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by

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Distribution

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[illegible]

[illegible]

[illegible]
[illegible]
[illegible] 1/

[illegible]

International [illegible] of Synthetic Rubber Producers

[illegible]

United States of America

Frequently [illegible] chemical plants are considered indicia of [illegible] industrial development. Thus, some government leaders have established petrochemical industries in their developing countries even though the operation of such programs would frighten shrewd investors in [illegible] developed countries.

Minimum size operation and [illegible] demand

A single line 2, [illegible] about the minimum viable operation for manufacturing synthetic rubber. Labor and overhead are relatively fixed [illegible] per [illegible] cost per pound of synthetic rubber produced decreases as the quantity produced increases.

1/ The views and opinions expressed in this paper are those of the author and do not necessarily reflect the views of the secretariat of UNIDO. This document has been reproduced without formal editing.

Developing countries should consider that a synthetic rubber plant [illegible] within four years after [illegible] 100 per cent of [illegible] requirements. The [illegible], will have [illegible], polybutadiene, [illegible]. Ideally, the selected plant should be capable of producing several of these rubbers.

The cost and source of feedstock [illegible] availability. [illegible] plant [illegible] rubber plant [illegible] developing countries may find it [illegible] feedstocks.

[illegible] the right rubber

Choosing the type of rubber to be produced is a question of selecting the type that [illegible] the greatest percentage of total national requirements in the forecast demand pattern.

Management know-how

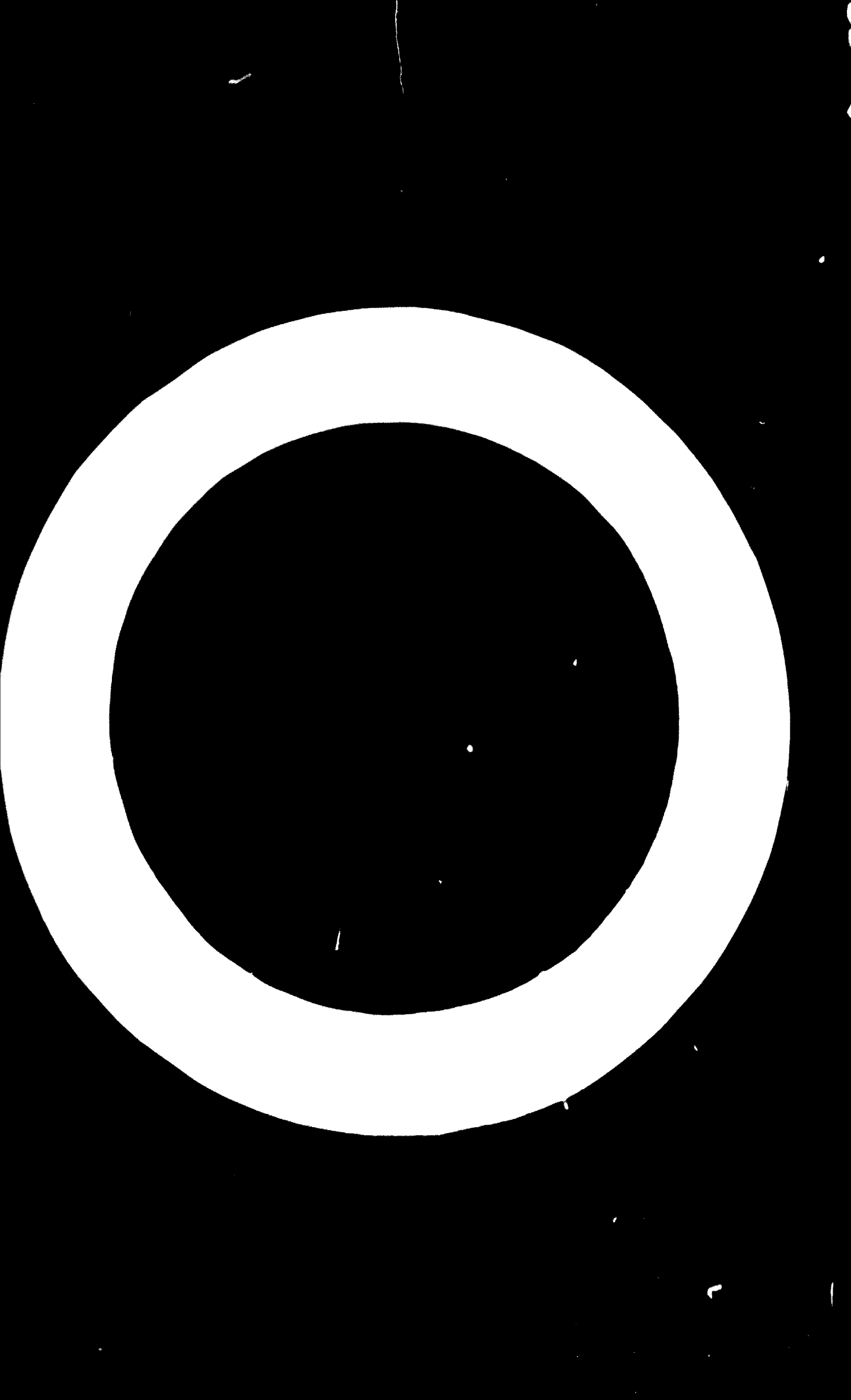
Management and know-how are critical. Developing countries tend to over value patents and undervalue technical know-how, experience and scientific management methods. Every synthetic rubber plant or business needs a continuing source of manufacturing technology. Thus, it is important to associate with a proven producer whose products meet the country's demands and who is willing to provide on-going technical assistance after the plant is on-stream.

Local raw material requirements

It is vital to determine whether available raw material will efficiently produce the selected rubbers to the quality standards established by local users.

Cost and the economics of a minimum sized monomer plant

The economics of any rubber plant depends upon its monomer costs. Monomer plants can require more capital than a rubber plant and a minimum



Unfortunately, [illegible] many is misleading [illegible]

[illegible]

However romantic [illegible] plant [illegible], it [illegible] with [illegible] quantities of [illegible] contribute to the nation's economy unless the market (or previously [illegible] demand) will [illegible] the plant operating at capacity within four years [illegible] after coming on-stream.

Minimum Size Operation and Market Demand

Experience has generally proved that a single line 20,000 T plant is about the minimum viable operation for general purpose rubber. A 40,000 T plant is probably more realistic and what financial [illegible] in a developed economy would insist upon before making the investment therein. A smaller plant requires specially built equipment thus increasing capital investment per ton of output. Since labor and most overhead items are relatively fixed, the proportional cost/lb. produced decreases as the quantity produced increases.

Caution, however, [illegible] that a market of 20,000 T/year total national demand for synthetic rubber in 3-[illegible] years does not necessarily justify plant construction since no one rubber plant could supply 100 per cent of the country's type requirements.

To be meaningful, any market survey must not only determine today's demand (by type) but also must anticipate the changing demand in the future for the different types of rubber. If trucks and buses are [illegible] per cent of a nation's vehicles, the kind of rubber required will be different from more developed areas with a higher proportion of passenger cars.

While [illegible] year may be minimum size for a rubber plant, it is not for a monomer plant [illegible] monomer plant might well cost almost as much, if not more than a rubber plant. Hence, many of the most developing countries will find it more economical to import feedstocks.

[illegible] may further complicate [illegible] local custom [illegible] a minimum return on investment of [illegible] per year. [illegible] investor reportedly expect [illegible] return [illegible] project interesting or feasible [illegible] plant don't give this kind of return on investment.

Management Know-How and Plant Problems

While there are those who would disagree with me, I feel strongly that most developing countries overvalue patents and undervalue technical know-how, experience and scientific management methods.

[illegible] tailored to conditions, [illegible] rubber [illegible] continuing [illegible] product has its own [illegible] Scandinavia [illegible] Australia [illegible] rubber [illegible] should go into an oil resistant hose or belt. [illegible] technical problems in a rubber plant [illegible] problem [illegible] it frequently is too late and too costly to start looking for management or technical assistance.

While [illegible] may be excellent, a surgeon who has performed [illegible] heart operations probably has more useful knowledge in heart surgery than the surgeon who has only read how it is done [illegible].

[illegible] a process for making synthetic rubber may be the cheapest part of going into the business. The important thing is to associate yourself [illegible] develop connections with a proven producer whose product meets your demands and who is willing and prepared to provide on-going technical assistance and training after your plant is on-stream. You may buy a recorder and take it home and you may be able to buy a service manual and you may be able to service it yourself, but if you are going to buy an auto as highly engineered [illegible], there are some real

[illegible]

[illegible] higher [illegible] etc.

[illegible] tory limits [illegible] million. [illegible]

A [illegible] co [illegible] not [illegible] facility. [illegible] the plants [illegible] tions [illegible]

If y [illegible] exc [illegible] stocks [illegible] fi [illegible] stocks.

Foreign [illegible]

Foreign [illegible] above [illegible] be reasonable [illegible]

1. [illegible] vessels, pumps, [illegible] electrical components, instruments [illegible] controls, [illegible], plus

1/ Off-plot [illegible] structures, [illegible] nizing [illegible] construction, pre-start-up costs, and working capital.

engineering [illegible] contractors overhead and profit.

2. Royalties [illegible] ton.

3. [illegible] for [illegible] – [illegible] million [illegible]

4. [illegible]

5. [illegible] parts.

Plans for [illegible] Developing [illegible]

[illegible], there should be little problem [illegible] quantities of production over local demand [illegible] rubber [illegible] constructed – provided [illegible] competitive. [illegible], few large producers would [illegible] would be a convenient [illegible] country. Quality competitive [illegible] is the [illegible] profits are low – it [illegible] producers. The economies aren't there!

[illegible] ✓ [illegible] rubber – [illegible] below cost to create foreign [illegible] production costs for home consumption – [illegible] your competition or [illegible] friends for your [illegible] not [illegible] little, and there [illegible], if any, arguments [illegible] synthetic rubber plant of any size if "dumping" [illegible] to show [illegible] of sufficient size to justify construction.

However, [illegible] solutions which could be beneficial to several countries. [illegible] countries whose combined total demand for a particular type [illegible] justifies [illegible] minimum (or [illegible] size) facility could [illegible] into a treaty [illegible] plant costs and plant ownership. I believe such [illegible] project proved [illegible] Colombia and Venezuela both wanted [illegible] fertilizer [illegible] plant. [illegible] 45 per cent [illegible] put up 45 per cent of the capital, [illegible] 10 per cent. Such arrangements

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✓ Illegal in most countries.

keep to keep the licensor alert to protect his interests, and the project should benefit everyone. Note however, as a matter of sound business, most licensors are not going to be interested in making an investment - even of [illegible] - unless they are given reasonable control over the management of the new enterprise. This is usually a question of management protection for the investor's investment.

Where the market pattern does not justify a plant for one country alone, but combining two could solve a real problem for both countries and to keep everybody happy, a treaty based on such an arrangement should probably involve two products and two plants - one in each country. For example, such an approach could be very realistic in arrangement between Pakistan, Turkey and Iran which already have an arrangement covering regional cooperation for development or, between Colombia and Venezuela.

As an alternative solution - and there are those who would criticize such an approach - if the demand isn't there and you can't work out a two or three nation production plan, you might, where such an arrangement is lawful, consider a barter arrangement suggesting that one of the countries which has overcommitted itself all rubber to you on a mutually beneficial basis. In lesser lawful, you might even work out an arrangement to trade one of your products, such as coffee, cereals or cocoa (if profitable operation required expansion in excess of local demand) at cost or below market price in exchange for selling synthetic rubber to you at an advantage. Such arrangements are particularly useful when there are multiple demands for foreign exchange to finance capital expansion and development.

Labor Demands

Synthetic rubber operations are normally quite highly automated. The chemical operations are few in number and require very highly specialized skills.3/ The processes are complicated and the raw materials are

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3/ For example, a 20,000 T/year polybut diene plant will only require 20 skilled and 12 unskilled operators, 6 shift supervisors, 12 skilled and 4 unskilled maintenance workers.

quite hazardous so there cannot be any stinting in the quality of the people and their training.

Because of the high investment per unit of labor, the portion of the developed countries economic goals must be clearly established. If the function of the industry is to create job opportunities with a minimum of capital investment, the synthetic rubber industry will not satisfy this objective.

In short, the rubber industry is a highly skilled-labor intensive industry as well as a highly capital intensive industry. If one of the objectives of the developing countries is to utilize its low cost labor to a maximum advantage, the synthetic rubber industry is not going to meet that objective.

Conclusions

1. The synthetic rubber business is technologically based and its product fills a need, but the economics of the industry does not justify classifying it as a "glamour" business.

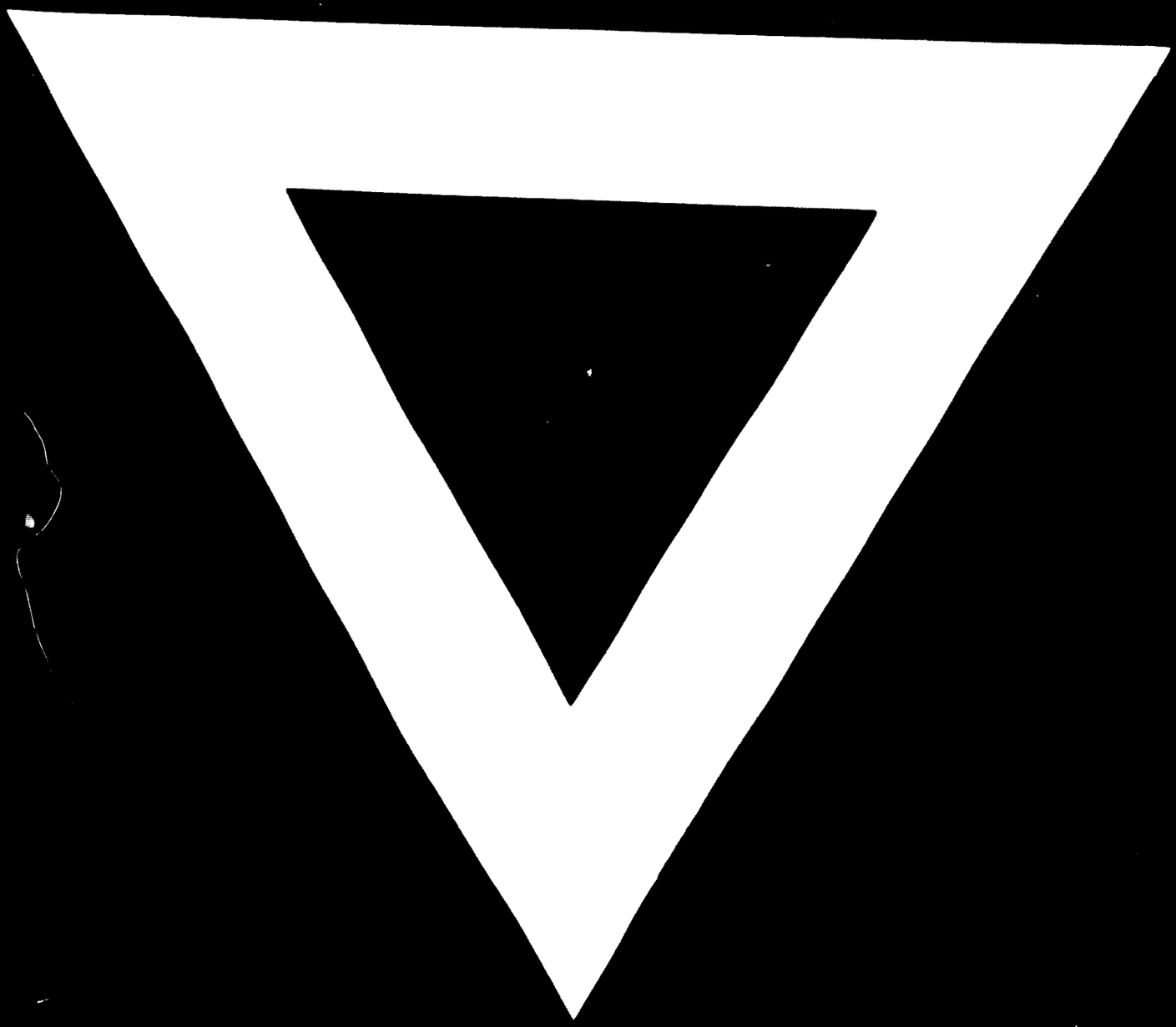
2. Generally speaking, developing countries may expect problems if they go into the synthetic rubber business with plans to compete on the export market with more efficient larger plants in more developed countries against strong marketing organizations which provide technical service and world-wide stocks.

3. The mere possession of low cost crude oil or raw materials to make monomers - or of the monomers themselves, may not be sufficient economic justification for giving priority to local construction of a synthetic rubber plant in a developing country.

4. Technical and operational assistance from a qualified rubber producing company, particularly one which has built and operated plants in several countries - is invaluable during start-up, and for training in production, quality control, marketing, etc.

5. If a developing country's economic objective is to maximize employment, the rubber industry will not satisfy that economic objective because of its high capital cost per unit of labor.

6. Joint venture with another or several developing countries may be the most viable - indeed the only viable route for many countries which want to get into the synthetic rubber industry.



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