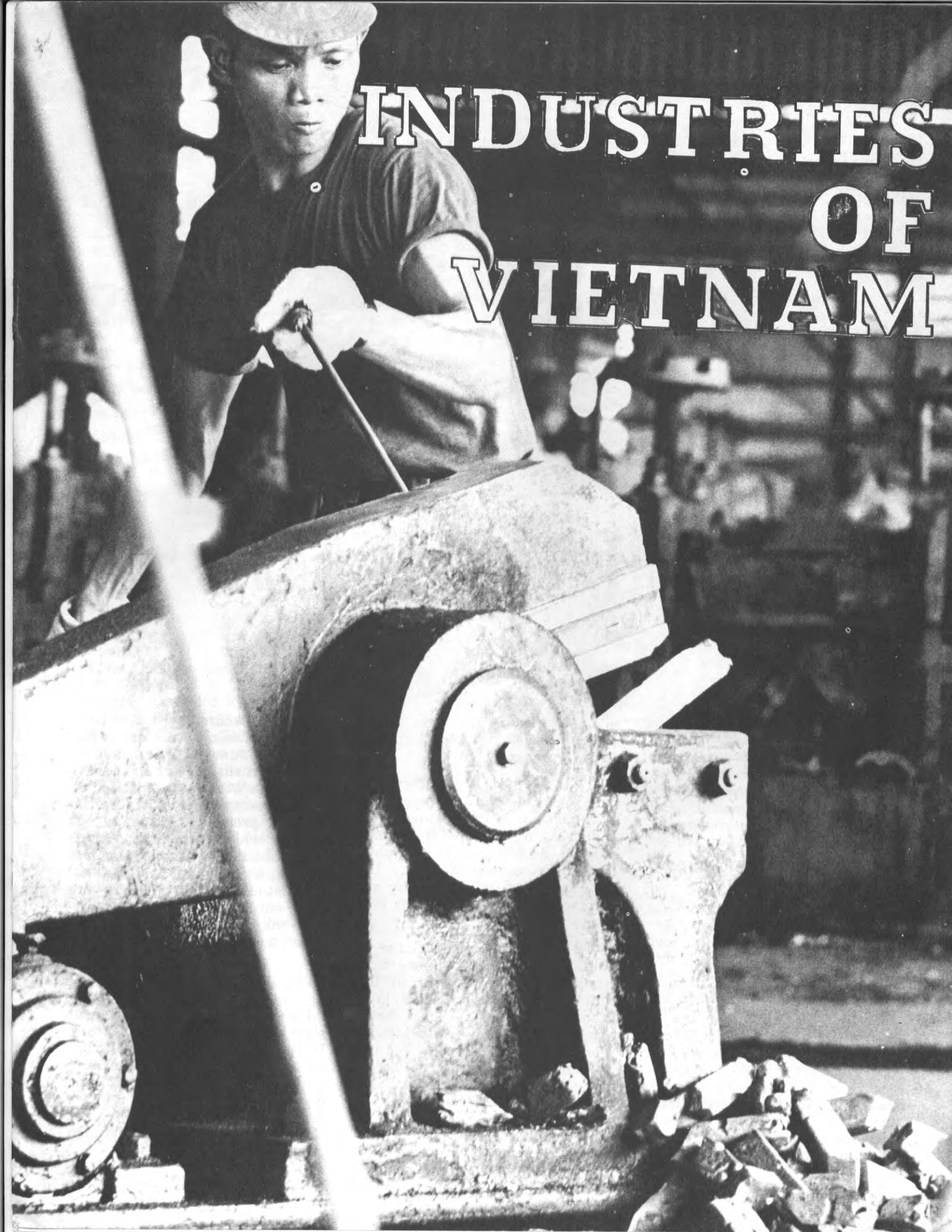
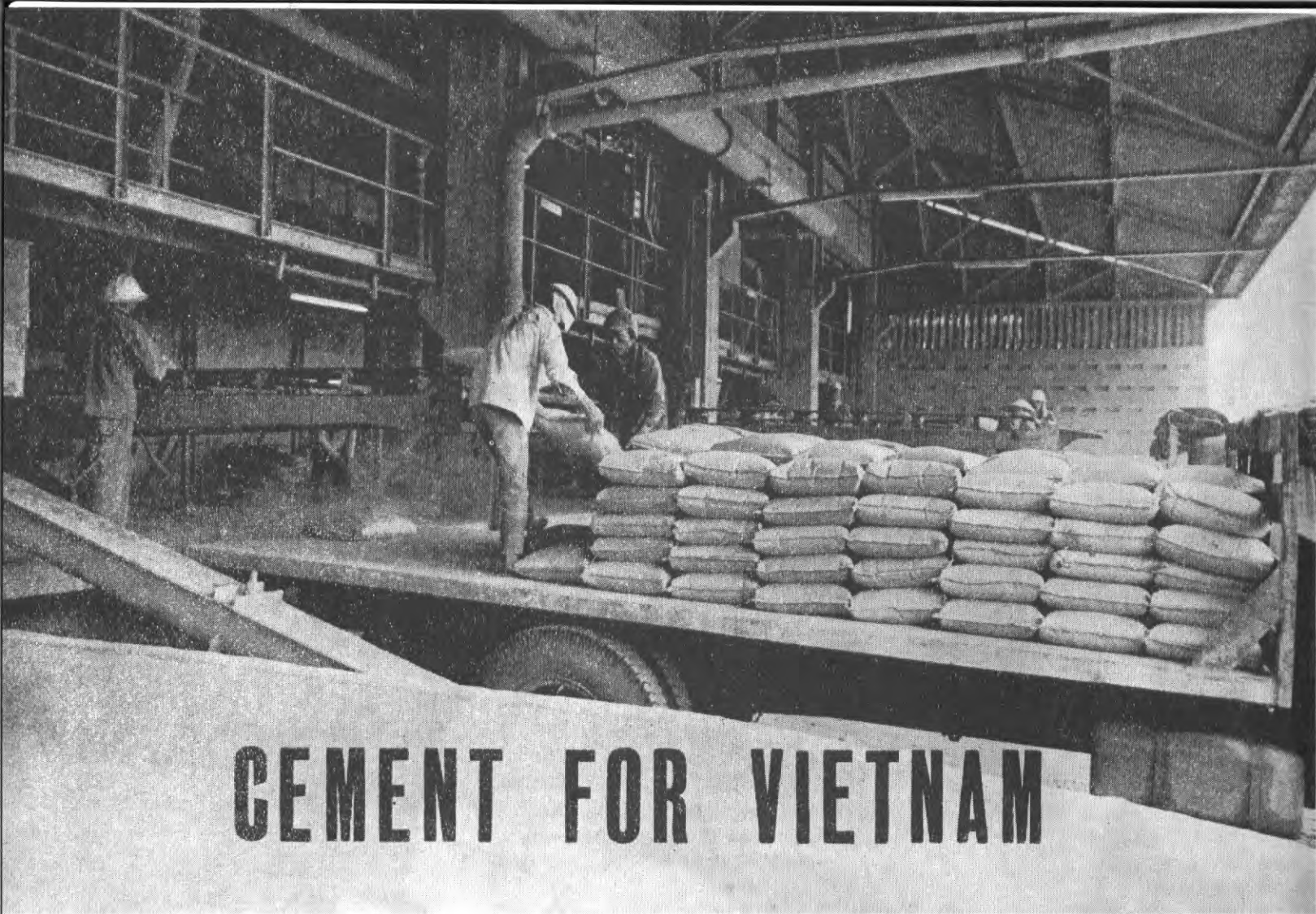


INDUSTRIES OF VIETNAM





CEMENT FOR VIETNAM

Now in its seventh year, South Vietnam's cement industry comprises one government-owned firm producing 30 per cent of the nation's commercial requirements for Portland-type cement. But prospects for postwar development, already getting underway, are excellent. Construction work has started on expanding the Ha Tien Cement Company's grinding mill, bids have been invited for increasing its crushing mill's capacity, extensive raw material reserves have been discovered and explored, and the country expects to be self-sufficient in cement long before the end of this decade.

For years the files of the Economy Ministry have contained detailed plans, ready to be implemented whenever hostilities finally ceased, to expand the cement industry enough to meet domestic needs. Now these plans are being put into effect, starting immed-

iately. Professor Vu Quoc Thuc, State Minister for Reconstruction and Development, explains why:

«The year 1970 is considered by our government as a turning point in the history of the Vietnam war. It marks, in our eyes, the beginning of the postwar era. We have decided to start immediately the implementation of all feasible reconstruction and development projects.»

The declining pace of battle... erosion of Communist strength... steadily growing security in the countryside... increases in government foreign exchange holdings as well as private investment funds... a slight easing of the manpower shortage... accelerating job training programs... and expanding public demand — all have contributed to making it possible for «postwar» industrial development measures to be laun-

ched now. Addressing a Southeast Asian economic development conference in June, Minister Thuc revealed that «in the coming months, our efforts will be concentrated on the implementation of several industrial projects.» He listed 10 fields in which those efforts would be made initially. Among them was cement, the key building material in Vietnam today. (Others are steel, sugar, textiles, fish processing, shipyard, oil refining, urea, glass and plywood.)

Production

Last year Vietnam's cement plant produced 180,000 metric tons. During the year another 400,000 tons were imported for Vietnam's projects, and 200,000 tons were brought in by the U.S. military for its own needs and for the joint U.S.-GVN highway rehabilitation program.¹

Grinding, bagging capacity increase is project target



Laboratory technician Nguyen Thi Kim Hoa tests cement's kneading periods.

self-sufficient from that source alone, because 1971 demand is expected to be about 800,000 tons. But in addition a new plant has been proposed for Long Tho — if financing can be found to build it — which would have a capacity of 150,000 tons. All of this increased production probably would be needed for construction projects planned by a number of ministries for the decade of the 1970s. But if expansion plans go according to schedule, ultimately the nation could begin looking for overseas markets for a cement surplus.

Efforts are now being made to obtain the funds needed for construction of the Long Tho plant, estimated at US\$3,700,000 plus 230 million piasters (the official exchange rate now is 118 piasters to US\$1). Meanwhile, construction work already is in progress at Thu Duc to increase its grinding and bagging capacity to 600,000 metric tons initially, a project estimated to

cost US\$3 million plus 247 million piasters. And requests for bids to raise Ha Tien's crushing capacity to 900,000 tons have been sent to six construction companies, five of them Japanese and one French. Even if Ha Tien's crushing capacity or its transport capability cannot be raised to match Thu Duc's projected capacity, alternate plans call for the importation of clinker from abroad to enable Thu Duc to produce bagged cement at a greater rate.

By importing clinker instead of cement, Vietnam would be saving little if any import costs, for the difference in price currently is about US\$1 per ton. But it is a necessary measure if work force layoffs are to be avoided and if grinding capacity is to be utilized even when crushing capacity drops. This method was used in the earlier years of the cement industry, to good effect. When the Ha Tien Cement Company was

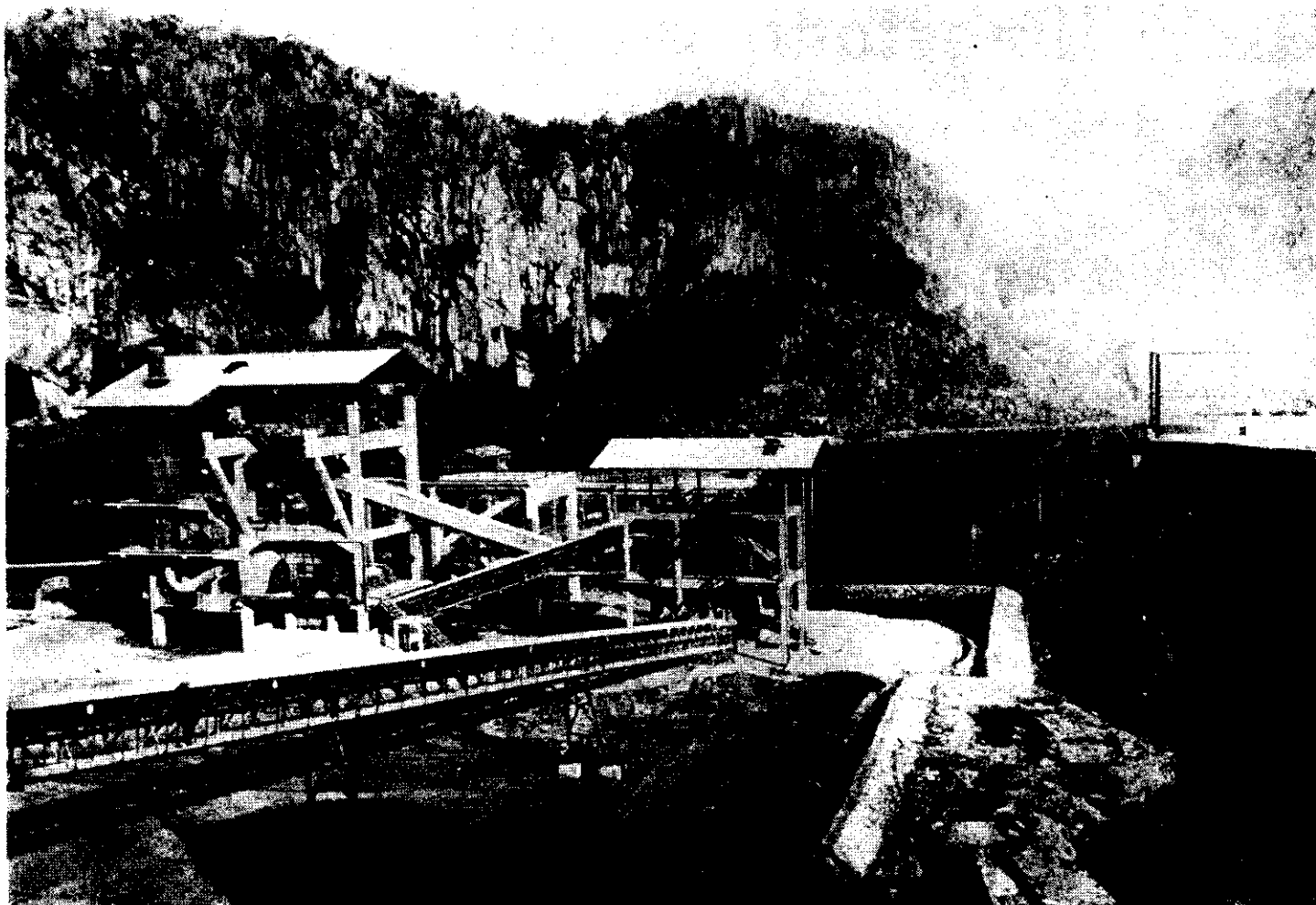
founded in 1964, its production that year totaled 75,000 metric tons (demand then was 513,000 tons). But in 1965 and 1966, security conditions along the canals from Ha Tien to Thu Duc deteriorated so badly that clinker delivery was frequently interrupted and grinding operations occasionally had to be shut down. Production dropped from an all-time high of 188,600 tons in 1965 to 141,000 tons in 1966 — but these production levels were maintained only because in those two years the Agency for International Development (U.S. AID) financed the importation of 113,143 tons of Thai clinker at a cost of US\$2,295,000. This kept Thu Duc grinding. From 1967 on, the company's output has stayed at about 180,000 tons a year, without any further clinker imports being necessary.

Import Alternatives

At first glance it would seem more practical to import \$20-a-ton bulk cement and store it in silos than to import \$19-a-ton clinker for domestic grinding. But Ha Tien's Director Ao favors the investment of government funds in the building of more grinding facilities rather than in the building of silos. «Every ton added to grinding capacity,» he says, «is another step toward the nation's self-sufficiency in cement production. In the long run this would prove to be more economical than taking the easy way out and importing our bulk cement requirements. In brief, we are planning to do more and more grinding even if we have to import, at least temporarily, some of the necessary clinker.»

The current selling price of Vietnamese cement is about 350 piasters per 50-kilo bag, compared with 370 piasters (after import duties) for imported cement.

Ha Tien's difficulty in getting clinker delivered to Thu Duc might have been avoided if the crushing mill and the grinding mill had been built on the same site. But when construction began in 1961 few anticipated escalation of the war to a level that would interrupt clinker deliveries. And it is normal practice in most parts of the world to situate crushing facilities near the



Ha Tien Cement Company produces 180,000 metric tons of South Vietnam's 580,000-ton commercial requirement.

source of the limestone while situating grinding and bagging facilities near the market area. This system of maintaining a «satellite» grinding plant is expected to prove increasingly more successful as the war winds down, especially when the rich limestone deposits in the Ha Tien area must be more fully exploited to meet increasing demand. Thu Duc has no such limestone deposits, but it is only 150 kilometers from the source of gypsum, an ingredient going into the final grinding stage. The salterns at Can Ha, near the coastal port of Phan Thiet east of Saigon, supply all the gypsum required. (At Can Ha, salt is produced from the evaporation of trapped seawater, and the chief by-product is gypsum.)

Built by French

The Ha Tien Cement Company's facilities at both Ha Tien and Thu

Duc were built and equipped by French engineers. Financed by the Vietnamese government, construction cost nearly US\$27 million. With management offices at Thu Duc, the company employs about 1,000 workmen, including electricians, engineers, mechanics, electric motor rewinding specialists, heavy equipment operators, plumbers, welders and laborers. They were initially trained by French technicians, but enemy harassment forced many of the Frenchmen to withdraw from Ha Tien in 1966. The company's work force is now 100 per cent Vietnamese.

Personnel at the Ha Tien site live in permanent quarters equipped with electricity, water and plumbing. At the adjacent quarry the limestone is dynamited, broken into chunks and sent to the crushing mill. Each hour the mill crushes 240 tons of limestone

chunks. The results are mixed with clay dredged from natural beds in nearby ponds and rivers. After storage in two 750-cubic-meter tanks, this mixture is passed through two kilns, each 200 meters long and seven meters in diameter. The mixture is fire-fused and dried into clinker, a stony substance. (Technically the limestone, or calcium carbonate, has had its carbon burned away and becomes calcium oxide.)

After its 400-kilometer voyage to Thu Duc, the clinker is mixed with gypsum at a ratio of 19 to one. With some sand added, this mixture is processed through the grinding mill and the final product, cement powder, emerges to be bagged. (There is less than 10 per cent difference between clinker tonnage delivered and the tonnage of cement bagged.)

Raw material deposits at Ha Tien

Rich limestone deposits surveyed

are estimated to total 54 million metric tons of high-quality limestone. Another 10 million to 15 million tons are deposited within 100 kilometers of the main deposit. Combined, these would give Ha Tien a life expectancy of 65 to 70 years at an annual rate of 300,000 tons of clinker production.

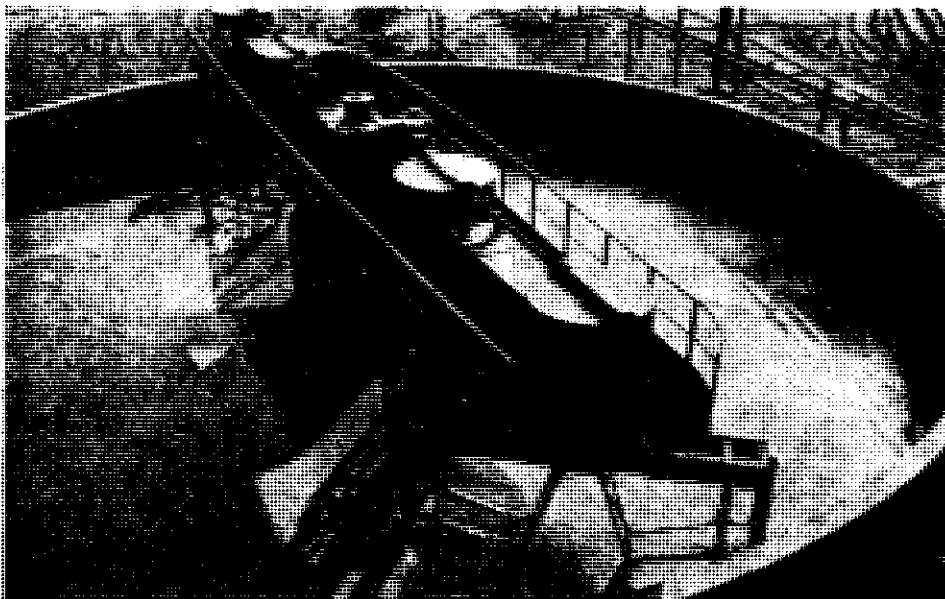
An even greater deposit farther north has been surveyed by the Reverend Henri Fontaine, a French Maryknoll priest. A trained geologist who has spent 18 years in Vietnam, he is employed by the government's Bureau of Mines. According to Father Fontaine, a limestone belt starts a few kilometers west of Hue, some of it submerged and some in the form of mountains. The belt stretches westward into Laos and contains hundreds of millions of tons. The priest-geologist estimates the deposit could provide 900,000 tons of clinker annually for 55 years.

Coral Deposits

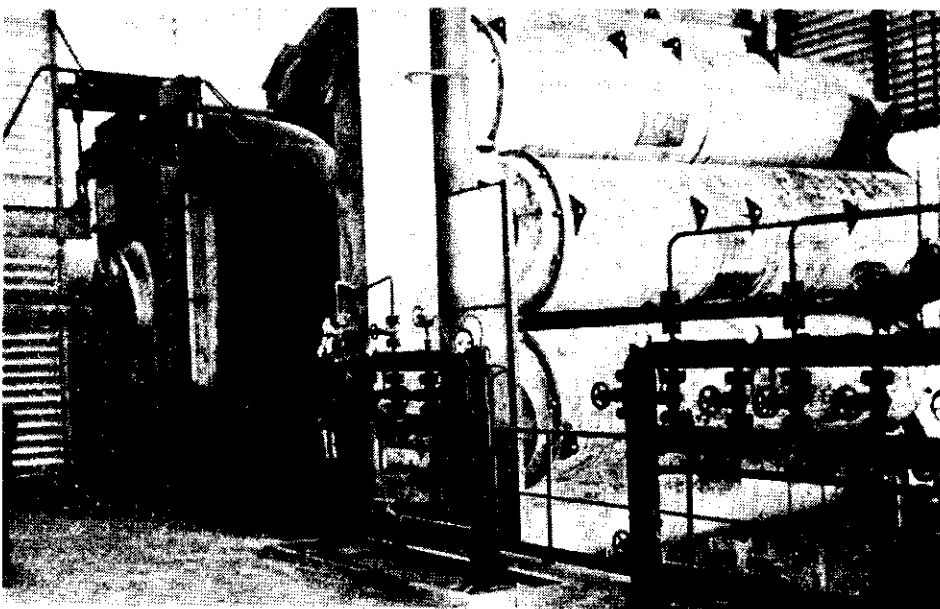
In addition, according to U.S. AID specialists, there are coral deposits stretching from the country's southern tip along the coast of the South China Sea up to the 17th parallel some of them 18 to 30 meters deep. Coral is another form of calcium carbonate. But Vietnam's planners have doubts that it would be economically feasible to substitute coral for limestone in making clinker.

The Vietnamese government has commissioned a number of firms to make in-depth studies on Vietnam's industrial potential. The Kaiser Cement Corporation now is conducting a survey of the cement industry and the nation's future requirements.

The government hopes to attract private investment in Vietnam's cement industry. In fact, it seeks that objective in all indus-



Clinker, sand and gypsum are mixed in giant mixer to produce cement powder.



Thu Duc grinding machinery has annual capacity of 300,000 metric tons.

tries. It is the avowed policy of the government to divest itself gradually of all its manufacturing interests, according to Dr. Do Kim Thuc, chief of the productivity de-

partment of the Industrial Development Center. «A stable peace is likely to do more than anything else to attract the private sector,» says Dr. Thuc.

THE STEEL INDUSTRY IN VIET-NAM

Until last year, although served by a widespread cottage industry of small shops and foundries shaping from iron and steel consumer products, South Viet-Nam had to rely solely on imports for its raw material and construction requirements. But in September, 1969, a modern plant in Bien Hoa began making basic steel from scrap. Several other firms now are in operation or planning to go into production soon and strides are being taken toward self-sufficiency in a number of steel products.

South Viet-Nam needs 180,000 to 200,000 metric tons of steel a year. Imports have provided much of the foundation for the country's expanding industries. But within two years Viet-Nam's own productive capabilities, young as they are, should be enough to make the country self-sufficient in billet steel for concrete reinforcing bars. These products are essential to the construction industry, which accounts for about 60 per cent of commercial steel requirements.

Complete self-sufficiency in steel is not the goal of the Republic of Viet-Nam's planners, says Mr. Khuong-Huu-Dieu, Director of the Industrial Development Centre. The country does not have

the natural resources required for large, integrated production processes.

Without the mining and smelting of iron ore there can be little hope for the development of an extensive steel industry. But Viet-Nam is seeking self-sufficiency in basic commodities like rebar, wire rods and small shapes, for which the demand is currently estimated at 65,000 metric tons annually. Self-sufficiency in these products is expected from 1972 on. This prediction is based on the assumption that scrap will be imported when present supplies, largely obtained from U.S. military sources, are exhausted. By making billets from scrap, Viet-Nam hopes to decrease imports of finished steel, thus freeing foreign exchange for other requirements of growing industry, Mr. Dieu added.

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Workers at VICASA Steel Mill handle the enormous molten steel bucket with care as liquid metal flows from an open cock into ingot molds.

Basic production

Basic steel production got underway in Viet-Nam eight months ago when Vicasa (the Viet-Nam Steel Casting and Rolling Mill) began to cast billets from locally available scrap. The nation's pioneer steel-making concern was organized in 1967 by a consortium of local businessmen, many of them importers. They raised an initial capital of 460 million piastres from private funds and Saigon banking sources. According to the company's managing director, Mr. Tran-Minh-Chau, Vicasa's investors anticipate a period of five to ten years before they can expect a full return on their investments. Further capitalization is planned.

Vicasa invested its funds in a furnace and rolling operation on a spacious site in the Bien Hoa Industrial Estates, a 511 hectare park established by the government's Industrial Development Centre, 30 kilometres north of Saigon. The Communist 1968 offensives delayed construction work for four months. Once in operation the plant was producing at 65 per cent of capacity when an explosion in April, 1970, disabled one of its two electric arc furnaces bought from Taiwan. The furnace is expected to be back in operation by August. The rolling mill, also purchased in Taiwan, is designed to produce concrete reinforcing bars. Five diesel generators capable of producing 8,500 kilowatts provide power for Vicasa's furnace operation. Chinese technicians, most of them hired on 18-month contracts, are assisting in running the plant and training Vietnamese personnel.

The operation has an annual capacity of 25,000 metric tons of rebar. Because of start-up problems and supply shortages, top production so far has been limited to an annual rate of 16,000 tons. Vicasa sells its rebar for VN \$1,500 per ton, 20 per cent less than the price of the imported product, and already accounts for about one-eighth of the nation's rebar consumption.

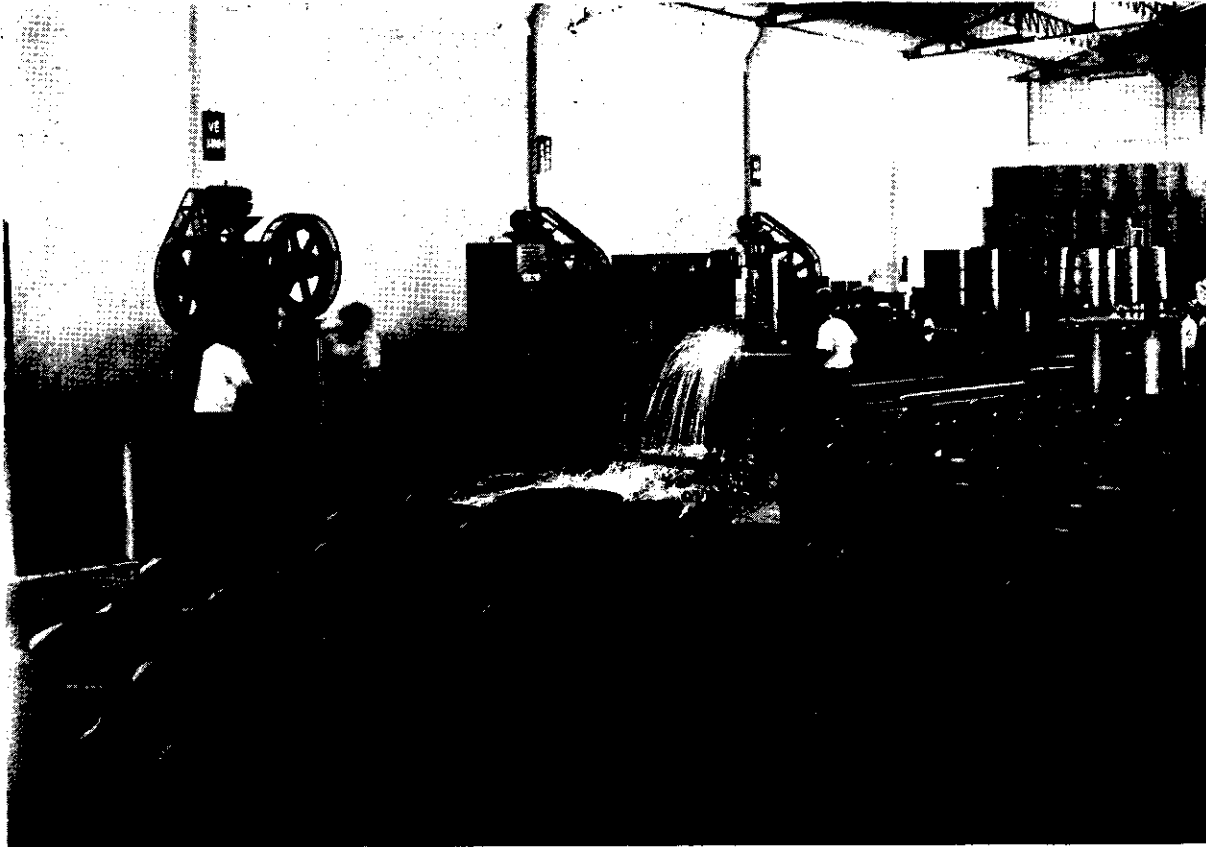
According to Mr. Chau, Vicasa is planning extension of its facilities. It has put in a bid for an additional 1.2 hectare site in the Bien Hoa industrial park for scrap storage, and it intends to build extra melting capacity. Some of the production processes now are performed by hand-labourers but the new facilities will be fully automated.

Other firms are following Vicasa's lead. Sadakim has a scrap melting facility and Vikimko, which has had a rolling mill in limited operation for two years, now is completing installation of a furnace. It plans to start scrap melting later this year. The government has given approval in principle to several other firms planning melting and rolling operations, but these are still in the planning stages. By the end of 1971, however, Vicasa, Sadakim, Vikimko and other new steel-making plants should be in full production. Self-sufficiency in billet steel, rebar, wire, small shapes and steel tubing should follow shortly thereafter.

Commercial steel fabricating

Commercial steel fabricating—the making of products from billet steel—so far is confined to the two rolling mills operated by Vicasa and Vikimko, and their only product is rebar. Vikimko (Viet-Nam Kim-Khi Cong-Ty), in Saigon's suburb of Thu Duc, has a rated capacity of 15,000 metric tons annually. Last year, however, it was plagued by production and financial problems that held its output to 1,000 tons of rebar made from imported billets. Recent increases in Vikimko's orders for imported billets indicate, however, that the firm plans to expand production this year. Several other rebar-making plants are in the planning stages and at least one — Nguyen Van Diep — will be operating before the end of the year.

Wire rod, used in construction as a substitute for rebar and in the production of wire and nails, is not yet produced locally, but Vicasa plans to



"Binh Dong" steel drums manufacturing plant.

add a wire rod facility in the near future. By mid-1971, according to Mr. Chau, the facility should be operating near its annual capacity of 30,000 metric tons. Another company—Xuong Dinh My-Chanh—is procuring rolling equipment to make wire rods from billet steel. Due to be operational by the end of 1970, the plant will have an annual capacity of 10,000 tons. This firm is the nation's biggest producer of wire and nails, so most of its wire rod production can be expected to go into its own operations.

Several firms now draw wire for general use, for galvanizing purposes and for manufacturing nails. Last year, as new equipment came into operation, capacity doubled to 15,000 metric tons. Between 6,000 and 8,000 tons of wire are used for

making nails each year, with most of the remainder going for fencing and barbed wire. By mid-1972 the country should be self-sufficient in wire drawing and galvanizing.

Foundry operations are scattered throughout the country, in boatyards and family-run backyard plants. The largest are three plants in the Cholon area of Saigon with a combined capacity of 2,500 metric tons annually. Consumption of pig iron in foundry operations is calculated at 6,500 tons a year, with products ranging from pots and pans to castings for machinery housing and parts.

Production of nuts and bolts meets about half of Viet-Nam's requirements. Two plants are in

operation—Lien-Hiep Ky-Nghe Cong-Ty and Tan Hung Ky-Nghe Kim-Khi Cong-Ty, both located in Cholon. They have a combined capacity of 1,200 metric tons a year, but both are planning to expand capacity this year.

There are eleven metal furniture and fifteen bicycle manufacturers in the Saigon-Cholon area, but numerous smaller shops abound in the provinces. Their operations are relatively simple, relying on a process of cutting, bending and welding steel tubing. The tubing is mostly imported, but installation of a new mill at the Khai-Minh Tubes plant in Saigon should eliminate the need for importing tubing by late 1971. The mill, expected to go into operation later this year, will have an annual capacity of 4,000 to 5,000 metric tons. The larger furniture and bicycle manufacturers depend heavily on a primitive cottage industry for their components. Tiny shops located throughout the country make products ranging from small structural shapes to vehicle and machinery components. Their low overheads allow them to be competitive with larger plants.

Metal sheeting has become something of a status symbol in rural Viet-Nam, where the more prosperous farmers use roofing and siding made from galvanized sheets. Only one firm presently is making galvanized sheets—Vinaton, located at Phong Phu in Thu Duc. The plant has an estimated capacity of 40,000 metric tons a year, but the company claims that the recent introduction of its third galvanizing facility should boost capacity to 60,000 tons, which is just about estimated country requirements. Three other firms are joining Vinaton in this field. They are Donato, which has a plant under construction in the Phu Tho Hoa section of Saigon, and two firms located at the Bien Hoa Industrial Estates—Coviton and Dai-A Kim-Khi Cong-Ty. The three new plants, when they go into production, should have a combined capacity of 105,000 metric tons annually.

End Users

The construction industry, which uses 100,000 to 120,000 metric tons of steel annually, consists of some 2,000 firms. About 180 of them are capable of major building operations such as multi-storied structures. Construction permits, the prime indicator of the industry's steel requirements, totalled only 363,000 square metres in 1969 instead of the 525,000 anticipated by industry planners. Activity in 1970 is not expected to rise much above the 1969 level but an indeterminate growth in construction work is expected to be underway by mid-1971.

The second most important end-users of steel is the container and closure industry. Tinplate is consumed by oil companies for containers, the dairies use it for milk cans and the bottlers need it for bottle caps. Several food packagers and one major paint manufacturer have their own can-making facilities. Two large independent can-makers and several smaller concerns augment the oil companies' supplies and also provide cans and closures to numerous small industries. Consumption of tinplate totalled 14,000 metric tons in 1969 and it is expected to reach 17,000 tons this year.

Steel Imports

Most steel importers are commercial importers who import for resale. But 20 per cent of imports are accounted for by manufacturers who bring in steel to meet their own needs. More than 350 firms are registered as importers of iron and steel, most of them general traders rather than metal specialists.

Last year 175,000 metric tons of commercial steel were brought into Viet-Nam. The annual average of steel imports in the last five years was 190,950 tons.



Women harvest stalks of sugar cane in Lai Thieu district of Gia Dinh province.

Sugar in Vietnam

Sugar is generally ranked right after rice and corn in importance to the Republic of Vietnam's agricultural economy.¹ It is an industry that has been badly crippled by the war and is now heavily dependent on imports. But postwar planners are not waiting for the last shot to be fired, and already ambitious recovery plans have been mapped calling for self-sufficiency in sugar, including new types of high-yield, disease-resistant strains. Research is underway, a new refinery and two mills are under construction, and blueprints have been drawn for a chain of 12 commercial mills to dot the countryside from Da Nang to Saigon

when peace comes.

Today, with rising incomes boosting the average Vietnamese's consumption to about 11.2 kilos a year, South Vietnam's population of nearly 18 million needs well over 200,000 metric tons annually of both white (refined) and brown (raw) sugar. Since 1966 Vietnam has had no mill processing cane into refined sugar. Two government-owned plants now are refining imported raw sugar into white sugar at an annual rate of 100,000 tons. For the rest of the nation's requirements, roughly half are met through imports of refined sugar and half through the primi-

tive production of brown sugar from cane by 400 to 500 rural mills operated by peasant families and their water buffaloes.

Cane Growing Halted

Vietnam has not been self-sufficient in sugar since 1956, when two commercial mills and hundreds of small mills throughout the country met annual requirements then totaling 110,000 metric tons. At that time nearly 42,000 hectares of cane were under cultivation, some of it on huge plantations covering up to 7,000 hectares each. But the closely planted, heavily foliated stalks grew five to seven

meters high, and the large fields provided excellent cover for marauding Viet Cong. Entire battalions could lurk in cane stretching kilometer after kilometer. In late 1965, as the pace of war quickened, commercial cane growing was ordered suspended for the duration.² In 1965 about 34,000 hectares were being cultivated, mostly in the southern provinces. By 1967 cane fields had been reduced to 25,000 hectares, and since then they have dropped to a negligible figure. Today what cane is still produced in South Vietnam comes mostly from family plots, each covering less than a hectare and containing no more than 80,000 widely spaced stalks. These small, thinly planted fields offer little shelter to Communist guerrillas. But output is limited; while they meet the cane requirements of cottage industry making brown sugar for neighborhood consumption, they can provide only a small surplus for commercial brown-sugar processing (for soft drinks, for instance).

Vietnam's present refineries at Khanh Hoi, a Saigon district, and at Bien Hoa, 30 kilometers to the north, have an annual rated capacity of 60,000 metric tons of white sugar each, but are actually refining about 50,000 tons each from imported raw sugar. The Khanh Hoi plant was taken over from the French by the government-owned Vietnam Sugar Company in December 1965 and now employs 1,000 workers. The company's other plant, newly refurbished with Japanese equipment in 1967 after it was moved to Bien Hoa from Hiep Hoa, employs 1,020 workers.³ Since 1965 some 400,000 tons of raw sugar have been imported from Taiwan, Thailand, Latin America and the Philippines to keep the refineries operating. By processing raw sugar into white sugar, the two refineries are saving the Vietnamese government at least US\$ 3 million a year. (The difference in price between raw and refined sugar can run as high as \$32.50 a ton.)

To supplement the production of these refineries, more than 300,000 tons of refined sugar have been imported from Taiwan, Japan and the United States since 1965

and sold directly to grocery stores by the Vietnam Sugar Company. But Vietnamese generally prefer the sweeter taste of the local product, and home-grown brown sugar sometimes sells for nearly twice the price of the imported or commercially refined brand.⁴

In the typical family mill, the cane stalks are pressed between two rotating drums, usually made of wood but sometimes of burned clay. The drums turn as a pair of water buffaloes walks slowly in a circle. The extracted syrup is boiled, filtered and condensed. In 1965 about 80,000 metric tons were produced in this manner, but now home production is believed to be 50,000 to 60,000 tons. It is all brown sugar, for no family mill can refine it. The farmer totes it to market on the back of a Honda motorbike, or it is consumed by his family and neighbors. Few family mills can produce more than half a ton a day.

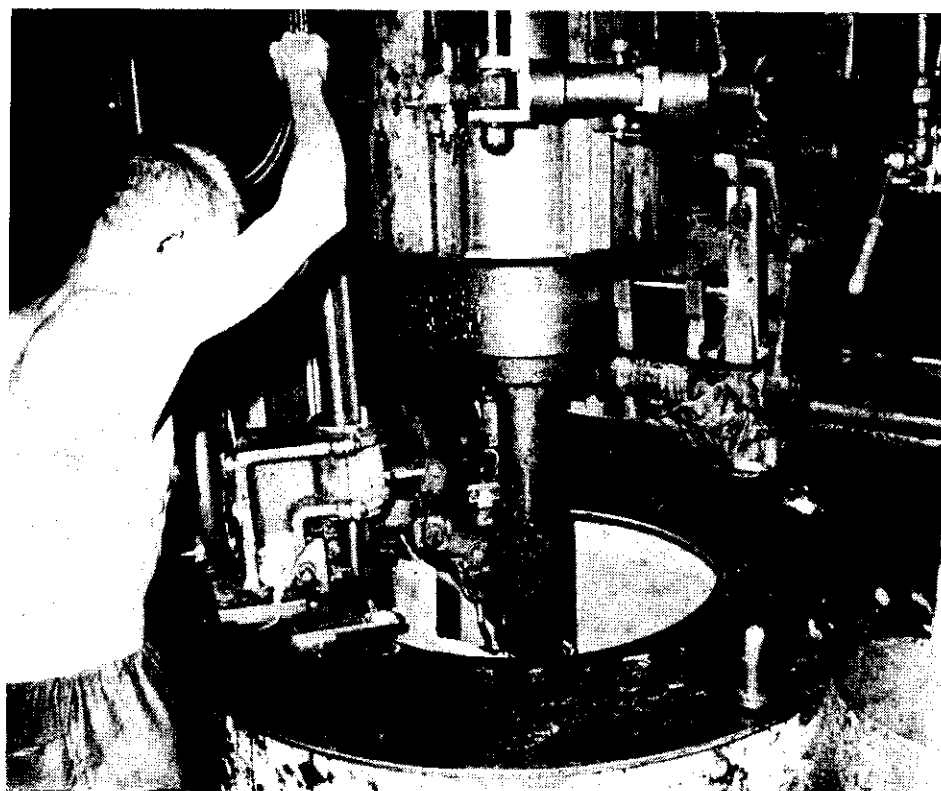
This brown sugar comes from cane stalks with a 14- to 18-month growing cycle, originally imported

to Vietnam. A large-stalked, seven-month variety indigenous to the country is cut into short lengths and sold in street stalls for the consumer to chew for its sweet juice.

Postwar Plans

By 1980 per capita consumption of sugar should rise to 18 kilos a year, according to Dr. Do Kim Thuc, director of the government-run Industrial Development Center in Saigon. Preparing for that day, Dr. Thuc and Dr. Ton That Trinh, former Agriculture Minister and now president of the Quang Ngai Sugar Company, are spearheading the sugar industry's recovery effort. They have drafted a specific blueprint for postwar development.

«It would be bad policy to build many new refineries now,» says Dr. Thuc. «When the war ends and the sugar cane crops again flourish, there will be a need for total mill processing, not just the refining of raw sugar into white sugar.



A technician, Nguyen Van Bay, collects white sugar from centrifugal machine.

It would be more expensive to convert a large number of refineries into mills than it would be to build new mills from scratch.»

The planners have mapped a network of small to medium-sized mills throughout the country, each situated near the source of future cane crops so as to eliminate the expense of transporting cane to the mills. «It would be better to have many small mills near crop-growing areas than a few large ones near market areas,» says Dr. Thuc, «for costs of transporting the bulky cane can eliminate profits. Bagged sugar is transported much more cheaply.»

Another Vietnamese sugar expert disagrees on this point. Tran Trach, planning chief for the Vietnam Sugar Company, says large mills are more economic because, in order to be profitable, a mill must crush a minimum of 1,500 tons of cane a day.

Present postwar development plans call for 10 government-owned and two private mills to be operating throughout the eastern lowlands extending from just south of Da Nang to Saigon, as follows:

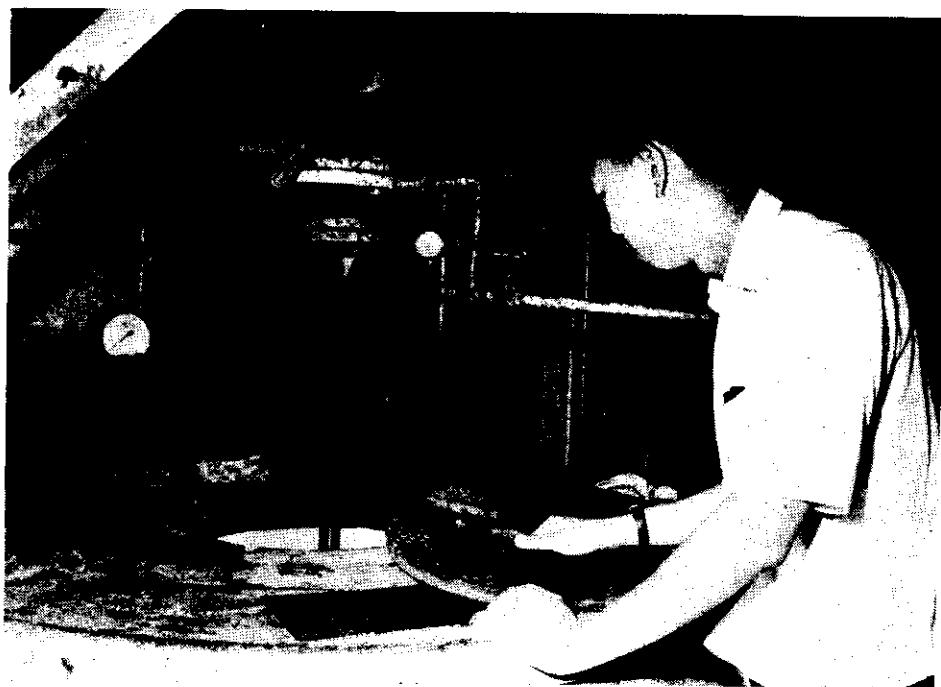
- * The Hiep Hoa mill, whose refining activities were moved to Bien Hoa, will be reactivated after the war and expanded to a rated capacity of 30,000 metric tons of white sugar annually.

- * The privately owned Vinh Phu mill, also closed in 1966, will be reopened and its capacity increased to 5,000 tons annually.

- * The Khanh Hoi refinery will continue its present 50,000-ton output, but after the war it probably will process cane.

- * The Bien Hoa refinery will be scrapped and a new one built near its present site by 1976. Construction of this new plant is already underway at an estimated cost of 700 million piasters, and capacity should total 60,000 tons a year.

- * By 1972 a 15,000-ton mill will be completed in Binh Duong and a mill of the same capacity in Quang Ngai. The Binh Duong mill already is 95 per cent completed and the Quang Ngai mill is 70 per cent



Director Vo Ngoc Truoc examines a centrifuge analyzing varieties of molasses.

completed, but present plans call for them to open only on cessation of hostilities when they can process cane to be grown in adjacent areas.

- * In 1973 a privately owned, 30,000-ton mill will be built in Tuy Hoa.

- * In 1975 a 70,000-ton mill is slated for Phan Rang.

- * In 1978 a 20,000-ton mill will go up in Tan Linh.

- * In 1979 the last three mills will be built. Each with 30,000-ton capacity, they will be situated in Quang Nam. Binh Dinh and Lac Thien.

«The construction dates for these mills,» Dr. Thuc admits, «assume that everything goes exactly as we plan. These plans are contingent on the speed with which the war is concluded, the rapidity with which the sugar cane can be planted and harvested, and the amount of foreign exchange available in the country.»

Research Underway

Vietnam's agricultural experts are experimenting with various types of high-yield sugar cane to

supplement or eventually replace the traditional varieties. Estimates are that with new and improved types of cane the average yield may be increased three or four times. The Institute of Research in Saigon is studying strains that not only should yield more sugar but which would be less prone to sugar diseases and grow larger and stronger stalks.

The countryside has large areas considered particularly adaptable to growing cane and in most of the country the climate is good. Sugar cane will not grow well in the very wet flooded plains nor will it grow in the drier upland regions, but the western reaches of the Mekong Delta and the eastern coastal plain are very suitable.

Molasses, alcohol, rum and a substance used in cooking sauce are all by-products of the processing of cane, and Vietnam's planners anticipate that these sources of income will expand significantly as the sugar industry grows.

There are no future plans to develop sugar as an export product even after self-sufficiency is attained. The relatively high cost of labor in Vietnam, high taxes on industrial equipment and stiff

competition from high-grade sugars being produced by other Asian countries make the possibility remote.

«The potential demand for sugar in this country cannot be estimated,» says Dr. Thuc. «The amount imported to supplement our domestic production depends not so much on how much sugar the people want in their diets but how much foreign exchange the government can afford to spend on imported sugar. After the war sugar consumption undoubtedly will rise along with increased domestic production. We must be ready for that increased consumption. Our people need sugar for their health, and our country has the land and the climate to produce all their sugar requirements. Peace will liberate the energies needed to build

a sound, self-sufficient sugar industry.»

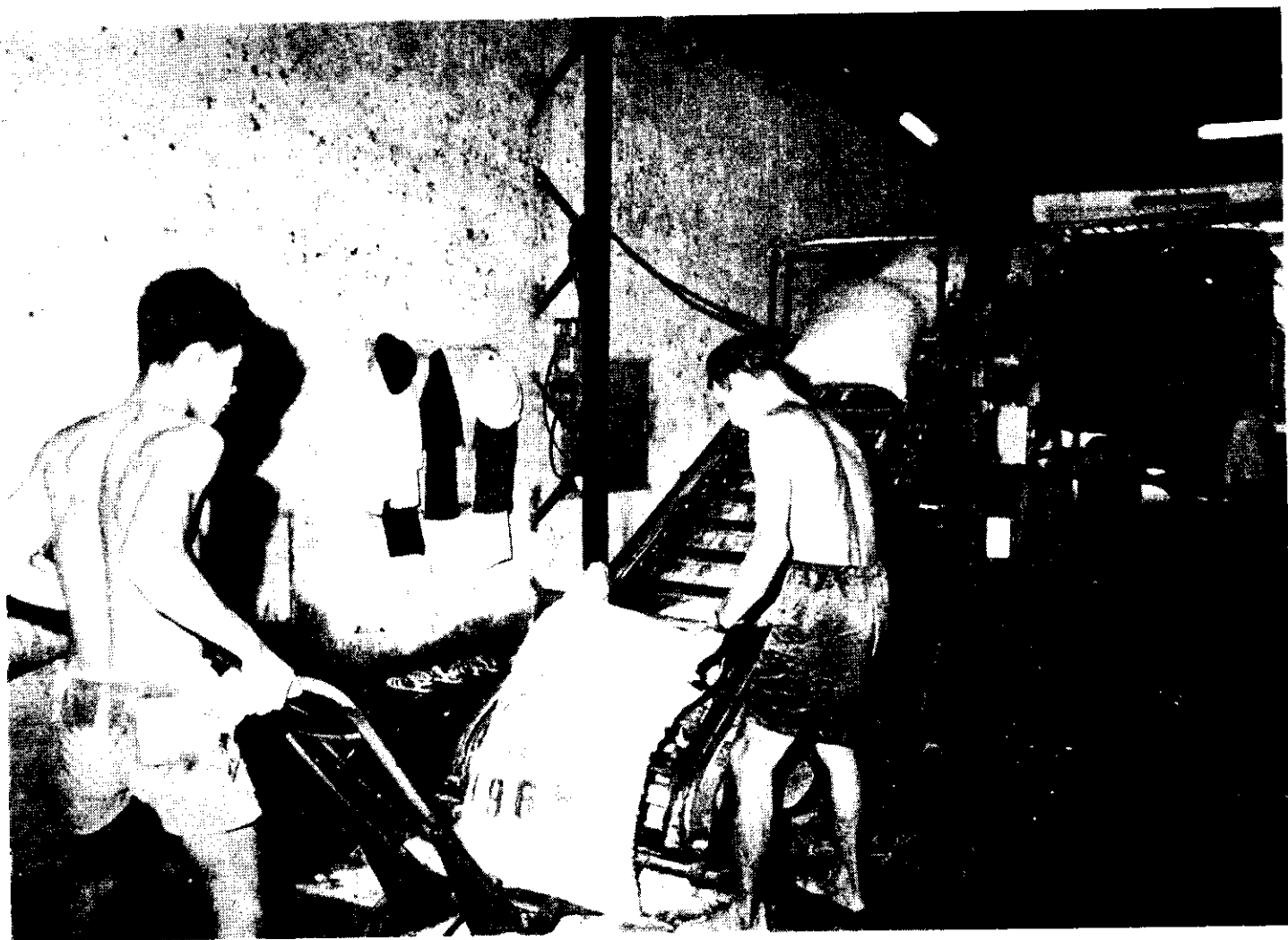
1. Many economists rank sugar second after rice, others rank it fourth after rice, corn and sweet potatoes, but most rank it third after rice and corn. (This ranking, based on national development goals, is different from the cost-of-living index, which weights fish as the highest ranking consumer item after rice.)

2. For seven years prior to this government order the crop had been declining. Some 40,000 to 50,000 tons of raw sugar had to be imported from 1957 to 1965 to keep refineries operating close to capacity, so 1966 was Vietnam's last year of self-sufficiency in sugar.

3. Before it moved to Bien Hoa, the Hiep Hoa facility was a commercial mill making white sugar from cane. It had a capacity of up to 15,000 metric tons annually, getting its cane from 3,000 Hiep Hoa families tending 4,500 hectares of reclaimed land. But like the privately owned Vinh Phu mill, also making white sugar from cane, it had to shut down in 1966 when security conditions required leveling of the cane fields. Only the refining capability was moved to Bien Hoa from Hiep Hoa.

4. There is no fixed price for sugar, but recently the products of family mills were selling for 60 to 80 piasters a kilo compared with 38 to 41 piasters for refined sugar. (The official exchange rate is 118 to US\$1.)

Potential demand for sugar in Vietnam



Bagged white sugar comes down a carrier at the Khanh Hoi refinery for loading on trucks.

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