

MODERN INDUSTRY IN THE NETHERLANDS EAST INDIES*

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THE evolution of simple existence to prosperity encounters the same problems everywhere. In modern countries the evolution goes from the stage of self-employment via compulsory labour to modern wage employment. Especially in the field of agriculture, where up to the present day self-employment is still in existence at some places, the stage of compulsory labour was in the beginning represented by outright slavery, while in industry in the beginning labour was compulsory and received only meagre wages.

In modern times social legislation, organized labour, modern banking and the gospel of thrift, fostered in the non-capitalistic classes, made it possible to take care of the future and also to give a fair share of the gains of production to the working classes. The first stage—that of self-employment—was a fairly static one; the second—that of compulsory labour—brought a larger increase of income but only to the entrepreneurs, whose wealth and power grew; the third stage—that of modern wage labour—inaugurated a period of prosperity for an ever-increasing part of the whole population.

In the Netherlands East Indies we find the same evolutionary trend; the stage of general self-employment, with only an irrelevant volume of exports, is succeeded by a period of compulsory labour. Under the influence of the entrepreneur class, a large volume of agricultural and mining products was produced and surplus capital was formed in the same manner as this class fulfilled its mission in industry in Western civilization. The labourers received low wages because the greater part of the production was performed as part-time work by the Indonesian farmer, whose bare existence had been protected from the beginning by agricultural laws.

The development followed the same natural course of events as everywhere in the world. The entrepreneurs made a large amount of money and for the greater part this capital was reinvested in new enterprises, paving the way for new possibilities for the future of the people.

The difference from the development in other countries is that the reinvested capital remained mainly in the hands of the Dutch, the British and, later, the Americans. Dividends and interest payments did not affect the purchasing power of the native population but that of absentee investors. This kind of commercial imperialism has certainly been very advantageous for the entrepreneurs. More and more capital went to tropical regions to be invested in the production of raw material. A keen price competition between the raw material countries caused an interruption in the rise of workers' wages, while the power of the entrepreneur class was seriously threatened.

The extent to which the prices were reduced in the Netherlands East Indies during this crisis can be demonstrated by mentioning that an Indonesian rubber grower could get a sewing machine for 40 lb. of rubber in 1913, as against 240 lb. in 1939; a copra-growing farmer could buy a can of salmon for 2 lb.

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of copra in 1913, while in 1939 he had to pay with 6 lb. of his product; an Indonesian gum-producer could have a piece of cotton goods for 7 lb. of gum in the former year, whereas he had to produce as much as 20 lb. to obtain the same commodity in 1939.

This very disadvantageous rate of exchange caused a difficult situation internally for the Indonesian workers and farmers and loss of capital and energy to the entrepreneurs. It provided for the Indonesian people and its government, however, the opportunity to show how with united forces such difficulties could be overcome. The Indonesian intellectuals, educated in schools of higher learning, took their fate in their own hands with the help of a progressive group of economists. By degrees they were able to influence the Government, which gradually shifted from a guiding and conciliatory position to a form of almost completely directed economy, with the greatest amount of prosperity for the native population as guiding principle. First of all, the formation of capital, thus far mainly for the good of the absentee capitalist, was fostered in the local Indonesian community. As to commercial capital, here the Indonesian stake had already grown to more than nine hundred million guilders and was increasing rapidly.

The production of the commodity industry, organized by Western methods, tripled in this last decade, while nearly a hundred million guilders of invested capital were in Indonesian hands. Wages in industry rose rapidly. In 1940, the average income of factory workers in industries amounted to about 350 guilders a year. A guilder was equivalent to two American dollars.

The above statistical data on development were reached at a time when buyers of the Netherlands East Indies raw materials drew the main profit out of the total production, and entrepreneurs in the Netherlands East Indies lost a large amount of capital. This may seem paradoxical but it is actually very reasonable, and it is of paramount importance for future developments to understand this economic phenomenon. For example, gradually only 568,000 hectares of the total rubber-cultivating area was in the hands of Dutch and foreign investors, while 1,300,000 hectares were owned by the Indonesians. Of the coffee estates, 107,000 hectares were financed by Dutch and foreign capitalists while 123,000 hectares were brought into production by native capital.

Of a total of about 4½ millions of hectares of land producing raw material, not less than about three millions had come into Indonesian hands. This shift of production from European to Indonesian producers caused an ever-increasing income for the Indonesian people. Moreover, and this is of great importance for the future development of the secondary industry, the overhead costs of European management were much higher than those of Indonesian organizations. Thus, the Indonesian was able to save money and procure new purchasing power for further industrialization.

This happy evolution is, however, pregnant with one great danger. The initiative and the necessary research for nearly all productions now in the hands of Indonesian enterprise has been carried out by European entrepreneurs. I am convinced that the disappearance of this class, so badly needed in economically not fully developed countries, would mean a catastrophic interruption of economic progress. Research could partly be taken over by government-sponsored

institutions, but the divulging of realistic knowledge of national and international economic conditions is more difficult for the Government institutions; and I believe that the taking of initiative and risks lies within the scope of a government in a country like the Netherlands East Indies and should be shared by government and private capital together. It is rather the task of the Government to watch the situation closely and to plan measures through which the power to produce and to consume may be increased.

Four facts have been stressed here. First, that the formation of capital in the Netherlands East Indies formerly mainly increased prosperity abroad and not that of the native society. Secondly, that the formation of capital and the growth of buying power of the Indonesians were reached by the transition of more lucrative agricultural production to native enterprise; thirdly, that overhead expenses are much higher for Western than for Indonesian organization. Lastly, that technical knowledge, skill and experience until now have mainly been imported. This means that for future industrial development, it will be necessary that more and more technologically stabilized production of raw materials is carried out by Indonesians to promote the further formation of Indonesian capital and income; that development also should be promoted in secondary industry in order to lower cost prices and to extend consumption; that the white man's job in the future should not be one in competition on the same level of efficiency with the Indonesian producers, but to introduce new and more complicated forms of organization and technology.

In this decade of evolution in the Netherlands East Indies these new principles have been promoted as well as was possible despite the very disadvantageous rate of exchange between the Netherlands East Indies raw materials and imported consumer and capital goods. The income of the native farmer grew, thanks to his increasing share in the production of export materials. The total population increased 19 per cent during 1928-40. In the same period the total export of raw materials in guilders in 1928 decreased three per cent, but the Indonesian part of it increased sixteen per cent. This new income from agriculture was widely spread and therefore of benefit to all classes.

Thus a large demand for commodities was stimulated. In this same period, the number of mechanized factories was doubled, the number of workers in these was tripled and the output quadrupled, according to statistical data. They show the fact—so important to future evolution—that some time between 1928 and 1940 Indonesian society matured and began to build its own future.

In these years we recognize a continuous growth of small-scale industry—industry with factories of less than fifty workers and with little or no machinery, growing in output as well as in organization.

In this industry—not to be confused with home industry—nearly 1,400,000 men were working in 1930, while in 1940 this total had been increased to 2,600,000. Formerly, this type of production was merely in a stage of self-employment, mainly producing goods for consumption in the home village. In the second half of the last century, a certain degree of insular trade developed, Chinese and Javanese middlemen—the so-called *bakoel*—received most of the profit. These middlemen were as capitalistic as the Western entrepreneurs of the late nineteenth century. Similar to these, they sweated the labourer in order to fill their own pockets and to

extend their production. At the same time, they were indispensable to the industry; they were bankers, suppliers of raw material and distributors, while in some instances some of the more difficult technical phases in the production were carried out under their direct supervision. Their position generally was very strong indeed. In the small-scale textile industry in middle Java, it was found in 1935 that seven key positions were still occupied by these middlemen.

In the last decade, however, this situation was rapidly changing. Small-scale workers, enlightened by vocational schooling, Press and governmental field services, are gradually organizing themselves on a co-operative basis. This is being done in several different forms according to the special needs of each type of industry, but the general characteristic is that the knowledge, ability and other services formerly embodied in the middlemen are being taken over by some kind of centralizing agency, which manages in general a mechanized finishing factory, governed by a board. The board in turn is chosen by the workers.

This agency, owned and directed by the small-scale workers themselves, supervises a fair division of profits, the reservation of a sufficient amount of money for later expansion and for vocational training of new workers. It is a kind of 'new deal' organization, which has sprung up spontaneously in the Javanese society. The Government, and more specifically the Bureau of Industry, has promoted this movement for these last seven years, under my direction, in every possible way.

Apart from this small-scale industry, there was, during this time, a continuous development of the mechanized industry. In 1940 alone, more than five hundred new factories were established. The secondary industry quickly expanded. Practically the entire field of consumers' goods, from crockery to shoes and clothing, from vegetable fats to chocolates, from soap to rubber, were influenced by this innovation. Formerly the mechanized industry had always depended on the long established agriculture and mining industries, but since 1935 an independent commodity industry began to arise.

The Government thus had to meet the demand for leaders, skilled labourers and technical instruction. First of all, consultation offices were established in the main centres. These offices had at their disposal a large staff of technical and economic instructors and also a staff of travelling vocational teachers, backed by well-equipped central research stations and laboratories. In 1940, 332 industrial schools, with Indonesian languages as their medium, and 379 with Dutch as their language, 26 technical commercial schools with Indonesian languages and 4 with Dutch, were in existence. In addition to the textile research institutions, the ceramic research works and the leather laboratory, there were also vocational schools for specialized engineers to help in large factories, or to establish themselves as leaders of smaller units. Small and very simple schools were established all over Java to educate skilled labourers for the textile, pottery, tanning and other industries. Travelling vocational teachers were also of inestimable value to the small-scale workers. Practically all these instructors, all these travelling and vocational school teachers, were Indonesians. Care also has been taken, however, to establish colleges for the education of factory leaders. In the beginning the University at Bandoeng only turned out civil engineers, but the faculty soon had to be enlarged in order to produce

mechanical, technological and electrical engineers. The majority of the students were Indonesians. But a young industry is not the right place to gain general experience. Scholarships, therefore, were extended to young Indonesian graduates of the University, which would enable them to gain experience abroad. In this way, the Government hoped to create Indonesian industrialists.

Large factories also came into existence. Persons well trained for research and with wide experience are rare in the Netherlands East Indies. To meet these difficulties all these large factories are formed as affiliated enterprises of well-established factories abroad. In this way, they can profit by the research work and experience of the mother industry, and every development abroad is available with a minimum of cost.

The future of the Netherlands East Indies industry lies in the production of consumer goods, as the iron ores found in the Netherlands East Indies are poor and the coal is very soft. Because of this, heavy industry, based on iron, is practically impossible. Though we produce a large quantity of tin, this metal will continue, therefore, to remain an export product. The case is different regarding bauxite. Large masses of rich ores are available, and in the vicinity of the mines huge water-power plants can be installed. The construction of an aluminium factory had already started when the Japanese invaded Sumatra. Other metal ores found in the Netherlands East Indies, perhaps with the exception of nickel, are all poor in quality or in quantity.

On the other hand, raw materials such as rubber, sisal, wood and fibres for paper and rayon, vegetable oils, salt, tannery barks, can be had in any quantity. (Salt and sulphur as bases for chemical industries are available. Cow-hides, fish and fruits can serve as the foundation for further industry.) Water-power, coal and natural gas are readily available, and the Javanese is a good labourer, as long as he does not have to handle too much weight. As a spinner and weaver, for example, he is an excellent worker, but in the rolling mill he would lack the desired qualities.

OBITUARIES

Mr. Robert W. Paul

THE announcement of the death on March 28 of Mr. Robert W. Paul will recall to many the great part he played in the manufacture of electrical measuring instruments and the development of the cinematograph.

R. W. Paul was born at Highbury, London, in 1869 and was educated at the City of London School and at the City and Guilds Technical College, Finsbury. He worked in the electrical instrument shop of Messrs. Elliott Brothers and obtained there a practical knowledge of instrument making which was invaluable to him. In 1891 he started business for himself as an instrument maker in Hatton Garden, working long hours and using his inventive powers in perfecting the small, but important, parts of electrical instruments. He was fortunate in being able to work under the inspiration of such pioneers of electrical measurement work as Perry, Ayerton and Mather. It was on the manufacture of instruments

developed with these pioneers that Paul built up a successful business.

In 1903 Paul invented a moving-coil galvanometer in which the coil is supported on a single pivot resting on a jewel, placed in the centre of a steel ball which is fixed between the poles of a permanent magnet. He gave the instrument the eminently suitable name of 'Unipivot' and it met with an immediate success. The first model gave a full deflexion for about 60 micro-amperes (coil resistance 50 ohms), a sensitivity far beyond that of any pivoted galvanometer then in existence. The 'Unipivot' maintained this proud pre-eminence for many years. Realizing the small amount of energy required to actuate it, he developed a series of resistances, shunts, etc., which made it an invaluable instrument for laboratory and test-room work. He fitted an efficient locking device which held the coil with its pivot away from the jewel, thus rendering it safe for transit. He was fond of demonstrating the robustness of the instrument and the efficiency of the clamping device by throwing it in its leather case downstairs, or even using it as a football.

In 1900 Paul transferred his works to Muswell Hill and it was there that the majority of his instruments were made.

About 1907 he commenced to make instruments designed by Albert Campbell for alternating current work, a collaboration that was most fruitful in producing instruments which have stood the test of time in a remarkable manner.

Paul's fame as an inventor will probably rest on the cinematograph rather than on his instruments. He was the first maker in Great Britain of a projector for showing pictures continuously, and his mechanism for feeding forward the film intermittently, generally referred to as the 'Maltese cross', is still universally used. The story is well known of the excitement caused in Hatton Garden when the first picture was shown in his workshop. The first semi-public display was given at the Finsbury Technical College in February 1896. He went to immense trouble to make and take pictures. In June 1896, he photographed "Persimmon" winning the Derby and projected it himself the same evening at the Alhambra. The excitement of the audience was intense, and it is said that Paul was called before the curtain six times. He fully realized the possibilities of the cinematograph for scientific work. In conjunction with Prof. Silvanus Thompson and a group of students, a series of diagrams were drawn showing changes in some phenomenon, for example, in the field between two magnets as they approached each other. These various diagrams, or pictures, were photographed separately and then projected continuously in the accepted manner of a Walt Disney film. About 1912 he disposed of his cinematograph rights and no longer interested himself in the industry.

In 1920 his business was amalgamated with the Cambridge Scientific Instrument Company, the combined firms now being known as the Cambridge Instrument Company Limited.

During recent years he developed, with Sir William Bragg, the Bragg-Paul pulsator, an apparatus for assisting breathing in cases of respiratory paralysis. He had the satisfaction of knowing that this apparatus had been instrumental in saving the lives of several children.

The scientific instrument making industry owes much to Paul's efforts to improve the technical education given to its workers. He advocated, and indeed put into practice in his own works, the holding of