INDUSTRIAL DEVELOPMENT OF THE NETHERLANDS INDIES

by

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CHAPTER I

INTRODUCTION

From 1928 to 1939 the population of the Netherlands Indies increased from about 60,000,000 to 70,000,000. On the principal island, Java, the population reached a density of 1,360 persons per square mile of land under cultivation. The continuous problem of feeding all these people caused much anxiety. The difficulty was overcome partly by migration to uncultivated lands available in the Outer Islands where agricultural settlements were established, and partly by irrigation, fertilization, and the distribution of selected seeds, etc. It seems that so far as food is concerned complete self-sufficiency has been reached for the time being. However, continuous efforts will be necessary to maintain this equilibrium in the future.

The figures in Table I indicate that this fortunate condition was achieved between 1935 and 1939 at which time the demand for more industrial products increased suddenly and sharply. As is well known from the history of the development of other lands, when the level of income is increasing the demand for food products becomes to a great degree inelastic at the moment that self-sufficiency is reached. At the same moment the demand for commodities begins to expand. We need not go further into the subject at this stage. It may be said that all indications of consumption in the Netherlands Indies make it clear that between 1935 and 1939 this point was reached. During these years we see an increasing stream of secondary products going into the villages of the Javanese countryside and to those of the Outer Islands. We see that gold, formerly an investment in the Indonesian world for the purpose of raising one's social standing, is parted with freely and used to provide the means of producing secondary products. We see an independent industry increasingly develop from the existing mechanized industries which were formerly largely dependent on export trade, and from the traditional small village industries.

At the same time there was a remarkable expansion in inter-ins
communications while changes also took place in the monetary fiel
these years the growth of activity in the economic, financial, and
cational fields which had earlier occurred only among the Indonesian
lectuals began to include larger groups of Indonesians as a result of b
instruction and improved communications. As I see it, there was a tu
point in the social-economic life of the Netherlands Indies between
and 1939. The index figures in Table I below support this point of view

Table I

Index-figures: 1928 = 100

Years	1928	1932	1935	1939
1. Population increase	100	106	110	118
2. Cost of living for worker's family with stable standard of living	100	65	56.5	57
3. Price level of food	100	51.5	43.5	44.5
4. Income from native agriculture exports in units of purchasing power (a)	100	52	64	88
5. Total exports in units of purchasing power	100	59	53	87
6. Income from industry in units of purchasing power	100	165	210	335
7. Total imports in units of purchasing power	100	61.5	48	90
8. Consumption of primary foodstuffs in kilograms per person	100	102	105	112
9. Calorie value of this food	.....	.....	100	110
10. Consumption of textiles in yards per person	100	.....	92	136
11. Number of mechanically operated factories	100	132	134	162
12. Area technically irrigated	100	125	139	164

(a) The purchasing power of the income for subsistence of a family with an income of about 360 per annum was taken as unit of purchasing power.

Other information of a similar nature, which, however, unfortu
does not cover many years, is given below:

Table I A

Years	1936	1937	1939
Taxable wages, in millions of guilders	493	541	620
Electric power used in industries (index)	.....	100	128
Importation of capital goods (index)	100	144	144

It is clear that the people, formerly satisfied with a minimum of goods
ich they produced and bought only when absolutely necessary,
dually demanded more and were therefore willing to exert themselves
re, although their requirements were still modest. A new spirit has
n born and its influence has become perceptible.

The depression which brought suffering in more advanced countries
ugh the resulting unemployment, was also the cause of trouble in
Netherlands Indies, as illustrated in Table I, because the standard of
ng of the Indonesian population had been principally influenced until
n by the proceeds of the export trade. It may be said that agricultural
duction provided the Indonesian population with crops for their nourish-
nt, while the proceeds from export-crops, cattle-breeding, fishing, mining
l in recent years more and more from industry, commerce and pro-
ions determine the available margin for raising the standard of
lfare of large groups of the population above the subsistence level.
sidering that the great majority of the rural Indonesian population
e their own dwellings and land[1], it is evident that with sufficient food
l clothing, which is naturally simple because of the climate, an in-
ase in prosperity readily finds expression in the use of all sorts of
v articles. For example, in two industrial organizations in the small
ages of Japara and Pasoeroean in 1938 and 1940, respectively 285,000
l 370,000 guilders' worth of furniture was manufactured for the domestic
rket. The umbrella production in Tasikmalaja rose from 330,000 pieces
1934 to 1,800,000 in 1940. The consumption of bread and biscuits—as
rt from the basic diet of rice—grew by millions of kilograms; soap
nufactured for domestic use reached a volume of over 80,000,000 kilo-
ms in 1940. In nearly every *desa*[2], no matter how small or how re-
ely situated, the use of flashlights has become general. For these, about
,000 batteries are manufactured daily in the Netherlands Indies. In
ner years, some 18,000,000 yards of tussore cloth were imported annually
men's clothes. At present one sees men everywhere in Java with
ore jackets. The importation of tussore has just about held its own,
in addition, there is now a home industry producing about 40,000,000
ds a year.

From these figures and from the index figures in Tables I and II, it is
e evident to what degree industry in the Netherlands Indies has profited

[1] The housing situation in Java, where two-thirds of the total population lives, can be estimated at
t 1,000,000 stone dwellings, 6,000,000 dwellings with tiled roofs and 2,500,000 with other types of
ng.

[2] A *desa* (village or hamlet), is the smallest unit of Indonesian society and consists of a group of
llings with their accompanying farmyards and cultivated fields.

from the increased buying power attained by the rural population. increased prosperity, as I have shown, may be considered as the r rocal action between the greater profit for the Indonesian from pri products on the one hand, and the growing desire of the populatio more goods on the other hand; this action has strongly promoted i trialization.

It may also be seen from the index figures in Table I that wi slight decrease in the value of total exports (line 6: from 100 to 97), w affected principally the European-owned estates, the income of the I nesian farmer increased (line 4) from 100 to 116. This increased prosp of the Indonesian farmer was not diverted to increased imports, but fav the development of domestic industry, thus effecting a further incr in prosperity. Here a very large role is played by the development o so-called Outer Islands. As an outcome of the establishment of agricul centers in formerly uncultivated areas[3], of the ever increasing sha the population in growing agricultural produce for export, of the dev ment and organization of mining industries, etc., a flow of indus articles found its way to the outer islands from densely populated Jav

Table II

EXPORTS OF INDUSTRIAL GOODS FROM JAVA TO THE OUTER ISLANDS

Year	1935	1936	1937	1938	1939	1940
Value in millions of guilders	34	40.1	64.1	54.6	58.6	73.4

This development of the relations between densely populated Java the Outer Islands parallels in miniature the development which place between the eastern states on the one hand and the southern the western states of the United States on the other hand, during the i period of America's industrial expansion, about the middle of the century. There also the chief products of the east were at first agricul while industrial commodities were bought from Europe. Then, a agricultural development of the south and west gathered weight, the developed its own industry and became the supplier of industrial pro to those regions. Here the comparison ends. The United States at pr

3. This native migration shows the following results:

Years	1936	1937	1938
Number of migrants	16,627	19,307	33,399
Area cultivated by them in hectares (1 hectare equals 2.471 acres)	18,004	21,565	28,071

eached a further stage : an ever better distribution of industry has effected. In the Netherlands Indies we have not yet traveled so lthough the future certainly appears to lie in that direction. The time not be far when industrialization of certain districts of the Outer ds is begun.

order to define the place of industrial production in the whole mic scheme, it is desirable to give a rough general idea of the total ction figures in the Netherlands Indies, as estimated during recent . Combining the domestic market prices with the statistically known ultural production, adding the value of slaughtered cattle, figuring alue of the fish catch, so far as known, and calculating the value known exports of mining products, gives an idea of the value of ultural and mining production of the so-called primary industry. the data gathered in industrial statistics one can arrive at the amount alth which is added to the national income through machine industry. ver, we do not know the amount of earnings from commerce, pro- n or capital.

n the basis of the census of 1930, the very rough test count held in and of available industrial statistics, the following estimate of the er of persons occupied in the professions may be considered fairly ate.

Table III

e of Occupation		Number Employed
ltural production, cattle raising, fishing, forestry, etc.		14,000,000
cale industry	secondary industry	2,500,000
e industry	secondary industry	300,000
industry	secondary industry	600,000
Total		17,400,000 (a)
merce, transportation, clerical work and professions		4,600,000
Grand total		22,000,000

ntrary to usage in many other statistics, women are included here among the agricultural work- ar as their main source of income is derived from agriculture or cattle breeding. From investiga- ide in 1940 and 1941 it appears that there was an average of 1.7 workers per family. The number ers in agriculture, if only men are counted, can be accepted as approximately 10,500,000.

e round figures for production, so far as they are known, indicate a ncome in 1940 of about 2,500,000,000 guilders for the 17,400,000 work- sted in Table IV. This includes 450,000,000 guilders added to the

income from industry. The rest of the workers performed all sorts o
in commerce and gardening, the income of which is not known. N
is the income of the 4,600,000 workers in trades and professions k
but it may be assumed that this group—as is true nearly all ov
world—was able to obtain a higher income per person than th
category of workers.

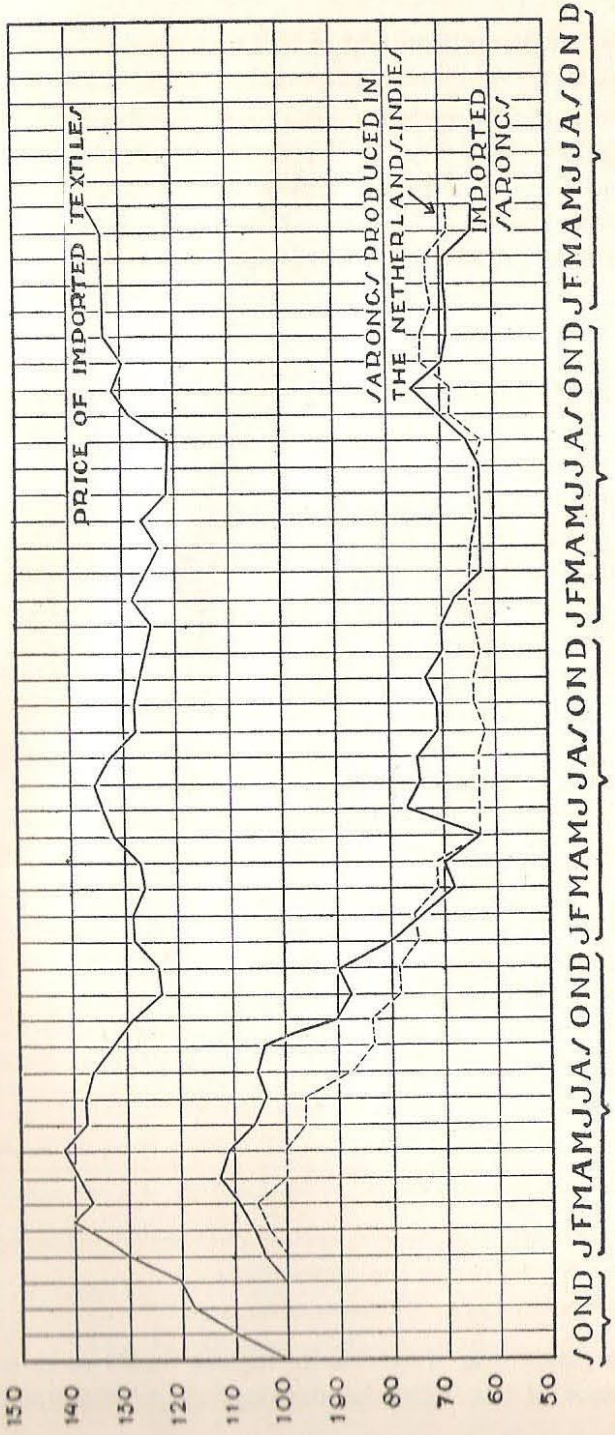
As is shown above, industry in the Netherlands Indies has a
become an important source of direct income. In addition to this
contribution to the national income, Netherlands Indies industry a
leased a not inconsiderable purchasing power, even with a rising
ard of living, by producing cheaper articles than those previously imp
An illustration of this tendency is to be found in the decline of the
of woven sarongs. This article of clothing was formerly imported, f
main part, but since 1935 has been manufactured in ever incr
quantities in the Indies, until in 1940 with a perceptibly increase
sumption, the domestic industry was able to supply the whole m
Until 1936 the sales price of the domestic and of the imported artic
practically identical, and the price fluctuated with the price index
ported sarongs. The competition of the two products, which do not
in quality, then became independent of the general index. Importer
(during the last years with losses) to retain the market, but very
imports dwindled to nothing. Graph A illustrates the story[4].

The average price of woven sarongs in 1936 was about 35 guilde
codi (20 pieces), while the annual consumption was 700,000 cod
cause of reduced prices resulting from domestic production and
sales by manufacturer to retailer, a consumer purchasing power of
10,000,000 guilders was released on this article alone, besides that a
by the labor in that branch of production.

Domestic industry also brought important advantages for the
nesian population in another form. Although we have shown that in
than one way additional purchasing power became available
time between 1935 and 1939, there remained in the first place a r
demand among the native population for cheap consumer goods
an article as shoes, originally a commodity for the European coloni
generally imported, has become an increasingly used article in the
nesian world during the last ten years[5]. A domestic industry has dev
from this demand and an article suitable to the native market in

4. Taken from the "Economisch Weekblad", May 1941.
5. This is especially important from a hygienic point of view. Hygienic propaganda has grea
lated the use of shoes since chances of infection, especially from hookworm disease, are thus di

GRAPH A



and price is now manufactured in small and large industries. Graph B a picture of the price trend of imported and domestic articles.

While imported footwear naturally followed the trend of the price level for secondary products the domestic output followe of the domestic cost of living. This is a typical example of the w which domestic industry decreases Indonesian sensitivity to world for raw materials and to world commodity prices in western co upon which the Indies formerly depended exclusively.

The example of sarongs at once brings up the question as to w the development of domestic industry will not have an unfav influence on the volume of imports which can be roughly consider maintaining a balance of trade with the exports of raw materials subtracting the services rendered abroad. When the figures for trade as given in Table V are examined, such a development seem most unlikely, especially considering that in the period repre in that table total world production increased 43% and total world increased 13%. It is probable that the collapse of world trade was c by the substitution in the industrial countries of autarky for specializ in products for which they are best fitted.

Table IV (a)

MOVEMENT OF GOODS ON THE WORLD MARKET

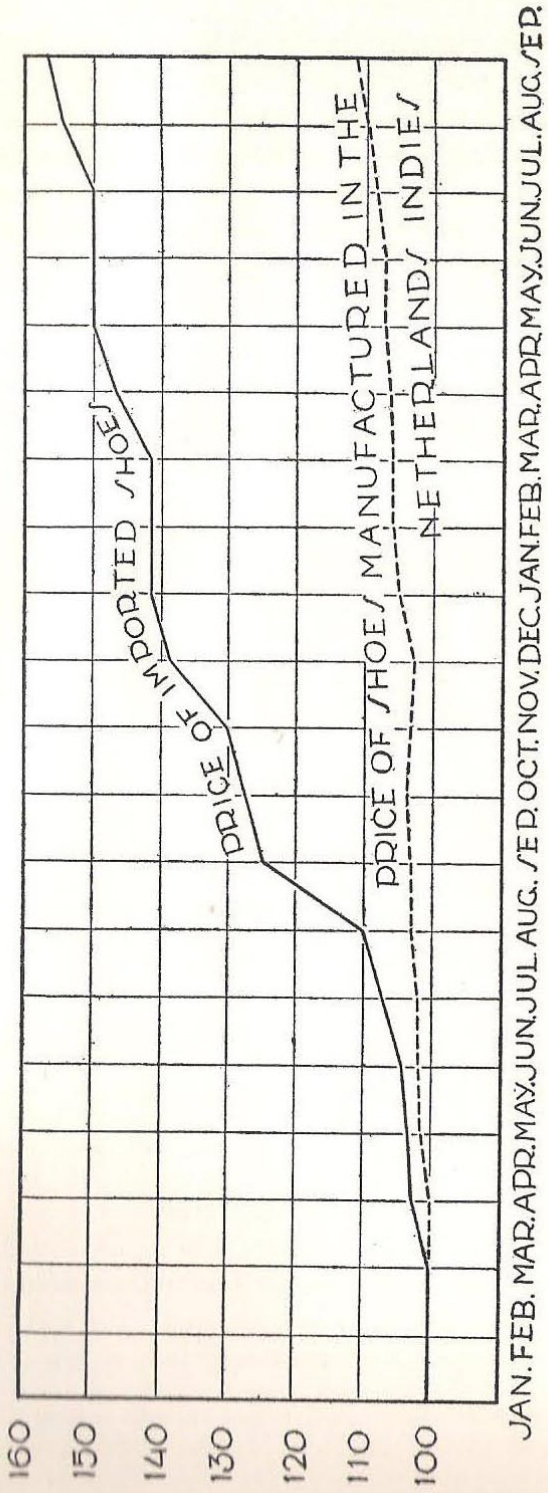
(Percentages on the basis of value)

Imports of	1911-1913
a. Raw materials and foodstuffs into industrial countries from industrial countries	18
b. Manufactured goods into industrial countries from industrial countries	12.3
I. Exchange of Goods between Industrial Countries	30.3
c. Raw materials and foodstuffs into industrial countries from raw material countries	26.5
d. Manufactured goods into industrial countries from raw material countries	1.5
e. Raw materials into raw material countries from industrial countries	7.2
f. Manufactured goods into raw material countries from industrial countries	21.3
II. Exchange of Goods between Industrial Countries and Raw Material Countries	56.5
g. Raw materials and foodstuffs into raw material countries from raw material countries	10.5
h. Manufactured goods into raw material countries from raw material countries	2.7
III. Exchange of Goods Among Raw Material Countries	13.2

(a) Taken from a pamphlet by Dr. S. Korteweg at The Hague.

With one reservation a number of factors would seem to indicat in consequence of the industrial development of the Netherlands

GRADH B



even more purchasing power becomes available for imports. The r
vation I have in mind is that the industries in the Netherlands I
must be able to produce at a price level (which I call the Pacific
level) in harmony with the buying power of the Indonesian consu
This price level must be equal to or lower than the level of the co
which exports the cheapest goods to the Indies without dumping or e
aids. The reservation suggests that preferably only those articles sh
be manufactured for which the raw materials are to be found in
country itself or in which the labor factor is important. Thus it is prim
low-priced and relatively bulky goods which enjoy a certain an
of natural protection in the island country. This situation will con
for the time being because of the unfavorable freight relations bet
imports and exports.[6] These industries show sufficient profits so
further investments will be possible at an early stage.

One should give special attention to the fact that the advantag
such an industrial development far exceed the directly perceptible a
tages to the national income level. In the first place, the imme
increase in the national income level can be compared to the first
which is formed when an object is dropped into a pool. This infl
is felt in ever widening circles. The same is true when new secon
industries are created in an agricultural country. The national inc
obtained directly from industries, forms ever widening rings of prosp

It is certain that a good investment in Netherlands Indies ind
creates more purchasing power than the total value of prod
achieved by the investment, so that the value to be imported int
country must become steadily greater, although the articles ac
imported may be of a different nature. This increase of imports into
cultural lands such as the Netherlands Indies is of primary impor
for the future, and also for existing industrial countries.[7] Raisin
national income by industrialization and thus raising the purchasing p
in agricultural countries, will do much to mitigate future unemploy
in the whole world. In addition to a better rate of exchange for the
materials to be traded, a suitable industrialization of the raw ma
countries will place these countries in a position to buy ever-incre
quantities of consumer and capital goods from the essentially indu
countries.

Statistical calculations demonstrate that in the years 1925 to

6. Compared to 12,000,000 tons of exports, imports amounted to about 2,100,000 tons in 1940
resulted in high shipping rates for imports to the Netherlands Indies.

7. See Table V.

ample, workers in industrial countries such as the United States and
Britain had incomes respectively of 1,368 and 1,069 "international
" each per year, while workers in agrarian lands such as Finland,
ary, and Poland earned only 380, 359 and 352 international units
respectively.[9] This suggests the likelihood that greater prosperity
densely populated country cannot be achieved without industrial
opment. This is corroborated by other evidence; the worker's income
United States showed a steady rise from 1850 to 1925. Income in
ational units increased from 582 in 1850, 813 in 1880, 1161 in 1900 to
in 1925.[10] And it becomes evident that industry is the lever to greater
erity when the incomes earned in primary and secondary production
ferent countries are compared.[11]

Table V

PURCHASING POWER OF AVERAGE INCOMES PER HEAD
(International units)

Country	Primary Production	Secondary Production
U.S.A. 1935	688	1728
Great Britain 1930	827	1151
France 1930	500	1373
Japan 1934	146	959
Sweden 1930	278	1109

mmarizing the material presented above with regard to the Nether-
Indies, one may assume that some time between 1935 and 1939 the
reached a stage of self-sufficiency for foodstuffs, and through
onal purchasing power, attained because the Indonesian population
acquired a larger share in the proceeds from the exportation of
ultural products, the demand for secondary products was strongly
lated. Thus, conditions were favorable for a rapid development of
dary industry.

king advantage of this achievement, a rapid economic advance
. There seems reason to expect that the trend in industrial develop-

"international unit" is the average purchasing power in the U. S. A. for primary necessities
vices of $1.00 between 1925 and 1934. By a simple comparison of the money values of wages,
income, etc. in certain countries with those in less developed countries, a helpful, though un-
ly inaccurate, idea is obtained. Thus, Clark in his *Conditions of Progress* (Macmillan—1940) has
ed that the rupee in British India has an actual purchasing power ratio of about 3 rupees to 1
terling, while the exchange rate was 13.4 rupees to 1 pound sterling. For Japan he figured the pur-
ratio of one yen as 14.1 pence. Rough calculations for the Netherlands Indies show that the
ing power of one guilder in the Indies for farm produce, food, clothing, fuel, light and other com-
is about equal to that of $2.00 in the United States. (Pages 35-39.)

rk, *op. cit.*, pages 40-41.

id, chart facing page 148.

id, page 342.

ment, the growth of which is evident from Tables I and II, can be tained in the future.

In consequence of the war various vested interests such as interi shipping, railway communications, etc. which had slowed dow economic development have disappeared so that in the future it w easier than before to replace obsolete organizations by those whic more suitable to the economic life of the Netherlands Indies. It is worthy that the same decade which was marked by the upward in the line of economic development, showed an equally important t point in the social organization of the country. There was an impr expansion of education, coupled with the transfer of its managem autonomous councils, mostly with Indonesian majorities in control, tr of public health services to the same social-political institutions, forn of producers' unions for obtaining better distribution of income f who collaborate in production, with here and there spontaneously ized social provisions for the workmen; there were savings in the nesian community, which have been invested in productive ve instead of in sterile gold, etc.

This all seems conclusive evidence that in these years forces grown in the Netherlands Indies which will carry the land mor more rapidly to greater freedom and prosperity.

For the students of Far Eastern economics, let me round off this duction with the results of a calculation of the capital invested Netherlands Indies. Naturally these figures must be considered as rough estimates since the statistical data in the Netherlands East are insufficient for an exact calculation. In many writings, howeve mates are found which summarize the interest and dividend infor and thus give the so-called commercial capital. The large sums in in irrigation works, highways and bridges, dwellings and harbor etc. are not included. In my calculations, since this is the interna usage, land values and national debts have not been included. The were as follows:

Table VI

	Million gui
Buildings	1,200
Communications	1,550
Commercial capital	5,400
Government enterprise	1,600
Balance not included in previous headings	400
TOTAL	10,150

(a) Of this amount, 900 million was Indonesian capital.

When one considers that this investment represents about 550 guilders[12] working man, a figure which may be compared to about $4,500. in United States, it is clear that in order to reach greater prosperity in Netherlands Indies, considerable sums of money still have to be ted. The figures mentioned also explain how it happens that behind worker in the Netherlands Indies there is an average of only 1.8 epower available to provide for his needs, while for each American ker there is available an average of about 40 horsepower.

[12] Here also the guilder cannot be represented simply at its rate of exchange.

CHAPTER II

THE ORGANIC STRUCTURE OF SECONDARY INDUSTRY

For practical purposes the industrial field in the Netherlands I can be divided into three main categories:

Cottage industry (in Dutch, *huisvlijt*): the production of commoditi agricultural workers in their spare time[1] by the use of hand tools by which they add to their incomes.

Small scale industry (kleinnijverheid): handicraft and workshops less than, say, 50 workers, principally working with hand tools and no important mechanical aids.

Factory industry (fabrieksnijverheid): all further secondary prod with mechanical aids or with more than fifty laborers. Factory prod only includes those factories which are to a certain degree indepe units. Sugar refineries, tea and coffee factories, etc., which form p an agricultural estate are considered as primary production in the N lands Indies.

This division is thus affected principally along technical lines: the basis used in the industrial statistics set up in the Netherlands in 1939. Nevertheless, these forms correspond closely, although not lutely, with the social structure.

In the first place, cottage industry is practically entirely in the of the Indonesian farmer. The goods are produced, for the greatest within the family circle. The major part of the production is trad members of the family in their own village; another part is boug by buyers and sold in wider circles, or even in some cases expor often happens that the raw materials are provided by a middlem which case the finished article is delivered for payment of wages f work.

1. A work analysis of rice cultivation shows that 65 men and 44 women working 4 hours a cultivate 2.5 acres of rice-fields in one day. Thus there is a great deal of spare time available. The ownership per farmer is 1.6 acres.

2. In Indonesian: *bakul and tengkulak.*

he money earned by the people in this branch of industry is quite iderable. An examination of the budgets of 5,000,000 farmers in Cen- Java shows that, from cottage industry, trade in these products and ings from cultivation in their own gardens of the raw materials used is kind of industry, an average of 17% accrues to the budget.[3]

ecent investigation shows that this percentage has, in general, been tained. Analyses of budgets, which have been published extensively cent years, make it evident that about 10% of this 17% comes from earnings of cottage industry. On these grounds, the addition to the nal income from this industry may be estimated to be about 110,000,000 lers. Production analyses have shown that about 20,000,000 guilders' h of materials for use in this branch of industry are imported each (tools, raw materials, and semi-finished goods).

here are many forms and variations of this cottage industry. There lso many instances of cottage industry combining and collaborating small-scale industry and sometimes even with factory industry. This boration often developed new structures in cottage and small scale try which had certain advantages but which were often socially economically fatal as administered by the bakuls since the bakul directed the work only wished to keep control of the whole situation is own profit. Thus, in the textile industry, to maintain his key posi- he would introduce inefficient methods of winding thread, to prevent workers from dealing with any other entrepreneurs. In Middle Java s were especially imported in a form not suited to the looms being ted. The weavers could only buy yarns in a form they could use the bakuls who rewound the imported hanks. In this way he retained nopoly of the trade and credits of the weavers although yarn have been imported in usable form. On the other hand, these tures had the advantage of teaching the people that by division of and collaboration there were possibilities of increased efficiency e same way as on the assembly line in a modern factory. The fol- g example demonstrates this combining and cooperating:

the little villages grouped around Soekaboemi, a small town in West situated in a prosperous agricultural district, a fairly important ge industry existed, making agricultural implements for local use. this, a small-scale industry developed which extended its produc- program by making all kinds of cutlery. Here the hammering out of s, etc. was done in small-scale industrial shops with from four to

ilcome of an investigation carried out by Resident Steinmetz in 1903.

ten workmen, while the handles, made from horn, bone, wood or tor
shell, were made in the sphere of cottage industry.

The knives were subsequently assembled in the shops and were
locally. The product could not be compared in quality to that which
being imported from England, Belgium and Germany. However, onl
more prosperous could afford to buy the better, imported article.

Then through instruction and education consumers desired
workmanship. Growing incomes stimulated this demand and this en
aged the workers in small-scale industry to greater efforts. A numb
small-scale shops negotiated for closer cooperation and within a c
of years they organized some 1,200 workers into a so-called indu
central, or cooperative.[4]

This industrial central built a finishing plant for the joint accou
its members, in which the most skilled workers from various small
workshops were brought together and where, also for their joint ac
polishing machines, boring machines, tempering furnaces, equipmen
nickel and chromium-plating, etc. were installed. The workshops
were cooperating with the industrial central pledged themselves to bri
every week a specified amount of work, such as blades, with the ha
made in cottage industry. These semi-finished products were made fro
terials and models furnished by the central; they were delivered to th
tral for a reasonable price, jointly decided upon by the members.

At the time of delivery to the central the objects were inspected for
ity and form. Badly made pieces were handed back to the shops for imp
ment, the approved ones finished and assembled, then packed and s
dealers. It was an accepted principle that profits should be shared a
the workshops according to the quantity of goods they had delivered,
the elected management of the central exercises a certain authority in
ing the uses to which the money shall be put. In principle, it was agree
part of the profits was to be spent on better tools for improving the affi
small-scale shops.

Thus we see the development of a form of industry by which the In
sians have established a business as complex as that of a big factor
combining the cottage, the small-scale and factory industries.

This example introduces the second form of secondary industry, i.e.
scale industry. In this branch there are many and varied centrals
nature described above. There is the weaving industry, where wi

4. It is noteworthy that in the same period also agricultural centrals were created: tapioca
vegetable oil centrals, etc.

ing, washing and sewing take place in cottage industry, while shearing
weaving are done in small-scale or factory industry. In the batik in-
various stages of preparations are allocated to cottage industry. In
niture industry, the manufacturing of the composite parts is given to
scale workshops by the main factory, while the finishing and the sales
place through the centrals. In the pottery industry the molding and
is done in small-scale industry, and the glazing, packing and shipping
through the central.

growth of small-scale industry resulting from this system has been
remarkable. This is especially to be ascribed to the form which is com-
suitable to the mentality and nature of the population. A little ex-
into social-economic territory will call attention to two important
which undoubtedly have influenced the growth and form of
especially small-scale industry. First is the sense of *obligation to*
mutual assistance, a conception which has penetrated Indonesian com-
life and by which every communal relationship, whether to society
individuals is determined. The second phenomenon relates to the
recurrences of slack periods in the cycle of consumption which has
pressions and two peaks each year closely connected with the harvest
ls.

hen the harvest is sold and the farmer has money in his pocket is the
hat he buys new clothes and tools. It is the period of courtship and mar-
and thus of festivities with purchase of delicacies and the organization
ricals and dances.

obligation to give assistance, called *sambatan* or *sambat-sinambat*
referring to the community and *toeloeng menoeloeng* when referring
ow villagers has had a very favorable influence on the results of the
industrial centrals. So long as the cottage and small-scale industries
producing only for the needs of their own communities the ingrained
of obligation to be helpful to that community and to its members
the best quality possible to be delivered and insured that the re-
articles were ready on time. Later, when buyers outside the village
orders the situation changed and it was often very difficult to get
ries on time. Anyone who was ordering such goods about fifteen or
years ago knows the usual outcome. Never on time, not what one had
d, poor form and finish, poor materials, etc.—these were the things for
the Indonesian craftsman was reproached. Only the shrewd bakuls
lemen) were able to obtain a certain position in this village production
fering ample credit or advances in times when the workers could best

use money. The result of this was that intolerable social conditions existed which have disappeared with the growth of the centrals. The lishment of the centrals which were often directed by an Indonesian craft teacher[5] and the best educated of village craftsmen — men sometimes went to the city, read the newspapers, in short, people vision was extended beyond the boundaries of the village—removed of the other social and technical shortcomings. The small-scale wo united in a central, realized that they had assumed an obligation towa finishing plant. They have begun to see this finishing industry as a p their community and therefore they feel obliged to do good work and early deliveries. The following little episode will explain the new se obligation better than many statements.

Once when I visited one of the central smithies, the master black with much pride exhibited his tools: new files, a drill, an anvil, etc. Bu still more pleasure he showed me his beautiful, shiny gasoline lamps he had hung in the smithy "to be able to work by night too." Natur told him they were beautiful, they were, in fact, but I expressed surpris he was going to take on night work, a surprise which is understandable I explain that in this industry one seldom works more than an average to seven hours a day. He hastened to assure me that they were certain going to work every night, but he said, "You know that we have to many celebrations in the village, for the harvest, for births, mar deaths, etc. Because of this we often lose much time. It might hap there were many such festivities, our production would become so that our finishing factory would have no work. We can't let them do in such cases," he said with a sigh, "we shall have to endure such work." This statement proved to me that he considered the finishing p communal possession, even though it was situated in another villag *sambatan* obligation was the binding element in this case. It was regaining of lost income which regulated his conduct, but the obliga the community to which he belonged.

The second influence, the influence of the rise and fall in consumpt small-scale industry, is of an entirely different nature. It is of vital impo in those forms of production which emanate from mechanically org ventures with fairly high fixed overhead costs, and those under Indo control with very low fixed costs. When the former is obliged to lim duction, the production costs per unit rise very steeply; when the latter production, however, such a rise does not occur. If a mechanically org

5. For further details on these teachers see Chapter III.

ess can work from its stocks, it can maintain an even level of produc- during the whole year and in this way keep production costs at a fixed However, when the product is perishable, e.g. cigarettes or biscuits, hen it is dependent on the vagaries of fashion, e.g. striped sarongs, , etc., then the machine industry is often unable to hold its own against mpetition from Indonesian hand production in the face of very great nal fluctuations in consumption and sales possibilities.

us in Java from December to April a monthly average of not more than illion to four million meters of batik goods is sold while from June to mber this average is between twelve million and fourteen million s. The sale of all sorts of necessities except primary essentials more or llows the same trend. Consequently, the industries which are obliged nge their work according to this seasonal fluctuation have often ed special systems. The machine weaving industry is a typical ex- . At first these factories produced only woven sarongs, multicolored in read, potentially a very profitable article. But this article is strongly ced in color and design by fashion and can be made by competitors with machine and hand looms. With the development of the latter a le arose between the machine and hand loom business in which the ne would certainly have lost out had it not taken up plain fabrics in make it again possible to compete. Through this change in their pro- n program they were able to meet market demands and keep their busy at plain weaving during each slump, since this naturally did dergo the influence of fashion trends.

hand industry is often also influenced by the same circumstances, the manufacture of a certain type of hand-wrapped cigarettes. Instead ng paper, these cigarettes are wrapped in the thin leaf of corn which around the corn stalk, while their filling consists of tobacco mixed spices of which finely ground cloves is the main ingredient. These ttes are extremely popular with the native population, both for their and flavor and for the crackling noise made by the clove grains as urst from the heat and free their aromatic oils. Their cost is about one cent.

total gross production in this industry amounted to about 19,000,000 rs in 1940. However, in the periods of slump not more than 1,000,000 rs' worth were sold per month, while the demand increased by about the months of prosperity. These cigarettes cannot be kept for more s weeks without deteriorating.

1940 there were 69 factories producing these cigarettes, employing

about 24,000 steady workers. They maintained a regular output of app
mately 1,000,000 guilders per month, while production of the extra quan
needed to fill the requirements of the peak months was given out to the f
ing families, in other words to the cottage industry. This system has bec
general and is called the *abon* system. It is a remarkable and prac
industrial form, especially since the consumption peaks follow the ha
months. Less hands are needed then in agriculture and the farming po
tion therefore has plenty of time to earn a little extra. Similar methods h
come into being in other branches of industry.

Cottage industry is entirely in the hands of Indonesians. Small-scal
dustry is also mainly in their hands, although in the cities there has be
strong infiltration of Chinese small-scale workers, especially noticeab
new production. In 1930 there were about 94,000 Chinese among the 2,20
industrial workers or 4.7%. In recent years after the finishing plants
tioned previously had begun to flourish under wholly Indonesian man
ment, Chinese contractors tried to set up similar businesses and to esta
the same relationship between the small-scale industries and their vent
It was remarkable that this plan met with meager success in spite o
vances of money made by the Chinese to the small-scale industries a
spite of good prices also. The *sambatan* obligation does not generally
ate toward these contractors who soon had to combat the old phenom
careless production, neglect of time limits, etc.

In small-scale industry and especially in the weaving branch, the Chi
succeeded in obtaining numerous small shops while the Indonesians
generally the laborers. This penetration aroused a great deal of resist
among the Indonesian political leaders. In the People's Council (Volks
there were repeated demands for regulations to control this penetration
lar to those forbidding the sale of farmlands to non-Indonesians. Howe
such regulations were never actually imposed for it became evident tha
Indonesian community had developed sufficiently to look after itself. I h
every reason to believe that the penetration was actually not very ser
There were a number of small looms bought by Chinese from Indones
From 1935 to 1940, however, some thousands of small, modern wea
establishments came into existence owned and operated by Indonesian

The result was that many small factories were run by men unable to m
age them well. When the government took measures to regulate this
rapid growth and the expansion decreased many of the weaker propri

6. In 1930 there were 500 modern hand looms and 40 mechanical looms in operation in the
scale and mechanized textile industry. In 1941 these numbered 49,000 and 9,800 respectively.

had insufficient knowledge of the trade had to sell out to the highest
er. Among Indonesians there were not enough capable interested par-
Although the Chinese were not seriously interested in industrial develop-
originally, there were many who now became interested.

An investigation made in one of the most important weaving centers,
djalaja, a village near Bandoeng showed that about 335 of the total of
oximately 1,500 large and small businesses passed from Indonesian to
nese hands in 1939. In 1940 this number was 35. This is a clear indication
we have here a case of economic readjustment. As soon as they realized
this field of enterprise did not suit them the less capable producers sold
factories. When there were no Indonesian purchasers these sales were
de to Chinese. These transfers were therefore due to special circum-
ces and consequently it was not a question of racial penetration. On the
hand an opposite movement occurred in many of the older industries
the same period. In Djokjakarta and Solo the Chinese batik producers were
most all pushed out by the Indonesian contractors as in Pekalongan also.[7]
Unquestionably the Chinese dealer has always had an important place
small scale industry. For this there are historical reasons. At an earlier
ied the occupation of merchant was definitely not valued in Javanese
les. In the closely woven village relationships the merchant had no place,
the Javanese intellectual considered trade as an inferior activity.
philosophy of the Indonesians made it easy for the Chinese to take a
important place in the Indonesian economic world. They became the
ers of products as well as the distributors and collectors for the European
orter. They also filled the role of distributor for the importer. About 20
rs ago this business was practically entirely in Chinese hands. But in the
ten years great changes have taken place. More and more the Indo-
sian is reserving certain parts of commercial service for himself and
ing out the Chinese from them. This is also true in the case of secondary
dustry. As a typical example I mention the fact that the batik industry
ght up nearly all the textile raw materials through the Chinese middle-
. However, when the batik centrals were organized, the Indonesian
agers, buying large quantities as the Chinese did, made agreements
ctly with the importers, often for prices specified in advance by the pur-
er by a sort of first refusal contract. Thus they obtained a considerable
duction in the cost of the final product and proved in their negotiations to
e a clear understanding of modern business.

I remember that a few years ago one of the directors of the Indonesian

7. About 50% of the whole batik industry is concentrated in Djokjakarta, Solo, and Pekalongan.

batik central in Solo[8] told me that the last Chinese batik establishm which were nearly always auxiliary to the main business of being m men, had decided to close down. It is noteworthy that he had promis buy larger quantities of native auxiliary material such as charcoal peanut oil from these former business rivals and to give them prefe for the local distribution of batik. "You see," he said to me, "these p have worked in our line for dozens of years; formerly they gave credi help in difficult times to many of our men who had small businesses. sure, sometimes they also competed unfairly with us, but still, to a ce extent they belong on our side. Now that we have grown strong throug cooperation, and they have not been able to keep their business goi competition with us, we feel obliged to support them in their trade." He a broader connection—a connection which the intelligent director of the central understood—was an expression of the modernized *sambatan* id is typical that the capitalistically minded buyer of small weaving fac considers he has fully carried out his obligations by the payment o agreed sum of money, while this Indonesian director feels it as an ob tion, when any action on his part causes changes in the life of the munity, to take the consequences upon himself, or to mitigate them. Alth I will certainly not say that every Indonesian intellectual is as imbued the spirit of the *sambatan* obligation as this director was, it is a fact tha relation between employer and employee in Indonesian organizatio different from that found in the majority of Chinese and European indus Whenever great profits are made in a European business, the manage comparatively generous shares of it, even greater shares go to the o or stockholders, and in general the workers are but modestly compens A much more flexible arrangement exists in Indonesian business conc because of the sambatan. Wages, as well as the size and kind of gifts the contractor to his workers at the time of the annual celebrations, wedd etc., rise and fall much more elastically in general, according to Indon business conditions. Since the Indonesian considers this system to be just, there are seldom difficulties with the workers in Indonesian enter

The extent of small-scale industry can best be measured by the nu of persons employed. Of the estimated total of about 2,800,000 worke secondary industry, there are about 2,500,000 in small-scale industry whom about 2,400,000 are Indonesians. The other workers are mostly nese. Among the 2,400,000 Indonesian workers, according to an esti made in 1939 from a very incomplete test count, there are about 600

8. This entirely Indonesian central consisted in 1941 of 289 batik establishments which had a bined turnover of about 10,000,000 guilders per year.

men workers. The majority of these worked in small shops, either built to the home of the owner of the business, or built on his land. An incom- te and rather general investigation made in 1937 indicates that probably to 45% of the total number of workers lived in villages. Beside these, re is a group called bakul-workers, probably about 40% of the total, who l their products either wholly or principally to middlemen, while 15 to % work in hand operated factories with less than 50 workmen. These named concerns often also buy up the products of the bakul-workers. regards the types of production, the following table gives data from the sus of 1930 and from the general investigation of 1937.

Table VII

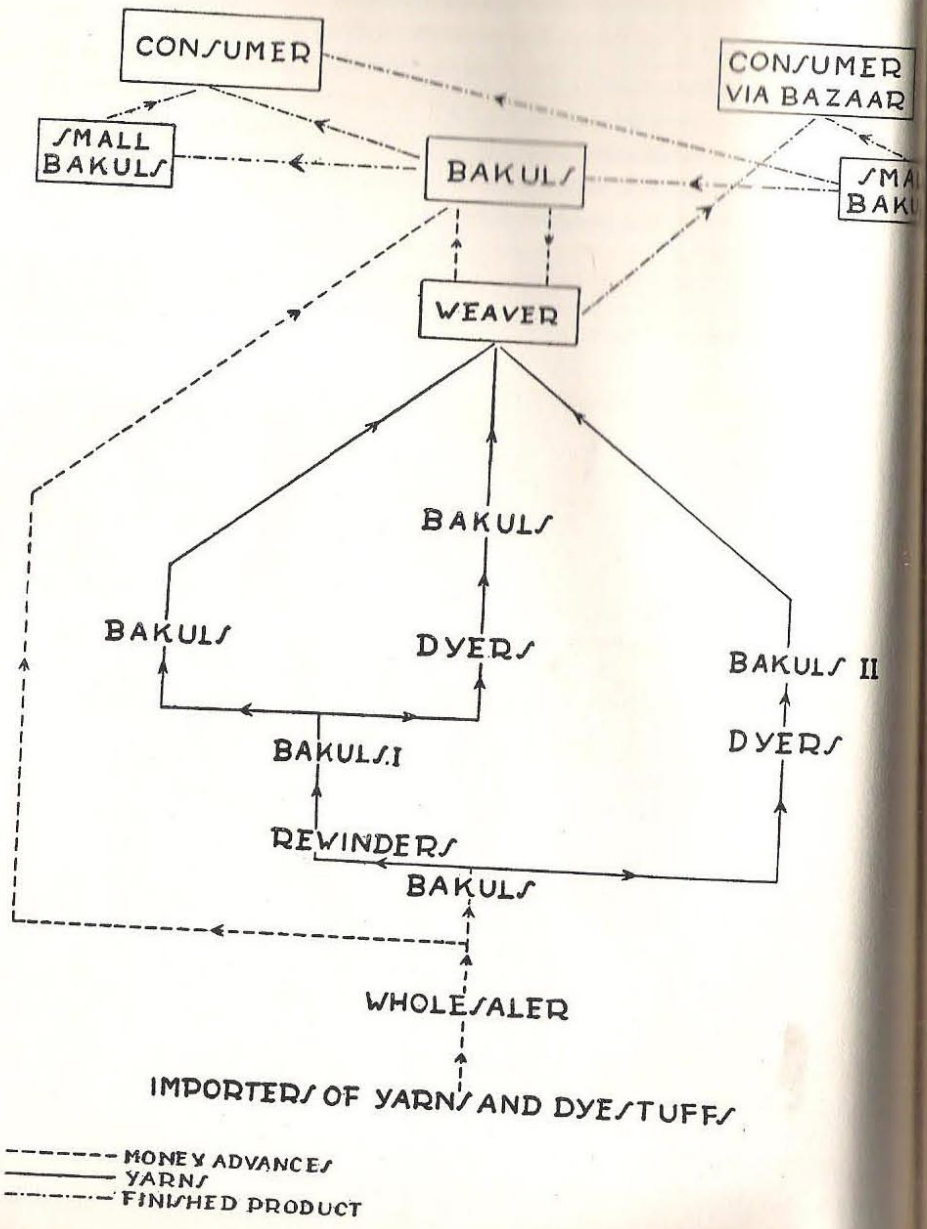
PERCENTAGE OF WORKERS IN SMALL-SCALE INDUSTRY

ch of Industry	Village Production	Bakul Workers	Factory Workers
tile, clothing, leather	21.5	48	73
ducts timber, bamboo, etc.	18	31	22
and table luxuries	48.5	5	5
alwork	3	3	
istry	3	7	
cellaneous	6	6	
Total	100	100	100

Only the factory workers can be considered as actual wage earners, hile all the other workers may be considered principally as share-holders the business, both with respect to the means of production and to the mmodities manufactured. Both among the middlemen and among the ners of the hand operated plants there are Javanese and Chinese foremen o are completely capitalistic in outlook. Unfortunately data about the portion between the number of businesses conducted and owned by donesians and by Chinese are not available.

The middleman, generally called bakul, more profit- than community-nded, has repeatedly taken advantage of the opposite mentality of the donesian producer. Such cases arouse serious dissatisfaction in Indonesian ellectual circles. The most extreme complications and machinations which se and in which the Indonesian workers came off very badly, sometimes emed insoluble. The following diagram, illustrating the complexity of se relationships, applies specifically to the situation encountered in the llage textile industry in Central Java, where a thorough investigation was de in 1936.

DIAGRAM OF THE COTTAGE TEXTILE INDUSTRY



As may be seen from the above, the bakuls placed themselves between w materials—via the cottage industry—and consumer. They knew how to tain a powerful position by offering advances in credit, and especially splitting up the work. I call special attention to the latter because the dustrial centrals also followed this system of dividing up work, but with ite other intentions. The bakuls operated with the plan of keeping the rkers dependent on them to increase their own earnings to the limit, at e expense of the workers. The centrals on the other hand operate in order maintain the quality of the work, and to improve the social-economic sition of the workers and of the village. In the latter system, the earnings m the industry were shared as evenly as possible; in the former there s a very uneven distribution of earnings. The previously mentioned in-stigation in 1936 in Central Java and an investigation made at the same e into the abuses in the furniture industry in Eastern Java, demonstrated t not less than 70% and 50% respectively of the earned income—i.e. ges plus profits—went to the bakuls as pay for their management. That ese shrewd fellows were able to accomplish this, and that the popula-n accepted the situation, must be ascribed to the social position occupied the bakul in rural districts. In general they are the most advanced, they ow the outside world—but in addition, they know every characteristic of village; for the building of new homes, at weddings, births and funerals, bakul is ready with advice and help (the latter especially in the form of ney advances to be paid off later in delivered products), to stand by the rkers dependent on him. He can do this without too great a risk because knows the people thoroughly. It is remarkable that in the modern relation-ships of the industrial central these same good qualities of the bakul are also ilized. The workers in the central always have a credit account in the ishing business, against which they may draw in exceptional circum-ances. The setup of the management and the workers in the finishing fac-ry, who both come from the cottage and small-scale industry, guarantees e very necessary knowledge of details concerning the personnel. I am oroughly convinced that this form—which has developed in the last six or even years as a result of the growth of education and travel facilities—will ay an important role in the future of the industrial development of the therlands Indies.

In order to round out the picture of small-scale industry, I may add some details concerning the working day and wages. From the data (Publication II of the N. E. I. Office of Labor, 1935) gathered from 1931 to 1935 on con-ditions in the hand-operated cigarette industry, which was then entirely, and

even now to a great extent, working under the old system, it may be that in Central Java, 25,650 workers were employed in cottage industry 23,170 in manufacturing industry; in East Java the figures are 6,712 13,420 respectively. A workman, or woman, in this industry worke average of not more than 800 or 900 hours a year. Absenteeism from was very prevalent in other industries also. An investigation undertak 300 small weaving establishments in the previously mentioned weaving ter of Madjalaja on Java, showed that although absenteeism was not se there, still a weaver worked on an average not more than 6.4 hours a

The following may be said regarding wages. In cottage industries, in as they are controlled by bakuls, the wages are unbelievably small. relationship to the bakul gives a logical explanation for this. One can ha call the pay a wage. In fact, it is more in the nature of spare-time earn Although the wages are also low where the cottage industry is in coop tion with the centrals, they are about on a level with what may be ea in farming. In small-scale industry the wages are appreciably better. N rally, wages in the different classes of industry are extremely varied, run from 3 to 10 cents an hour[9] in the centrals and the new industries, whil the bakul controlled business they are about half.

As may be seen from these rough figures, the working day and wages constitute the weak points in the cottage and small-scale indust The location of secondary industry in villages or small towns, in other wo in farming districts where there is much free time, tends to explain

The new forms which have come up during the last years in these in tries justify our expectation that a new spirit is growing in the Netherla East Indies, with much greater enthusiasm for work and with econo insight.[10]

During recent years factory industry (factories or non-mechanized pla with more than 50 workers) has expanded greatly. In 1939 many branch of industry which fall under this heading were included in the statistics the Netherlands Indies. The management and setup of these factories they are not finishing plants working in cooperation with small-scale cott industry, are practically entirely western, capitalistic in organization. ferentiation of forms, so typical of small-scale industry, is not much in e dence; the structure is simple; the goods produced are in the hands of t owner or of stockholders; the purchase of raw materials and labor is m

9. Footnote 8, Chapter I, deals with the real value of these wages.

10. This point of view is supported by the fact that at the same time the fisheries, for example, w ized modern cooperatives with motorboats and central markets. In the Indonesian shipping trade d period there were also cooperatives with freight centrals, etc.

ere they are cheapest; the sale is to the highest bidder. The extent of the tories is extremely varied. The number of workers per factory varies ween twenty and 4000 or 5000.

The development of this type of industry also demonstrates the turn- point in economic expansion between 1935 and 1939. Secondary ustry until then always originated as servant to agricultural industry. normal consumer goods for the worker were at that time imported produced by handicraft. As soon as agriculture became mechanical,[11] repair shops came into existence. At a time when exports of agri- ltural products to other parts of the world were growing, dry-docks and ipyards became necessary. Slowly a tool industry developed, supplying iculture, shipping and handicraft. Following this, the workers' needs consumer goods grew so fast that they could no longer be supplied handicraft; the volume of demands had then grown so large that it ame profitable to fill them from local mechanized production. It should noted that this point appears to have been reached in the Netherlands ies about 1935. Within about five years, the number of workers in tory industry was tripled; next to the old established ventures such as sembly-industries, ship-yards, etc., there was a large expansion of the mmodity industry; the number of electric power-stations grew from 299 458; the number of large weaving mills grew from 9 to 67, and about other factories were established.

Two forms of industrial development which were to become important the Netherlands Indies came into existence at this time: the overseas tory and the managing agency.

The first, a factory set up as a subsidiary or built on the experience of ilar factories in highly industrialized countries, is of great importance future development. The Goodyear tire factory, the Lever and van den gh's margarine and soap factories; the great paper mills, the General tors plant, the breweries, the Bata shoe factories, several large weaving spinning mills are typical examples. These are in general large fac- ies, set up in the Indies with capital and management from a distant, hly industrialized country, and to which new ideas are constantly ing from the mother factory in the land of origin—ideas which embody results of research, or which are brought by new personnel when the tory is expanded or when there are replacements. This setup appears

11. In the Netherlands Indies the sugar industry with its extensive mechanical refineries greatly anced the establishment of assembly industries. When the sugar industry was reduced to half its ious size in 1932, the Government had to take steps to prevent the simultaneous collapse of those diary industries.

to be very efficient and attractive for backward countries. In these countries real scientific and technological knowledge is expensive. People with the required education are comparatively few in number. In the mother country well organized and well run research institutions are generally available, as well as large groups of experienced engineers. The airplane has brought the world closer together; thus close contact with the mother land can be maintained. This is the best form of "white man's job" provided there is no exploitation of the worker and endeavors are made to pass on to the Indonesians as much experience and knowledge as possible.

The other development, the managing agency, does not impress one so favorably, especially in the form in which it has grown up in the Indies during the last five years. When factories came into existence, furnishing many commodities which had formerly been imported, the importers of these goods became to a certain extent superfluous. Since the importer was generally also the wholesale dealer and thus in possession of a well organized distribution system, it was logical that the manufacturers, who in the beginning had enough worries, gladly turned over the sale of their articles to a middleman, i. e. in this case the former importer. Since the import business often was at the same time a department store, it was in many cases a very efficient plan. This cooperation, which was certainly not fundamentally unacceptable, reached a point, however, where many industries were tempted to too rapid expansion, for which they obtained financial facilities from the importers. These importers thereby acquired the exclusive rights for the furnishing of machinery and raw materials, as well as for the sale of the products. The importer became the managing agent for the factory. This arrangement has in some cases led to complete subordination of the manufacturer to the importer, a situation which is certainly not conducive to a healthy development of industry.

Statistics have been assembled since 1939 in the Indies for a number of branches of factory industry. In these branches of industry there were 5,469 factories with 324,210 workers in 1940. The distribution of factories to cover the whole field of commodities, and the stage of development already reached, are most important. But before passing on to this, I shall first survey the methods by which the very rapid industrial expansion of the last years has been directed and advanced.

CHAPTER III

INDUSTRIAL POLICY OF THE GOVERNMENT

In every economic development one sees primary production setting the pace. The following table, which refers to the United States, clearly demonstrates this trend.

Table VIII [a]

	Occupied Millions	Same, less unemployed	INCOME Billions of dollars	INCOME Dollars per person engaged in industry	Income I.U. per person in work on 48 hour week basis
1850					
Agriculture	4.97	4.97	0.765	154	298
Mining., mining and building	1.35	1.20	0.457	381	737
Balance, excl. rents	1.38	1.23	0.992	807	1561
TOTAL	.....	7.39	2.214	299	579
Incl. rents	.....	7.39	2.385	323	625
1870					
Agriculture	6.90	6.90	1.78	259	354
Mining., mining and building	2.92	2.72	1.75	643	878
Balance, excl. rents	3.10	2.80	3.19	1139	1558
TOTAL	.....	12.42	6.72	540	739
Incl. rents	.....	12.42	7.18	576	787
1900					
Agriculture	10.70	10.7	3.69	345	624
Mining., mining and building	8.45	7.6	5.71	752	1361
Balance, excl. rents	9.92	8.7	8.56	984	1780
TOTAL	.....	27.0	17.96	665	1203
Incl. rents	.....	27.0	19.36	716	1293
1930					
Agriculture	11.15	11.1	9.0	810	625
Mining., mining and building	13.85	13.0	22.1	1701	1313
Balance, excl. rents	16.85	15.6	36.9	2366	1828
TOTAL	.....	39.7	68.0	1712	1322
Incl. rents	.....	39.7	72.4	1822	1406
1935					
Agriculture	.....	10.5	4.70	448	669
Mining., mining and building	.....	11.9	13.4	1127	1683
Balance, excl. rents	.....	19.95	3.9	1599	2390
TOTAL	.....	41.35	50.0	1210	1809
Incl. rents	.....	41.35	53.0	1282	1917

[a] Clark: *The Conditions of Economic Progress*, page 346.

When, at the beginning of any industrial development the income worker derived from primary production increases, industry itself follo this pattern. The increased purchasing power from primary produc makes such an industrial development possible.

This is evident when one compares the total actual incomes, ear in the various years listed below. These figures are based on a 48 h work week.

Table IX

(From figures in Table VIII)

INCOME IN INTERNATIONAL UNITS (Billions)

Year	1850	1870	1900	1920
Income primary production	1.48	2.45	6.70	6.90
Income secondary production	0.88	2.38	10.35	17.20
Total	2.33	4.85	17.05	24.10

The above figures show that between 1850 and 1935 the actual inco from primary production increased four times, while that from seconda production increased twenty times. The level of agricultural developme at which a considerable margin of profit makes greater prosperity po sible for the rural population, is at the same time the level at which rapid general increase in prosperity sets in. At this stage the new pr duction—secondary industry—soon takes the lead.

There is not enough statistical material available regarding the Neth lands Indies to make a comparative survey covering any length of ti for that country.

According to the index-figures in Table I, and according to my perso views, based on an experience of thirty-five years in the Indies, the sta reached in 1870 by the U. S. A. in its economic growth was reached b the Netherlands Indies some time between 1935 and 1939.

This has not been achieved without great effort. Many measures ha been taken in order to direct this growth and to keep it on the right cour In some publications it is stated that the industrialization of the Indies a practical result of the necessity of the times. The increasing populati coupled with the very unfavorable basis of exchange between agricu tural exports and import commodities in 1932 and 1933[1] undoubtedly ha a propitious influence on the pace of industrial advancement. The cau however, as I showed in Chapter I, lay in the increased income fro agriculture and in the psychologically changed attitude of the Indonesia

1. In 1928, 1932 and 1939 the price of tea was 0.63, 0.175 and 0.41 guilders respectively per pou The rubber price was 0.585, 0.085 and 0.315 guilders respectively in these same years.

ward the appreciation of prosperity in terms of commodities and the eans of acquiring such commodities.

An increased total income from agriculture cannot absorb all sorts produced or imported commodities and consumer goods unless this come is distributed as well as possible among the workers, thus raising e purchasing power of the individual farmer.

In order to attain this, the acreage under cultivation was extended rough migration, so that the poorest farmer from Java became a more osperous one in the Outer Islands. Individual production was increased rough irrigation, distribution of higher yielding seeds, and through edu- tion. By the formation of agricultural cooperatives and funds the Indo- esian farmer was enabled to obtain greater profits from the generally tter paid export crops. Furthermore, the burden of land taxes which eighed on the farmer's income, was reduced and credit facilities were tablished for the rural population. Where onerous debt relations existed, e Government established means of combatting chronic indebtedness. y fixing the commercial price of rice at a higher level, more in con- rmity with the general index figure, a wider spread was given to the gmented farm income.

It is easy to see that resistance was often encountered from the plan- tion (estate) owners against this state of affairs, which was being strongly imulated by the Government in order to give the Indonesian farmer a ger share in the raising of export crops and in the profits resulting erefrom. The Government, however, won more and more followers so at some time between 1935 and 1939 a majority was formed in the People's Council who backed the Government policy. After that, in spite the difficult times, the material foundation was laid in an ever-quickening mpo for the possibilities of industrial development.

The desire of the Indonesians for new and more numerous com- odities has been a special stimulus to industrial development. In order encourage this desire in wider circles, several methods have been used. ne of the most efficient propaganda methods in this was the organization small and frequently varied exhibitions of all sorts of commodities eful in rural districts. These exhibitions were often held in schoolhouses at the home of the teacher. The use of these articles was demonstrated y the teacher in the schools. The children spoke at home about what ey had seen: shoes, forks and knives, flashlights, bags and trunks, mbrellas, etc. The older folks went to see what "teacher" had, and learned hat comfort and pleasure these new things could procure.

At the same time the many fairs offered excellent opportunities to the people to become acquainted with various articles. All these methods initiated by the Government and by corporations, were readily taken over by importers and distributors who visited the rural districts with cars equipped with loudspeakers and exhibited their articles in the village bazaars[2] in order to demonstrate and sell them.

It is natural that Indonesian small industry responded to the desire for these articles by taking up the manufacture of them, first in a primitive fashion, then gradually in efficiently managed workshops. They then sent salesmen out into the villages and to the bazaars and in this manner people became generally familiarized with the new articles. The consumer angle was well taken care of through the previously mentioned system of regulations and actions. At the same time production was stimulated through many and ever-increasing Government regulations.

To help the producers an extensive government service for technical instruction, called the Industrial Division of the Department of Economic Affairs, came into existence. It consisted of a section for industrial policy, one for scientific research and a comprehensive propaganda and instruction service.

The Section for Industrial Policy, naturally with the closest cooperation of the other sections, had the task of studying whether and to what extent legal measures should be taken or amended in order to promote industrial development as much as possible. It was an essentially social-economic organization which was well adapted to the needs of Indonesian society. All production reports were studied by this organization. As soon as there was a hitch anywhere, or when the instruction service or the general directors reported difficulties in industrial production, a local investigation was instituted, and measures were taken in accordance with the findings. In Chapter II, I gave an example of the entanglements in which the village weaving industry in Central Java found itself. An investigation made by personnel of the Section at that time showed that the bakuls or middlemen, had obtained a too preponderant position to the detriment of the workers. Without delay the Industrial Office established a pioneer bakul business in the neighborhood, which took over the bakul services to the workers on a fair basis. In this sphere of cottage and small-scale industry such methods worked better than any legislation. In a short time this brought about consultation between the bakuls and the Government service, which tended to mitigate the unfavorable circumstances.

2. Nearly every village has one or more "bazaars" where all kinds of village products are traded.

This Section also dealt with the larger mechanized industry. In Chapter II I mentioned the disadvantages often attached to the managing agency in factory industry. Whenever serious and well-founded complaints about conditions appeared to exist, the office stepped in in order to change the financial relations between manufacturer and agent by arbitration, or to establish new and more satisfactory connections.

In the rapidly growing textile industry, when the large organizations, some with investments of 3 to 4 million guilders in sarong production, experienced competition from the small-scale industries, certain financially powerful concerns tried to wipe out the small-scale industries by price slashing, although the smaller concerns, as I explained in Chapter II, were completely competitive and beneficial from a social-economic viewpoint. In these cases the Government provided for legislation by which a total production and a production quota were established, a reasonable price was maintained, and the expansion of the textile industry was put on a sound footing.

The subject of legal regulation of production gives a good illustration of the intensive manner in which the Netherlands Indies Government occupied itself with these industrial affairs.

In order to keep the market open for domestic textiles, a system of import quotas was set up in such a manner that there would always be a market for domestic production. In addition the factories were legally bound to a licensing system. These licenses indicated the productive capacity of the factory, stated in numbers of mechanical or hand looms, while stipulations could be added concerning the type of goods to be manufactured, the wages to be paid, etc. In this way it was possible to guard against exhausting price wars, against a cartellization of the large factories to the detriment of the smaller ones, against a socially unwarrantable division of incomes, etc. In short, the far-reaching intervention of the Government in industrial affairs fostered healthy industrial development, beneficial for all concerned. The figures given below express better than words the rapid development made in this branch of industry when these measures had come into effect.

Table X

NUMBER OF LOOMS

Year	1930	1935	1940	1941
Mechanical Looms	40	400	6,600	9,800
Modern Handlooms	500	4,000	35,000	49,000

Similar legislation was made applicable to various other branches of industry: printing, ice factories, foundries, cigarette factories, dock and stevedore establishments, rubber milling and rubber smokehouses, rice mills, etc.

The Section of Industrial Policy, in collaboration with the Section for Industrial Instruction, issued regular reports on market prices of important raw materials and by-products. It also advised the government concerning the expediency of support in certain cases, for instance by granting exemption of import duties on certain capital goods and materials used other than raw materials, by preferential treatment in allotting Government tenders, by guaranteeing industrial credits, by government share holding in the larger industries requiring sizable capital. This Section was also the authority which drafted recommendations concerning import duties, quotas, etc. and prescribed the period within which a certain part of the managing functions in new factories were to be allotted to Indonesions.

Working in close contact with the Section of Industrial Policy, the government-founded organ for Scientific Industrial Research studied both the technological and the economic aspects of the various industries. The findings were passed on to the industries. This organization consisted of four branches: (a) laboratory for chemical research; (b) laboratory for testing materials; (c) central bureau for technical research; (d) bureau for economic research.

The task of the chemical laboratory was threefold and included:

1. Increasing and improving knowledge of the chemistry of Indies' products.
2. Chemical research for all the branches and divisions of the Department of Economic Affairs, and, when necessary, for other Government services.
3. Analytical research for agriculture, commerce and industry, the results of which are largely documented in certificates of examination.

The laboratory for testing materials makes studies of materials in general and Indonesian materials in particular. In addition it handles the inspection of materials for the Government as well as for industry and commerce. The central bureau for technical research studies the processing of domestic raw materials into final products or constituent products for the Indies' and foreign markets. The activities of the bureau of economic research are devoted to the study of technical and economic

possibilities of and conditions for establishing branches of industry in the Netherlands Indies. In addition to this general work assigned to the laboratories and bureaus, they collect the information for technical and economic improvements.

Industrial instruction is extremely varied and depends on the scope of the industry, its structure, and the type of plant operated. It deals with the selection of raw materials and with the manner of using them to the best advantage from the point of view of profits, of production costs, and of the quality of the finished product. Technical guidance given by the bureau for technical research is chiefly solicited with regard to the type of plant which would be most suitable. Although large scale industrial organizations sometimes require technical guidance which their own specialists may not be able to furnish, it is principally the medium-sized and small plants which are in need of such advice, especially the newer ones.

The export industry, insofar as its requirements are cared for by the Industrial Department, produces to a large extent raw materials for foreign industry. The ever-changing requirements of foreign industry necessitate constant modifications of the processing of raw materials from the Indies to comply with varying standards of quality and assortment, and in connection with special characteristics of the material. Extensive research is carried on in connection with new applications, and to counteract the use of substitutes to replace their products. The lowering of production costs by adopting cheaper methods, by speeding up the process, etc. was not only essential to increase the profits of industries, but to keep them going.

Industry working for domestic consumption was obliged to exert itself to the utmost in order to compete in price and quality with imported products which came mostly from old, and thus very advanced, industrial countries. In this struggle, the instruction service with its section for economic-technological research and its laboratories, was at the disposal of the industrial plants, and technical aid was given wherever necessary.

A special office—part of the Bureau for Economic Research—in charge of investigating the possibilities of setting up new branches of industry in the Netherlands Indies, dates from 1940. Even before that time the need had been felt for a survey to ascertain whether it would be advisable and beneficial to have certain industries established in the Indies, in connection with the economic and structural expansion of industry as a whole. Earlier there had been such investigations occasionally, carried on by personnel who of necessity had to be detached temporarily from

their routine work. The development of industry necessitated an expansion of this type of investigation, and, moreover, it proved necessary to turn the work over to specialized personnel.

The government services mentioned above, with offices and laboratories concentrated in Batavia, Bandoeng and Buitenzorg, could be visited by and were within easy reach of, the larger manufacturers. However, the very important cottage industry, the small-scale industry and the smaller units of the factory-industry, in which several million workers earn their living, could derive but small profit from it.

In order to overcome this difficulty, the Government instituted a very extensive educational service, establishing a great number of consultation offices, a large staff of technical and economic instructors, and a staff of traveling vocational teachers. Naturally these services had access to the findings of the technical scientific service, but in addition they had industrial laboratories: a textile institute and a ceramics laboratory at Bandoeng; a tanning and leather works laboratory and a batik testing station at Djokjakarta, and numerous weaving schools all over the country, etc. The instructors and traveling vocational teachers maintained close contact with the government industrial and vocational schools. There were 332 industrial schools giving instruction in the vernacular, and 379 where Dutch was the medium; 26 business schools using Indonesian languages and 48 with instruction in Dutch. In addition, there were schools attached to the textile institute, the leather tanning laboratory and the ceramics laboratory for training factory foremen and managers for the smaller factories.

A few words about the traveling vocational teachers seem to be appropriate because this institution differs from the others mentioned in that it probably is peculiar to the Indies. It is moreover of great importance for industrially backward countries. The traveling vocational teachers are chosen from the best Indonesian craftsmen and are given special training in Indonesian vocational conditions. They travel with one or two assistants and good, simple tools, calling on thousands of workshops and teaching the use of good equipment, of molds, etc. to everyone from the apprentice to the boss. They explain the proper use of the proper materials; keep the craftsmen informed of price fluctuations and explain how to figure cost prices, teach how to judge the quality of raw materials, etc. These teachers are not white-collar men who stand up before the class, but work men. They travel around in their overalls and demonstrate the better techniques themselves, showing what can be accomplished with better

tools and better materials. It is remarkable in how short a time these teachers became the welcome friends of the small-scale workers. They often board with them, and sit through the long Indies evenings talking about conditions as they are and as they could be. These men, with the instructors who do more general work, are the ones who started the new forms of cooperatives which I described as industrial centrals, in Chapter II.

Aside from the measures mentioned in this chapter, there are three bodies appointed by the Government to support industry:

First, the "fund for small industries," which grants loans at low interest rates to small-scale workers for setting up new production. The fund builds up pioneer industries, which it operates for its own account as long as these industries still hold many risks. As soon as the difficult initial stage is passed, the Indonesian directors are enabled, by paying off the real value of the plant, to become its owners.

Second, the "medium-industry credit," which is an institution giving credit to larger enterprises on recommendation of the Section of Industrial Policy, in cases of oppressive relations with managing agents where the financial position of an otherwise sound enterprise so demands. Such credits are also available for the enlargement of smaller factories which are well managed and have a place in the general industrial scheme.

Finally, the Government has added a sum of 10,000,000 guilders annually to the budget during recent years, in order to participate in large industries, which are considered to be of benefit to the community or the country.

All of these activities of the Government were developed in close cooperation with the industrial leaders and interests of the Netherlands Indies.

Thus the legislative measures for regulating production came into being after a poll was held among the owners and managers of industrial enterprises, and a "Council on Legislation" composed of industrialists had been heard. Advisory committees were appointed for every branch of industry; they comprise Europeans and Indonesians, representatives of large and small plants. They can demand to be heard on every production measure. A commission consisting of industrial accountants and bankers was formed to collaborate with the advisory committees in matters dealing with "medium industry credits." There was also an Industrial Council to decide on whether or not the Government should hold shares in and promote new large industries. This Council was aided by an advisory board of which Indonesians, Chinese, and Hollanders were members.

The above does not give a complete picture, but it presents an outline of the manner in which industrial development is being fostered. The cordial cooperation between Government and industrialists, between Europeans and Indonesians, which came into being appears to be quite as important as the greater prosperity which was attained. Just as the industrial development in Western countries gave impetus to great social development, so the Netherlands Indies' industrial development nurtured greater independence of the Indonesian as a means of his becoming an independent citizen.

Thus the Government has been greatly interested, especially during the last decade, in the development of cottage and small-scale, as well as Western, mechanized industry. Until now these forms have been able to exist side by side. It is already evident that cottage industry lags behind in the progress of development. More and more, the small-scale worker is taking over the production of cottage industry. However, as long as farmers have so much free time as they do in the Indies, cottage industry will continue to exist. Nevertheless, cottage industry will tend to decrease as the volume and quality of agricultural products per worker increases. How to increase these is a problem in itself, which in the interest of the social-economic balance of Indonesian society continually demands new solutions. However, in many special fields small-scale industry will continue for many years to be a cheaper producer than the western organized mechanical factory. So long as there is a great difference between the wages paid in the Netherlands East Indies and in Western countries a number of products will remain cheaper if they come from small little-mechanized factories with low overhead and an elastic wage scale than products which are manufactured in the large mechanized factory. Machines, ready-made in Western industrial lands, replace Eastern manual labor. The relation between the productive capacity of the large machine and of slightly mechanized manual labor has until now determined the form of industrial production in the Netherlands Indies. Thus, large and small industry will consequently be able to continue their existence side by side in the future.

CHAPTER IV

FACTORY INDUSTRY

Chapter II described certain conditions which have developed in mechanized industry, and I shall devote this chapter to a description of the results obtained in the Netherlands Indies.

In what is called factory industry, manual labor has been replaced to a greater or lesser extent by machine work. The rate at which a factory is mechanized is dependent on the wages to be paid and on the productive power of the machine. Until now it has nearly always been found in the Netherlands Indies that parts of the production can be made cheaper by hand labor than by machines. The extent of mechanization possible is an arithmetical problem in each individual case. As wages go up, and this was taking place, continued mechanization becomes more expedient. However, a large factory in the Indies, built along American lines, after operating for some years, began "de-mechanizing" certain parts, since this had a favorable influence on the cost price.

Whatever this relation between mechanized and non-mechanized industry may be, it is clear that in the Indies a rapid development of factory industry is taking place. The index figures in Tables I and II show this clearly, as do the statistical data, only partially published thus far,[1] which have been assembled for 1939, covering 25 branches of industry with 3,538 factories and 172,368 employees, and for 1940, covering 52 branches of industry with 5,469 factories and 324,210 employees.

The factories investigated all work independent of agricultural or mining estates. Thus, the sugar industry is not included, although the confectioners are. Tin-smelting factories are not included, but metal-manufacturing is. The mineral oil factories are not included but the coconut oil factories are, etc.

The available figures make it possible to give a picture of the industrial position attained in 1941. The statistics are too recent to be used to

1. "Industrie in Nederlandsch Indië," *Economisch Weekblad*, May 1941.

demonstrate the development described in Chapter I. However, some comparative figures for 1939 and 1940 have been assembled covering 23 branches of industry, and are given in the following table:

Table XI

Type of Industry	Number of Factories		Number of Workers		Production in 1939	Production in 1940
	Dec. 31 1939	Dec. 31 1940	Dec. 31 1939	Dec. 31 1940		
Canning	5	6	226	315	988,000 kgs.	1,418,000 kgs.
Starch	220	220	13,872	7,566	187,138 tons	223,742 tons
Rice Mills	1,040	1,137	26,618	28,560	1,114,825 tons	1,202,826 tons
Vegetable oil and margarine	105	113	6,788	7,107	202,530 tons	220,538 tons
Palm Oil	31	31	5,102	3,950	298,290 tons	236,651 tons
Soap	13	14	1,743	1,864	15,307 tons	16,588 tons
Fireworks	20	21	3,699	1,936	1,256 billion pcs.	739 billion pcs.
Rubber articles	11	14	1,403	3,371	858 tons	2,200 tons
Sawmills	105	103	5,183	3,957	130,032 tons	118,917 tons
Furniture	10	12	397	813	436 tons	943 tons
Wood barrels and cases	19	27	1,963	2,147	2,229,000 pcs.	2,605,000 pcs.
Other wood products	10	9	206	166	773 tons	231 tons
Printing	268	284	14,309	15,162	16,227 tons	18,000 tons (approx.)
Tanning	20	25	1,302	1,293	594,000 hides	1,185,000 hides
Weaving	131	200	37,342	50,168	36,618,000 meters	81,823,000 meters
Shoes	12	10	1,329	2,519	610,000 pairs	3,196,000 pairs
Public electricity	115	126	8,407	9,274	325,200,000 kWh	969,600,000 kWh
Tiles	14	21	1,702	2,497	18,700,000 pcs.	28,420,000 pcs.
Glass containers	5	6	829	1,617	3,455,000 pcs.	17,674,000 pcs.
Iron castings	5	5	439	392	3,118 tons	3,000 tons (approx.)
Tinplate works	28	28	1,497	1,705	21,300,000 tins	31,500,000 tins
Steel barrels	5	6	251	463	479,000 pcs.	589,000 pcs.
Agriculture machinery	61	68	9,005	10,559	14,691 tons	30,062 tons
Repair shops machinery	213	282	13,726	17,812	1,279 tons steel	———
Repair shops electrical	10	163	606	1,569	385.7 tons metal	———
Shipbuilding and repair	12	16	4,303	7,268	4,037 tons metal	———
Wagon building	23	23	6,993	5,895	5,537 tons metal	———
Automobiles, repair and assembly	27	40	1,228	3,346	38 tons metal	———
Totals	2,538	3,010	170,468	193,291		———

Thus, in 1940 nearly 500 new factories were established in these branches alone, engaging no less than 23,000 workmen. The total number of mechanized factories was about 4,800 in 1935, and in 1939 had grown to about 6,100. If the development of 1939-1940 (unfortunately the only years for which we have reliable figures available) is taken as a basis, it may be concluded that fully 55,000 workmen are assimilated yearly into factory industry.

Chapter III explains what was being done, both in vocational schools and by traveling teachers, to train skilled labor. It must be considered that it was also necessary to train more and more teachers, as well as a great number of surveyors. The tremendous educational task at that time could not be managed by the government alone. Private initiative had to step in, and took over several branches of instruction. At the same time a strong movement of workers took place from small-scale to factory industry. In each locality where a shortage of workers developed—this shortage was becoming acute in the last few years, especially in the textile and in the shipbuilding and repair yards—local training schools were set up, where, in turn, the recruiting of teaching personnel caused many headaches.

Table XI listed the factories which appeared in the census of 1939. In 1940 this number grew to 5,469. Grouped by industries, the picture, according to the census at the end of 1940, was as follows:

Table XII

Industry	Factories on Java	Factories other Islands	Number of workers	Average per Factory
Foodstuffs	1002	605	43,068 (a)	27
Beverages	177	163	5,005	21
Tobacco	115	2	53,547	464
Veg. oil, margarine, etc.	824	254	21,850 (a)	20
Chemicals	61	11	6,038	82
Rubber articles	10	4	3,371	240
Wood products	81	70	7,083	52
Printing, binding, etc.	251	59	15,842	51
Tanning	23	2	1,583	63
Textile	231	8	50,168 (a)	210
Clothing, shoes	24	1	7,624	30
Gas and electric	518	212	11,232	154
Earthenware, glass	100	23	12,371	102
Metal	34	12	3,710	81
Repair shops and shipbuilding	476	116	46,449	78
TOTAL	3,927	1,542	324,210	59

(a) Not complete. Not available from certain branches. The total is therefore greater than these figures would indicate.

The total value of wages in these industries is incomplete and therefore cannot be accurately presented. First we may note that 70% of the factories are in Java. Also, the factories are not large—the figures covering the number of men employed show this. This spread of work over many smaller factories, which are also geographically distant from each other, is naturally beneficial from a socio-economic viewpoint. The form of Java, a very long, narrow island, and the nature and origin of the industry, lead to this. This tendency was further strengthened by the former high cost of transportation by land and sea. While it is true that this cost has been lowered considerably in recent years, still as a result of vested interests in railways, and Western-organized steamship lines, it continues to be too high to make a concentration of industry advantageous. To give an idea of the difference in transport costs, the average freight rate in Java is from 3.5 to 7 Dutch cents (approximately 2 to 4 U. S. cents) per long ton, while in the United States the average rate is about 1 U. S. cent.

In Table XIII, given below, are grouped the more important statistics bearing on conditions in the industries given in the previous tables.

Table XIII

POWER AND FUEL CONSUMED IN FACTORIES LISTED IN TABLE XII
(Except 471 repair shops, for which no figures are available)

No. of Motors	25,818
No. of Mechanized machines	55,970
Hard Coal used (tons)	93,920
Oil Used (tons)	72,075
Gasoline (1000 liters)	1,124
Firewood (1000 cubic meters)	886,414
Gas (1000 cubic meters)	23,256
Electricity (K. W. hours)	94,996
Lubricating oil (1000 kgs.)	2,589

Figured in k.V.A. (kilo-volt-amperes), the average motor was of 25 k.V.A., while the average for each factory was 64 k.V.A. About 7,400 Europeans and 18,889 Chinese were employed in the factories. There were about 24% women among the workers, preponderately in the tobacco factories (39%) and in the textile industry (34%). The ratio between managing personnel, minor supervisory personnel and laborers was 1.6%, 6% and 92.4% respectively. While the complete totals of wages and salaries paid

are not known, the total for 1940 covering a large percentage of the factories employing about 146,000 workers is known, so that we can make a rough estimate of the wages per worker. Assuming that the increase in 1940 was the same, the average number of workers can be estimated, and on the basis of this, an average yearly wage can be arrived at, which would, perhaps, be somewhat on the low side.

Table XIV

YEARLY INCOME OF INDUSTRIAL WORKERS

Groups	No. workers Jan. 1, 1941	Estimated average in 1940	Wages in 1000 gldrs.	Wages per year per worker in gldrs.
I. Preserves, starch, ricemills, foodstuffs, soft drinks, veg. oil and margarine	40,918	38,000	7,665	202
II. Alcohol, ice, gas, soap, shoes	7,665	7,120	2,149	302
III. Rubber, woodwork	19,797	18,420	4,461	242
IV. Dyes, chemical, zincographic, limestone	20,108	18,690	6,524	349
V. Iron, steel, press work, repair and other metal constructions	58,283	54,600	22,734	416
TOTAL	146,771	136,830	43,533	318

In estimating the value of these wages, the purchasing power of the guilder must be taken into account. These figures cover a period of great industrial expansion, so that a large number of apprentices must be counted among the number of workers. Their exact number is not known, but it would be safe to assume that 10 to 15% were boys and girls younger than 15 years of age.[2]

It is not known how many of these young people work in the family circle. We have seen that in the industries studied, 24% of the workers are women. Thus it is certain that the average income per family is considerably higher than that given for individual workers in the industries mentioned in the table.

In addition to the amount of wages paid, it is of special economic significance to consider what portion of the raw materials for industry can be supplied by the land itself. Surveys of this have been prepared by the Industrial Service in the Indies. In 1940 the resulting figures for the branches of industry covered were as follows:

2. In 1930 in the U.S.A. there were 49 million gainfully employed, of whom 11 million were women. About 0.7 million were under 15 years of age.

Table XV

COST PRICE FACTORS IN PERCENT OF GROSS VALUE, IN 1940

Kind of production	Gross value of production	Wages	Raw Materials or constituent products produced in N.E.I.	Ditto imported	Balance	Net National income
Preserves	100	13.2	25.6	26.7	34.5	55.5
Soap	100	10.8	37.5	15.7	36	54
Rubber goods	100	29.7	22.7	19.8	27.8	67
Sawmills	100	16	59	3.6	21.4	70
Printing	100	39	8.5	31.5	21	45
Steel construction and repair	100	23	7.5	33	36.5	38.5
Tanneries	100	11	57,5	3	28.5	78
Tile, bricks	100	37	36	2	25	82
Biscuits	100	15.6	23.3	48	13.1	36
Weaving	100	20	7.7	52	20.3	31
Confectioneries	100	8.2	26.5	9.8	55.5	33
Margarine	100	7.4	64	5.5	23.1	72
Paint	100	6.5	6	62	25.5	12.2
Weighted average in N.E.I.	100	22	17.7	33	27.3	about 55%
Average, secondary industry in Australia	100	20.1	59.3		20.6	

Using the average figures for Australian secondary industry for comparison, it appears that the "balance" figure for the Indies is perceptibly higher than that for Australia, a country which also had to import its machinery from abroad until very recently, although its industrial development took place much sooner. The comparison shows that Netherlands Indies industry apparently has passed the difficult age, while industrialists still profit from the advantages of the early start.

In figuring the cost price components, the Industrial Service at the same time made a calculation of the direct national income derived from various industries. By this is understood the total of incomes from wages and obtained from native raw materials, insofar as these were unused before the industry was established (for example: clay in the tile and brick industry; sand in the glass industry), and from the profits made by the entrepreneur. Thus, dividends and interest are not included, nor are incomes obtained from the importation of machinery and raw material, repairs and maintenance of equipment and buildings, etc. The actual total national income is, therefore, certainly substantially higher.

These figures are of the greatest importance in estimating the value

of an industry in a setting like the Netherlands Indies. The Government has always strived to obtain only such industries which logically fitted into the economic system of the country. In this—except in a few very special cases where defense interests were at stake—there was never any attempt at autarky. The legal regulations even give the right to prohibit the establishment of certain branches of industry, and to set a ceiling on production. This control over the component parts of industry made it possible to decide whether limitations should be placed, and if so, to what extent, in order to achieve the greatest benefit for future development. These data are of the greatest importance for the Office of Industrial Policy.

From the data in tables XI and XII, it is clear that the industry of the Indies is growing into a consumer goods industry, chiefly for domestic use. This was natural and it is probable that this tendency will long persist. If this development is guided along such lines that in general only those articles are manufactured which cost less effort than the producing of raw materials with the same trade value, then it will lead to perceptibly greater prosperity, while at the same time, a wide market will remain open for imported commodities and capital goods.[3] For this future development there are many favorable natural factors.

In Java there are still 76,000 horsepower (in units of more than 2000 horsepower) of undeveloped water power available; besides this amount there are a lot of smaller sources, the total volume of which is not known. Thus Java is not rich in this resource, but the presence of oilfields makes it possible to use natural gas and cheap oil for power also. In addition, coal as a source of energy can be obtained in any quantity from the Outer Islands.

There are other important sources of water power in the Outer Islands. Insofar as these have been observed, one has been found of 663,000 horsepower at the Asahan River in North Sumatra; this has been harnessed and is to be used for the aluminum industry; in Celebes, near Larona, there is available water power of 180,000 horsepower; near Posis, 220,000; near Tonado, 64,000; and Naen, 16,000. These sources of power, of which the first mentioned is near a bauxite deposit, and the latter near iron and nickel deposits, can and will be of great value in the future.

The development of electric power has made rapid strides in recent years. The last ten years have seen the harnessed energy doubled, and in the last twenty years it has become thirty times greater. At present

3. See also Chapter V.

550,000 horsepower are harnessed in generators of more than 25 k.w., while 3,400,000 horsepower of water power in sources greater than 500 horsepower are known to be available. The future industrial development will be well able to use this. Water power has been expensive to harness in Java; the large sources in the Outer Islands have been much cheaper to use. The price per k.w. hour on Java, taken from public utility figures, varies for industrial use from 2.5 to 6 Dutch cents (1.4 to 3.3. U. S. cents). The cost price in great power plants in the outer islands is probably between 2 and 5 Dutch cents (1 and 2.8 U. S. cents) per k.w. hour.

The tropical climate, especially on Java, is generally moderate, and by a good selection of location one can secure advantages in temperature and humidity. Actually, with modern air conditioning, the factor of climate has become less important, although in the Netherlands Indies it cannot always be considered as favorable. The great daily variation in humidity, which fluctuates on an average from 48% to 86% is a handicap for many branches of industry.

The Javanese is a good worker, although his short stature[4] and light build make him less suitable for heavy work. A repetitious operation, when no great feat of strength is involved, suits him very well, and his performance, after a short period of training, is in that case as good as that of a European workman. As the work gets heavier, his performance rapidly declines. Thus the Javanese is an efficient worker in the textile and cigarette industries; a workman with great possibilities in the manufacture of bicycle tires, but not so good for automobile tires. He is also very inventive; this quality finds opportunity for expression in small-scale industry.

Much was said formerly about the great drawback of absenteeism among the Indonesian workers, but this appears to have been exaggerated, although it seems probable that absenteeism is somewhat higher here in mechanized industry than it is in similar factories in Europe. In the first spinning mill, established in Java in 1937, absenteeism—exclusive of sickness or accidents—was only 3% in 1940. Within two years this factory had attained a productivity per worker equal to that of an average Dutch spinning mill.

In the years when industry was growing so rapidly, greater interest in the trade union movement developed among the workers, although this movement did not advance beyond the primitive stage. In 1935 there were

4. The Javanese weavers' choice of Japanese looms was partly due to the fact that these looms are built 6 inches lower.

111 trade unions with 72,675 members; in 1939 there were 75 with 109,547 members. Thus there was growth and concentration. In 1939 there were 18 strikes of from 1 to 12 days, involving a total of 1,628 workmen. The motives were wage disputes or unjust treatment of one or more workmen by the overseers.

There are other factors in the development potentialities of mechanized industry. Thus far a typical industry of consumer goods has developed, spread over the whole territory in comparatively small units. Many of these factories use quantities of raw materials and semi-finished goods which it will certainly be possible to produce in the Indies. In general such semi-raw materials are only advantageously handled in large quantities. Since the export of such products is nearly always impossible, the domestic consumption must be built up in order to undertake manufacture thereof. The use of various producers' goods has slowly increased to such an extent that new possibilities developed. Thus the use of cotton thread for weaving grew from 3,000 tons in 1930 to 28,000 tons in 1940;[5] consequently sizable spinning mills could be built. Owing to a sharp increase in the soap industry, the consumption of caustic soda during the same period increased from 4,000 tons to 18,000 tons per year.[6] As a consequence of the developing mechanization and expansion of repair and construction shops and shipyards, 50,000 tons of scrap steel became available yearly.[7] The use of various chemical products has grown from about 300,000 to 500,000 tons since 1934.[8]

This growing consumption of various materials stimulated the establishment of many factories in the Indies; however, entrepreneurs had a justifiable fear of taking on these factories which demanded so much capital, and which, without exception, required a rather large concentration of production.

Freight rates by land and sea are high in the Indies. The hesitation on the part of entrepreneurs was overcome when the Government itself actually began to work on the problem and a series of large factories could be undertaken sitmultaneously. It was calculated that a private organization set up jointly by a number of factories for sea transportation by small motor ships to bring in the raw materials and take away the finished products would lower shipping costs to nearly 35 per cent. When

5. The spinning mill in Tegal is in operation; in Semarang, Koedoes and Pasoeroean, mills are being built. Altogether, 160,000 spindles.

6. A soda factory with a capacity of 15,000 tons caustic soda and 15,000 tons fertilizers was in preparation.

7. A steel mill with open hearth furnaces and a simple rolling and hammer mill was being planned for 1941 for the processing of 40,000 tons of scrap.

8. A chemical plant with a capacity of about 65,000 tons was being built at Tjepoe.

this was proved, five projects for fundamental industries were begun within a year.

There is still considerable difficulty in the Indies in obtaining well-trained managing personnel. Since industrialization is still in its infancy, specialized personnel for organization and management is not yet available locally. This personnel has to be imported or trained. For small-scale and smaller mechanized industry a training system has been organized. In effect, more and more Indonesians with theoretical training are becoming available as the University of Bandoeng trains civil, mechanical, electro-technical and chemical engineers. But these young people lack the experience necessary to build up and operate industrial enterprise independently. The structure of the overseas factory has solved this problem.

Finally, the question of whether or not raw materials are available locally is of the greatest importance. There is neither cotton nor wool in the Indies. While there have been extensive experimental plantings of cotton, they have not given very encouraging results thus far. It is not likely that large cotton plantations can be developed. The climate of Java is, in general, too humid; furthermore the available agricultural acreage must be used for food crops. Cotton cultivation always requires extensive areas. Possibly, a limited opportunity for cotton planting exists on some of the smaller islands east of Java. It will remain necessary to import cotton for the textile industry.

There are many possibilities for industries using agricultural products, wood, fibers, rubber, tapioca, vegetable oils, hides, sand, clay and limestone. For the whole metal industry, which until now has been using 300,000 tons of imported metal per year, even more metal in all forms will have to be imported.

CHAPTER V

CONCLUSION

What course will the development of the Netherlands Indies' industry take in the future? To answer this question, it is desirable to consider further the industrial possibilities in the economic life there.

Industry in the Indies in its first phase developed in two directions—on the one hand as village commodity production, and on the other as an adjunct to the large estates. A comparatively important small-scale industry producing consumer goods for the local market grew out of the village industry when the people's purchasing power from agriculture increased.

In the meantime, education and travel had stimulated the desire for more commodities, so that the Indonesian villages were a ready market for all sorts of new products. At the same time the Indonesian community was progressing; men with ability went into the factories not only as laborers, but also as managing partners. Production centrals in many forms and variations were taking the place of obsolete economic forms. The Western entrepreneur, who in many cases took the initiative in production which was comparatively difficult from a technological viewpoint, was passing on his knowledge and experience to the Indonesian. Consequently, the Western entrepreneur always had to go on to even more difficult processes. Thus industrial growth was speeded up.

The impulse to industrial development in this second phase came from the higher incomes obtained in primary production: agriculture, mining, fishing, cattle raising, etc. This developed a typical production of consumer goods, in both small and factory industry.

In primary production considerable agricultural and mining industries had already come into being. These, however, largely served the export trade. The most important of them are given in the following table.

Table XVI

AGRICULTURE AND MINING FACTORIES

Type of Industry	Number of Factories	Production 1939	Approximate Percentage used for Home Consumption
Sugar factories	138	1,500,000 long tons	25
Rice mills	1,137	1,200,000 "	90
Tea factories	273	120,881 "	30
Rubber remilling factories	193	421,000 "	3
Tapioca factories	220	223,000 "	37
Fibre factories	31	108,000 "	0
Coffee hulling factories	89	120,000 "	50
Palm oil factories	31	250,000 "	10
Vegetable oil factories	113	263,178 "	70
Etheric oil factories	100	5,193 "	5
Kapok cleaning	213	18,000 "	0
Sawmills	103	118,000 cubic meters	90
Quinine factories	1	200 long tons	10
Petroleum refineries	—	7,036,348 "	18
Tin refineries	—	14,000 "	1
Saltponds and refineries	—	160,000 "	100

In addition to the factory production mentioned in the above table, there is an important production of similar goods among the farmers themselves, both in cottage and small-scale industry. For instance, besides the factory sugar production, there is a production of native sugar, both from cane and from some species of palm. There is an extensive tapioca production for home use, as well as an equally extensive production of vegetable oils, especially coconut oil, for home use.

Aside from rice mills, coconut oil factories—which are included under vegetable oil factories,—sawmills, saltponds and refineries, the agricultural and mining industries in Table XVI are essentially servants to the export trade.

The products which often undergo an intensive technological processing in the Indies could, in many cases, be processed even further so that there will undoubtedly be an expansion of the finishing industry. In general, this type of industry will remain limited to the standardization of products, unless further processing offers definite economic advantages. Besides the export of about 14,000 tons of tin, approximately 25,000 metric tons of tin ore are exported; in addition to 200,000 kilograms of quinine, approximately 7,000,000 kilograms of cinchona-bark are exported. In order

to save shipping space, complete processing of tin and quinine will undoubtedly take place locally in the future.

Furthermore, the future will probably see a further standardizing of rubber[1] through a suitable factory process of preparation. The growing demand for tapioca as paste and as starch has already made several additional processes necessary in that industry. It is difficult to say, however, in what direction these processing industries will develop. This will depend on the actual requirements of consuming countries for the product, and on their future requirements, brought about by further industrial developments in those countries. Insofar as it is possible to foresee this, there are no great potentialities here. More may be expected from the processing of various industrial by-products which are at present thrown away, and of raw materials which are now being exported without any refining. In the Indies, for instance, the bagasse from the sugar industry is still used as fuel, although this by-product is good raw material for the manufacture of wall-boards, paper and rayon. The residues and molasses from this industry are only used to a limited extent for alcohol, but for the most part exported—not less than 200,000 tons annually. This by-product would be good material for the manufacture of yeast and vitamins. In the rice mills, mountains of bran are burned; in the tea factories much ordinary leaf tea and tea dust are lost; in the fibre factories some of the material is considered worthless and is thrown away; in kapok cleaning a great quantity of kapok hearts remain unused, etc. The research organizations mentioned in Chapter III are all seeking practical means of processing such by-products to good advantage.

Nevertheless, the above offer only a limited field for industrial expansion; the raw materials which are exported in natural form or but slightly processed offer greater opportunities. The principal products in this category are: hides of which approximately 7,000 metric tons are exported annually, resins and gums 32,000 metric tons, tanbark, 18,000 metric tons, and bauxite, 300,000 metric tons. Plans have recently been completed for the manufacture of aluminum from bauxite. Making hides into leather, also for export, was growing steadily, and can undoubtedly be expanded still further. At the same time the extraction of tannin from barks will be considered; this production will become greater each year owing to intelligent refcrestation. A technological process was worked out for refining resins and gums, by which a standard product could be

1. For example, rubber technology may develop projects whereby latex, the liquid form of rubber, will play a greater role, and from this we can expect other processings in the Netherlands Indies.

offered on the market, and a pilot plant was being built. But, here again, all these processing industries will only make possible a limited industrial expansion.

It is possible that nickel production from the rather extensive nickel fields in Celebes may form a worthy trio with tin and aluminum production. But since the consuming territory is elsewhere, the further processing of nickel will probably take place elsewhere. While antimony, molybdenum, mercury, tantalum, columbium, titanite, bismuth, magnesite, dolomite and other ores also occur in the Indies, so far as is known, they are not found in rich deposits or in important quantities. Good clay, which has been sought for years for the pottery industry, has not been found.

The Indies do not possess good quality iron and coal necessary for developing heavy industry with accompanying machine industry and extensive shipbuilding. The iron ore found is poor so that refining is difficult. The available coal is soft and poor-burning. In this respect also the industrial possibilities of the Indies are limited.

Better, even great, possibilities exist in the clearing of forests and the manufacture of wood products. In the field of turpentine and resin distilling, and of wood pulp, paper and synthetic silk, the natural resources of the Indies offer many opportunities. The reasons why these opportunities have not been utilized heretofore are principally the excessive cost of transport and also the extremely varied types of wood in the forests. Through reforestation work over scores of years, however, new conditions have been created; transportation costs have also been lowered, so that in the near future industrial expansion in this field will be possible.

The fishing industry also offers a few, though very limited, industrial possibilities. The seas round and between the islands of the archipelago are in general not rich in fish, and the kinds which are caught do not justify any hope that a great canning industry, like the American or the Japanese, could be organized. (The fish production for 1940 was about 300,000 tons of fresh fish.) The fish-salting and other preserving factories for domestic consumption could be slightly enlarged.

Fruit canning also offers only a limited possibility of expansion in the provision industry. The fruits grown in the Indies are generally of a different quality, apt to deteriorate more rapidly than those grown in temperate zones, so that the canning business, at least for the present, offers but small chance for expansion. There is quite a large potentiality in the field of soft drinks, but this would be only for domestic consumption

and would not materialize until the purchasing power of the masses could permit it.

Cattle raising in the Indies does not offer a basis for important industrial expansion. The native cattle are principally draft animals, and unsuitable for dairy products. Pastures were unknown. Fertilizing the rice fields is done by irrigation, not by manure, and therefore it was not necessary to keep livestock as in European agricultural countries, like Holland and Denmark. With the importation of dairy cattle an attempt was made to meet the comparatively small demands for milk, butter and cheese. At first an endeavor was made to cross these animals with British Indian cattle, but the results were disappointing. Better results were obtained with Dutch and Australian cattle, principally in the mountains. It is clear, however, that with a total of about 130 heads of cattle per 1,000 inhabitants, nearly all for slaughtering or for draft purposes in agriculture—horses are not used in agriculture—and with less than four milch cows,[2] per 10,000 inhabitants, there is hardly a basis for industrial development. Since land given over to grain produces six to seven times as much food energy as the equivalent land used for dairy cows, the dense population of Java made cattle raising for dairy purposes practically impossible.

There are not many minerals. Oil production is about 3% of the world total; the coal yield, about 2,000,000 tons a year, will burn, but cannot be made into coke. Tin and bauxite are important, but only the latter ore can support an industry of consumer goods. For the time being, tin will have to remain an export article since the quality of the available iron ore and coal makes it impossible to set up blast furnaces with rolling mills which would be necessary for a tin plate industry. The primary wealth of the Indies lies in the extensive and good agricultural lands and in the 70,000,000 people whom we have learned to know as excellent workers. Because of these factors it was possible to secure enough food for them, and to develop an extensive production of agricultural raw materials, in consequence of which the Indies became important in world trade.

It is quite remarkable that agricultural export products are nearly all obtained from plants brought to the Indies, from other parts of the world. Rubber, coffee, tobacco, tapioca, quinine—these are immigrants from South America and Africa. The tea bush came from China and British India, and oil palm from Africa, etc. With perseverance and industry these cultures have been developed and improved. The earnings from

2. Two thirds of the milch cows come from Australia or from Holland.

these sources have yielded rich profits for the entrepreneurs,[3] but also as a consequence thereof it was possible to build excellent highways, an extensive system of railways and irrigation works, and to make education and health services available. And not only is capital formed by these activities to further expand the work of the entrepreneur, but also investments are being made by and for the Indonesian population. Here foundations were laid for a further and more rapid progress of prosperity.

In the meantime, the Indonesian people have grown mature for an intensive cooperation in the future building up of prosperity. One of the means of reaching this will undoubtedly be industrial production of consumer goods organized on a wide scale. This production will certainly not be for the local market only. The position of the Netherlands Indies, with its 70,000,000 workers and consumers, and therefore with the possibility of a large domestic market, certainly facilitates the finding of markets in British India, in Thailand, Indo-China, Malaya, etc. A number of articles were already being sold to those countries.

In many places this study has shown that agricultural production is the starting point for prosperity in the Indonesian community. For a future development, the great wealth of fertile land, including the still unexploited territories in the Outer Islands, the favorable climatic conditions, the situation of the archipelago on many sea lanes, and the fact that among the 70,000,000 consumers some 62% are agricultural workers, must continue to be the basis of any government desirous of stimulating prosperity.

The farmer's purchasing power must first be increased, otherwise the volume of consumption would remain too small. In Chapter II are described various measures of domestic policy which were applied and which began to show marked results in the years between 1935 and 1939. The total results of these measures were good in spite of the increasingly unfavorable rate of exchange during the last ten years between our raw materials and the imported commodities, which counteracted this development. The index figures in Table I show this clearly. Tables covering a longer period would demonstrate it even more clearly. In 1913 an Indonesian rubber planter could get a sewing machine in exchange for 40 pounds of rubber; in 1939 he had to give 240 pounds.[4] A tin of imported salmon could be obtained by the Indonesian farmer for two pounds of copra in

3. When we examine the sums paid out of the Indies from 1935 to 1939 we see that an average of 158,000,000 guilders in dividends and interest left the country, or about 4.5% of the capital invested by outsiders in the Indies.

4. In 1932 he had to pay 520 pounds of rubber for the same machine. At this low point, international cooperation somewhat improved this impossible situation.

1913, but in 1939 it cost him six pounds. In 1913 an Indonesian gum collector could obtain a bolt of imported cotton goods for seven pounds of gums, but the same goods cost him no less than 20 pounds of gums in 1939.

Should the rate of exchange become more and more unfavorable for lands producing raw materials, the only solution would be for them to attempt to be self-sufficient in the sphere of capital goods and commodities. That way, the increase in prosperity will inevitably advance ten times more slowly than when raw materials can be produced in abundance and exchanged for commodities at a fair rate with the industrial countries which need them. Naturally, these commodities must be other than the ones which the raw material countries will be able to manufacture themselves. Complicated products, and those difficult to make, such as motors, factory installations, automobiles, airplanes, sewing machines, radios, watches, etc., will be the ones which can be imported in ever-increasing quantities: it will then be possible for structural steel, cables, tinplate, bicycles, hinges and locks, many classes of household articles, etc. to enter these lands in a wide stream. Cotton, preserves, dairy products, dyes and paints, etc., can then be bought by the 70 million consumers of the Netherlands Indies.

The situation will mean a rapid growth of prosperity for raw material countries, and thus for the Indies. At the same time, if it is attained generally, it will stimulate world trade and might become the means of mitigating unemployment in the essentially industrial countries, and of maintaining or improving the standard of living in the latter.

In one of the publications of the Brookings Institution[5] the question is asked, with reference to the United States: "What would be the result upon consumer demand if, by some means, poverty could be completely eliminated, and if there were very moderate increases of income among the families in the middle classes?" A similar question can be asked with reference to the Netherlands Indies: How will the Netherlands Indies develop further economically?

The following table gives, very roughly, the Indonesian income and disbursements, as estimated from data at my disposal:

5. *America's Capacity to Consume*, 4th edition, p. 117.

Table XVII

INCOME AND DISBURSEMENT OF INCOME IN 1940

(in millions of guilders) (see note 3, page 54)

	Workers (in millions)	Income	Food	Home Furnishings	Clothing	Other Commodities	Balance
1. Agriculture, cattle raising, fisheries	14 (a)	1,800	990	220	84	163	349
2. Secondary production, mining	3.4 (a)	650	257	98	49	87	159
3. Others	4.6 (a)	900	315	142	73	120	250
	22	3,350	1,562	460	206	370	752

(a) Probably 8.4, 2.7 and 2.8 million families, respectively.

The extent of imports into the Indies and of the gross production value of the domestic commodity industry may be estimated as follows:

Table XVIII

(In Millions of Guilders)

	Food	Home Furnishings	Clothing	Other Commodities
Imported	80	40	130	30
Manufactured	250	390	80	350

In order to make possible the production and consumption as given in the tables, the sum of approximately 10 billion guilders, including commercial capital, had to be invested in the Indies.

From 1870 to 1900 incomes in the United States increased as follows:[6]

Table XIX

GROWTH OF NATIONAL INCOME IN U.S.A.

	Number of Workers in Millions		Income in Billions of Dollars	
	1870	1900	1870	1900
Agriculture	6.90	10.7	1.78	3.69
Manufacturing	2.72	7.6	1.75	5.71
Others	2.80	8.7	3.19	8.59
Totals	12.42	27.0	6.72	17.98

In these years we see a strong industrial development. The number employed in secondary industry grew much more rapidly than the number of farmers.

6. Taken and adapted from the figures in Clark's *The Condition of Economic Progress.*

Although this development will have a different course in the Netherlands Indies, particularly since natural circumstances there are not so favorable as they were in the U. S. A., an increase in consumption and production were it to take place in half the tempo of the economic growth of the U. S. A. between 1870 and 1900, would influence the figures given in Table XVII as follows:

Table XX

INCOME AND DISBURSEMENT OF INCOME IN MILLIONS OF GUILDERS

(Theoretical Situation, twenty years hence)

	Workers in Millions	Income	Food	Home Furnishings	Clothing	Other Commodities	Balance
Agriculture, etc.	17.8	2,770	1,400	360	160	330	520
Secondary industry	6.4	1,385	530	220	126	208	301
Others	9.4	1,660	630	263	152	250	365
Totals	33.6	5,815	2,560	843	438	788	1,186

In the above I arbitrarily pre-supposed that the following adjustments in disbursements of incomes would have taken place:

Table XXI

DISBURSEMENTS OF INCOME

(Percentages)

	Income		Food		Home Furnishings		Clothing		Other Commodities		Balance	
	1940	1960	1940	1960	1940	1960	1940	1960	1940	1960	1940	1960
Agriculture	100	100	55	50	12.2	13	4.7	5.8	9	12	19.1	18.8
Secondary industry	100	100	39.5	38	15	15.8	7.5	9.1	13.4	15	24.6	22
Others	100	100	35	38	15.8	15.8	9.1	9.1	13.4	15	26.7	22

In this very modest tempo of development, we obtain figures from which possible imports can be calculated. It may be figured that 750 to 1,000 million guilders' worth of articles could be imported per year, assuming that the Indies would limit itself exclusively to the manufacture of articles for domestic use. In addition, since the Indies would to a large extent have to import the capital necessary for the expansion of production and consumption, not less than an estimated 1,500 million guilders would have to be invested, of which between 700 and 1,000 million guilders would go for the importation of machinery.

Such an investment would certainly prove profitable if foreign countries would be willing to pay reasonable prices for Indonesian raw

materials and products. The internal situation would then become relatively prosperous, and much more could be done for public health, defense and education than formerly. Not 40%, but 100% of the youth would then be educated; hundreds of millions of guilders yearly would be available for defense.

This hypothetical setup of the future is by no means Utopian. Should anyone in the U. S. in 1870 have predicted the situation attained there in 1900, it would probably have sounded quite as fantastic. The Netherlands Indies have become ready during the last ten years for development in an even faster tempo than the one which I illustrated as a possibility. Every year during these years new agricultural centers were being opened in the Outer Islands; modern industry was developing much faster than I thought possible, thanks to directed economy and to the absence of commercial imperialism. With much trouble and difficulty, a life of its own, young and strong, has developed in the Indonesian world. In a short time this Indonesian life has taken over various functions, some of them in production. Already 50% of the rubber, 70% of the tapioca, 50% of the coffee, and many other export products are handled not by the European estates, but by the Indonesian farmer.

In secondary industry about 25% of the managing positions in the factories are already occupied by Indonesians. The overseer groups now consist of about 75% Indonesians. More and more the European immigrant is seeing his place taken by the intellectual Indonesian. Thus the basis is laid for many possibilities which did not formerly exist. The European will be spurred to greater effort, to greater science and to greater enterprise.

If he is incapable of greater effort, then his services as leader become superfluous. Developments have shown that he is fully aware of this obligation. Until as recently as 1930 no ships could be built in the Indies larger than 500 to 600 tons; in 1940 docks and ways were built for ships of 10,000 tons. In 1930 the largest piece of steel which could be cast in the Indies was of 1,500 kilograms; in 1940 pieces of 7,500 kilograms could be produced. In this whole development, the experience, science and organizing talents of the Western entrepreneur continually stimulated more difficult types of production. After a stabilization of technique has taken place, the Indonesian more and more rapidly takes over all or part of this production. In this manner, through this cooperation between East and West, the wealth of the Indies was acquired in the past. Thus Dutch entrepreneurs earned a place in Indonesian economic life.

In the future there will be the same white man's job to be done. It is, for

example, almost certain that natural rubber will be largely replaced by the synthetic product in industrial countries. A tin substitute is being sought, as well as a palm oil substitute for use in the tin plate industry.

The war has caused the cultivation in South and Central America of many Netherlands Indies plants producing raw materials. Through all these changes, many of the present exports from the Indies will disappear. This will undoubtedly be a heavy blow for prosperity, but the Dutch entrepreneur and the Indonesian population have dealt with similar situations before. The synthetic dyestuff industry killed the flourishing indigo production. Synthetic resins drove 70% of Indies' natural gums from the world markets. The increase in sugar production elsewhere made it necessary to stop 50% of Java's very efficient sugar industry.

All these blows have been sustained. At the same time the Dutch started rubber production, palm oil production and sisal production, which through cooperation with the Indonesian population, expanded to new and important sources of income. The dangers mentioned here can be overcome in some similar way; they will be overcome: the Indonesian people, cooperating with and stimulated by Western experience and science will undoubtedly rapidly regain their place in the world when the land shall again be free. Industrial development will play an important role in this.

In this study I have endeavored to give an idea of the industrial situation, as it has developed in the Netherlands Indies thus far. Before outlining the main points of the program for the extensive policy which should be followed, we must consider many attempts to industrialization made since the first part of this century.

About 1901, it was stressed in the Netherlands Parliament that prosperity in the Indies could only be increased if a secondary industry could be developed. This theory was accepted, and technical experts started their studies. Many of them submitted reports, which appeared to be widely divergent regarding the potentialities and the policy to be followed. However, there was one unanimous opinion, i.e. that small-scale industry in which the Indonesian could do good work, could offer no competition against the greater mechanized industry, where, in the opinion of many, the Indonesian worker would not be at his best.

These confused theories resulted, after many arguments back and forth, in Governor General Idenburg's appointing a commission in 1916 to establish factories, called the Commission for Factory Industry. In the opening speech this statesman declared that while there was no unanimity of opinion as regards the possibilities, it had been proved that Western organized factor-

ies could manufacture certain commodities more cheaply than they could be imported—therefore, let us see that these factories are established as soon as possible. This was more or less the order received by the Commission from the Governor General.

The Commission set to work—it analyzed the manufacture of existing import articles, made suggestions, of which a few proved practicable, and was finally dissolved by Governor General D. Fock.

A paper factory established with Government aid, besides a railroad carriage factory which was closed down within a short time, and many projects on paper, was the industrial result of the extensive work performed by the factory commission. Nevertheless, a basis was laid for future development.

Technical experts were brought in to study the projects; industrial consultants were appointed to make surveys and to give instruction. A pioneer enterprise in the textile line was set up but failed; however, the technical personnel which consequently became available formed the basis of the Textile Institute at Bandoeng, which later proved so useful. From a similar pioneer enterprise in the line of ceramics, the Ceramics Laboratory came into being. There were other such examples.

It is my personal conviction that in these years when there undoubtedly existed a strong and sincere desire to industrialize the Netherlands Indies in order to increase the prosperity of the Indonesians, comparatively little was achieved only because all attempts were based on transplanting Western organizing methods to an Indonesian society not prepared for them. Too little attention was paid to the basic social structure and the economic conditions in the Netherlands Indies. The setting up of factories such as the Commission had in mind, could only mean the establishment and management of production by Westerners. In that manner the native population could not really participate in further development.

Meanwhile, new views were born, which all emphasized the point that activity on the part of the population itself, even if on a small scale at first, should be considered as more important than the establishment locally of foreign enterprises. Means to this end were considered: expansion and more expansion of elementary education; increase of production and consequently of the purchasing power of the individual farmer; a rice policy; absorption of farmers into small-scale industry which could be operated by and for the Indonesian; development of such small-scale industry by lower freight and power rates, by extensive instruction and, where necessary, by support through financial grants and commercial policy.

Carrying through these general measures would, according to this view —which had also been adopted by the Government—develop the possibility of important migrations of workers from primary to small-scale secondary industry. This development would bring possibilities for Indonesian leadership; this, in turn, would encourage the spontaneous establishment of larger enterprises which, not being artificially created, would grow in a sound and strong manner, while balanced relations could be maintained between local production and local consumption, between export production and imports from other countries.

The Government has strived resolutely during the past ten years to realize the program briefly outlined above. The previous pages set forth as objectively as possible all that has been achieved. The results obtained demonstrate that the policy followed in these ten years has been efficacious.