Sundays, paid public holiday or in excess of the weekly working hours shall be considered to be overtime work. For the purpose of calculating overtime, thirty minutes shall be the minimum and any overtime work done in less than thirty minutes shall not draw any benefits nor shall it accumulate.

19.02 The remuneration of overtime work shall be as follows:

19.02.01 During the weekdays which include Saturday, the employee shall be paid at one and half times the substantive rate.

19.02.02 During Sundays and public holidays the employee shall be paid at two times the substantive rate.

19.02.03 An employee, who having been asked to work overtime and who works for a period of time finishing after 0100 hours will be entitled to his next normal shift off with pay at the substantive rate.

20.00 Annual Leave

Employees shall be entitled to leave in accordance with the grade related scales as follows:

20.01 Employees on basic salary of K3,288 per annum and above-3 days a month.

20.02 Employees on basic salaries of K1,320 to K3,288 per annum - 2 1/2 days a month.

20.03 Employees on basic salaries below K1,320 per annum-2 days per month.

21.00 Compassionate Leawe

Requests for compassionate leave shall receive sympathetic consideration by Management. Any such leave taken shall be recovered from the employee's accrued leave.

22.00 Special Leave

Paid leave shall be granted upon written application and supported by proper evidence in the event of the following:

22.01 Marriage of employee - two days.

22.02 Death of wife, husband, child, mother or father-three days.

22.03 Participation in an examination approved by the Company-necessary time subject to a maximum of two weeks.

22.04 Special leave shall be free and, therefore not recoverable from employee's accrued leave. An employee may obtain copassionate leave in addition to special leave.

23.00 Unpaid Leave

It is contrary to Campany policy to grant unpaid

leave of absence. If however in the opinion of the Management there is justification in a particular case for an exception to be made to this policy, the matter shall be left at the discretion of Management.

24.00 Maternity Leave

Female employees who have completed at least twelve months' service with the employer shall be entitled to leave accrued by month plus ninety days unpaid leave if they so wish.

25.00 Union Leave

The Union Branch official shall be assured of the maintenance of his earning in respect of the time spent by him in carrying out his duties as a Union official within terms of his agreement and provided that:

25.01 In case of leave for training puposes, clause 22.03 shall apply. Leave requested for domestic Union business shall be considered by Management.

26.00 Sick Leave

Any employee who is, according to judgment of a psysician or medical practitioner designated by the employer unable to execute his work, shall be granted paid sick leave on producing a medical certificate and provided that such sick leave shall be in compliance wiht:

26.01 When an employee is absent from work as a result of an industrial accedent, he shall be covered by the provisions of the Workmen's Compensation Act, Cap. 509.

26.02 During the employee's sick leave as a result of ordinary sickness or non-factory accident, the sick leave

pay entitlement shall be as follows:

26.02.01 A maximum of twenty-six days on full pay and a further eight weeks on half pay shall apply.

26.03 Sick leave shall be computed separately for each year and shall not be comulative.

26.04 When an employee exhausts his sick leave days, the employer in consultation with the Union may terminate the employee's contract of service on grounds of prolonged absence or grant unpaid sick leave. Repatriation benefits as stipulated in clause 6.09 shall apply.

27.00 Marriages, Births and Separations

Theso shall be notified at once to the Personnel Department for the purpose of changing privilege entitlements of employees.

28.00 Housing

28.01 If accommodatin owned or controlled by the employer is available and allocated to the employee, the employee may occupy such accommodation and the employer shall deduct from his wages/salary 10 per cent of the employee's basic salary.

28.02 Owner-Occupier Housing Allowance - The rate of housing allowance will be assessed on the value of the at the time of purchase, based on the building society valuation or actual purchase price where no mortgage in involved. The housing allowance will be as follows:

Value of House K	Housing Allowance per Month K
2,000 and below	20
2,001 to 5,000	40
5,001 to 10.000	60
10,001 to 15,000	80
15,001 to 20,000	100
20,001 to 25,000	120
30,001 and above	150

28.03 Own Arrangement Housing Allowance - This allowance will be paid to employees who are entitled to accommodation provided by the employer but who elect to make their own arrangements instead and do not qualify for owner-occupier allowance or have not been accommodated by the employer:

28.03.01 Officers on a basic salary of K4,248 and above:

	Per month K
Single officers	20.00
Married officers	40.00
Widow or widower with children ..	40.00
Widow or widower without children ..	20.00

28.03.02 Officers on a basic salary of K2,280 and above but not exceeding K4,247 per annum:

	Per month K
Single officer	10.00
Married officer	20.00
Widow or widower with children ..	20.00
Widow or widower without children .	10.00

28.03.03 Officers on a basic salary of K1,392 per annum and above but not exceeding K2,279 per annum:

	Per month K
Single officer	7.00
Married officer	11.00
Widow or widower with children ..	11.00
Widow or widower without children ..	7.00

28.03.04 Officers on a basic salary of K1,391 per annum and below:

	Per month K
Single/married	7.00
Widow/widower with or without children	7.00

28.03.05 Where an employee occupies a local authority house, he will be apid an 'own arrangement housing allowance' equal to the rent of that house or the allowance as shown in 28.03 above as applicable or whichever is less.

29.00 Protective Clothing

The employer shall from time ensure the distribution of suitable items to employees according to the requirements of their job. Employees will be under obligation to wear such protective clothing as designated by the employer. Employees in the production section will receive four units every year, those in the warehouse, will receive two units per year, those in transport section will receive two units per year while those in adminis-

tration will receive two units per year and a pair of shoes.

30.00 Disciplinary Policy (Offences and Sanctions)

30.01 The Union acknowledges that it is the function of the employer to maintain order, discipline and efficiency, and also to discharge, suspend or otherwise penalise employees for proper cause in accordance with the agreed statement of the disciplinary policy for the industry provided that any disciplinary action taken shall be made known to the Union and may be subject for discussion. For offences and penalties see Schedule C.

30.02 Disciplinary Procedure - It is recognised that it is the duty of the line Management to institute discipline to its employees whenever a disciplinary code has been infringed, it will be the duty of the immediate supervisor of the erring employee to call the employee concerned and make out a complaint form in triplicate. Contents of the complaint must be read to the employee concerned. The original complaint form should be forwarded to the Head of Department or his nominee. The duplicate to the Personnel Department for investigations and recommendations. The triplicate to the shop steward of the department concerned.

31.00 Agreement Variation

This Agreement shall remain in full force and effect unless and until:

(a) replaces by a new Agreement negotiated between the employer and the Union;

(b) amended in part following negotiations between the employer and the Union;

(c) terminated summarily in the event of either party ceasing to be legal entity.

32.00 Period of Agreement

This Agreement shall cover the period of two years from the 1st of January, 1978, to 31st December, 1979, after which period it may be terminated by either party giving the other three months' notice in writing.

In witness whereof the parties have set their hands at Lusaka on the 6th day of July, 1978.

For and on behalf od Medical Stores Limited

S.E. CHALILA,
General Manager

S.M. KAMELI,
Personnel Manager

B.C. MALATA,
Company Secretary,
National Import and Export Corporation

For and on behalf of the National Union of Commercial and Industrial Workers:

G. SAKALA,
National Chairman

J. MUSONDA,
General Secretary

B.C. NKNKWE,
Chairman, Works Committee

SCHEDULE A

Grade	Administration	Accounts	Stores	Manufactory	Sales	New Scales per Annum K
S10/9	Post/Training Officer	Asst.Accountant Salaries Officer			Purchasing Officer	4,460-5,777
S11/10		Credit Controller	Stores Controller		Distribution Contr. Freight/ /Shipping Officer Tenders/ /Cont./Off.	3,780-5.015
S13/12	Security Officer	Cashier Supervisor Sen.Costing Clerk	Asst.Stores Contr. S/Stock Clerk	Asst. Contr.	Asst.Distribution Booking Supervisor Transport Officer Purch. Supervisor Senior Mechanic Customs/Clearing Clerk	2,394-3,780
S16/14	Administrative Clerk Personnel Clerk Typist Receptionist/ Senior Carpenter Head Cook	Accounts Clerk Sen.Pricing Clerk Assistant Cashier	Stock Contr. Clerk	Product. Clerk	Distribution Clerk Transport Clerk Booking Clerk Purchasing Clerk Mechanic	1,462.2,281

SCHEDULE B

TECHNICAL AND SECRETARIAL SCALES

Grade	Administration	Accounts	Manufactory	New Scale per Annum K
SS1	Personnel Secretary to the General Manager Typing Pool Supervisor	Senior Machine Operator		2,961-3,944
SS2	Stenographer Shorthand Typist			1,865-2,394
SS3	Typist			1,613-1,688 1,386-2,394
SS4		Accounting Machine Operator		1,184-1,310 1,386-2,961
TS13/11			Pharmacy Technician Laboratory Technician	2,507-4,637
TS15/14			Manufactory Artisans	1,537-2,394
TS16			Learner Artisan	995-2,167

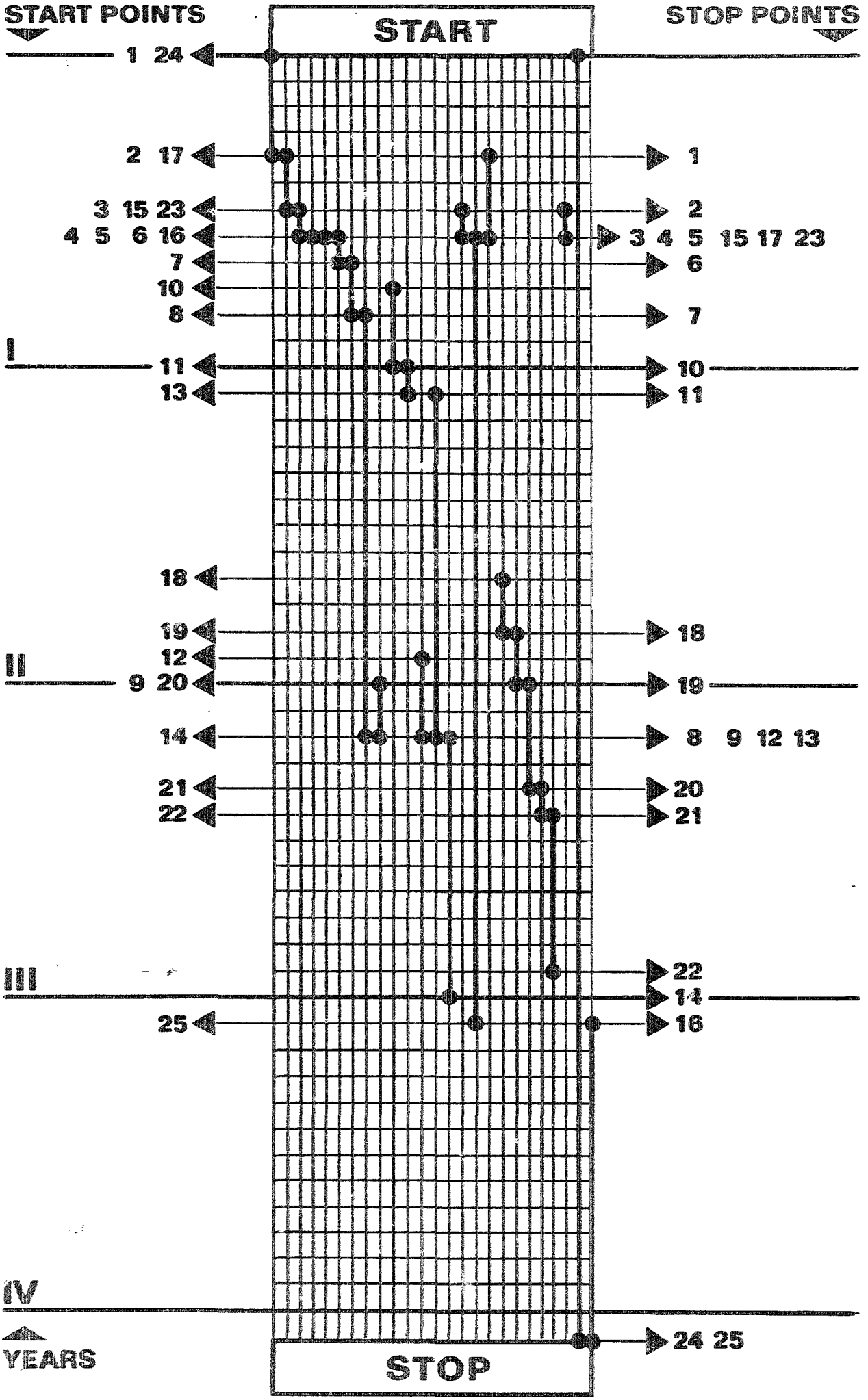
SCHEDULE A

S19/17	Carpenter	Asst.Accounts Clerk	Driver
	Security Guard	Pricing Clerk	Fork Lift Driver
	Records Clerk	Production Clerk	Senior Storemen
	Senior Office Orderly	Stock Verifier	Ledger Clerk
	Stationery Clerk	Capital Exp. Clerk	
	Registry Clerk		
	Cook		
S22/20	Office Orderly		Storeman
	General Kitchen Staff		
	Sanitary Orderly		
	General Workers		
	Watchman		

Senior Storeman	Senior Storeman Handyman (Mechanic)	995-1,286
Storeman	Storeman	642-932

IX. IMPLEMENTATION SCHEDULING

Fig IX/1 Implementation flow chart


START POINTS
START
STOP POINTS
1 24
2 17
3 15 23
4 5 6 16
7
10
8
I
11
13
18
19
12
II
9 20
14
21
22
III
25
IV
YEARS
STOP
1
2
3 4 5 15 17 23
6
7
10
11
18
19
8 9 12 13
20
21
22
14
16
24 25

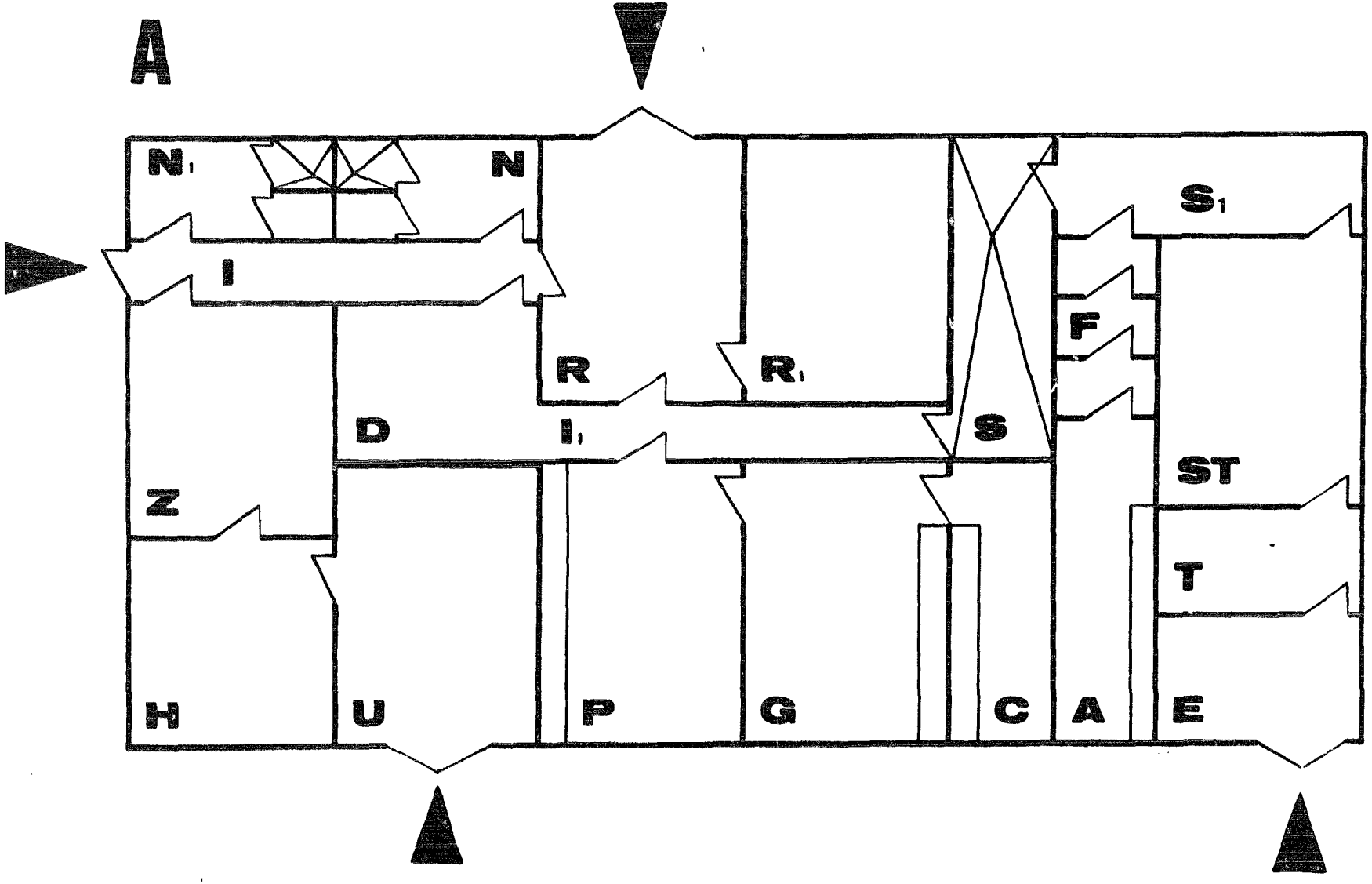
X. FINANCIAL AND ECONOMIC EVALUATION

XI. APPENDIX

AN APPROACH TO THE DEVELOPMENT OF HOSPITAL PHARMACY IN ZAMBIA

Table XI/1

			ROOMS																								TOTAL			
			D		C	B			A					C	B	A	D				B C	A								
			WAITING ROOM	DISPENSING ROOM	PRESCRIPTION ROOM	GALENICAL LABORATORY	CONTROL LABORATORY	SCULLERY	CLEAN SCULLERY	HYGIENIC FILTER	ASEPTIC ROOM	STERILISATION ROOM	ADJUSTING ROOM	STORE ROOM I	STORE ROOM II	STORE ROOM III	CLOAK ROOM I	SHOWER BATH I	WC I	CORRIDOR I	CORRIDOR II	CHIEFPHARMACIST'S OFFICE	ROOM FOR EMPLOYEES	CLOAK ROOM II	SHOWER BATH II	WC II				
SYMBOL			U	D	P	G	C	S	S_1	F	A	ST	T	R	R_1	E	H	H	H	I	I_1	N	Z	N_1	H_1	H_2	A	B	C	D
SQM			22	14	22	22	11	13	12	7	13	22	8	21	21	18	5	15	15			18	28	6	15	05	220	[illegible]	87	44
WALLS	FACING TILES							O	O	O	O	O						O							O					
	FACING TILES 180 CM				O	O	O						O						O							O				
	OIL PAINT																			O	O									
	PAINT		O	O										O	O	O	O					O	O	O						
	ROUND JUNCTION				O	O	O	O	O	O	O	O	O																	
	PARAPET DESK				O	O	O				O																			
CEILINGS	OIL PAINT							O	O	O	O	O						O							O					
	PAINT		O	O	O	O	O						O	O	O	O	O		O	O	O	O	O	O		O				
FLOORS	TILES		O	O	O	O	O						O	O	O	O			O	O	O					O				
	TERAZZO							O	O	O	O	O						O							O					
	PVC																O					O	O	O						
WINDOWS	OPENABLE		O	O	O	O	O	O				O	O	O	O	O	O		O			O	O	O		O				
	DUSTPROOF								O		O																			
ILLUMINATION	NATURAL		C	A	A	A	A	C	A		C	C	C	D	D	D						A	A							
	ARTIFICIAL	GENERAL	80	80	80	50	80	50	80	50	80	50	50	60	60	60	50	30	30	50	50	50	50	50	30	30				
		LOCAL		200	200	100	200	150	150		200	200	200									200	200							
ELECTRICITY	220 V		2	1	2	2	2						2	1	1	1	1			1	1	1	2	1			21	[illegible]	6	6
	220 V WATERPROOF							2	1		1	2															6	2		
	380 V					1																					1	1		
	SWITCHES	INSIDE	O	O	O	O	O						O	O	O	O	O							O						
		OUTSIDE	O					O	O	O	O	O						O	O						O	O				
	ILLUMIN. BULB	COMMON			2	2	2			2			1	1			1		1			1	1	1	1	1	17	[illegible]	5	2
	ILLUMIN. BULB	WATERPR.						1	1	1	2							1							1		7	2	1	1
	ILLUMIN. FLUORESC.	COMMON	3	3	3	3	2						1	4	4	1				2	2						28	[illegible]	17	8
	ILLUMIN. FLUORESC.	WATERPR.						2	2		3	3															10	2		
	UV LAMP									1	3																4			
	TELEPHONE	PUBLIC																				O	O							
		INTERNAL		O		O					O		O	O								O	O							
WATER	COLD WATER		O		O	O	O	O	O	O		O	O					O							O					
	HOT WATER							O	O	O								O							O					
	STERILE WATER								O		O																			
	SINK				1	1	1	6	4			1	1														15	8	1	
	WASH BASIN									1																	1			
	SHOWER									O								O							O					
	GULLY							O	O	O								O							O					
GAS	CYLINDER INSIDE				O	O	O	O	O			O																		
	CYLINDER OUTSIDE										O																			
CLIMATISATION	VENTILATION							O																						
	[illegible]		[illegible]																											
	AIR-CONDITIONING SPECIAL										O																			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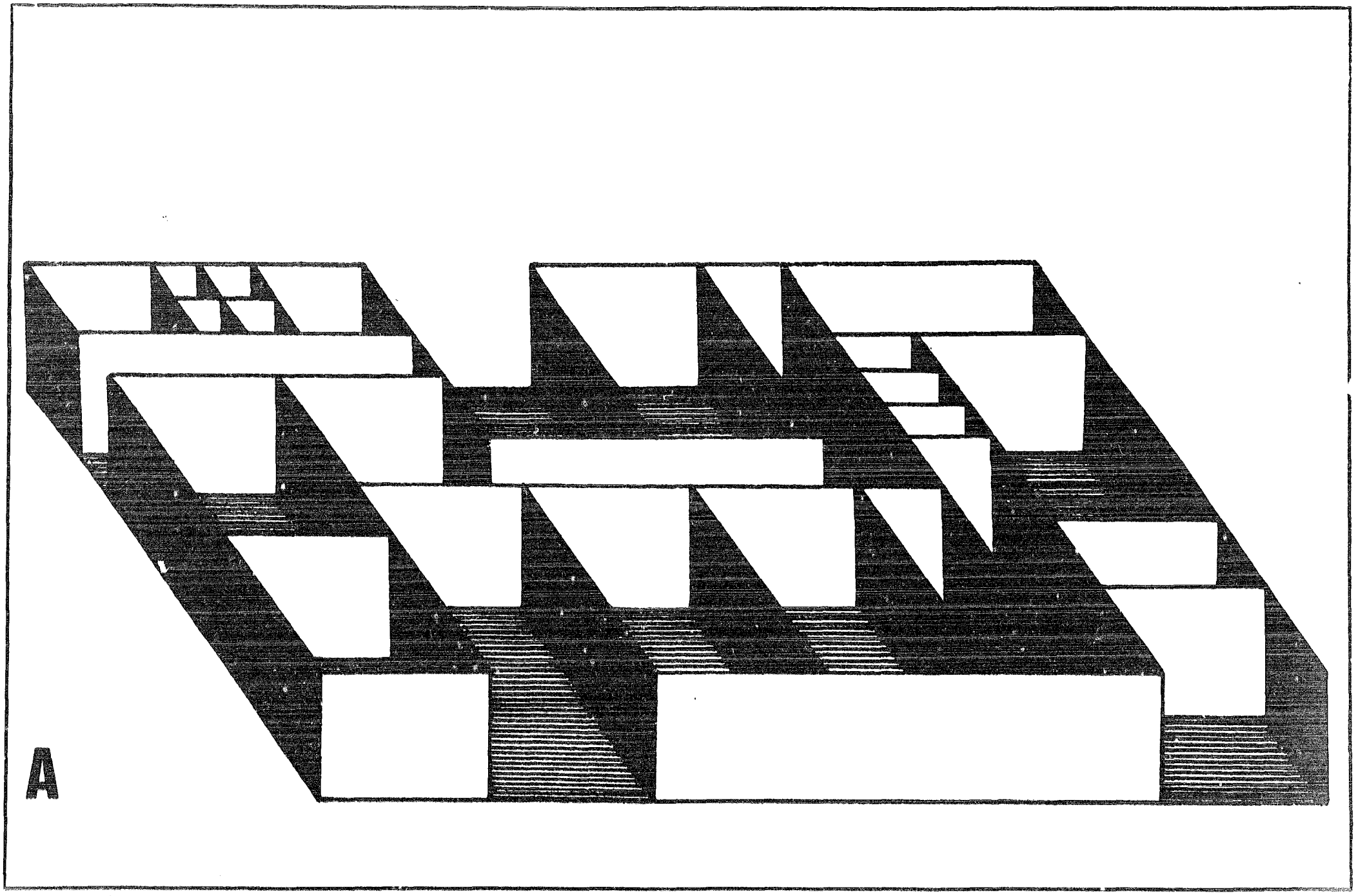
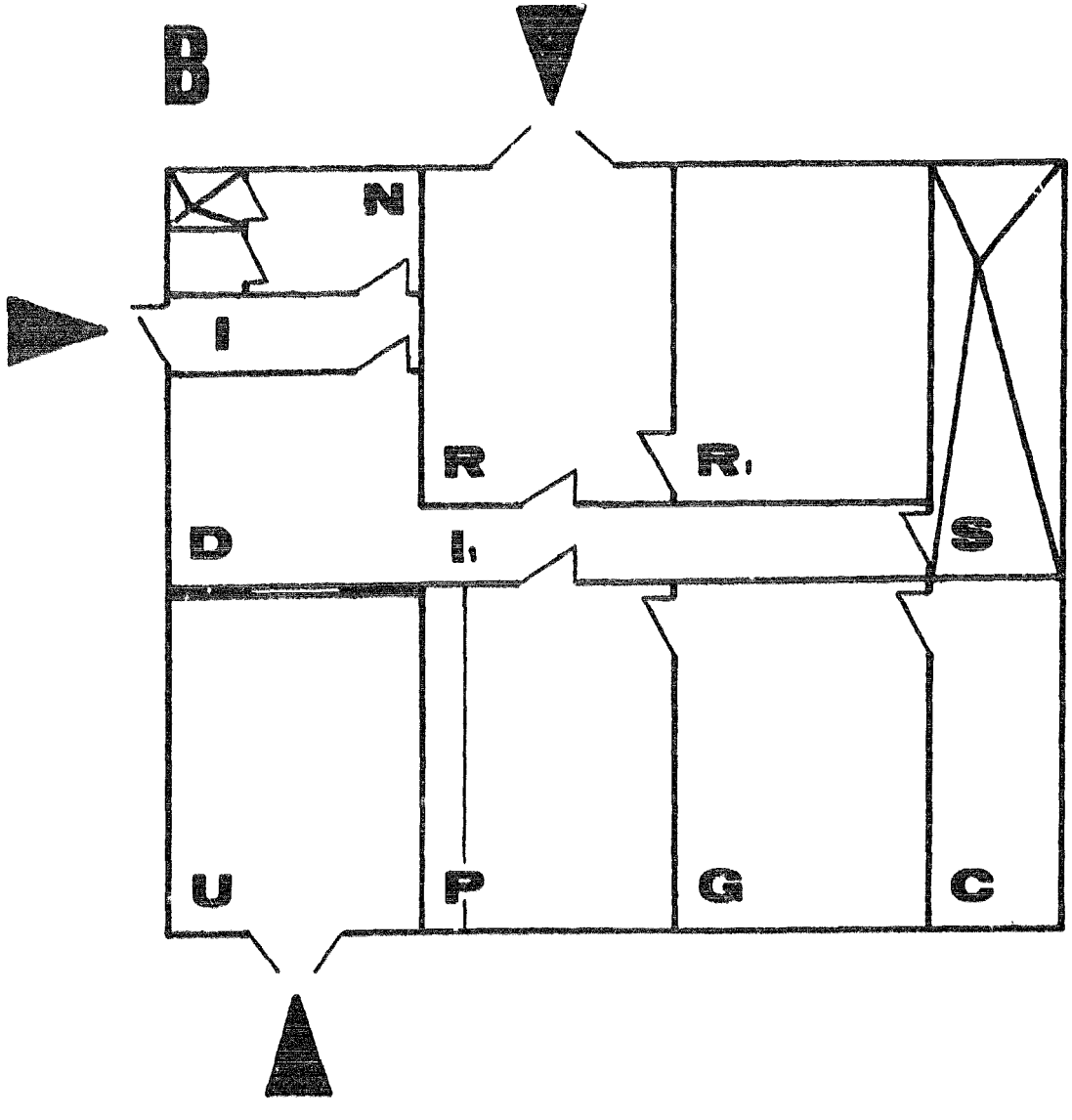


Fig. XL/2



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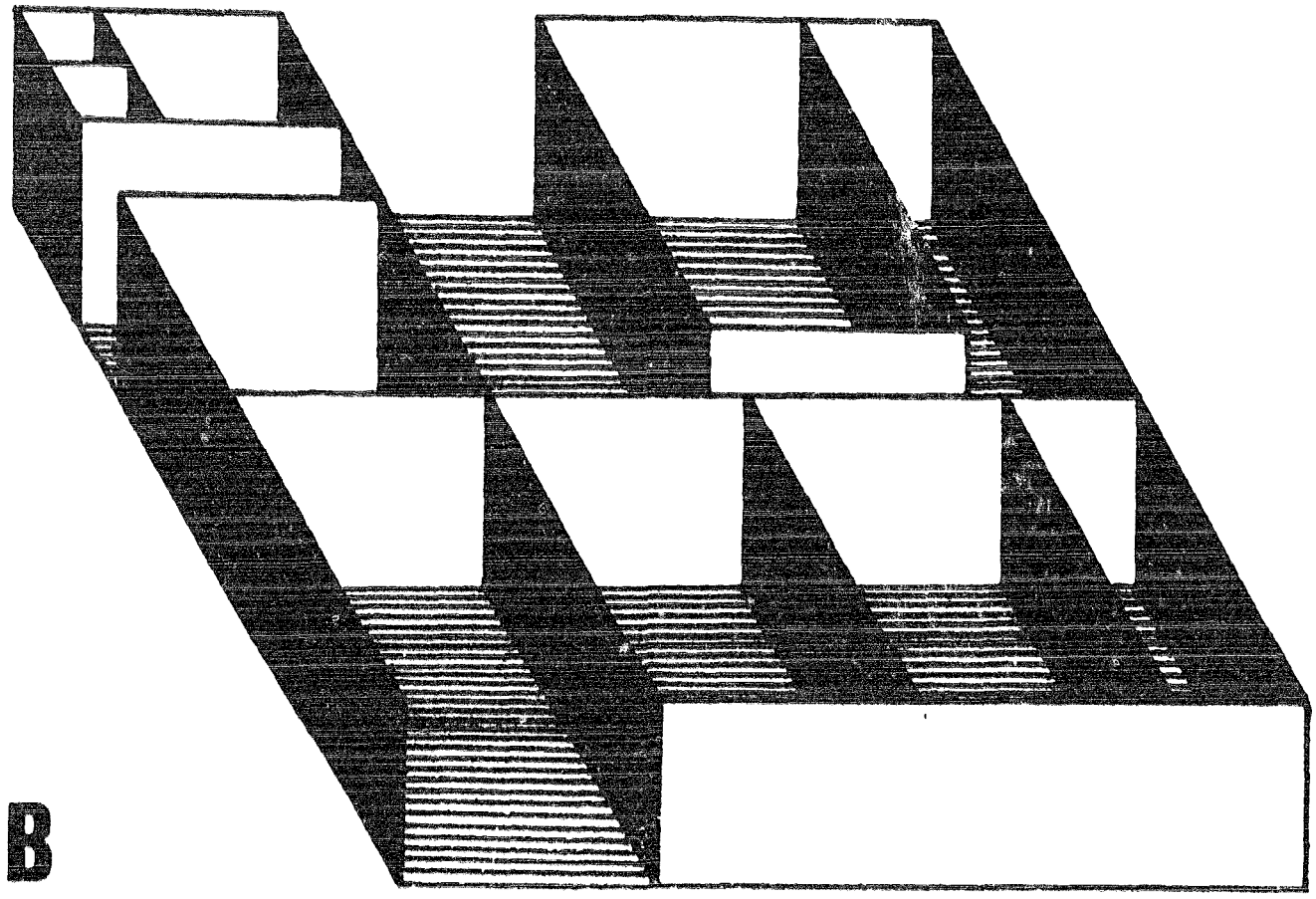

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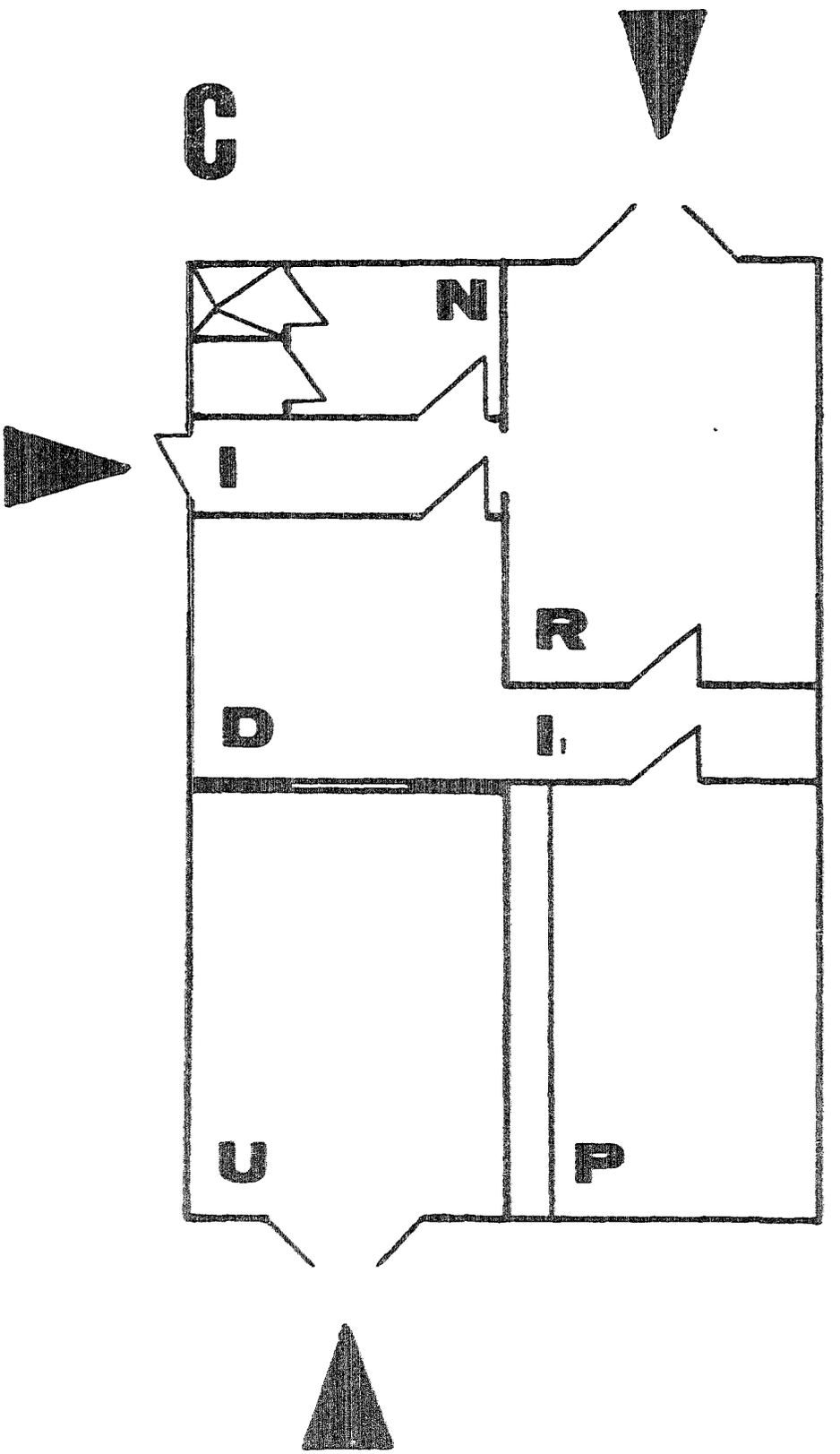

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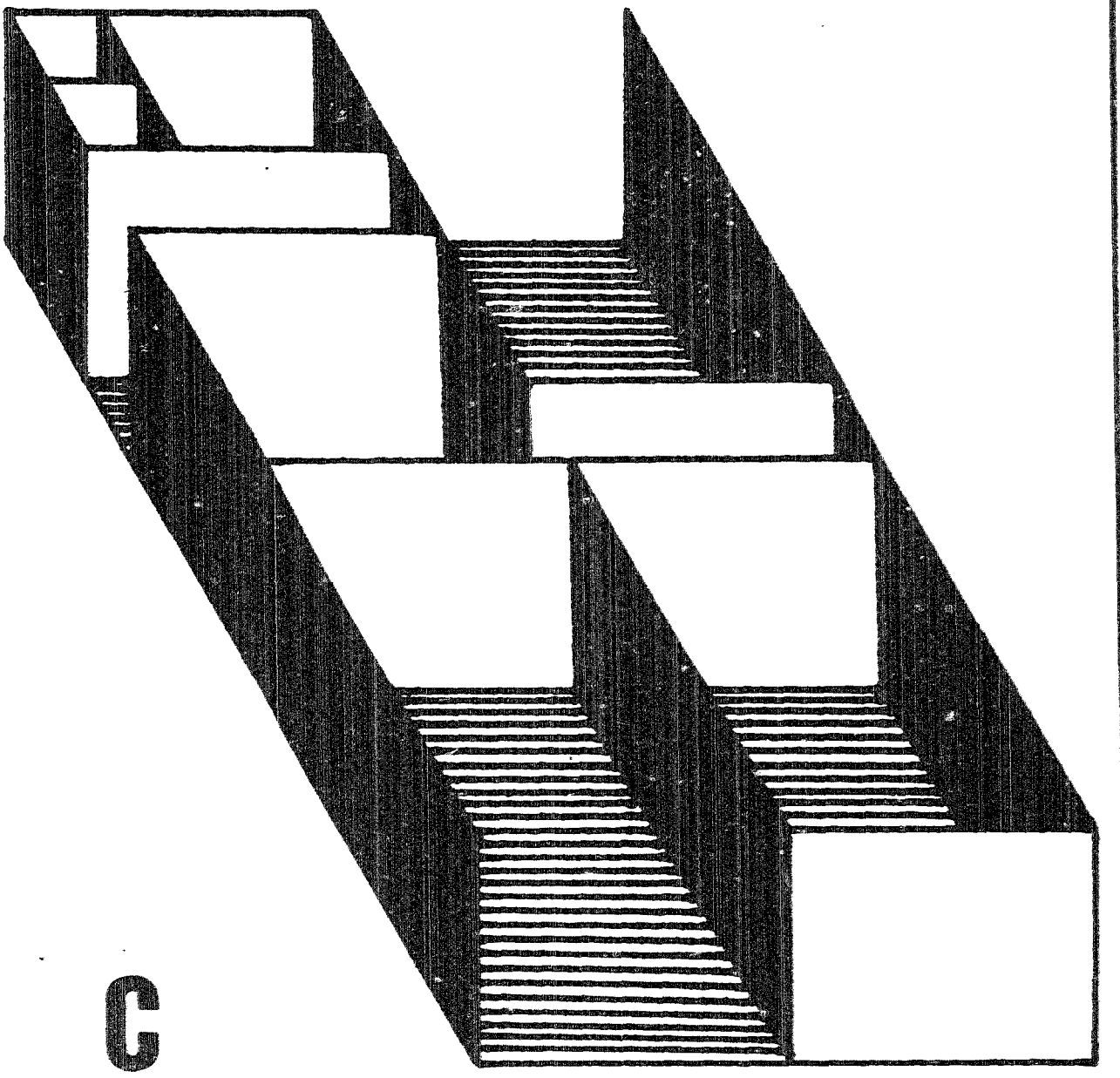


C

Fig. XI/6

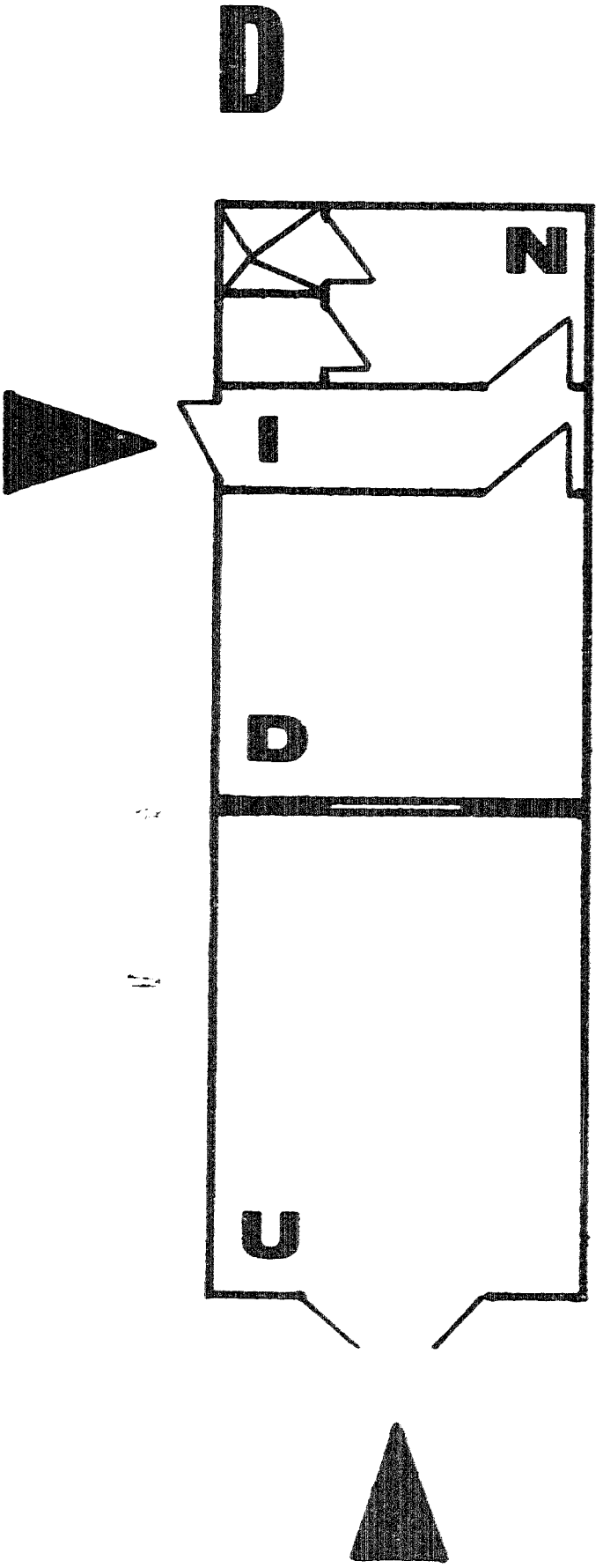
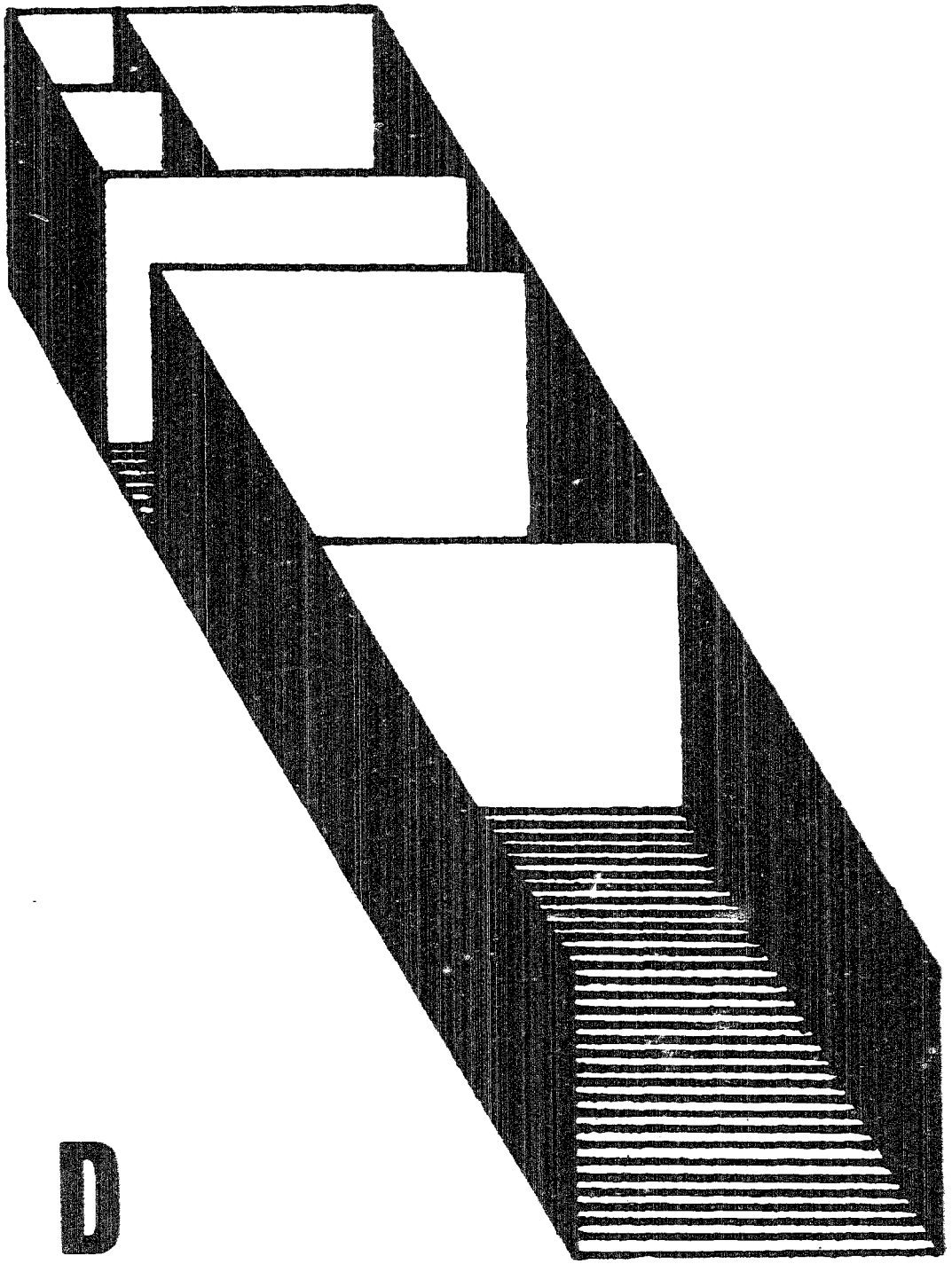


Fig. XI/7



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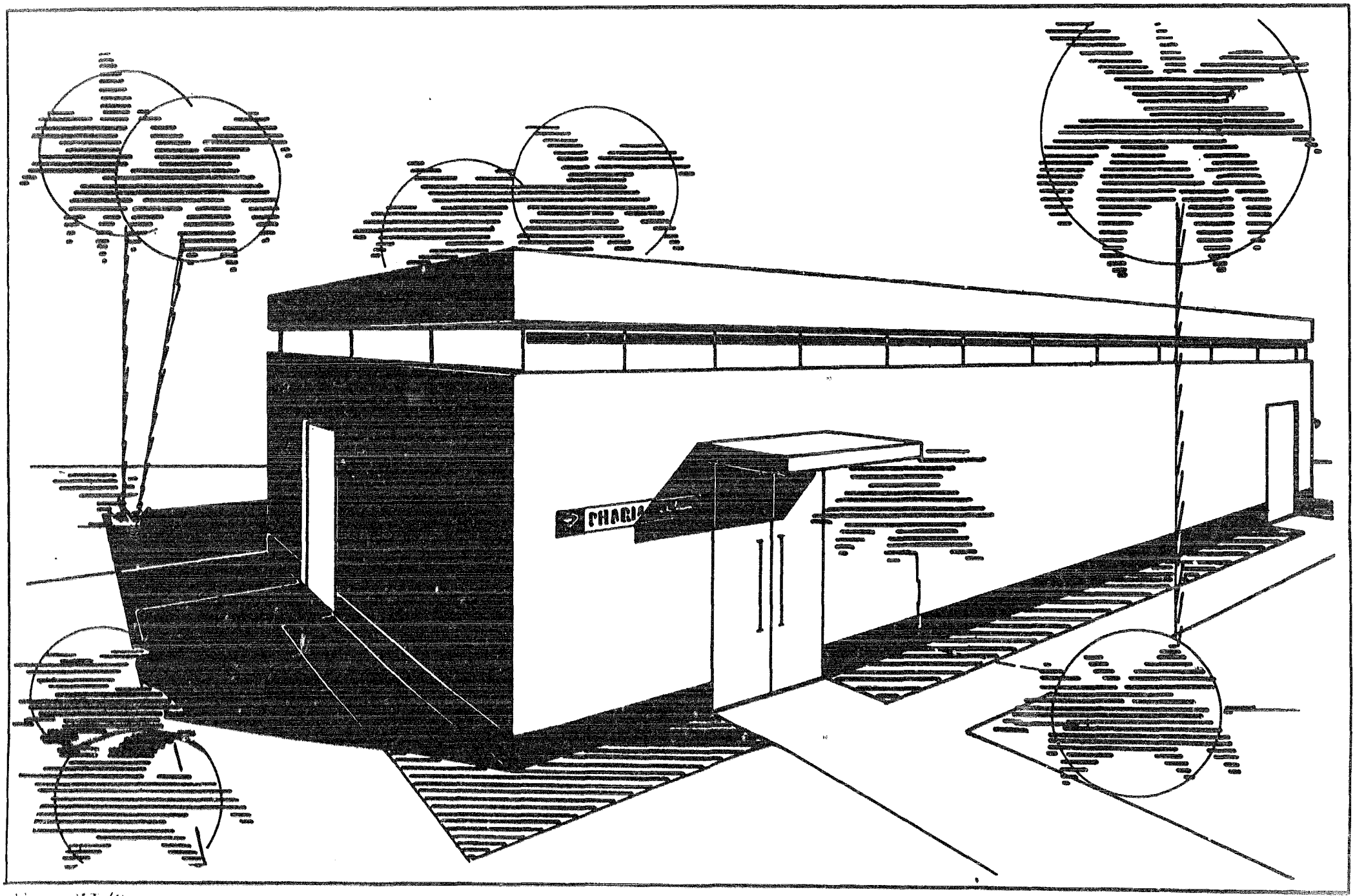
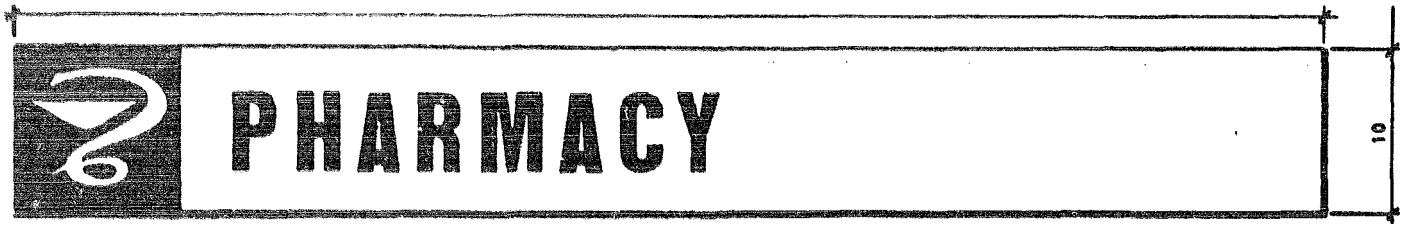
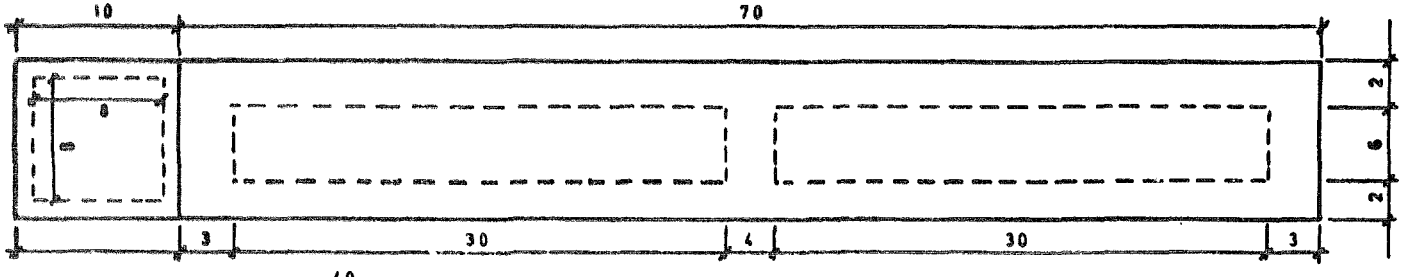


Fig. XI/9



SCALE 1 : 4



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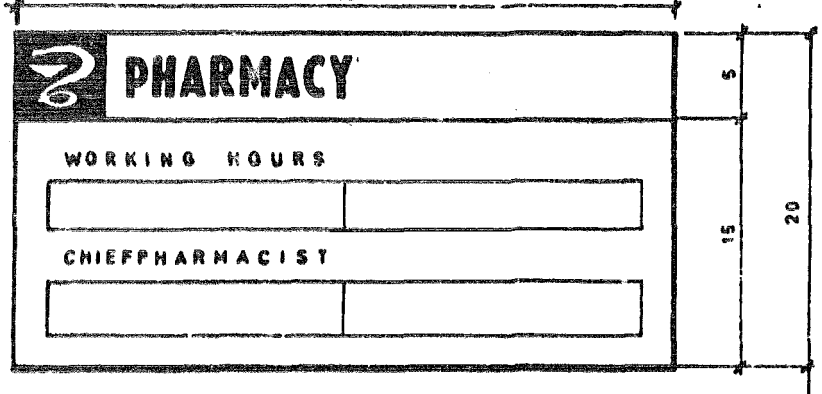
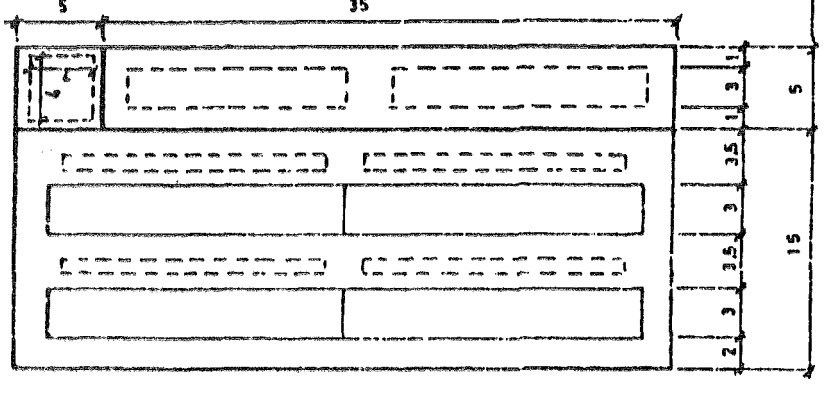


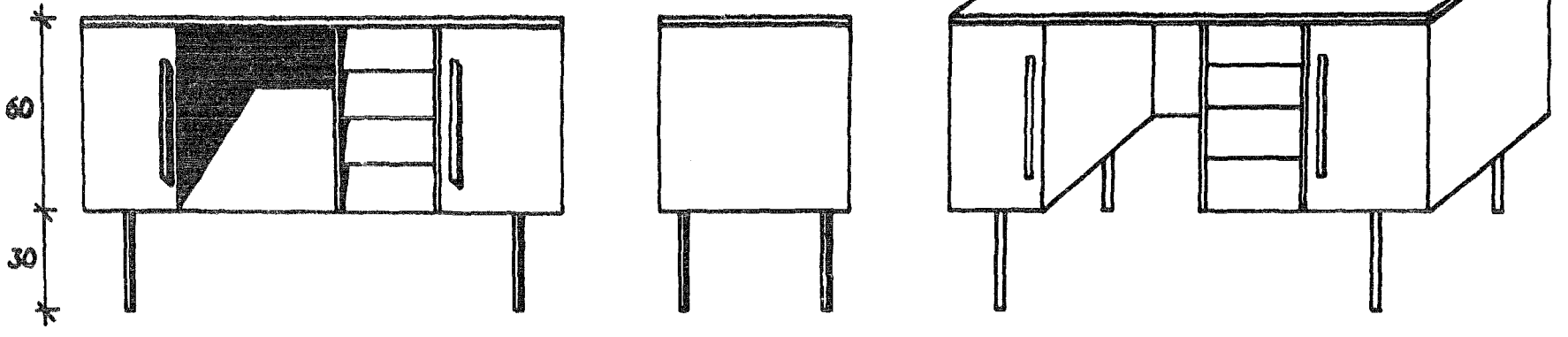


20 × 40

SUGGESTION FOR HOSPITAL PHARMACY SIGNBOARD

SYMBOL	WHITE IN RED FIELD
LETTERS	RED IN WHITE FIELD
TEXT	BLACK

DIMENSIONS IN CM



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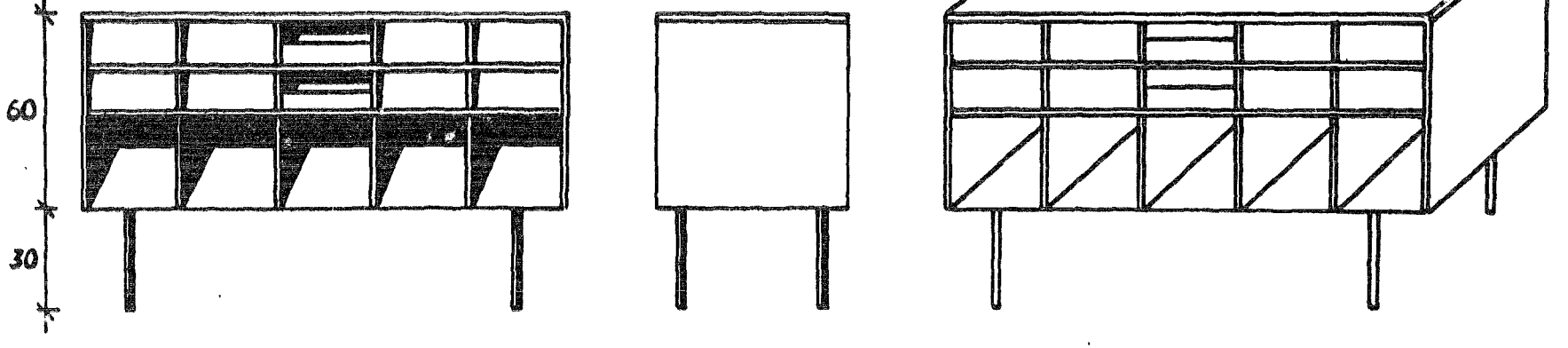
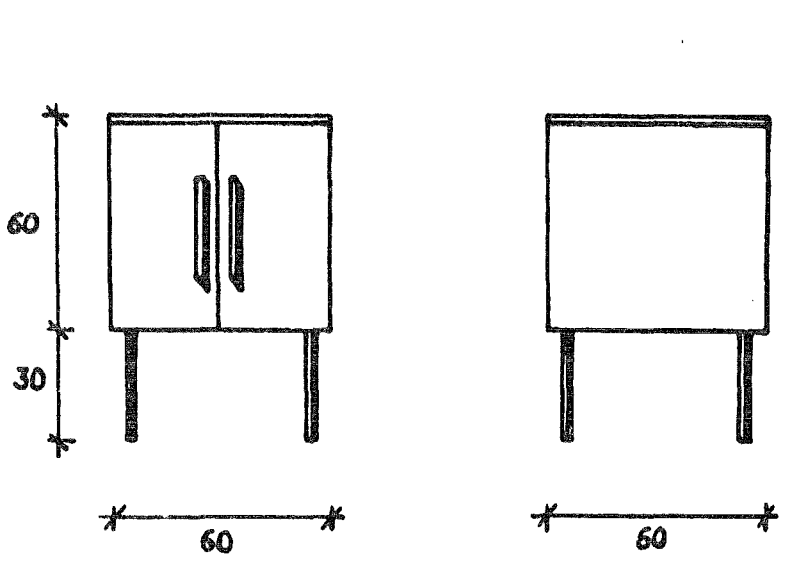
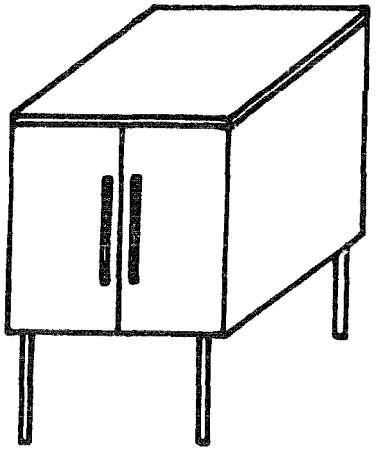


A2





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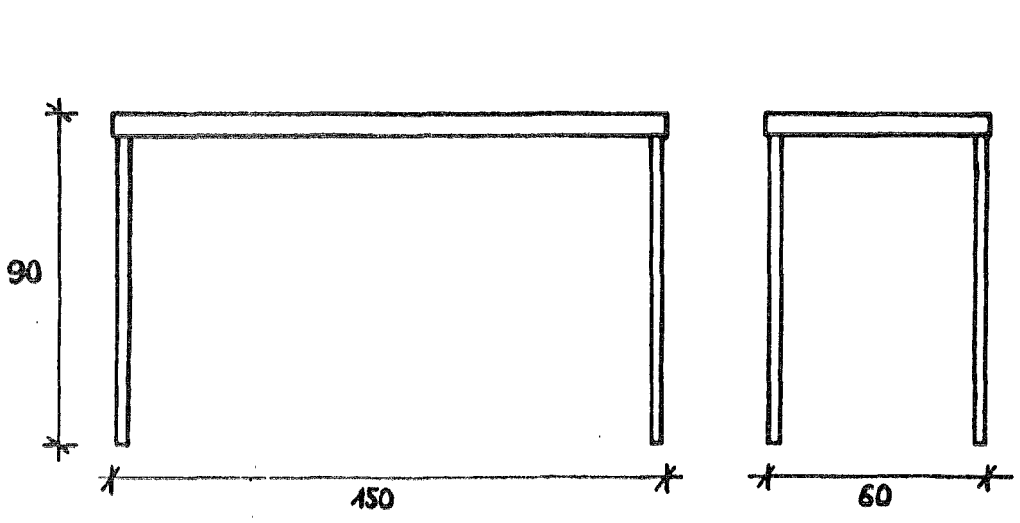

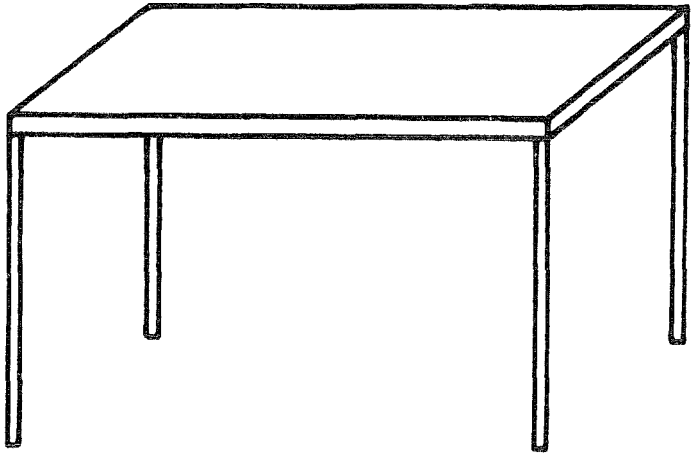

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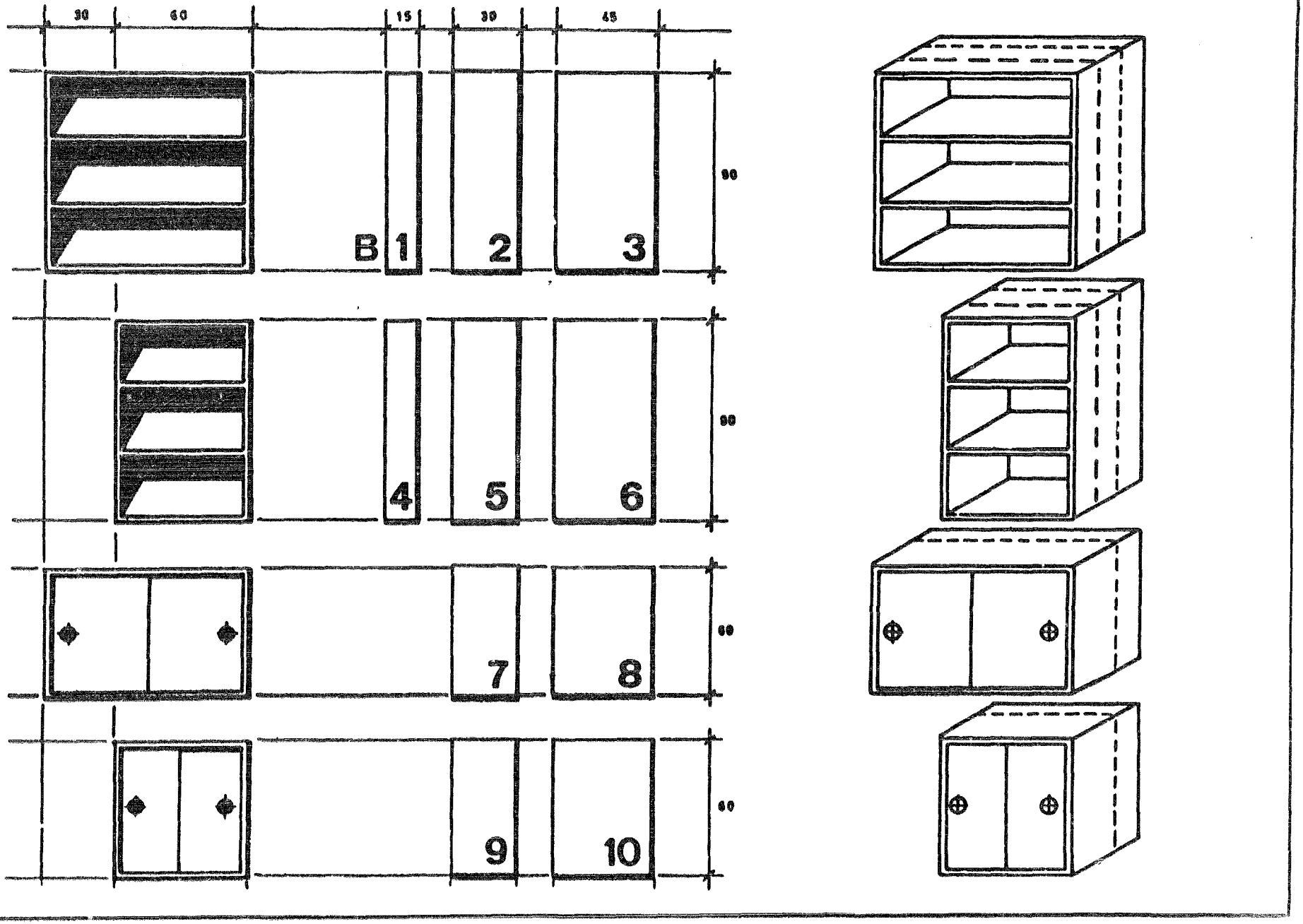


Fig. XI/13

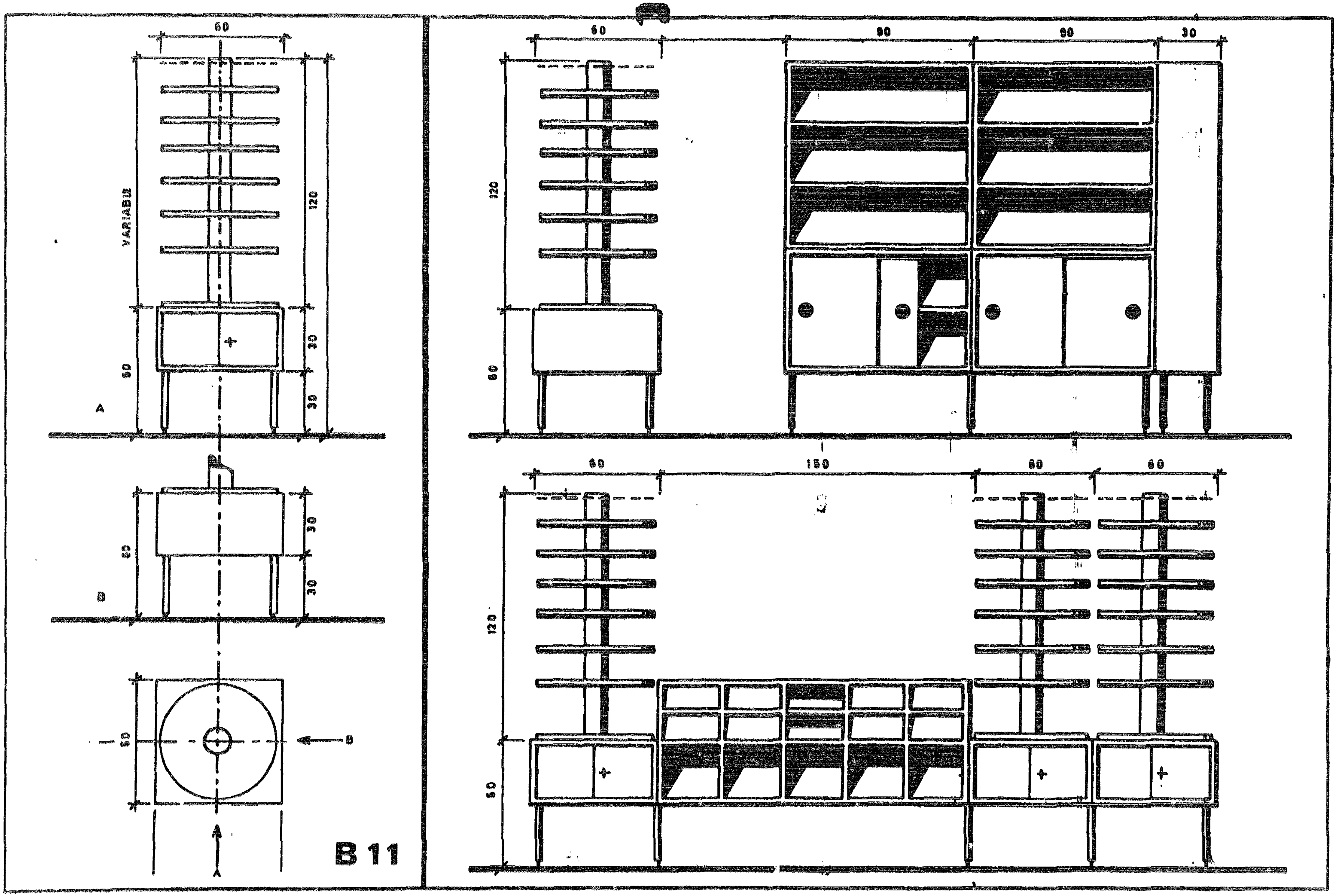


Fig. 11/11

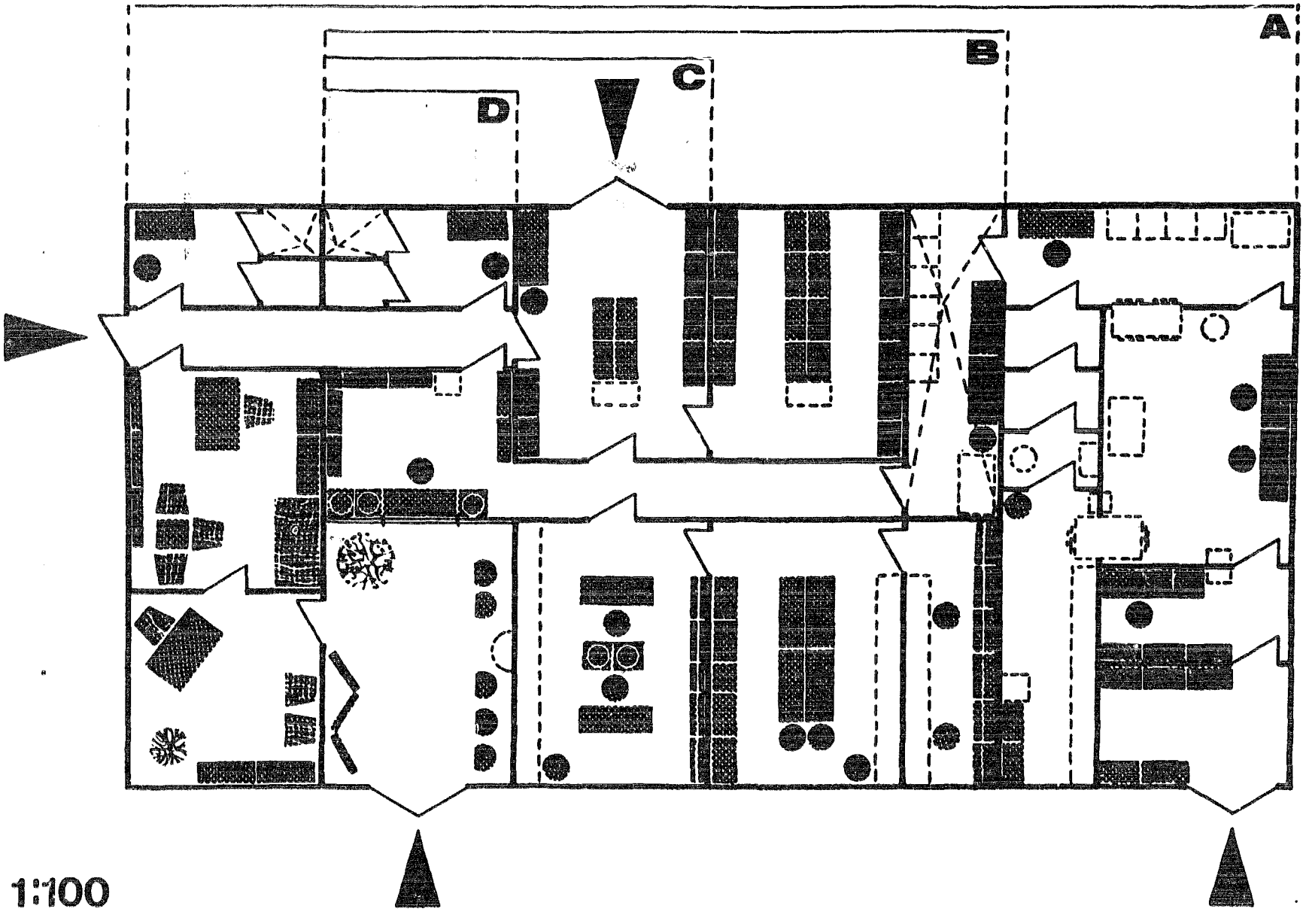
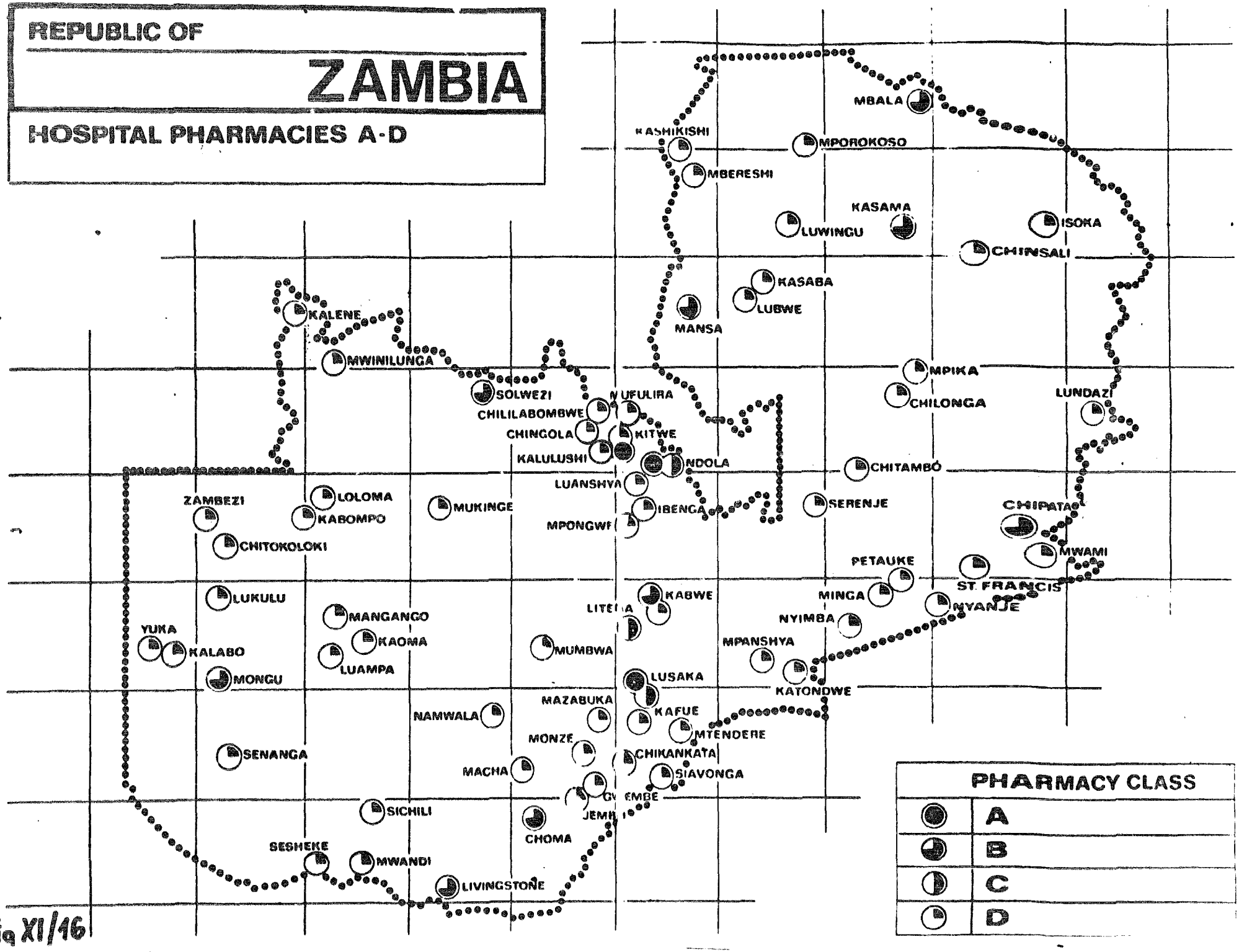


Fig. XI/15

REPUBLIC OF

ZAMBIA

HOSPITAL PHARMACIES A-D



PHARMACY CLASS	
	A
	B
	C
	D

Fig XI/16

SOME FIGURES
OF THIS DOCUMENT
ARE TOO LARGE
FOR MICROFICHING
AND WILL NOT
BE PHOTOGRAPHED.