STUDIES IN THE
ARTIFICIAL CONTROL OF
RAW MATERIAL SUPPLIES

by
J. W. F. ROWE

No. 2. RUBBER

March, 1931
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THE RUBBER INDUSTRY

I.—THE HISTORICAL BACKGROUND.

The world's rubber industry of to-day was born with the present century, but it can hardly be said to have left the cradle before 1900. Commercial planting of rubber in the Middle East began about 1858, and in 1905 a quantity of some 150 tons of rubber was produced. The world's rubber supply, obtained by the collection of the wild product in the Amazon valley and in Africa, amounted to about 55,000 tons in 1901, and reached a peak of 83,000 tons in 1910, by which time the plantation production was 11,000 tons. In 1906 plantation crépe sold for 6s. per lb., and planting started in earnest, not only under the stimulus of such a price and the rapidly increasing production of motor vehicles, but aided also by the facts that the coffee industry in Ceylon had been virtually annihilated by disease, while in general the older plantation industries were in a state of temporary overproduction with its accompaniment of reduced profits. Between 1906 and 1910 it is estimated that nearly 1 million acres were planted with rubber, but none of this acreage was, of course, in bearing at the time of the great rubber boom when the price touched 12s. 9d., and averaged 9s. 6d. for the whole of 1910. The profits at these prices were reaped by the wild rubber collectors, and by the very few early plantations with their output of 11,000 tons; also, of course, by speculators, though many of them lost heavily in the end. But capital was poured into the plantation industry to an extent which at the time seemed perfectly preposterous and extremely dangerous to all concerned, though subsequent history makes it doubtful whether such fears and condemnations were really justified. At first sight it may appear curious that the early development of the rubber plantation industry should have been so exclusively a British affair. The United States was already, in 1910, consuming one-half of the world's production, and it might be imagined that the American tyre manufacturers, if not the investing public, would have taken a hand in providing for their own requirements. But tyre manufacture in the U.S.A. was still a relatively small-scale industry, and all available financial resources were required by individual firms for the expansion of their manufacturing plant. Equally the United States as a whole had little or no surplus for foreign investment, while Americans disliked the idea of waiting six or seven years for any return, and had no experience of tropical plantation industries such as tea, coffee, sugar, etc., had already given to British capital. The only proved areas suitable for rubber planting were under the British flag, and, with ample funds to invest, London was obviously designed as the centre directing the development of the new industry. Germany might have played a much bigger part than she did, but early experiments in planting rubber-producing trees and vines, which were native to the German colonies in Africa, did not prove a success. This left British capital with a more or less clear field at the start.

The year 1910 was a turning-point in many respects. The rising price-level of the previous ten years was replaced by a downward trend which has virtually continued until the present day—with the exception of the artificial boom of the restriction period—despite an increase of consumption to approximately eight times that of 1910. The wild rubber industry began a decline which can only end ultimately at zero—a fate which prices fortunately cannot share, though they are at the moment not far behind in the race! But rubber planting was not confined to European capital: the interest of the Chinese and Malays, both in British Malaya...
and in the adjacent islands of the Dutch
archipelago, was also aroused. The European
industry was not much more than five years
ahead of the native, and until certain recent
potential developments came into sight, the
native industry was catching up its late start in
such a fashion as suggested the possibility that
the European industry would in due course be
forced to retire from the field.

After the collapse of prices to a free-shilling
level in 1911 and 1912, with a rapid subsequent
decline to half a crown in 1914, the influx of
European capital largely ceased. Planting
programmes were vigorously pursued in Malaya,
Ceylon and Java, and by 1914 the area under
rubber is now estimated to have been 25
million acres, or nearly double that in 1910.
By 1914 the effect of the considerable planting
before the boom is shown by an increase of
plantation exports to 75,000 tons as compared
with 21,000 in 1910. By 1910 all the capital
supplied in 1910 was, however, put to work by
1914. But for the British Treasury's war-time
prohibition of the export of capital, it is possible
that the planted area would have continued to
increase faster than it actually did. On the
other hand, the price of rubber had fallen
below 25. per lb., and there were many who
feared that the expansion had been already
overdone.* The actual increase, however, would
certainly have been smaller but for Chinese
and native planting, mainly of small-holdings.
Native planting also began in Sumatra and
other islands of the Netherlands East Indies,
and since this latter at any rate was largely
unknown at the time, probably more than a
million acres were added during the Great War.
Prices fluctuated during these years between
two and three shillings, but in 1917 and 1918
the shortage of shipping may be said to have
neutralised the fall which would otherwise have
accompanied the large additions to production
from estates planted in 1910-11, and now
coming into full bearing. As it was, stocks
accumulated in the East despite the operation
of voluntary restriction to the tune of 80 per
cent. of the 1917 output, and the Singapore
price fluctuated under 15s. i.e. less than half the
London price-level quoted above. With the
Armistice, sufficient shipping was released to
make possible a total world net export of
988,000 tons in 1919 as compared with 221,000
tons in 1918; prices fluctuated somewhat
violently, but the world was eager to replenish
its stocks, and the average for the year was
24s. 14d.

The voluntary restriction of rubber
production in 1918 was one of several similar
restrictions necessitated primarily by the short-
age of shipping relatively to the distance
between producers of staple raw materials and
the chief countries of consumption. It has
little permanent interest, apart from a govern-
ment commission, the Rubber Protection Com-
mmission, which was appointed in Malaya, under
the presidency of Sir George Maxwell, to con-
sider the difficulties of the 1918 situation. This
commission drafted a scheme of compulsory
output restriction for Malaya and the N.E.I.,
and efforts were made to secure the co-opera-
tion of the Dutch. But the Armistice was
signed before these negotiations had reached
a serious stage, and therefore nothing came of
the scheme at the time. It was this scheme,
however, which was to be the "runner-up"
before the Stevenson Committee three years
later.

Production, as measured by net exports,
was therefore abnormally low in 1918, and
abnormally high in 1919 owing to the shipment
of stocks carried over from the previous year.
If the 1917 exports may be regarded as normal,
the production of plantation rubber increased
by at least 100,000 tons between 1917 and 1920.
The collapse of the post-war boom in America
brought a crashing fall in prices in the summer
of 1920 from the near neighbourhood of 35. to
as low as 10s. At that time few estates could
cover even their direct costs at such a price-
level, and the Rubber Growers' Association
promptly called upon its members to restrict
their output by 25 per cent. for one year from
November 1. This restriction was well sup-
ported by the members of the Association, and
also by many Dutch and other foreign pro-
ducers. But its effects on prices were less than
was anticipated for two reasons, first because
manufacturers, and especially American manu-
facturers, were heavily stocked with rubber and
rubber goods, and in addition had heavy for-
ward commitments,6 so that they virtually
canceled to buy at all, and secondly because the
native plantings of 1914-16 were now coming
forward purchases made in 1920. Statistics of
stocks at this date are somewhat incomplete.

*These bars found expression also in the formation of
Rubber Manufacturers, Ltd., at the end of 1913, to investigate this
and other means of increasing consumption.
but the Stevenson Committee estimated a world total of 310,000 tons on January 1, 1922, of which only 90,000 tons was in producing countries. World production in 1921 was reduced by 50,000 tons as compared with 1920, and the outlook towards the end of that year was becoming in general a little brighter, so that prices rose somewhat sharply to above 3s. This coincided with the voting on the renewal of the R.G.A.'s restriction scheme. Whether any influence was brought to bear on the market at this juncture by design, or whether it was a purely spontaneous movement, cannot possibly be decided, but the effect was that the R.G.A. failed to secure the support of its members to the necessary extent of 70 per cent. Many were dissatisfied with the partial character of the scheme, while some were optimistic as to an early revival in the American demand. These and other factors doubtless operated in the minds of members, but it would certainly seem possible, and even probable, that if there had been no such rise in price, their verdict would have been different. In that event the whole history of the last ten years might also have been entirely different, for if voluntary restriction had been maintained for another year, any further restriction would probably have been avoided. As it was, the breakdown of voluntary restriction appears to have been a decisive factor in the mind of the Colonial Secretary, who had already received most urgent representations from Malaya and Ceylon. On October 24 he appointed the now famous Stevenson Committee, by way of a six months' belated reply to the R.G.A.'s request for compulsory restriction, which had been made early in the year.
II.—AN OUTLINE OF EVENTS DURING THE PERIOD OF RESTRICTION.*

The Stevenson Committee was appointed on October 24, 1921, and its first report is dated May 19, 1922, though it was not published until June. The report states, however, that the chairman reported the position to the Colonial Secretary, at that time Mr. Winston Churchill, towards the end of November 1921, and obtained his authority to approach the Netherlands Government with a view to ascertaining whether they would be prepared to co-operate in the adoption of one or other of the two schemes ultimately set out in their report. It is a reasonable inference, therefore, that the length of the Committee’s deliberations was primarily due to attempts to obtain at least informal assurances of co-operation from the Dutch Government, though the failure of these attempts may have necessitated prolonged discussion by the Committee itself as to whether they should report in favour of restriction in the British Colonies irrespective of such co-operation. In any case, the final decision of the Committee was that they could not carry their inquiry further "until the attitude of the Dutch is definitely known," and they therefore recommended that the Colonial Secretary should "cause further representations to be made to the Dutch Government on the subject with a view to holding an international conference in London of the principal interests concerned."

Proposals with regard to co-operative legislation to limit the output of rubber were accordingly made by the British Government to the Netherlands Government. Early in July the Dutch Rubber Growers’ Association at the Hague requested their Government to appoint a committee for the same purpose as the Stevenson Committee. But in August the Dutch Minister of the Colonies refused to appoint such a committee, and Great Britain was informed that the Netherlands Government had decided not to take at present any legislative measures to restrict the output of rubber in the Netherlands East Indies. The Stevenson Committee then resumed its deliberations. In September the R.G.A. appealed to the Colonial Office to proceed with a restriction scheme regardless of the Dutch Government’s refusal to co-operate, and announced its intentions to try and secure the voluntary co-operation of the British-controlled plantations in the Dutch colonies. On October 2 the second report of the Stevenson Committee was published, together with an official intimation that the Colonial Secretary was in favour of its proposals for restriction in Malaya and Ceylon.

According to the first report of the Stevenson Committee, the salient facts of the situation were as follows:

<table>
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<tr>
<th>Year</th>
<th>World Production</th>
<th>World Consumption</th>
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<tr>
<td></td>
<td>(in 000 tons)</td>
<td>(in 000 tons)</td>
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<tr>
<td>1921</td>
<td>73</td>
<td>52</td>
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<tr>
<td>1922</td>
<td>71</td>
<td>54</td>
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The Committee estimated "necessary stocks" at the equivalent of eight months’ consumption, i.e. at 200,000 tons, and therefore considered that surplus stocks amounted to 110,000 tons.

For convenience, it may be added that the price-level was around 10d. at the beginning of January 1922, but then rapidly fell away, and was fluctuating between 7d. and 8d. until the end of September with a general tendency to decline.

The Committee concluded that these figures suggested the need for a 25 per cent. restriction of output in order to reduce production to the level of probable consumption, but that in their opinion the depression in the industry could not be sufficiently rapidly relieved unless a substantial import were made into the existing surplus stocks during 1922, and that a more drastic restriction was imperative to ensure this.

The relative importance of different producing countries was estimated as follows:

- Malaya: 57.5%
- Ceylon: 12.5%
- South India and Burma: 20%
- Netherlands East Indies: 25.5%
- Other countries: 2.5%

Percentage of World Production

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* This section contains only a record of facts and events, and all discussion and critical examination thereof is relegated to the next section; readers who are familiar with the facts may therefore pass on to Section III. For tabulated statistics see Appendix.

In consequence, the Committee put forward a scheme based on the combat of rubber, and the shortening of the period of restriction, that it was not prepared to co-operate with the Dutch Government with a view to ascertaining whether they would be prepared to co-operate on the basis of the Committee’s report, and in particular, that they have the fullest confidence that the fact that no scheme, however well it might be designed, could properly be proceeded with for adoption unless it contained the recommendations of all the Governments during the period of restriction.

The Committee put forward a scheme based on the combat of rubber, and the shortening of the period of restriction. The first was the scheme of the Oxford Commission of 1918, which was based on the fundamental principle that the output should be adjusted to the rate of actual output. The second was Stevenson’s own proposal for the exportation of standard production (the production of the specified period) to the extent of 90,000 tons per annum, which would be automatically reduced as output exceeded or failed to equal actual production. The Committee concluded that these figures suggested the need for a 25 per cent. restriction of output in order to reduce production to the level of probable consumption, but that in their opinion the depression in the industry could not be sufficiently rapidly relieved unless a substantial import were made into the existing surplus stocks during 1922, and that a more drastic restriction was imperative to ensure this.

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In consequence, the Committee "desire to put on record that at the outset of their inquiry they formed, and have never departed from, the conviction that it was impossible to deal with the problem as one affecting only the British Colonies and Dependencies in which rubber is produced. ... This conviction formed the basis of the Committee’s deliberations, and, in particular, they have throughout kept in view the fact that no scheme, however excellent in itself, could properly be recommended to you for adoption unless it commended itself to the authorities of the Dutch East Indies. ...

The Committee put forward two schemes. The first was the scheme of the F.M.S. Protection Commission of 1928, elaborated by the Duncan Committee of 1920-21, and of which the fundamental principle was a restriction of actual output. The second scheme was Lord Stevenson’s own proposal for a restriction of exports by the imposition of a graduated scale of export duties, varying with the percentage of standard production (i.e. output during a specified previous period), which percentage would be automatically regulated according to the price of rubber. The Committee regarded this second scheme “as the preferable of the two and easily workable,” but no reasons for the choice are given in the report except a hint in the previous paragraph that the first would bring in no additional revenue to the State, whereas the second would, “and should not prove difficult to administer.”

In their second report the Committee, faced with the refusal of co-operation by the Dutch, reversed their previous conclusion that such co-operation was essential, on the following grounds:

1. Excessive and increasing production of rubber, owing to the failure of the producers to make voluntary restriction effective, with the consequent continuation of the depression in the price of rubber.


3. The assurances obtained by the R.G.A. from British estates in other territories of their co-operation by voluntary restriction on the lines of any restriction imposed within the British Empire.

They therefore proposed the adoption of Scheme II as set out in their first report, with certain modifications and additions, basing their recommendations on an absorption of 300,000 tons “notwithstanding the fact that the rate of the world’s absorption of rubber for the present year shows a substantial increase” on this their previous estimate, because they wished to “err on the safe side.”

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1. The percentage exportable at the minimum rate of duty [1d.], to start at 60 per cent. of standard production, which was in the case of mature areas to be the production in the year ending October 31, 1920.

2. For the purpose of the scheme four restriction quarters of 3 months each were established, beginning November 1.

3. If during the second or any subsequent restriction quarter the price averages less than 1s. per lb., the percentage exportable at the minimum rate of duty shall be reduced to 55, and by a further five points every succeeding quarter unless and until the average price of the preceding quarter shall reach 1s. 3d. The percentage could not fall below 60 in the first instance unless the price averaged less than 1s.

4. If and when in any restriction quarter the price averaged 1s. 3d. but less than 1s. 6d., the percentage exportable at the minimum rate of duty shall be increased by 5 points for the ensuing quarter, but if in any quarter the average price exceeds 1s. 6d., by 10 points for the ensuing quarter.

5. Once the percentage has been lowered, it

* i.e. 2 cents Straits currency.
cannot be increased except on a basic price of 1s. 3d.

6. Any producer, to be able to export more than his quota on payment of higher export duties, beginning with 4d. for the first 5 per cent above his quarterly export quota.

The scheme does not lend itself to compact tabular summary, but, in short, the objective was to raise the price to 1s. 3d. by more and more drastic restriction if that was required, and then to allow a gradual resumption of full production so long as that price was maintained; if it was not maintained, restriction would be steadily increased until that level was restored, while, if the price rose above 1s. 6d., a more rapid rate of release was allowed.

Rules were issued to provide for assessments of standard production under unusual circumstances, and a standard scale of output was fixed for immature rubber. An advisory committee was appointed in London to co-ordinate the operation of the scheme in the different colonies, and to advise the Colonial Secretary as to the alterations in the rate of restriction to the tune of 40 per cent. on nearly two-thirds of the supply did no more than prevent any increase in world supplies. But it must be remembered that large new areas were coming into being in all producing countries. Thus, although in 1920 Malaya had actually shipped only 151,000 tons, the standard production for the first restriction year was fixed at 274,200 tons.† This made the permissible shipments approximately 166,000 tons as compared with exports of 214,000 tons in 1922, but actually Malaya in 1923 exported 261,000 tons owing partly to the shipment of 20,000 tons of the stocks on hand when restriction was imposed, and partly to evasion of the restriction regulations. In Ceylon there was a much greater increase in production than in Malaya, but even the combined total was more than outweighed by the increased exports from other producing countries, headed by the N.E.I., with 23,000 tons more than in 1922. Thus although actual production in Malaya and Ceylon was considerably smaller than in 1922, the effect was completely neutralised, partly by the shipment of stocks on hand in those countries and partly by the increased production of other countries, and it was the increase in demand, and not a decrease in supply, which brought about the reduction of stocks.

The results of the first year's working of the scheme, however, seemed such as to justify its adoption. But the dates of 1922 production as measured by net exports had totalled nearly 400,000 tons, due to a certain amount of voluntary restriction, and had therefore very nearly equaled actual absorption; there had been a slight increase of some 150,000 tons in Malaya, but no such general increase as the Stevenson Committee had expected in their first report. During 1923 restriction in Malaya and Ceylon prevented any increase in world supplies, and as consumption continued to increase, visible stocks were reduced by 30-40,000 tons during the year.

At first sight it may seem somewhat extraordinary that restriction to the tune of 40 per cent. on nearly two-thirds of the supply did no more than prevent any increase in world supplies. But it must be remembered that large new areas were coming into being in all producing countries. Thus, although in 1920 Malaya had actually shipped only 151,000 tons, the standard production for the first restriction year was fixed at 274,200 tons.† This made the permissible shipments approximately 166,000 tons as compared with exports of 214,000 tons in 1922, but actually Malaya in 1923 exported 261,000 tons owing partly to the shipment of 20,000 tons of the stocks on hand when restriction was imposed, and partly to evasion of the restriction regulations. In Ceylon there was a much greater increase in production than in Malaya, but even the combined total was more than outweighed by the increased exports from other producing countries, headed by the N.E.I., with 23,000 tons more than in 1922. Thus although actual production in Malaya and Ceylon was considerably smaller than in 1922, the effect was completely neutralised, partly by the shipment of stocks on hand in those countries and partly by the increased production of other countries, and it was the increase in demand, and not a decrease in supply, which brought about the reduction of stocks.

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The results of the first year's working of the scheme, however, seemed such as to justify its adoption, and to offer good prospects of a rapid return to normality. Vigorous protests had been raised by the rubber manufacturers of Great Britain in October-November 1922, but the appointment of Lt.-Col. J. Seely-
The Second Restriction Year.

During the second restriction year (November 2, 1923–August 1, 1924) the percentage exportable at the minimum rate of duty remained at 60 until the fourth quarter, when it was reduced to 55. The average quarterly prices were approximately 8s. 6d., 10s. 6d., 11s. 6d., and 12s. 6d. respectively. Thus, although there was a sharp recovery when restrictions were tightened as the result of the failure of the rubber to reach its minimum rate in the third quarter, the average failed to reach 11s. 6d. in the fourth quarter, and therefore the year ended with the prospect of a further reduction to 50 per cent.

World net exports in 1924 totalled 428,700 tons, or approximately 23,000 tons more than in 1923. The standard production of Ceylon was slightly greater owing to the growing maturity of new plantations, and the net exports were approximately the same as in 1923, the increased permissible exports being balanced by the absence of the small shipment of stocks which had taken place the year before. Against this total decline of 20,000 tons from the restriction area, the N.E.I. exported 32,000 tons more than in 1923. Out of a total of 139,000 tons, approximately 22,000 tons came from British estates which were voluntarily following the restriction scheme, and their output was not appreciably greater. The output of the Dutch and other estates amounted to 69,000 tons, an increase of 10,000 tons on 1923. The balance of 55,000 tons was native rubber at its estimated dry weight, and this was 20,000 tons more than in the previous year; to some extent the increase was due to rubber smuggled from Malaya to Sumatra and other Dutch islands, but in the main it was definitely an increase of Dutch native production. Every other producing country increased its exports, and hence, as has been said, the world's net exports were 20,000 tons greater. On the other hand, world absorption increased by 35,000 tons, and exceeded net exports by more than 40,000 tons in the year. The statistics of visible stocks show an even greater decline, amounting to 60,000 tons, or including an allowance for invisible stocks, to a further reduction of 50 per cent.

The Stevenson Committee estimated necessary stocks at the equivalent of eight months' consumption, including invisible as well as visible stocks. As stated above, crude rubber in the manufacturers' hands is included in the statistics of visible stocks in the U.S.A., but in no other case. The recorded visible stocks on January 1, 1925, at 181,000 tons, were equivalent to only 4½ months' consumption at the 1924 rate, or including an allowance for invisible stocks throughout the world other than in the U.S.A., it may be said that stocks were below two-thirds of the level deemed necessary and proper by the Stevenson Committee. Even if the Committee erred on the high side in this
matter, the deficiency in stocks by January 1, 1925, relative to the current rate of absorption, was nearly as serious as the excess had been in January 1922 and January 1923.

The Third Restriction Year.

For the first quarter of the third restriction year (i.e. November 1, 1924 to January 31, 1925) the percentage exportable was raised by 10 points to 50; the average price just failed by a tiny fraction to reach the 15. 6d., which would have given 10 points additional release, instead of the 10 points actually secured. In the February-April quarter the average was over 15. 7d., and during the third quarter, therefore, the percentage exportable was raised by 10 points to 65. But consumption was still outrunning production; and stocks were dwindling still further. At the end of June, 1925, the total visible stocks of the world were only 120,000 tons, which was equivalent to less than three months' consumption at the current rate. In the United Kingdom there was a mere 7,000 tons, and the 50,000 tons in the U.S.A., which includes manufacturers as well as dealers' stocks, was equivalent to little more than one month's American consumption. Nearly 60,000 tons is estimated to have been afloat, but only 22,000 tons were working minimum. As a result, in the May-July quarter the price averaged 35. 2d. This gave another 10 points' release to 75 per cent., but the price continued to rise, and averaged over 35. 7d. for the August-October quarter. The peak of 4s. 7d. was reached early in December, but the increase in stocks in the U.S.A. at the end of the year to 51,000 tons, as compared with less than 35,000 tons at the end of September, showed that, with the exportable percentage again increased by 10 points and now standing at 85, the critical point had been passed, and at the close of the year the price had dropped to 35. 10d.

The world's net exports during 1925 amounted to 57,500 tons. World absorption is estimated at 560,000 tons. The deficiency in supplies was therefore no greater than in 1924, but in that year it could be made good from stocks without seriously affecting the price, whereas in 1925 it could not. Moreover, the American manufacturers were not alone in their belief that a chronic shortage was almost inevitable within a few years, and many believed that the rise in price was genuine, in the sense that it was an attempt to forestall the coming shortage by affording a stimulus to new planting; the native planting already going on in the N.E.I. was still largely unknown. The actual deficiency was comparatively small—only 7 per cent.—but it was sufficient to raise the price by 400 per cent. In 1925 standard production in Malaya was eventually * fixed at 576,750 tons. Including special allowances to small-holders, the licensed export was about 200,000 tons, whereas actual net exports were 210,000 tons, the excess being presumably the results of smuggling and evasion generally. The standard production of Ceylon was higher, but the net exports were some 2,000 tons in excess of the licensed export. Malaya and Ceylon together exported 35,000 tons more than in 1924, and the N.E.I. nearly 40,000 tons more, of which native rubber contributed nearly three-quarters, though a substantial amount of this was rubber smuggled from Malaya to the adjoining Dutch Islands. In all, the world's net exports were 90,000 tons more than in 1924.

The Fourth Restriction Year.

As has already been said, the fourth restriction year started with prices at the peak, and the exportable percentage at 85. At the end of the first quarter (January 31) the price was down to 23. 6d., and the exportable percentage was raised by 5 points more than the 10 which was automatically due, thus bringing the percentage to 70, and nominally removing all restriction.† On April 26 the Colonial Office announced drastic changes of the scheme. The exportable percentage for the coming May-July quarter was to be maintained at 200 per cent., but if the price during this quarter averaged less than 25. 6d., the percentage would be reduced to 70. This would thus be raised to 50. 6d., and the average for the quarter then ending was 25. 6d. By the beginning of June the price was 21. 6d., but then the fall was more or less arrested, and though the tendency to decline continued, the price never fell below 15. 6d., and the average for the quarter came out at 15. 9d. Restriction was therefore avoided for a further quarter by the narrowest of margins. In the August-October quarter the average was only just over 15. 0d., and consequently the fifth restriction year began with an exportable percentage of 80. Meanwhile a radical change was taking place in respect of stocks. During the year 1926 the world's visible stocks increased from 850,000 tons to 1,200,000 tons. In the United Kingdom at the end of the year the 50,000 tons were valued at £3,000,000, while the current cost of a similar amount was £3,000,000.

* This had been foreseen in a statement issued on December 6, 1925.† The maximum allowance per acre was increased during the years from 600 to 700 tons.

Mr. Hoover's campaign for the United States in 1928 was made possible by the achievement in 1927 of a 'pivotal price.' This had been foreshadowed in a statement issued on December 4, 1925. The Fourth Restriction Year was the conclusion of a period of 'pivotal price,' which was a term used to describe a price 20% higher than the average for the previous year.
world's visible stocks increased from 135,000 tons to 145,000 tons. London and Liverpool started the year with 7,000 tons and finished it with 50,000, while the corresponding figures for the U.S.A. were 51,000 and 72,000. But even at 245,000 tons, these stocks represented less than six months' consumption at the 1925 rate, or say seven months' if allowance be made for invisible stocks outside the U.S.A., which were probably abnormally large at this time. Three successive quarters of full production had done little more than restore a comfortable position, and even that would not have been accomplished if consumption had continued to expand. An account of events in the U.S.A. during the boom will receive special attention in Section IV. There can be little doubt that Mr. Hoover's campaign for rubber economy had some share in reducing the American absorption of crude rubber by 25,000 tons in 1926 as compared with the previous year, but the main share in this achievement must be allotted to reclaimed rubber. In 1921 the U.S.A. had used 76,000 tons of reclaimed, or about as much as in 1925 and 1920, and less than the amount used in 1917. In 1925 the absorption of reclaimed amounted to 137,000 tons, and in 1926 to 161,500. In other words, without the increased use of reclaimed the U.S.A. would have required 39,000 tons more crude rubber in 1925, and would have required as much crude rubber in 1926 as in 1925, instead of 25,000 tons less. The United Kingdom's absorption of crude rubber was increased by 10,000 tons in 1926, and the rest of the world maintained its net importation of Malaya's rubber. The licence importers, as in 1925, reduced their purchases of Malaya rubber. The standard production of Malaya was fixed at 341,853 tons, an increase of 38,000 due partly to the increased area and the greater maturity of the trees, but also to the increased maximum for small-holdings. The licensed export may be put at 300,000 tons, whereas the actual export was 296,000 tons, and of this a significant quantity was undoubtedly smuggled. Malaya could not in fact produce its standard production, although it exported 26,000 tons more rubber in 1926 than in 1925. Ceylon was in the same position; with a standard production of 70,475 tons her exports only reached 58,800, although this was an increase of 13,000 tons. The restriction areas therefore provided 90,900 tons of the increased supply, and the N.E.I. supplied 15,000 tons, mostly from British estates which had been voluntarily following the scheme and were now, therefore, producing freely. Dutch native rubber had temporarily come to a halt.

The Fifth Restriction Year.

The fifth restriction year opened with the exportable percentage reduced to 80, and during the first quarter (November 1926-January 1927) the price averaged a little over 11.7d. At the end of October 1926, the statistics of stocks had announced a full revision of the scheme, thereby supplementing the incomplete and interim statement of the previous April. The revised scheme may be summarised as follows:

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<tr>
<td>Over 31st.</td>
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<tr>
<td>Not less than 11.9d. but under 11.9d.</td>
</tr>
<tr>
<td>Not less than 11.3d. but less than 11.9d.</td>
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<tr>
<td>Below 11.3d.</td>
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In no case would the exportable maximum be increased above 100, or decreased below 60.

The announcement also stated that no further alterations would be made for twelve months. Therefore, for the quarter February-April 1927, the percentage exportable was reduced to 70, and since in that quarter the price averaged only a little above 11.7d., though this was a little higher than in the previous quarter, the minimum of 60 per cent., became operative during the May-July quarter. Despite this rapid return to drastic restriction, the price continued to sag slowly, until in the latter half of June there was a sharp break from a little under 11.8d. to 11.4d. From this there was some recovery, and throughout July, August and most of September the price hovered round about 11.5d. After another break to under 11.4d., there was again some recovery, and the average for the August-October quarter eventually came out a little over 11.4d.

The stability during the first half of the year, and the decline and more nervously erratic course of prices during the second half finds its counterpart in the statistics of stocks. At the beginning of 1927, the world's visible stocks amounted to 259,000 tons; at the end of June the figures showed only a small increase.

The above table is summarised from the statistics as follows:
but September saw a much larger addition, despite the return to 60 per cent restriction five months previously. During the first half of the year the failure of Malayan exports to show any reduction at all was an effect of the reduced permissible export and the return of restriction in the three quarters of 1926 when there had been no restriction, had accumulated a substantial amount of unexpired export rights and coupons. The reduction to 80 per cent in the November-January quarter had made little difference to the exports from Malaya, which had never much exceeded 90 per cent of the standard production and were now maintained at that figure by the use of these accumulated export rights.

As restriction was tightened, it became gradually effective, but so slowly that in August the market was beginning to think that it never would achieve the reduction in supplies from the restriction area necessary to outweigh the increase in supplies from other sources. The standard production of Malaya in 1927 was 356,000 tons, and the licensed export (for the calendar year 1927) may be put at approximately 220,000 tons; actually the exports amounted to 242,000 tons. On November 1, 1926, unexpired export rights totalled 22,044 tons; at the end of January 1927, the total was 18,570 tons, of April 1927, 13,000 tons, and of the calendar year, approximately 10,000 tons. Thus of the 22,000 tons excess of actual over licensed exports, probably 10,000 tons represented unexpired export rights, the difference being probably smuggled rubber, etc. Ceylon's exports were also 10,000 tons more than they should have been on the basis of standard production. The actual exports from Malaya and Ceylon were some 47,000 tons less than in 1926, but against this there was an increase of 26,000 tons from the N.E.I., and 7,000 tons from other countries.

The result was that world net exports were 607,300 tons as compared with 621,500 tons in 1926. World absorption is estimated at 596,000 tons or an increase of 25,000 tons; there was only a small increase in the U.S.A. and the U.K., but the net imports by other countries showed a record increase of 28,000 tons, and this resulted in a reduction of stocks in the U.K. in the last quarter of the year. The world's total visible stocks increased by 15,000 tons during the year, and at the end represented a little less than six months' consumption.

* Some limitation was imposed on the validity of export rights issued on and after February 1, 1927, but as this was not retrospective, and on all issues made prior to the 80 per cent, influence when operated, the effect was negligible.
In the two months following the end of restriction Malayan net exports were at a rate of nearly 60,000 tons per month, as compared with an average of less than 20,000 tons in the preceding months of the year. In order to ascertain the relations of production, consumption and stocks during the final year of restriction and at the same time to secure comparability with figures already given and to be given, it may be assumed that during November and December a total of 35,000 tons would have been exported if restriction had continued at 60 per cent. A similar assumption may be made for Ceylon. The net exports of Malaya during 1928 may then be put at 215,000 tons, and of Ceylon at 50,000 tons. Shipments from the N.E.I. were not much affected by the removal of restriction, and the total world net exports in 1928 may be put at approximately 560,000 tons. World absorption amounted to 680,000 tons. Thus demand was in excess of supply to the extent of 120,000 tons, as is also shown by the decline of stocks in consuming countries. On September 30, 1928, world visible stocks were equivalent to less than four months' consumption at the current rate. The fall in prices from 1s. 7d. in January to less than half that amount is no criterion whatever of the current relations of demand and supply: consumers knew, or thought they knew, that there would be ample supplies soon after the removal of restriction, and by allowing stocks to dwindle to a point which in 1925 had resulted in rubber at 4s. 6d., the increased demand was just met until the increased supplies became available. Otherwise, since stocks were by no means excessive at the beginning of the year, the increased demand would certainly have required increased supplies from the restriction areas, and the price would undoubtedly have been in the neighbourhood of 1s. 9d. or even 2s. But such reflections more properly belong to the next section in which the wisdom or folly of this and other aspects of restriction will be discussed on the basis of the facts now duly set forth.
III.—Restriction from the Producers' Point of View.

(1) The Necessity and Advisability of Restriction.

The word "necessity" here requires some definition. It is meant to imply that under the laissez-faire equilibrium between supply and demand would have been established sufficiently quickly or smoothly to avoid the financial failure or actual closing-down of productive capacity which was reasonably efficient at the time, and which would be required again in the near future, and that artificial control was necessary to avoid a wholly unnecessary financial loss to the industry and the community. There is a general presumption that laissez-faire makes for the best interests of the producer, as well as the consumer; the question here is whether this general presumption was on this occasion incorrect, and whether therefore some form of artificial control was not necessary to secure the best interests of producers—the consumers' point of view will be considered later. If not deemed an absolute necessity, some measure of control might still have been advisable.

In order to answer the question whether any form of conscious control was necessary, some attempt must be made to estimate what world production would have been if there had been no restriction, and if no capacity had been closed down. This is an extremely difficult and hazardous task. During the first restriction year, Malayan assessments of standard production were most probably on too generous a scale; and therefore the standard production of the second year may be taken as approximating potential production both in 1923 and 1924. As will be argued later, there is, however, some doubt as to whether the Malayan smallholders were not under-assessed in the sense that they would have produced more than their assessments if there had been no restriction. But while this qualification should be borne in mind, its magnitude would not be sufficient to invalidate the arguments to be based on the statistics in the table below. The statistics of standard production during the restriction period this applies to Ceylon. The table on the opposite page shows the potential production of Malaya and Ceylon in comparison with their actual exports for the calendar years, and the excess is then added to the total world exports for comparison with world absorption.

When the Stevenson Committee began their deliberations in November 1921, they estimated that on January 1, 1922, surplus stocks (i.e. over and above the stocks of convenience) would amount to 150,000 tons, and that by January 1, 1923, this surplus would be doubled. It seemed to them that production was a great deal in excess of the probable demand in the immediate future. Actually, as they realised, the trouble was not because the production was being rapidly reduced as a consequence of restriction, but because the problem was that it was being rapidly increased. This is the basis of the argument that if there had been no restriction, some form of artificial control was not necessary.

The statistics of Malayan standard production during the period 1920-21, and had almost caught up production, and throughout the whole restriction period this applies to Ceylon. The table on the opposite page shows the potential production of Malaya and Ceylon in comparison with their actual exports for the calendar years, and the excess is then added to the total world exports for comparison with world absorption.

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and consumption were nearly in equilibrium,† and the only real trouble was that 100,000 tons of surplus stocks, the true burden of which was being rapidly reduced as consumption increased. This is the basis of the American argument that restriction was really unnecessary, because the trouble in 1921-22 was not primarily excess-producing capacity, as the Stevenson Committee implied, but a temporary decline in consumption which had almost passed away by the time restriction was imposed. The validity of this argument may be admitted, and with the admission goes the essential part of the case for restriction as presented by the Stevenson Committee. But this equilibrium at the end of 1922 was very short-lived, not because consumption declined again, though the 1922 rate of increase was not maintained, but because production was expanding even more rapidly than consumption. In their first report the Stevenson Committee stated that in their opinion "consumption is not likely to outpace potential production for some years." If this forecast was wrong, it was wrong in the letter only, but the Committee should have stressed that the cause would lie in the future increase of productive capacity and not in any failure on the part of consumption.‡ At first sight the excess of production from 1922 to 1927, as shown in column 6 of the above table, seems so great as to make the necessity for restriction absolutely self-evident. But these figures require modification. In the first place, restriction undoubtedly affected the volume of stocks carried by merchants and manufacturers. During the first three-quarters of 1923 stocks in the hands of American manufacturers remained more or less constant at the same level as in the past three years, despite the increase in absorption. At the end of 1923 many of them had perforce come largely under the thumb of their bankers, and the bankers insisted that since their troubles had been mainly caused by huge losses on stocks and forward contracts, they should drastically reduce the ratio of stocks which they had been in the habit of maintaining. Thus, however, is hardly an adequate explanation for the absolute reduction of stocks during 1924, which must be attributed either to a deliberate attempt to "break" restriction, or to the conclusion that with the percentage at or below 60, there was plenty of rubber readily available even under the restriction scheme. If the American and British manufacturers had even maintained their stocks at the 1923 level, there would have been a significant increase in net imports, and much of the excess of world potential production over actual absorption (col. 6 in above table) would have been required for the maintenance of American manufacturers' stocks. Moreover, the statistics of world absorption represent only net imports for all countries other than the U.S.A. and the U.K., and no account is taken of their invisible stocks, which were also certainly reduced. As a true measure of actual absorption, the statistics in col. 6 of the table require to be increased slightly on this account during 1923 and 1924, and reduced in 1925 when these depleted invisible stocks in other countries were rebuilt. Finally, it is possible that actual world absorption would have been slightly higher during 1923 and 1924 if the price had

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<th>Actual Production</th>
<th>Excess of Potential Production</th>
<th>World Production</th>
<th>World Absorption</th>
<th>Excess of World Production</th>
<th>Excess of actual supplies over actual absorption</th>
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† Some allowance must, however, be made for the fact that many British estates in Java and elsewhere were voluntarily observing the restriction scheme. No precise allowance can be calculated, and therefore an addition of 10,000 tons has been made to world exports on this account during 1923, except 1923 when the export allowance was 10 per cent, during three-quarters of the year. It is also fairly certain that N.E.I. native output was not at its potential in 1923.

‡ As the Times reported on September 19, 1922: "An equilibrium of supply and demand appears already to have been established." See also the issue of October 17. "The scheme has been produced rather late in the day, for since the reduction in the prices of rubber has been overdone, the rubber market has completely changed." It may be remembered in passing that the Times was consistently hostile to restriction from the start, though in no way detracts from the validity of these particular observations.
been, say, about 2/1, though manufacturers have repeatedly declared that within reason, consumption is little affected by the actual price of crude rubber. Taking these and other points into consideration, it seems doubtful whether the absence of restriction there would have been much increase in the outstanding 100,000 tons of stocks during 1923 and 1924, and there might even have been some reduction.

In 1925 it is certain that the high price brought about heavier production by all producers not subject to the restriction than would have been the case at lower prices, and thus, though the true world absorption might have been smaller than the figure in col. 6 for the reason given above, this would have been balanced by a smaller actual production. On a world consumption of, say, 400,000 tons, the eight months' equivalent stocks required for convenience according to the Stevenson Committee amount to 960,000 tons. It would not, however, be reasonable to regard this ratio as unchanging.

In 1921 the world's shipping was still somewhat disordered as the result of the war, whereas in 1925 an ample supply of tonnage was available, no congestion existed at the ports, and in general the speed and certainty of transit was much greater. Further, it must be appreciated that as a defence against the operation of a smaller proportionate volume of stocks will suffice as the volume of consumption increases, for the supply of speculators and their resources is not unlimited. Hence to-day a six months' ratio is generally considered adequate, and in 1925 not more than seven months' would have sufficed. Even a seven months' ratio, however, meant a total amounting to 315,000 tons, which would have been approximately the total stocks in existence in 1925, supposing that there had been no further addition during 1923 and 1924, as has been argued above. It seems, therefore, reasonable to suppose that during 1925 equilibrium would have been re-established between demand and supply, and that stocks would have become normal; the price might therefore be supposed to have risen to a reasonably profitable level. During 1926 the lower, though high, prices almost certainly again led to a larger production than would have resulted at a price-level a little above 3/1, while the actual decline in world absorption was certainly due to the effects of high prices both on consumption and in stimulating the use of reclaimed rubber,* as well as to the campaign for rubber economy in the U.S.A. Consumption might still have failed to equalise production, but making allowance for the correspondingly higher level of stocks, the excess of supply would not have been at all considerable. The same sort of considerations apply to 1927; consumption might perhaps have reached 650,000 tons, while production might not have much exceeded 600,000 tons; the discrepancy would have been bigger than in 1925, but not so great as to create a crisis. The figures in the table for 1928 are misleading in several ways; world exports were swollen during November and December by abnormally heavy shipments of stocks accumulated during the previous months while restriction was a-dying; equally world absorption would have been greater if invisible stocks, as well as visible stocks, had not been heavily drawn upon. To suggest that consumption was drawing ahead of even potential production is little more than guess-work, though it is quite in line with the course of events in 1929. Any surplus stocks accumulated in 1926 and 1927 would, however, almost certainly have been surplus no longer.

It must be admitted that these suppositions, especially after 1925, are largely a matter of guess-work, but the considerations which have been advanced will at least serve to undermine any hasty conclusions as to the necessity for restriction which might be drawn from calculations such as those in the table above. Broadly speaking, the odds are that without restriction the rubber producing industry would have had a difficult time in 1923, and probably, though to a lesser degree, in 1924. By a difficult time is not meant a continuation of the highly critical conditions existing during the summer and early autumn of 1922. The price-level of 2d. to 3d. then ruling was certainly well below the costs of a substantial part of the production at that time, and its continuance would have slept widespread bankruptcy to producers in almost all countries. But such a price-level could not have continued much longer in the face of the revival of consumption, even with the existing accumulation of surplus stocks, and the announcement of restriction had such an effect on prices shows that the market was only waiting for some such initial stimulus, though admittedly speculation played its part, this would not have been so effective if manufacturers had not been short of supplies. The trouble in 1923 was, and would have been in the absence of restriction, the surplus stocks; their existence might have kept down prices just too long for the resources of producers; and the recourse to restriction must find its justification

* If there had been no stimulus to the use of reclaimed rubber, its consumption might have been say 950,120,000 tons in 1925 instead of 100,190,000 tons, say 700,100,000 tons in 1926 (instead of 570,000 tons), say 550,000 tons. Consumption of crude rubber might have been approximately 800,000 tons in 1923 instead of 850,000 tons. Consumption of crude rubber might have been considerably lower on this account alone. On the general subject of reclaimed rubber, see page 54.

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On the other hand, equality respecting the view that surplus stocks accumulated in 1926 and 1927 was drawing ahead of even potential production is little more than guess-work, though it is quite in line with the course of events in 1929. Any surplus stocks accumulated in 1926 and 1927 would, however, almost certainly have been surplus no longer.

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largely on the ground that it ended such a danger. Once over this difficult time in 1923, there would have been steady improvement during the next two years, to a profitable and reasonably stable basis in 1925-26, and if 1927 had seen stocks mounting somewhat, 1928 would probably have seen the movement reversed. The case for restriction seems therefore to rest on the extent of the damage which would have resulted if, under the weight of the surplus stocks, prices had failed to rise for, say, another six or nine months to the level of 10f, which was probably about the level of marginal costs at that time.

When the problem is thus narrowed down to its true extent, there is obviously room for differences of opinion. Consideration must be given to the various groups which make up the rubber producing industry of Malaya—European estates, Asiatic estates, and Malay smallholders—while the point of view of the F.M.S. Government must also receive attention. There can be no doubt that at the time the European companies as a group were in a state of desperate anxiety, and full of fears lest they should be unable to carry on, and therefore have to sell their properties at knock-out prices, or close down with the prospect of much costly reclamation work if and when prices recovered to a profitable level. Even looking back, many responsible men maintain to-day that without restriction in 1923 at least 20 per cent. of the estate acreage would have been abandoned, while there seems little doubt that American capital was only waiting for prices to fall a little lower before making substantial purchases. On the other hand, equally responsible opinion now inclines to the view that the fears were exaggerated because the full extent of the recovery in the American demand was not realised sufficiently quickly. Probably, the truth lies somewhere between the two; it certainly seems likely that some acreage would have been abandoned, and that some estates would have changed hands, but it is doubtful whether the estate industry as a whole would have suffered as badly as many other industries suffered during the world depression of 1921. The Malayan dollar companies would probably have been harder pressed than the sterling companies, for the latter as a group had been able to finance a large part of the waiting period out of current annual savings from his existing source of income, and to be able to borrow the balance required; hence most Chinese estates are in debt before production actually begins. He borrows where he can, but there are three chief sources:

1. From shopkeepers, largely in the form of credit for food and materials. A number of estates, even under normal conditions, pass into the hands of shopkeepers by default on these advances. Usually Chinese shopkeepers put their savings into their shops, and not into tin or rubber, but in this way a good many of them have, so to speak, perforce become owners or part-owners of rubber estates, and even tin mines.

2. From the banks. The banks in Malaya are mainly exchange and not mortgage banks, but they will accept mortgages on houses and other property, including rubber plantations. The small Chetties are much in demand for short-term loans, and are prepared to take risks which the banks cannot stomach. The small Chetties are much in demand for short-term loans, and are prepared to take risks which the banks cannot stomach.

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In 1922 rather under 30 per cent. of the planted area was in European ownership.
per cent., and then charge their clients perhaps 12 per cent. in ordinary times and 15 to 25 per cent. in bad times.

- These rates appear high, but their clients have seldom much security to offer, for any good security will already have been pledged with the banks; hence the Chetties have few small risks to balance many large risks. * The Chetties, of course, lend to shopkeepers as well as to industrial purposes, and the Chinese rubber planter in 1922 was as likely as not indebted to the Chetty, not only directly but also indirectly through his indebtedness to the shopkeeper, who in turn had borrowed from the Chetty.

Any general trade depression inevitably shakes this elaborate but flimsy credit structure to its very foundations, and even if the depression is confined to rubber, the same is true, for as a broad generalisation it may be said that one-half of the Chinese industrial investment in Malaya is now in rubber estates.  

By the autumn of 1922, the Chetties had already foreclosed on Chinese rubber estates to the extent of probably 20,000 acres, and there can be little doubt that there would have been widespread ruin among the Chinese community in general, not only rubber estate owners but also the shopkeepers, merchants, traders, etc., if there had not been a very rapid recovery in the price of rubber. Whether such a general financial collapse could have been more or less stayed off for another six months is a moot point, but there are many leading Chinese, and also British Government officials, who maintain that conditions were so critical that it was a question of days rather than weeks before the Chinese banks would have collapsed as well as their individual clients.

The position of the Malay small-holders was in a sense much less serious, since the law prevents any but a Malay owning land within the reservations, and since the village moneylenders are seldom Malays, these small-holders cannot be deprived of their rubber trees or their essentials of life. * The Malay small-holders would have survived the crisis in their own way, not indebted to the Chinese planter as a group, since they need not have had much immature rubber on their hands, their position would have been much stronger, as, for example, is the case to-day; but the depression had come at a most difficult time, for they had been planting heavily from about 1916 onwards, and their credit resources in 1922 were stretched to their utmost capacity. * By itself the ruin of the Chinese planters would not perhaps have been of such consequence as to justify restriction, but this could not have taken place without involving ruin to the Chinese community as a whole. There is no doubt that the Malayans Government was impressed by the seriousness of this aspect of the position, and it is known that they advised the Colonial Office in favour of restriction early in 1922, if not before then. This is not to say that they were not perturbed about the position of the European estates. Two factors in particular weighed with them,—first, that if estates were abandoned, their Indian labour staffs would have to be repatriated at Government expense, and secondly the fear of disease spreading from abandoned estates and native holdings throughout the country. In addition there was the prospect of a serious depletion of Government revenues so long as the depression continued. But the Colonial Office had apparently declined to take action until the Stevenson Committee had reported, and while Dutch co-operation was in doubt. In September the P.M.S. Government, and indeed the whole continent, had given up hopes of any effective restriction measures, and was gloomily waiting the inevitable; the Stevenson Committee having advised the Colonial Office decision to impose restriction, was a surprise as unexpected as it was welcome. The Secretary for the Colonies, Lord Curzon, had changed his attitude towards restriction during the late summer and early autumn of 1922, but since the question of Dutch co-operation was undoubtedly the most important factor in the whole situation, it will now be as well to give attention to this matter.

In the opinion of many people the restriction was a dead letter, it is obviously difficult and usually some-
On the question of the necessity and advisability of restriction, my conclusions are therefore that while its absolute necessity may be subject to some doubt, a strong case can be made out on the score of advisability, especially in view of the situation in the Chinese community. A comparatively light and temporary form of artificial control finds justification on these grounds; such a scheme, removed in, say, 1924 or 1925, could have done but little harm, and might have avoided appreciable loss to the European plantation industry, and great loss, if not real disaster, to the economic life of Malaya. But a more important conclusion, or lesson, which emerges from this study of possibilities and probabilities, is that if restriction had been introduced promptly in November 1921, instead of twelve months later, it would have made possible the absorption of the 100,000 tons of surplus stocks during 1922 or early in 1923. In other words, restriction was primarily wanted to counter the temporary decline in consumption; it should have been used as a preventative rather than as a remedy. In the opinion of many people, the big mistake was that "restriction was kept on too long," but a bigger mistake was that some form of control was not imposed earlier. This matter also will receive further consideration in the next section.

(2) The refusal of Co-operation by the Dutch.

The refusal of the Dutch Government to participate in any form of restriction is not easily explicable, nor is the attitude of the Dutch planters in the earliest stages of the popular explanation is that the Dutch were sufficiently shrewd to realise that restriction would be imposed in British territories despite their refusal of co-operation, and that this would be extremely satisfactory and profitable to themselves; in other words, that their refusal was dictated by the most narrow and exclusive self-interest. This explanation may be broadly true as applied to the Dutch attitude in the later years of restriction, but it is certainly not applicable to 1922, and no well-informed person would give it the slightest credence. In the first place, the Dutch planters fully realised the gravity of the position in 1922, and were quite as worried as the British planters, and secondly there is no reason whatever to doubt the genuine character of their complete surprise when the British Government decided to take the plunge on its own.

The explanation most commonly given in Mincing Lane runs along the lines that the Dutch talk about the laws of economics was simply "eye-wash," the real reason being that the Dutch estates absolutely refused to entertain the idea of restriction on the output of estates only, because they feared the competition of the native producers in Sumatra, Borneo, etc., and the resulting stimulus to new native planting; hence the necessity for some Government scheme of compulsory restriction on native as well as estate production. A similar scheme of restriction, such as the proposed for Malaya by the Stevenson Committee, was, however, absolutely impracticable. In Malaya, a relatively good customs administration had already been built up, primarily to stop opium smuggling, but also accustomed to operating export taxes on tin and rubber, and in Malaya there was a relatively complete land survey, registration of land titles, a recently taken census of rubber areas and an adequate staff of district officials, thus making possible the internal administration of assessments, quotas, etc. In the Outer Possessions of the N.E.I. (i.e. other than Java itself), however, the whole control of the Government was so extremely slender that any regulation of actual production was utterly impossible either to initiate or enforce. Some scheme of rationing the bigger dealers at the principal ports might have been introduced, but this would have meant that the dealers would have bought their quota of the first native sellers who offered or from favoured sellers, and the remaining sellers would then have been unable to sell their rubber at all; the result would have been revolution. Any control of exports would have involved minute price-control. It must also be remembered that native unrest is a very real factor in the N.E.I. In short, the explanation is that the Dutch Government simply could not operate an effective restriction scheme, and since they naturally did not like to publish this abroad, they took refuge in pseudo-economic platitudes.

In my opinion, however, this line of explanation is in certain respects erroneous, and its general tenor is definitely misleading. It is too much coloured by the influence of subsequent events not foreseen as early as 1922. Thus from my recent inquiries in Java, not only from Dutch officials and Dutch planters but also from British residents, I am satisfied that no one in Java was paying much attention to native rubber as early as 1922; it was not until the end of 1923 and the beginning of 1924 that the Dutch began to suspect the potential importance of native rubber, and the results of the preliminary investigations were as surprising to them as they were alarming. The official reckoning of native rubber exports in
1922 was only 17,000 tons (dry-weight), and no one anticipated the rate at which the supply was increasing. In 1922 the Dutch estates were not in the least worried about native rubber, and this factor did not influence their attitude towards restriction in the slightest degree.

If this is correct, restriction in the N.E.I. would have been confined to the estates, and it follows that so far as the Dutch Government was concerned, their part would have been to coerce a recalcitrant minority. The administration of such a scheme might have been a troublesome addition to the normal business of government, and the idea would not have been welcome in official quarters in Java any more than the British scheme was welcomed by the Malay Civil Service, but there would have been no insuperable difficulty or objection so long as the scheme was confined to estates, and no attempt was made to include native production. It may therefore be presumed that if a large majority of the Dutch estates had been strongly in favour of restriction in co-operation with the British industry, the Dutch Government would have agreed to coerce the minority by instituting a compulsory scheme. Of the existence of a minority absolutely opposed to restriction there can be little doubt, and therefore a compulsory Government scheme was necessary. The whole question therefore turns on whether a majority of the Dutch planters was in favour of a compulsory Government restriction scheme. My conclusions are that there was no such majority. In the first place, at least half of the leading men in the industry hold laissez-faire doctrines as an integral part of their economic philosophy, and held them with the religious conviction of belief in the early nineteenth century, while in official quarters the then Director of Agriculture in Java was most vigorously opposed to attempts at artificial control of supplies or prices.

The idea that this belief in competitive laissez-faire is insincere, and a garb of convenience to get the better of a complete lack of understanding of the whole character and outlook of the Dutch as business men. The case of chinchona bark, which is so often quoted as evidence that the Dutch pay a mere lip-service to laissez-faire doctrines of a century ago, even if he holds the modern version as fervently as our forefathers held their version. Put shortly, his modern version of laissez-faire is that there is an exceedingly strong presumption against any artificial restraint of trade, and that unless the virtue of a particular form of restraint is supported by indisputable evidence, it stands condemned, even though its weakness or undesirable results cannot be clearly foreseen or demonstrated. In other words, there must be a strong positive, and not merely a negative case. Thus the Dutch planters had an instinctive belief that rubber restriction was bound to lead ultimately to government development, even though in 1922 they could not even guess what these developments might be. Their attitude was essentially negative rather than positive, and was thus extremely open to misconception.

But this instinctive hostility to restriction was powerful enough to force the Dutch Government to intervene in the industry. As has been said, a Government compulsory scheme was inevitable in order to coerce a recalcitrant minority. It must be remembered that business in Java has a long and comparatively recent history of struggles to be free of Government control, and this has left its mark on the attitude of the present generation; moreover, the greatest industry, sugar, is an even-to-day almost at daggers drawn with the Government over the land policy and the native question generally. During the war the rubber industry had been considerably annoyed by various interventions on the part of the Government, while more recently an export tax on rubber had been imposed, nominally to create funds for the compilation of statistics, though in the end the rate of tax had been fixed very many times higher than the Government had said it would be. Hence the planters not only disliked the whole idea of government interference with their industry, but happened at the time to be specially nervous lest they should again be fleeced, or that somehow the Government would gain at their expense. These feelings were greatly strengthened, however, by their belief in an alternative policy, namely, that all would be reasonably well with rubber, as it was with sugar, if only they had a central selling organisation such as the sugar industry possessed in the Verenigde Oost-Indische Staten.

In 1922 this organisation was certainly not the place to look for any definite shape or form of restriction, as the companies were inclined to look upon it as a far better line of advancement of Government control, and not in the least as a factor in the problem.

So far as I can gather, there can be little doubt that even a bare majority of the Dutch planters was in favour of it, and that the Dutch Government, at any rate in its official quarters, was not in the slightest degree opposed to any attempts at artificial control of trade, and this has left its mark on the attitude of the present generation; moreover, the greatest industry, sugar, is an even-to-day almost at daggers drawn with the Government over the land policy and the native question generally. During the war the rubber industry had been considerably annoyed by various interventions on the part of the Government, while more recently an export tax on rubber had been imposed, nominally to create funds for the compilation of statistics, though in the end the rate of tax had been fixed very many times higher than the Government had said it would be. Hence the planters not only disliked the whole idea of government interference with their industry, but happened at the time to be specially nervous lest they should again be fleeced, or that somehow the Government would gain at their expense. These feelings were greatly strengthened, however, by their belief in an alternative policy, namely, that all would be reasonably well with rubber, as it was with sugar, if only they had a central selling organisation such as the sugar industry.
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So far as I can gather, therefore, it is most
unlikely that even a bare majority of the indus-
try was ever in favour of restriction. It is
easy that the Dutch Rubber Growers' Associa-
tion to the Stevenson Committee, but there is no
evidence whatever to warrant the interpreta-
tion that this meant a majority in favour of
restriction, and there is no evidence that when
the Dutch Minister of the Colonies refused to
appoint such a committee, the Association was
seriously annoyed. Hence, while I agree en-
tirely with the proposition that the Govern-
ment of the N.E.I. could not possibly operate a
restriction scheme such as the Stevenson
scheme, in my view this consideration is really
irrelevant, because restriction in the N.E.I.
never really meant more than restriction of
estate production. Admittedly even this might
have meant a severe tax on the Dutch admini-
stration, and the subsequent change of
the marginal producers in Malaya, the Dutch
would benefit in the short period at the
expense of the British, but there might still,
and probably would be, a net balance in
the latter's favour; the Committee's grounds
for insisting on Dutch co-operation were not
enough. But for an increase in demand during the next few years, or otherwise
conditions of excess supply would be continued,
and restriction be indefinitely prolonged. The
Stevenson Committee's fears were certainly
justified from the long period point of view.
Actually the phrasing of their first report sug-
gests that their main concern was that the
Dutch would benefit in the short period at the
direct expense of British producers, and that
they were not over-anxious about the long
period, even though it certainly appears that
they expected a necessary duration of restric-
tion for some years. There is here a contra-
diction—if the scheme was to last for only one
or two years, the Dutch would certainly benefit
at the expense of the British, but there might still,
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justified from the long period point of view.
It is the Dutch native industry, and not the Dutch plantation industry, which has proved the villain of the piece from the British point of view, and as has been said, neither British nor Dutch producers were paying any serious attention to the Dutch native production in 1922.

The whole question must, moreover, be viewed from a rather different angle, especially in respect of the change in the attitude of the Stevenson Committee. As has been said, the desirability of Dutch co-operation was obvious, and their first report was strongly worded for the equally obvious reason that any hint that Great Britain might take action alone would have been fatal to the success of efforts to bring about such co-operation; the Dutch could not have failed to realise the advantage to themselves if Great Britain acted alone. Moreover, it seems more than probable that the Committee's first report was actually written in November 1921, and presented by the Chairman to the Colonial Secretary substantially in the form in which it was eventually published in May 1922, with the exception of the last two paragraphs, which were added when publication was decided upon. If this is so, consideration must be given to the fact that in November 1921 the general outlook was much worse than it was six months later, but even then the margin between probable production and consumption seemed so great as to necessitate Dutch co-operation if restriction in British territory alone was not to be impossibly severe.

By the autumn of 1922 the outlook had greatly improved; there was still a gap, but it was not so great. Nothing, it would have been said, for the idea that restriction by British producers alone might now be sufficient to bridge it. In the early part of 1922, on the other hand, the Report foresaw the developments which were on the threshold, and thus the Committee persisted in their efforts to secure Dutch co-operation because that seemed a genuine necessity for the practical success of the scheme. Without some such hypothesis, the delay between November 1921 and the final refusal of the Dutch in July 1922 seems inexplicable. The Committee must have realised very early in 1922 that the chances of Dutch co-operation were remote, and yet they continued a more or less hopeless crusade, while daily, stocks continued to pile up in ever increasing quantities, and the opportunity of using restriction as a preventative rather than as a cure was passing away. If the Committee's first report was really written in November 1921, it is clear that they realised the importance of immediate action. It is now clear that when their first overtures to the Dutch had been refused, the Committee should have boldly advised in favour of immediate restriction, for though this might have amounted to "carrying the baby" for the Dutch, the scheme would have quickly done its main preventive work. There would have been little new planting, and any sacrifice by British producers would have been out-balanced by the advantages achieved.

But this savours too much of wisdom after the event, and neglects the extreme pessimism which reigned in the early part of 1922, and which was not without its share of contemporary justification. The only other explanation is that the Committee could not stomach putting any money gratuitously into the pockets of their competitors, and that it took them nine months to reconcile themselves to such an abhorrent necessity. Such feelings very likely played their part, but the main reason more probably lies in the improvement in the outlook during the summer of 1922, and its effect in converting the Committee to the belief that restriction without the Dutch was daily becoming a more reasonable proposition, and one which could be commended with at least a fair chance of practical success. Actually the general idea that the task of restriction was easier at the end of 1922 than it had appeared twelve months previously should have been qualified by the refutation that, in fact, the great opportunity had been lost, and the surplus stocks were still hanging round the industry's neck. With this inculcus, the annual increase in the world's potential capacity was much more serious than it would otherwise have been, and the task of restriction was in fact much more difficult in November 1922 than twelve months before. Hence the importance of Dutch co-operation had really increased, and not decreased. This, however, does not alter the proposition stated above that some form of restriction, even in November 1922, would have resulted in a net advantage to British producers irrespective of the attitude of the Dutch.

At this point the attitude of the British Government towards the whole idea of restriction, and especially after the attitude of the Dutch was definitely known, must be briefly considered. It would have been a perfectly reasonable procedure for the British Government, after receiving the Committee's first report, with its insistence on the necessity of Dutch co-operation, to have called the whole matter off when that co-operation was refused. To allow the representatives of the industry to go back upon their cardinal principle, was an act of considerable grace, though possibly of mistaken grace. It is fairly certain that the Colonial Office, even under Mr. Churchill, was never actively in favour of restriction, and it was only the insistent demand which the Committee were correct in the first instance. Since the Committee were wrong in the idea of the essential character of the restrictions which they recommended, we must in some form of compensation require some share of their error. But if they did fail, the failure was in a plausible loophole of this last-felt principle and not in any of the attitude towards restriction. It is perhaps no accident that a period of two months elapsed between the final refusal of the Dutch and the Stevenson Committee's second report which, when it appeared, was so unsatisfactory to the Government. The Committee's second report was written in November 1921, it is clear that they realised the importance of immediate action. It is now clear that they must have entertained a genuine necessity for the practical success of the scheme. Without some such hypothesis, the delay between November 1921 and the final refusal of the Dutch in July 1922 seems inexplicable. The Committee must have realised very early in 1922 that the chances of Dutch co-operation were remote, and yet they continued a more or less hopeless crusade, while daily, stocks continued to pile up in ever increasing quantities, and the opportunity of using restriction as a preventative rather than as a cure was passing away. If the Committee's first report was really written in November 1921, it is clear that they realised the importance of immediate action. It is now clear that when their first overtures to the Dutch had been refused, the Committee should have boldly advised in favour of immediate restriction, for though this might have amounted to "carrying the baby" for the Dutch, the scheme would have quickly done its main preventive work. There would have been little new planting, and any sacrifice by British producers would have been out-balanced by the advantages achieved.

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was only the insistent demand of the industry which secured the appointment of the Committee in the first instance. Since in my opinion the Committee were correct in revising their idea of the essential character of Dutch co-operation, it follows that the Colonial Office were right in accepting the revision if they considered some form of control was really advisable. But if they did not, they now had a plausible loophole for escape. That they did not avail themselves of this chance suggests a change of attitude towards the whole idea of restriction. It is perhaps significant also that a period of two months elapsed between the refusal of the Dutch and the publication of the Stevenson Committee's second report, while, when it appeared, it was accompanied by the announcement of its acceptance by the Government; there is here a suggestion that the Committee had some difficulty in persuading Mr. Churchill to give his approval. Mr. Churchill appears to have performed a volte-face towards restriction in general almost as complete as that of the Stevenson Committee towards Dutch co-operation. But why he did so, at present remains a mystery. It is possible that the effect on the American exchange exerted some influence, for in a statement in March 1923 Mr. Churchill had considerable stress upon the point that "one of our principal methods of paying our debt to the United States is in the present crisis of rubber," and added that when he brought Lord Stevenson's scheme before the Cabinet, he was "strongly supported by the then Chancellor of the Exchequer, Sir Robert Home, and the Treasury." But this statement cannot properly be made to suggest that the Treasury applied pressure upon Mr. Churchill to bring the scheme before the Cabinet, or that this aspect of the matter was a decisive factor in his decision. It is fairly certain that he received no additional advice from Malaya, such as would convince him of the necessity for intervention; the Malayan Government had shut its bolt long before. Perhaps it was another case of sheer persistence, and that eventually Mr. Churchill yielded to the persuasions of Lord Stevenson for the sake of peace and quiet. That the assent was of a rather grudging character, may perhaps be judged by the fact that the Colonial Office during the first years of restriction left the whole business as much as possible to the industry and its representatives, merely giving the necessary effect to their desires. This saved the Government a lot of trouble and much responsibility, even if it was not a very dignified role. When later on the Government did take a hand in the game, the pitch was already so treacherous that no conclusions can be drawn as to whether or not a more active role in the earlier years would have been an improvement.

(3) The Machinery of the Restriction Scheme.

(a) Mechanical versus Arbitrary Regulation.

It is a question of vital importance whether the regulation of restriction should have been on an arbitrary basis or on the fixed mechanical basis actually adopted. The great defect in the mechanical regulation of restriction was its lack of elasticity; it depended for success to a very large extent on the financial ability, shrewd judgment and general co-operation of the consumers of raw rubber. The American manufacturers pointed out the possible dangers of its inelasticity in respect of more rapid releases should the world's demand suddenly increase, and laid stress on the opportunities which would arise for speculation if such a temporary shortage should arise. The R.G.A. delegation which visited America in January 1923, and also Lord Stevenson and other members of his committee, probably realised the possibility that the initial percentage exportable might have been fixed too low in view of the rapid revival of consumption during the winter of 1922-23, and if prices had got out of hand in the early summer of 1923, the percentage might have been arbitrarily raised in order to ensure a proper start.* But the Colonial Office and the British industry appear to have failed to realise that the lack of elasticity was a chronic weakness in the scheme, which might manifest itself at any future time, even when the scheme had perhaps been functioning smoothly for a considerable period. When in 1923 the need did arise, the leaders of the British industry could with a show of justification cast the blame on to the Americans, and they therefore turned a deaf ear to all appeals for emergency releases, while the general opinion was that it would be foolish to forego such an unexpected harvest for the benefit of those who for so long had enjoyed cheap rubber at the producers' expense. Equally the Colonial Office took no action until December 1925, when an additional 5 per cent. was granted as from February 1, 1926, by which time the peak of the boom was already passed. This additional release had, in fact, no effect whatever at the time, for Malaya could not produce its standard production on account of a depleted labour force, etc., thereby demonstrating a physical as

* See Evening Standard, March 12, 1923.
well as a merely mechanical inelasticity in the scheme.

The real point, however, is not the failure to give additional releases when required, but rather that, if they had been given, the mechanical basis of regulation would have been exchanged for an arbitrary basis, and the great advantage of a mechanical scheme would have been lost. This advantage was that all concerned — producers, dealers, merchants, manufacturers — did at least know where they stood, whereas under an arbitrary scheme, nothing would have been certain. If additional releases had been made in 1925, there was no certainty that additional restrictions might not have been imposed later: the justification of an emergency depended upon the definition of an emergency, and that would have been in the hands of the British Government and of the R.G.A.

There is, in fact, no possibility of compromise—such a scheme must either be mechanical or it must be arbitrary—and in 1925 the British Government acted wisely unless it was prepared to jettison mechanical regulation altogether.

The uncertainty of an arbitrary scheme is a great drawback. Its effect is chiefly felt in the refusal of speculators* to carry stocks; they simply dare not do so when there is no certainty as to the quantity of supplies which may be forthcoming in the near future. In the case of rubber, stocks to the equivalent of eight months' consumption were considered the necessary normal, and in 1922 there was one-third more. An arbitrary scheme might well have had disastrous results, for the start, if some provision had not been made to relieve the ordinary trader of his stocks, though admittedly a large proportion is carried by manufacturers. Again, an arbitrary scheme involves the appointment of an individual or a group of individuals to make the necessary decisions. This is a colossal responsibility, which few men would care to undertake. But it is still more unlikely that any industry would care to allow any outsider to undertake such a task. In practice, the task could only be undertaken by the Government, and in the normal way the industry would strongly object to the removal of its destinies out of its own hands, while equally no Government would take such responsibility except under the strongest compulsion.

When Governments have played an active part in artificial control schemes, as, for example, in Brazil, they have usually had recourse as far as possible to mechanical forms of regulation. The impracticable character as well as the uncertainty of arbitrary schemes are very great drawbacks.

The mechanical principle is undoubtedly superior provided that it is possible to secure a reasonably sufficient degree of elasticity. This, however, was a very difficult problem in the present instance. The revised scheme of releases, introduced in 1926, was an attempt in this direction, but it may well be doubted whether it would have been a sufficient improvement; no adjustment of figures could probably have produced the desired result without weakening the scheme too much from the producers' point of view. If it had been possible to have a system of monthly instead of quarterly quotas, a much greater degree of elasticity would have been secured. So far as estates were concerned, this would have presented little difficulty, but it was almost a physical impossibility in respect of the native holdings. As it was, it took most District Officers not less than a fortnight to distribute the export coupons at the beginning of each quarter, and this greatly interfered with their normal routine work. Moreover, the point of view of the natives themselves must be considered; some of them had to come a forty-mile return journey from their villages to the District Office; there was considerable grumbling as it was, and if they had had to make the journey every month instead of once a quarter, there would have been real discontent. An elaborate system of local offices, instituted specially for the issue of coupons, would have been enormous, and it is virtually certain that both parties would actually work out fairly to both parties, and it is virtually certain that both parties would in any case have thought that the other was gaining at its expense; it was really essential to treat estates and native holdings alike. One other expedient, however, must be considered; assuming that the sliding-scale figures had been adjusted in the best possible way, a reserve stock might have been held by the British Government, and released according

* Including, of course, dealers and manufacturers as well as the recorded professional speculators.
to a scale when the price rose substantially beyond the pivotal point. The argument that in a sensitive speculative market such as the rubber market, the presence of reserve stocks depresses price just as much as would the actual placing of that stock on the market, does not apply here. Held with the financial backing of the British Government, and only to be obtained at certain publicly specified prices, there could be no question of doubt as to whether or when the stocks would be sold, and it is this uncertainty which depresses prices by hindering speculation. The result would be that manufacturers would not trouble to carry large stocks of convenience, but would live more or less from hand to mouth so long as the price was near the pivotal point. This might be a great drawback in certain circumstances, but in the case of rubber, manufacturers did in fact reduce their stocks virtually to zero, even without the safeguard of a reserve in the hands of producers. The producer would not have suffered by any greater tendency to reduce stocks and so depress prices. Where he would have suffered is in respect of the costs of holding such a stock, which might quite well never be required. If the object of the Stevenson Committee had been to institute a full-fledged permanent stabilisation scheme, the value of such a reserve of rubber as, so to speak, a safety valve, should have existed with a certain amount of forethought. But, of course, their object was to rescue the industry from disaster, and restriction was to be removed as soon as equilibrium had been re-established. The prices did not get out of hand—and for the lack of a relatively few thousand tons of rubber in or near consuming centres—and it seems likely that they would have done so, even if the sliding-scale figures had been arranged to secure the greatest possible flexibility compatible with adequate general control. Hence such a scheme of reserve stocks, liberated at specified prices, might have been useful, and the costs of such stock-holding should have been regarded by producers as an insurance premium against the indefinable and uncalculable, but certainly most serious, results of run-away prices even from their point of view.

There was, in fact, no way in which a mechanical scheme could have been given a really adequate degree of elasticity except by enlisting the close co-operation of a large proportion of the consumers. The leaders of the R.G.A. did not realise this in 1922, but in 1925 they found it a convenient reply to American complaints; the whole trouble had been caused by the failure of the American manufacturers to realise the vitally important part which they were called upon to play in the operation of the scheme; to which accusations the Americans retorted, and with considerable justification, that their co-operation had never been sought, and that in any case it was an impossible rôle for them to play so long as each firm bought its rubber individually and in competition with each other. The force of this last point must be admitted; an individual manufacturer cannot be expected to force up the price against himself, and even if he did attempt to do so, his resources would be inadequate unless others chose to do the same.* The British contention that the Americans should have ensured themselves of adequate supplies under the scheme, is only valid under conditions of monopolistic buying. If the definite co-operation of the American manufacturers as a body, or at least of a substantial proportion of them, could not have been obtained, it becomes a matter of doubt whether an arbitrary scheme, despite all its drawbacks, might not have been better than even the best possible mechanical scheme, for producers really suffered in the long run from the events of 1925, at least as much as consumers did in the short run, while the lack of elasticity in effecting sufficiently rapid curtailment of supplies might have been, if it actually was not, a serious disadvantage.

It is therefore necessary to consider whether it would have been possible to evolve a scheme of active co-operation on the part of the American manufacturers. In 1922, it must be remembered that there was no antagonism between producers and consumers; it was simply an absence of any relations at all. The manufacturer of a commodity, such as rubber, has no special interest in ultra-low prices as compared to the interest which he has in stable prices. Admittedly the situation in the American tyre-manufacturing industry was not conducive to the conduct of organised relations on their part, but there was sufficient organisation at least to enable the R.G.A. to make plain what it intended to do, and the part which the Americans were expected to play. Whether the R.G.A. seriously considered consultation

* Nevertheless it seems hard to explain why the Americans did not buy in sufficient quantity during the quarter August-September 1922 to force up the price a few mills higher and prevent a further combination of the percentage exported from the restriction area. The average for the preceding quarter reached 1s. 5d. In 1924, however, only the larger manufacturers realised that the failure to reach 1s. 5d. would involve increased restriction—the rub— and so the smaller ones understood the scheme—and for the rest of the explanation, once the Americans cannot have expected the demands of restriction when the price was rising rapidly, whether they may have thought a few months previously, all that can be said is that the incident confirms the morbidly shortsighted character of competitive buying, especially when the weakness of an arbitrary control action is combined with the uncertainty just the current price-level may not be maintained in the future.
There can be little doubt that a great deal more should and could have been done to enlist the sympathy and general support of the American manufacturers. Whether the requisite degree of active co-operation could have been secured is another matter. In a later section, more attention will be given to the situation in the U.S. rubber manufacturing industry, to the attitude of the manufacturers, and their actual reception of the restriction scheme. Anticipating what will be said there, it seems extremely doubtful that any real co-operation could have been secured. Mr. Firestone was not without supporters, and if he had not made things too difficult, some one else would have done so, for there can be little doubt that certain American interests keenly desired to secure a substantial participation in Malayan plantations, which plans were frustrated by the imposition of restriction. Finally it must be admitted that many mechanical difficulties would have had to be surmounted in devising any effective method of co-operation, quite apart from the attitude of those concerned. Nevertheless, a great deal might have been done which was not done, towards securing a sympathetic understanding and generally harmonious relations.

Given such relations, and given the best possible arrangement of the sliding-scale, it may be concluded that a mechanical scheme of control is extremely complicated; sufficient elasticity could have been foreseen, one would have thought that some reference thereto would have been drawn to the Plan and their suggestions asked before it was adopted; or some clause in the Plan would have pointed out that stability would result only if the Americans maintained prices above a certain level by buying rubber. One cannot easily excuse for not realising that the cultivation of the goodwill of the consumer becomes of supreme and essential importance when producers embark on any sort of scheme of conscious control, let alone if that scheme is to be on a mechanical basis such as the Stevenson scheme. It was, in fact, only at the urgent request of the American manufacturers that the R.G.A. opened up definite relations by sending its delegates in 1923. The truth seems to be that in 1922 the British industry and the Colonial Office alike failed to realise that the consumer had to play any real definite part in their scheme, or that he had any power to influence its operation.*

There are certain conclusions reached in the following well-resumed passage from a pamphlet by Mr. J. T. H. Fyfe of the Department of Commerce entitled America and Rubber Industry, published by an American, and—as soon after the high feeling engendered by the price boom of 1922, it seemed to do no more than confirm, but in general maintains the impartial character of an economic study, such as might be expected by those who are familiar with Mr. Fyfe's other writings. He concludes, "One cannot search the Stevenson Report from cover to cover, and all the incidental matter that was published in connection therewith, without finding a single reference to the necessity of American cooperation in making the Plan a success. Had the need for such cooperation been foreseen, one would have thought that some reference thereto would have been included in the Plan. It would have been possible for the Colonial Office and the producers to, in a sympathetic understanding and generally harmonious relations, have been done which was not done, towards securing a sympathetic understanding and generally harmonious relations.

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pale. The practice of charging depreciation on buildings and machinery varies. With this qualification, which Mr. Macalister states to be relatively unimportant, it will be seen that in both these estimates, interest on loans or debentures, or depreciation on planted area are omitted, but otherwise all items normally reckoned as costs are included. The estimates are as follows:

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<th>Average All-in Costs of Estates in 1922-23.</th>
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<td>Malaysia</td>
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In view of the different size and composition of the samples, the agreement between these estimates is close, and they can be taken as a reasonably accurate general measurement. So far as Malaya is concerned, an average cost of 5$d. may be taken as including some allowance for interest. But it would be extremely misleading to regard this as the true normal cost even at that date. The low prices of 1922 had led to the most drastic economies, and possibly to some over-tapping as judged by the commonly accepted standards. Some of these economies were undoubtedly genuine improvements in efficiency, but many took the form of reducing the normal expenditure on weeding and the general upkeep of the estate, increased tapping tasks, reduction of European staff, and such-like reductions of expenditure which at least on the standards of the time could have been regarded as temporary measures only. For the period 1921-22 Messrs. Syngenta put average costs in Malaya at 15$d., and Mr. Macalister at 11$d.; whilst in the period before the depression had begun they give 14$d. to 15$d. It would be quite misleading to regard this last-mentioned figure as representative of long period normal costs, and nearly as misleading to accept the figures for 1922 at their face value. In a period when costs are rapidly and greatly changing, the conception of long period normal costs becomes very hypothetical, but this is nevertheless the measurement we require in reference to the fixing of the pivotal price under restriction. Very broadly, average normal all-in costs in Malaya in 1922 may be put at 10$d. Similar considerations would apply to the figures for Ceylon and the Netherlands East Indies, which latter have been included as some evidence of the point, made on p. 21, that costs...
in the N.E.I. were not below those in Malaya at this period.

Taking 2fl. as the general level of costs in Malaya during 1928, gives an estimate by a high authority of the full production, which is now necessary to estimate what these costs would be on a restricted output. The Report by the Parliamentary Under-Secretary of State for the Colonies on his visit to Malaya, Ceylon and Java during 1928, gives an estimate by "a high authority" from which it appears that the cost of 8d. on full production would be increased to 10s. 7d. on an output restricted to 60 per cent. This scale of increase tallies closely with such other information on the subject as I have been able to collect. In other words, it is estimated that the cost of 8d. per lb. for the minimum export tax imposed under the restriction legislation. This leaves a margin of 2fl. for profit at the pivotal price, but the pivotal price applied to standard quality sheet, and since no estate can avoid the production of a certain proportion of lower quality sheets, no estate would therefore realise a price of 11s. 3d. for the whole of its production; the average price obtained by an estate would not exceed 11s. 2fl. per lb. under the most favourable and efficient conditions of production and management. The real margin of profit would therefore be more than 2fl.

Statistics issued by the Rubber Growers' Association show that at this period the issued cost of 27 companies was 8s. 2fl. per planted acre. On such a capitalisation of profits of 2fl. per lb. would mean a return of barely 5 per cent.

It must, however, be remembered that the figures of cost which we have considered above are average and not marginal. Mr. Maclaren's average was 8s. 3fl. per lb. for 173 companies in Malaya; the distribution of their individual costs was as follows:

- 11 were just below 6fl.
- 20 were between 6fl. and 7fl.
- 37 were 7fl. to 8fl.
- 43 were 8fl. to 9fl.
- 20 were 9fl. to 10fl.
- 20 were 10fl. to 11fl.
- 14 were 11fl. to 12fl.
- 3 were over 12fl.

Raising these figures by about 2fl. to conform with the probable normal cost, and adding another 3fl. for the increase in costs on a restricted output and for the export tax, it is clear that the 27 companies whose costs in the above table are shown as over 11fl. would hardly pay their way at the pivotal price; these 27 companies amount to over 15 per cent. of his sample. On the basis of a restricted output, marginal costs in Malaya were certainly not much below 11s. 3fl. in 1922-23, and the pivotal price could not have been fixed much lower. If the existence of the marginal estates was to be preserved the Stevenson Committee's idea of a "satisfactory margin of profit," therefore, appears extremely modest, and from the point of view of foresters is not attractive; it seems a pity that they did not rest their case on the necessity for preserving the marginal producers; presumably they felt it necessary to make their scheme appear as attractive as possible to the producer, and of course the bulk of the industry would make small profits, while the lowest-cost producers might obtain a return of 10-15 per cent. Moreover, the Committee could rightly anticipate a tendency for costs to decline, since every year the proportion of mature acreage would tend to increase. Stress must, however, be laid upon the point that the above analyses and computations of costs of production rest upon the statistics of 1922-23, that these statistics then appeared to represent the result of drastic economies such as could not be indefinitely maintained without prejudice to the future, and that, therefore, true long period normal costs must be regarded as definitely higher. Actually this was not to prove a correct hypothesis. An examination of the cost figures of representative estates shows the very great reductions achieved in 1921 and 1922, but there is little or no tendency for costs to rise during 1923 and 1924. Under the spur of adversity, the industry brought down costs to a new low level, and assisted by the increasing capitalisation of fixed assets which was held, at least until prosperity returned in 1925, the purse strings were once more automatically, and in a sense, scuriously, loosened. This unexpected maintenance of economies was not in any way the expense of the future. The technique of production was changing, and it was found that many expenses which had been thought necessary, but which were temporarily foregone in 1922, could be dispensed with wholly or in part without detriment to efficiency. Hence in actual fact, though many estates incurred heavy losses in 1922, very few made losses in 1923.
and practically none in 1924, even though the price averaged little more than 15. 1d. It is, of course, possible that the Stevenson Committee foresaw the permanence of the low level to which costs were being reduced in 1922, and were really basing their idea that a pivotal price of 15. 3d. would give a satisfactory margin of profit, on this expectation. But this seems most unlikely, for few producers will deny that they were surprised at the continuance of low costs during 1923 and 1924. The reduction in costs as compared with 1920 was so great that it seemed that it must be looked upon as sub-normal, even though, of course, as each year passed the proportion of tappable acreage to total acreage was increasing on most estates. Allowance for this factor could have been, and probably was, made by the Committee, but that they realised the permanence of the 1922 level of costs seems highly improbable.

The Committee therefore seem to have opened their scheme quite unnecessarily to attack by the American manufacturers on the ground that the pivotal price was fixed too high. The defence, which was subsequently developed by some of the leaders of the industry, that a profitable level was necessary to stimulate new planting, and that new planting was necessary in the ultimate interests of the consumer, was not of a very convincing character. The most that could be anticipated was that the lower cost estates would continue some planting up of their reserve land, using their reserves for the purpose. Such extensions can be carried out at a cost per acre far lower than would be the cost per acre of establishing a new estate with factory buildings, coolie lines, etc., and probably a good deal of road-making. Such planting as did take place during 1923 and 1924 was indeed the planting of extensions, but it was on an insignificant scale. The Stevenson Committee cannot have failed to realise that it would be impossible to raise large amounts of new capital in the open market so long as the price remained at 15. 3d. New planting is naturally never undertaken on any large scale, whether in the form of new estates or even considerable extensions to existing estates, so long as the shares of existing companies with estates of average efficiency can be bought up at a price considerably below their equivalent in terms of the capital costs of new planting, in other words, so long as the current value of the existing acreage is below the costs of new planting per acre. This was undoubtedly the situation in 1922, for current share values had slumped heavily, and unless the pivotal price gave really satisfactory profits to existing producers, there was little probability of existing shares rising to the required extent, especially in view of the fact that during the boom of 1919-20 capital values had in many cases been directly or indirectly inflated to a considerable extent. If a price level of 15. 3d. was going to stimulate any considerable new planting, that stimulus was obviously stronger in respect of the Dutch than of British producers. Even though in 1922 costs in Java seem to have been rather higher than in Malaya, those costs would not be swollen by restriction, and a price-level of 15. 3d. would provide the Dutch with a satisfactory margin of profit. The question, indeed, arises whether, in the ultimate interests of the Dutch plantation industry, the pivotal price should have been set lower, even if that meant the bankruptcy of a number of the highest cost Malayan producers. The lower the pivotal price, the less the profits of the Dutch, and therefore the less the probability of any substantial new planting to the detriment of Malaya. But, as has been remarked in the previous section, the Dutch did not view the future as too satisfactory, even when restriction had been imposed and they found themselves in the relatively comfortable position of outsiders, and the Committee were probably right in concluding that the likelihood of heavy planting by the Dutch estates was not so great or so serious a matter as to justify the bankruptcy to the marginal British estates which was involved in any pivotal price lower than 15. 3d. In all the circumstances, little fault can be found with the initial selection of that figure; it was not unnecessarily high, nor was there any necessity for it to be lower.

(c) The Assessment of Standard Production in Malaya.

The assessment of estates over 100 acres was performed by special committees of planters; that of estates under 100 acres was carried out by the ordinary District Officers of the Malayan Civil Service, each for his own district. A right of appeal to the Central Advisory Committee was allowed to the owners of all
estates and holdings in excess of 25 acres, but the District Officer's assessment was final for holdings below this limit. It will therefore be convenient to consider the assessment of the two divisions, above and below 100 acres, separately.

For the first year of restriction, November 1, 1921, to October 31, 1922, returns were obtained from all estates of their production during the year ending October 31, 1920, and these were used by local Assessment Committees as a general basis and rough guide. Returns for a more recent period could not be used, as in 1920-21 voluntary restriction was general, and a number of individual estates were restricting to some extent in 1922. Allowances had therefore to be made for new areas which had come into bearing since 1920, and this was done according to a scale of output per acre by dates of planting, which had been drawn up by the Duncan Committee in 1921 with reference to their proposed scheme of restriction. Allowances had also to be made for the greater maturity of the younger trees, on which tapping had but recently commenced in 1920. The production records were therefore only, so to speak, a starting-point: the modifications which had to be made were very large, as may be seen from the fact that the total standard production of Malaya for the first restriction year was assessed at about 75,000 tons more than the total exports in 1919-20. But it must be remembered that the business of making these assessments had to be done in a great hurry, and it was impossible to check the statements sworn statements with regard to each estate. It did effect such a reduction, but this was little doubt that many estates claimed and obtained more than they should have done: and this was soon realised. The making of assessments for the second restriction year was entrusted to a Central Assessment Committee of planters. This Committee came to the conclusion that a universal scale of output according to date of planting would be both fairer and more accurate than specific reference to actual output in one particular past period, as some estates might have been pursuing a more conservative policy of tapping than others, who would thus obtain undeservedly large quotas. The Committee also felt that the Duncan scale was, in general, too high from the point of view of preserving the productive capacity of estates in the future, and this was rightly regarded as a most important principle. Accordingly, a new scale of output was formulated. This compares with the Duncan scale as follows:

<table>
<thead>
<tr>
<th>Duncan Scale, lbs. per acre</th>
<th>New Scale (1920-21), lbs. per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Year of Tapping</td>
<td>110</td>
</tr>
<tr>
<td>2nd</td>
<td>160</td>
</tr>
<tr>
<td>3rd</td>
<td>200</td>
</tr>
<tr>
<td>4th</td>
<td>240</td>
</tr>
<tr>
<td>5th</td>
<td>300</td>
</tr>
</tbody>
</table>

Special allowances up to a maximum of 400 lbs. per acre were made in the case of estates which proved that their system of tapping was lighter than a standard system adopted by the Committee, while deductions were made if the tapping system of an estate was heavier than this standard. Estates which proved that on the standard method of tapping their trees would not yield as high as the new scale, might receive an allowance on this score.

"The new scale reduced the standard for trees in their first year of production, and fixed lower maxima. On the other hand, additional areas must necessarily have come into bearing since the first year of exports regulation, and the areas assessed at 120, 180, and 240 lbs. in the first year fall into later age classes and rank at 180, 240, and 300 lbs. respectively in 1923-24. The F.M.S. Advisory Committee estimated that the new rules would give a total standard production less than that which would have resulted from the continuance of the old rules. As Mr. Maclaren, writing almost simultaneously with the change, pointed out, this did not necessarily mean an actual reduction in the total standard production. Actually, however, it did effect such a reduction, but this was probably mainly due to the much greater care with which assessments were made for this second year of restriction. Very detailed sworn statements with regard to each estate were demanded before an assessment was granted, and where the Committee had any grounds for doubting the accuracy of the figures supplied, inspection was insisted upon. Even so, Mr. Rex adds that "at the start there is little doubt that a certain amount of rubber was purchased in excess of the standard, but this was very probably due to over-assessment, whatever may have been the heart of the matter. But a leading Assessment Committee point of view of preserving the productive capacity of estates in the future, and this was rightly regarded as a most important principle. Accordingly, a new scale of output was formulated. This compares with the Duncan scale as follows:

1 Including also estates between 25 and 100 acres; these were used by the District Officers.
2 I.e., including estates under 100 acres.
was concerned, most of these errors were corrected, and the figures for the planted area undoubtedly attained a high degree of accuracy."

The great and unexpected increase in yields since the removal of restriction suggests the possibility that standard production was very much under—rather than over—assessed. The subject of this great increase in yield will be more fully discussed later on, but it seems advisable to anticipate here the conclusions there reached, namely, that in the case of cultivation, tapping, etc., which were introduced during the restriction period, and particularly perhaps during the later years. In the sense that in the later years of restriction Malaya could have produced more than the assessed standard production, it may be said that there was under-assessment. But the gradual rise in the potential yield, concealed so long as restriction lasted, was very little suspected even by the managers of estates, and in any case standard production was assessed on an essentially theoretical basis, and the accuracy of its assessment must be judged according to this basis. So judged, it is still possible, perhaps even probable, that there was some under-assessment. On this matter the opinions of estate managers or directors are altogether untrustworthy: every one of them complained that he was under-assessed and his neighbours may have felt in his heart of hearts. But a leading member of the Assessment Committee pointed out to me in conversation that the case of the Chinese estates was "If in doubt, reduce his assessment," and that the average estate manager was not a skilled presenter of a case. "It means to us," he remarked, "often have been different if there had been specialist lawyers to plead for estates, instead of the managers writing letters in the strain, 'I think this is very hard on us.'" The point merits considerable attention in respect of the making of assessments or quotas under all kinds of artificial control schemes. Hence some part of the thousands of pounds by which the Committee used to reduce preliminary claims, may not perhaps have been justly assessed. It should be added, however, that the speaker quoted above was convinced that the degree of under-assessment was not really appreciable. It must, indeed, be realised that the Committee had to deal with many claims which, though not meeting the appellation fraudulent, were nevertheless constructed by persons who were prepared to sail pretty close to the wind.

A leading Chinese planter, however, complained to me that the Chinese estates as a group were assessed more severely than the European estates. He pointed out that few of the Chinese owners can speak English, and were therefore on that account at a definite disadvantage in answering the questionnaires, while it was very significant that appeals by Chinese estates nearly always failed, while a large percentage of European appeals succeeded. It would be idle to deny outright the possible force of this argument, but at the same time his feelings are very similar to the feelings of European planters, most of whom maintain that the District Officers dealt more kindly with the Malay small-holdings than the Assessment Committee dealt with estates. Further, it must be remembered that even the larger Chinese estates were not conducted according to the same methods of planting, cultivation, tapping, etc., as the European estates, at any rate in 1922, though there has been a rapid process of approximation since then. Chinese rubber cultivation comes, so to speak, half way between the European and the native Malay technique. With their more drastic tapping, closer planting, etc., the Chinese estates in the absence of restraint would almost certainly have produced more than their standard production as assessed, at least for a time, and in this sense assessment according to European standards certainly involved a more severe restriction for a Chinese than for a European estate in the same way as it bore still more heavily on the Malay small-holdings. Personally I am inclined to think that this is the real substance of the Chinese complaint, and to doubt whether the Assessment Committee showed any discrimination against the Chinese estates when administering their duties as laid down by the Government regulations and decrees. Whether those decrees should have taken account of the differences of the Chinese and European estates is another matter; the assumption was that the European technique was the better in the long run, and while a definitely disputable point, the extent to which the Chinese have increasingly copied European methods is at least some evidence, though by no means conclusive evidence, that the Government were justified in, so to speak, imposing European standards on the Chinese estates. This, however, does not alter the fact that the imposition of those standards meant a rather heavier burden on the Chinese at the time.

It may therefore be concluded that the determination of the standard production, and

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"Assist owned estates over 100 acres are almost entirely Chinese owned, and are estimated to form about 15 per cent. of the total planted acreage in holdings of 100 acres and over in the F.M.S. (Rubber Statistics of the F.M.S. 1929.)"
the assessment of individual estates, was in general accurately and fairly carried out from the second year of restriction onwards. The standard production did represent potential production on the somewhat theoretical but essentially reasonable basis which was adopted, and there was no deliberate, nor much chance, discrimination between individual estates. The former conclusion, however, does not apply to the last year of restriction, and though breaking our rough chronological order of treatment, the assessment of standard production in 1927-28 will be most conveniently considered here. The position in the autumn of 1927 was that though the exportable percentage stood at the legal minimum of 60 per cent., yet the price had fallen much below the new pivotal level of 15.00, and was still obstinately falling. If the pivotal price was to be restored, still more drastic restriction was obviously required, especially in view of the existence of a large volume of unused export rights. It is now hardly a secret that while many producers wished to reduce the percentage to 50 per cent., the Colonial Office was unwilling to make the necessary revision in the regulations, even though the pledge of October 1926, that no further alterations would be made for twelve months, would have expired. The R.G.A., therefore, got round the difficulty by persuading the Advisory Committee in Malaya to discard the 1923 scale of output, and to make the basis of assessment a much lighter standard system of tapping than that which had been used in 1927. The result was to cut down standard production, as it would have been assessed on the previous scale, by about 10-15 per cent.; actually the total standard production was reduced by 20,000 tons as compared with 1926-27; at 314,000 tons it was approximately the same as in 1925-26. This is a somewhat ungracious justification for this change in the method of assessment that the standard production of 1926-27 had not in fact been produced even when the exportable percentage was 100, as is shown by the accumulation of unused export rights. In Malaya this failure to produce the standard production is ascribed either to shortage of labour or to the fact that estates deliberately refrained from increasing their labour staffs too much in view of the rapid fall in price, and therefore the probability that the exportable percentage would be again reduced; in other words, they preferred to accumulate unused rights in the hope that sometime the price would rise again. Hence in Malaya the whole business was, and still is, regarded as essentially a wangle. The London view was rather different; undoubtedly certain interests genuinely believed in the value of this still more conservative tapping system, and thought that its introduction at this stage would kill two birds with one stone, by forcing the unbelonging majority and also helping restriction. But so far as the former objective was concerned, the plant in its present state was unlikely to make any change in their actual methods of tapping, and merely rested more areas. This was the last year of restriction, the standard production was far removed from even a reasonable potential production as it was conceived by a majority of the industry.

So much for assessment problems in respect of estates over 100 acres. As has been said, the District Officers were responsible for all holdings under 100 acres. In making the assessments for the first year, returns were obtained from the owners of over 25 acres, similar to those obtained from the larger estates, but this procedure was of course impracticable for the far more numerous smaller holdings of the Malays. Reference has already been made to the census of 1921, and this was used as a basis for determining the acreage and the date of planting; assessment was then made according to the Duncan scale. The method of taking this census, and a brief appraisal of its accuracy, is given in his introduction to the "F.M.S. Statistics Relating to Rubber, 1929." He there points out that while the total planted area as shown in the census was probably a close approximation to the truth, this does not exclude the cancelling out of opposite errors in respect of different districts and of individual holdings. When these census returns were used for assessment purposes, the following results were obtained: the number of returns was very large indeed, and this is hardly surprising, for, when confronted by this mass of figures, the Malays had no idea of the object of the inquiry, and therefore did not know whether to exaggerate or minimise. To tell the truth would in such circumstances be mere weak-mindedness, and therefore the figures for individual holdings were in general extremely inaccurate, and it was soon realised that there must be a general check.

In the autumn of 1923 this checking was started by two distinct classes of official. The first were the District Officers himself, who had a wide knowledge of rubber estates, and who had not visited in 1923. The other were the smallholders, who hopefully, being of course in the main non-Europeans, were regarded as essentially a wangle. The London view was that the check should be made in 1924, as the 1923 scale of output was the first time the native could sell, and from February 1, 1924, all exports had to be made according to the 1923 scale. But the meaning of the word "check" was crystallised at the meeting of the F.M.S. Rubber Committee on the 2nd May, 1924, at which it was decided that the check should be made by one-third of the total area; if one-third of the area had been made according to the Duncan scale. But the meaning of the word "check" was crystallised at the meeting of the F.M.S. Rubber Committee on the 2nd May, 1924, at which it was decided that the check should be made by one-third of the total area; if one-third of the area had been made according to the Duncan scale, it was suggested that the rest be made by the census returns. But it soon became evident that the check would be made by one-third of the total area; if one-third of the area had been made according to the Duncan scale, it was suggested that the rest be made by the census returns.
started by two distinct classes of inspectors; (a) the nominees of local planters’ associations who received a fee to cover their expenses, and (b) the subordinate Malay officials from the local government service, who were taken from their proper jobs as they could be spared, and sent out to inspect. The small-holders naturally felt that the former were biased judges, and in any case their assessments were made strictly on their own standards on European cultivation, etc., a good deal of bad feeling was thus aroused. The Malay officials had no bias, but their check was unreliable on account of the possibilities of bribery. There was no double check. At the end of 1923 the Government started the formation of a staff of European supervising officers. This staff was recruited mainly from unemployed planters, and some of them were not entirely trustworthy. They had to deal with large areas, and in the main they were therefore employed in investigating appeals by the small-holders against their assessments; only a small minority of their inspections were made directly at the instigation of the District Officers.

Probably not until 1926 could it be said that as the result of frequent checks and re-inspections the assessments of the small-holdings were correct. But the meaning of the term “correct” requires careful definition. For the first restriction year the native assessments were originally made, as has been said above, according to the Duncan scale. But it was soon felt that with the exportable percentage as low as 50, the quantity which the native could sell would cause serious hardship, and from February 1, 1923, until October 31, 1923, the native standards of production were increased by one-third, i.e., to 427 lbs. per acre for fully mature rubber. For the second year of restriction and until May 1, 1926, holdings under 25 acres were assessed on the basis of a maximum of 340 lbs. per acre for mature rubber (definition was trees 36 inches in girth at 3 feet from the ground), and 160 lbs. per acre for rubber in bearing but not mature, while if the yield of estates per acre actually being tapped was just 15% of the potential capacity in the long run. The only statistical information as to native yields at the beginning of restriction relates to 1920 and is limited to the F.M.S. These figures suggest that the yield per mature acre on native holdings was in the neighbourhood of 300 lbs., and the yield per acre of all tappable rubber 270 lbs., as compared with a similar figure of 380 lbs. for estates. At the close of the restriction period, Mr. Beale in his D.O.T. report, “officially” though “on the most reliable information available,” estimated that the average normal yield on holdings under 100 acres at 300 lbs. per acre. And yet in 1929 and 1930 these small-holders have actually produced at a rate of no less than 450 lbs. per acre! This suggests that the earlier statistics must have been wide of the mark, for the causes which have led to the great increase in the yield of estates per acre actually being tapped, e.g., better cultivation, etc., apply only in a very limited degree to small-holdings. Further discussion and explanation of these matters is given in Section VI.
again to, say, 350 lbs. per acre, we can conclude that during the restriction period European standards were applicable to native holdings, and that therefore they were not appreciably under-assessed. But if the small-holders succeed in permanently maintaining yields near the present level, then we must conclude that European standards were not applicable, and that there was very serious under-assessment in so far as the assessments were supposed to approximate to potential production, which was undoubtedly the case. Another year, or perhaps a little more, must pass before this issue can be determined, for it may be remarked that most European planters confidently prophesied a decline in yields during 1929, of which there has not been much sign, and yet all reports indicate the drastic nature of the small-holders’ tapping. It seems impossible that the present yield should be maintained, but at the same time it must be admitted that we are still without even reasonably reliable information as to what the rubber tree will stand under the methods of planting and the physical conditions of the Malayan small-holding.

Even if time shows the probability of serious under-assessment, however, this does not carry with it the implication that the natives actually suffered unjust treatment. The raising of the original first year’s assessment, and the operation of the subsequent scheme of allowances, probably went far towards making good any possible under-assessment of the standard production, while there was so much evasion of the law and so much imperfection in the actual working of the assessment machinery, owing to the absence of adequate checking, that the native had no grievance in practice. In the later restriction years, when assessments were reasonably correct and evasion difficult, the small-holder had made so much money during the boom that he could bear any such burden with equanimity. In 1926, for example, he was not troubling to produce even all he was allowed to produce. This whole question therefore, instead of being out the great difficulties which must inevitably ensue under any restriction scheme which necessitates the application of a common standard where two entirely different methods of production prevail, the native rubber holdings cannot be considered simply as small sections of a European estate; on the contrary, it is hardly an exaggeration to say that the only point of resemblance between them is that they both grow rubber, and everything else is just about as different as the form in which they respectively produce that rubber. The application of European or large-scale plantation standards to a native industry producing for the same market, might easily involve real injustice, and with some native races give rise to serious political trouble. The injustice might easily have been perpetrated in Malaya, especially in the absence of trustworthy statistical information, and it is at least comforting to be able to reach the conclusion that any such injustice as may have been done was certainly over-laid by other mistakes or imperfections in the working of the scheme.

(d) Smuggling and other Evasions of the Law in Malaya.*

Estimates of the maximum rate at which rubber was smuggled out of the Malayan restriction area range all the way from 10,000 tons a year to 50,000 tons, while the minimum rates are estimated at anywhere between 5,000 tons and 20,000 tons. The passage of time has not helped the historian in this matter, and the truth is that the exact importance of smuggling as a factor in the restriction scheme of 1922–28 is not and never will be known. The F.M.S. Government, though pressed by the members of the Federal Council, always declined even to suggest any specific figures, though it confessed to the opinion that “there is considerable leakage of rubber by smuggling throughout the Peninsula,” and that the smuggling was being carried on “mainly from Johore, and also Kedah.” In commenting on previous discussions of the Federal Council, the High Commissioner stated in November 1927 that “opinions differed widely as to the quantities of rubber grown in the Malay States which were thus evading control, but all were agreed that they were to be counted by hundreds of tons every month, and that rubber smuggling was rapidly becoming a highly organised industry which indubitably had a large financial backing supporting it.” The only other source of official information is the annual reports of the Controller of Rubber. Judging by the statistics of convictions for smuggling, and of the number of boats and amounts of rubber captured, it could be estimated that during the first two restriction years, and reached a peak during the
high prices of 1924-25. The next year there was a "very marked decrease," due largely to the 100 per cent. release, or in other words to the fact that Malaya could not produce the full standard production as assessed. With the re-introduction of effective restriction during 1925-26 there was "a marked increase" and "smuggling was more highly organised," and "particularly active" from March to June 1927, though in November and December there was a distinct falling off. During the first two months of 1928 smuggling was less than in the corresponding period of 1927, and when the price dropped on the appointment of the Civil Research Committee to inquire into the future price which affected the volume of smuggling was above is. The further drop in price when the coming termination of restriction was announced in April had the result that "smugglers no longer found it a paying proposition to carry on their activities," and from May 1 the preventive launches began to be gradually withdrawn. It is thus clear that with the price of rubber above say, 16.6d., it was the degree of restriction rather than the price which affected the volume of smuggling — in other words, it paid to smuggle while rubber was above 16.6d., and the real limitation on the extent of the smuggling was the difficulty of getting supplies to smuggle. Of course the high prices of 1924-25 must have stimulated the degree of its profitability was not the important factor, so long as it was reckoned profitable at all. The supply of potential smugglers seems therefore to have been great. The trouble was that with a high exportable percentage the supply of rubber for them to smuggle was relatively small. This is a point of some importance in the technique of artificial controls in any way similar to rubber restriction ; the volume of smuggling may not be a factor, but the price level of the commodity; on the contrary, if the price under restriction is sufficient to induce the smuggling of one ton, it may well induce the smuggling of all the tons which can be obtained for the purpose. The supply curve of smuggling may apparently have a very unusual shape!

There can be no doubt that smuggling was a quantitatively important factor. At the meeting of the Federal Council on August 8, 1927, Mr. Egmont Hake explained in some detail the reasons which led him to believe that the total quantity of rubber smuggled from Malaya was at the rate of at least 24,000 tons a year, "so long as the legitimately exportable percentage is low. He put forward this figure as one which a reasonable person would accept, though he inclined to the view that it should really be much higher than this. He argued that "Johore is smuggling to the fullest extent of its wishes," and that "if the whole preventive organisation in that territory were closed down, it is very questionable to my mind whether the quantity smuggled would be appreciably larger than it is." His general summary was as follows: "Smuggling has been going on for three years, in varying degrees according to the export percentages, and some 40,000 to 50,000 tons must have reached the market during that period, which, as he remarked, must have made a great difference to the price of rubber and the whole working of restriction.

As the result of my own investigation on this problem, I am inclined to the belief that Mr. Hake's summary is a closer approximation to the truth than estimates either of a much higher or of a much lower order of magnitude. In my opinion, therefore, smuggling was a matter of very definite importance but not of anything approaching the crucial importance which some have believed. Whether it need have been so is another question. As has been said, the main source was the State of Johore. The fact that the maximum penalty in Johore was only six months' imprisonment, as compared with two years in the F.M.S., was a minor factor. The real trouble was that the Sultan made little attempt to enforce restriction until, in the summer of 1927, Sir Hugh Clifford, soon after his appointment as High Commissioner, visited him for a friendly talk on the subject. The "distinct falling off" in smuggling at the end of 1927, as reported by the Rubber Controller, was undoubtedly mainly due to this conversation. There seems little reason, however, to suppose that such steps would not have been taken at an earlier date, even if allowance be made for the somewhat delicate relations between the British Government and the nominally independent rulers of the native states, and for the fact that Sir Hugh Clifford was peculiarly well qualified for such a task.

It must be admitted, nevertheless, that even if a strong line had been taken in Johore, smuggling would still have been a serious difficulty. In the main, the smuggling was not done from recognised ports, i.e. with the connivance of the customs officers, though in 1926 the Rubber Controller reported the discovery of extensive fraud on the Johore-Malacca borders in which there was collusion between native Customs Officers and smugglers, seven of such Officers being sentenced to twelve months' rigorous imprisonment each." This was certainly no isolated instance of moral failure on the part of native Customs Officers, but in the main the smuggling was done from...
the innumerable rivers and creeks which make up the west coast of the Malay Peninsula. This, and the existence of similar facilities on the Dutch Islands, as well as the facts of their proximity, and of the relatively calm waters of the "Shallow Seas," combined to make ideal physical and geographical conditions for the smuggler. Another difficulty was that of providing a really deterrent penalty. It was only the small fry who were caught, and though the fines imposed were so enormous relatively to the customary income of these men that the alternative of two years' imprisonment was virtually always the actual penalty, yet they could face this with reasonable resignation, because their families are said to have been well looked after by the man for whom they had been smuggling, and an extremely handsome solatium was awaiting their release from prison. Nothing short of capital punishment, if that, would have exceeded. For it seems doubtful could probably have been kept within reasonable short of capital punishment, if that, would have awaiting their release from prison. Nothing tinct from the petty operations of native fisher-cultivators of the problem, however, smuggling had been a real deterrent! Despite all the difficulties of the problem, however, smuggling could probably have been kept within reasonable bounds if the original pivotal price had not been greatly exceeded. For it seems doubtful whether smuggling on the grand scale as distinct from the petty operations of native fishermen on their own initiative, would have been worth while at prices below 1s. 6d., and though the degree of restriction rather than the price was the controlling factor, yet undoubtedly the extremely high prices of 1892 did stimulate the building up of highly organised large-scale enterprises, and, having been perfected, their operations were continued even after the price had fallen much below the level required to bring them into existence in the first place. The potentialities of smuggling must always be considered by the makers of restriction schemes.

Other forms of evasion may conveniently be considered here. It must be realised that every European estate, every Chinese estate, every Malay small-holder, and every Asiatic rubber dealer responsible for the restriction legislation was unfair to himself individually and therefore fair game for exploitation and evasion in his own interest. The Chinese estates, unfortunately from their point of view, found the opportunities restricted, and their principal opening was in the matter of assessments, though even that provided little scope after the first year. But some of the Chinese estates discovered that various tricks could be played with export licenses. One example may perhaps be given. An export license was a paper divided into two parts, the top half containing particulars of the estate and the amount of rubber exportable during the quarter, and the lower half a blank for the entry of the shipments as they were made. The holder would by one means or another obtain an unfilled spare form, and when the lower half of his original form was filled with entries amounting to his exportable allowance, it was carefully torn off, and the top half of the original would be joined with stamp paper, the blank lower half of the spare form, the top half being torn off and thrown away. This form and mended document would then be submitted with some such explanation as "A terrible thing nearly happened, tuan. My boy was just tearing up this license, and I only just got the pieces in time." It realistically done, little could be said—at any rate on the first occasion.

Quantitatively, however, such tricks were of little importance. The possibilities of the "fair game" were, however, enormously greater in respect of the export coupons issued to holders of less than 100 acres. These were virtually, though not legally, negotiable documents, so to speak payable to bearer, and at the beginning of restriction they were printed by the Survey Department of Malaya, and accepted without any safeguards, no attempt being made to trace their antecedents or their history. There was certainly a large number of forged coupons in circulation during the first year or two, though no figure can possibly be ascertained. The trouble, however, was so well recognised that later the firm of De la Rue was called upon to do the printing, and the same sort of care was taken as with Bank of England notes. Each coupon bore a serial number, and as they were collected by the Customs Officers at the ports, they were returned to a central office in Kuala Lumpur for checking. Any dealer who handed to the Customs a coupon which this checking later proved to be a forgery, was held responsible; this made it still possible to tamper with the rubber stamps, but it was made much more difficult to get the pieces in time. If realistically done, little could be said—at any rate on the first occasion.

Many other forms of evasion have, of course, been evolved a more elaborate system of records of the hectarage of each estate, so that the holder of a coupon could be traced. The trouble, however, was so well recognised that later the firm of De la Rue was called upon to do the printing, and the same sort of care was taken as with Bank of England notes. Each coupon bore a serial number, and as they were collected by the Customs Officers at the ports, they were returned to a central office in Kuala Lumpur for checking. Any dealer who handed to the Customs a coupon which this checking later proved to be a forgery, was held responsible; this made it still possible to tamper with the rubber stamps, but it was made much more difficult to get the pieces in time. If realistically done, little could be said—at any rate on the first occasion.

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We shall not go into the performance of their proper normal duties, and though undoubtedly the vast majority adequately performed the additional duties laid upon them by the restriction legislation, few went out of their way to add voluntarily to their burdens in this respect. Some few, however, took the line that they were being asked to administer an absurd and impossible legislation, and that the sooner it damned itself the better, while more were inclined to adopt the attitude, if you will have such a scheme, this is only the sort of thing you must expect.

The scope for evasion and fraud varied therefore in different districts, but it should be realised that even the most complete precautions could not prevent the buying and selling of coupons which began in 1928, when the percentage exportable rose to 10 and production failed to reach the assessed standard. This new line of merchandise developed everywhere on quite a substantial scale. The Asiatic money-lenders, shopkeepers, and so on, as well, according to general report, as some Europeans—bought up coupons from the small-holders as a speculation on restriction being tightened again in due course; the customary buying price was half the current value of the rubber which the coupon represented, and the buyers hoped to resell at the full current value when in due course the small-holder’s exportable allowance was again reduced below what he desired to produce. The possibility of the failure of production to reach the assessed standard was never really foreseen: if it had been, pre-supposition mistaken. The producers as a body should have been on their toes, and coupons would have been valid for a definite period only.

Many other forms of evasion were attempted, but most of these were gravely unimportant. Sufficent has been said, however, to show how necessary it is that the designers and administrators of a restriction scheme should realise that even when the producers as a body are in favour of restriction, it is in the immediate interests of each individual to evade the scheme, and that the utmost precautions are necessary. It is a lesson which cartels in manufacturing industry have learnt by bitter experience, and when governments take a hand in the administration of restriction schemes, they should apply about the same standards as they would apply in the matter of heavy taxation, and the more law-abiding citizens should realise that the stringency of regulations and inspections is not only in the common interest, but is also a defence of their own interests against their morally weaker brethren.

The disquisition on the fallibility of human nature leads on to the consideration of an even more serious problem, that of bribery and corruption. It is necessary to consider this unpleasant subject, because it is a very important factor in the pros and cons of artificial control in practice, especially if the government service is in any way concerned. It is a subject on which exaggeration is as easy as it would be mischievous, on the other hand it would be the greatest disservice for a student of restriction schemes to play the ostrich game in this matter.

In the case of rubber restriction, it must be realised that the subordinate officials of the Civil Service of Malaya are mostly Malays, and that in the ordinary way a “grant” of a small kind is general with all Asiatic officials. Actually, in the ordinary business of government, the native clerks, etc., can do little beyond hastening or retarding very slightly the business of a particular person, who in most cases probably realises this well enough, but they nevertheless receive “palm-grease” all the time from native applicants, because the practice is so deep-rooted in the Asiatic mind. For example, in the law courts, the clerks receive such palm-grease, though the applicants know perfectly well that the British judge will not be influenced thereby one iota. In other words, it must not be supposed that graft was a thing unknown in the Malayan Civil Service before restriction was introduced. But when restriction appeared against this background, it brought this vital change, that in its administration there really was scope for the native officials to do something in return for a suitable present. For making a “clerical error” by writing 20 instead of 10 acres in an exportable which was made in return; probably in many cases native officials accepted bribes, but gave little in return. Nearly every District Officer during restriction complained that his staff were absolutely corrupted, but such complaints really imply that he could not trust any of his clerks, and not necessarily that he knew
that one and all of them were actually and repeatedly falling under the temptation. There is, however, little doubt that corruption was fairly widespread and general amongst the clerks in the district offices, and when these clerks were sent out in 1923 to check the assessments of small-holdings, their temptations were increased by the still greater scope for deceit and the still smaller risk of detection. Undoubtedly there was also an increase in corruption amongst the customs officials, while many people thought that there was a considerable amount of collusion between smugglers and the preventive launches, etc., though direct evidence of this is naturally not available.

It cannot, however, be said that corruption was confined to native officials. No one in Malaya has any doubt about the integrity of the regular British officials concerned with restriction. But considerable doubt arises in connection with the ex-planters and others, who were recruited as restriction officers to check the assessments of small-holdings, etc. From being "down and out," some of these men shortly adopted a standard of life far in excess of what their salaries would have provided. Circumstantial evidence alone is available, but there seems little doubt that many of them did accept bribes. Whether they did, in fact, give anything by way of a return, is another matter; it is said that some of them openly admitted that they accepted bribes, but at the same time stoutly maintained that they never gave anything in return. It is obviously very difficult in a country like Malaya to obtain a supply of entirely trustworthy Europeans to provide for such a temporary increase in the work of Government administration. Restriction meant that many estate assistants were discharged, deprived of their normal occupation by restriction, it was perhaps only natural that the morally weaker among them should make the most of the situation, and try and get one back on the cause of their discharge. Even the acceptance of bribes from natives was, of course, a very serious matter for the prestige of the Government administration.

Finally, there is the effect of restriction on the morals and morale of the native population in general, and on, in particular, the owners of small-holdings of rubber. Every small-holder tried to claim more than he should, and the absence of any adequate check on their statements during the first year or two provided a great temptation both for the small-holders themselves and for the headmen of villages. Again it must be pointed out that many European estates would have done the same, only their opportunities were so much restricted,

just as many people in England have few scruples about cheating railway companies or customs officers, and many more would do so if the odds appeared more favourable. The real importance of this type of dishonesty on the general morals of the community can be easily exaggerated, but it is obvious that every honest fisherman in Malaya was corrupted for life by turning smuggler when that temptation became a pressing problem for the Government. With the end of restriction the potential sphere of corruption narrowed immediately to its formerly relatively unimportant proportions, and those District Officers who feared the worst are now the first to admit that the demoralising effects of restriction on the native civil service and in the Malayan villages have passed away with unexpected rapidity, leaving no permanent scars. But while restriction lasted, the trouble was undoubtedly widespread and serious, and it seems unlikely that it would have cured itself, however long restriction lasted and whatever remedies were applied. Bribery and corruption must be reckoned a definite item on the debit side of all restriction schemes, especially those involving Government administration, though doubtless its precise importance would vary considerably in different countries.

(4) The Revision of 1926.

A good deal has already been said, incidentally to discussions on other subjects, concerning the attitude of the British Government and the industry during the price boom of 1924. The view has been expressed that the British Government was right not to sanction additional releases unless it was prepared to abandon the mechanical basis of restriction altogether, because any interference would have destroyed the great advantage of a mechanical basis, namely, that at all times the purpose of the Government can be foreseen and limited and the nature of the control. At the same time it was inferred that the British Government would not do it on its own accord, because any interference would have destroyed the great advantage of a mechanical basis, namely, that at all times the purpose of the Government can be foreseen and limited and the nature of the control. It must, however, be made clear that for practical purposes such action would have virtually necessitated the abandonment of restriction altogether, for it can be regarded as certain that neither the Government nor the industry would have been prepared for indefinite continuation of an arbitrary scheme. These conclusions should not, however, be pressed to extremes, but doubtless it would have been feasible to reintroduce a mechanical scheme for a short period, say a year or so, if an immediate termination of restriction had been deemed proper by the British Government. Similarly it is not pretended that by lessening restrictions to 75 per cent further releases existed in February 1925, but the percentage expected to have been obtained was 100 per cent, and it is obvious that even if it had been possible to stop the flow of supplies of rubber then, and this is a point which cannot be pressed to extremes, the Government would have been left in a position of great advantage both for itself and the industry. It is, however, little doubt that corruption was considerably widespread and serious, and it seems unlikely that it would have cured itself, however long restriction lasted and whatever remedies were applied. Bribery and corruption must be reckoned a definite item on the debit side of all restriction schemes, especially those involving Government administration, though doubtless its precise importance would vary considerably in different countries.
of restriction had been deemed undesirable. Equally it is not pretended that the additional 5% per cent. release granted in February 1926 so as to bring the percentage exportable to 100, really constituted an abandonment of the mechanical basis of regulation. But if a year previously, when it was clear that the price was getting out of control, the percentage exportable had suddenly been increased from 55 to, say, 80, which was sort of action necessary to remedy the situation, that would have seriously, and so to speak permanently, undermined mechanical regulation. No such action was, however, taken, and speculation as to the possible policies which might have been pursued if it had been taken, must give place to a consideration of the situation as it actually was in the spring of 1926.

Briefly, the central facts were that full production had been nominally restored just when the supplies of rubber coming forward were beginning to outstrip the current rate to which demand had been reduced by the results of the boom, namely heavy manufacturers’ stocks, an increased use of reclaimed rubber, and a temporary decrease in consumers’ requirements as to bring the percentage exportable to 100, and therefore critical conditions comparable to the 1921 situation would ensue. But it was also reasonable to suppose that the expansion in the motor industry and the generally high level of prosperity in the U.S.A., which showed no signs whatever of any check, would before very long result in a resumed increase in rubber consumption. Further, at that time there seemed little likelihood that the price of crude rubber dropped to 15, though admittedly this view would probably have proved erroneous. Bearing in mind also the depletion of the world’s stocks, a strong case could have been made out, even at the time, for supposing that conditions of excess supply would not have continued for long, and that equilibrium might have been achieved in, say, eighteen months’ time. Looking backward, such expectations appear even more reasonable, for even in respect of reclaimed rubber, it was the continuance of relatively high prices for crude rubber which accustomed the American manufacturers to the extensive use of reclaimed, and thereby taught them its virtues so much more quickly than would otherwise have been the case. It may therefore be concluded that restriction could have been terminated in the spring of 1926 without causing producers a greater loss than they should have been able to bear, especially if account be taken of the opportunities of accumulating the reserves which they had enjoyed during the boom. From the rubber manufacturers’ point of view, a rapid decline of price to 15, or under would have been extremely awkward in view of the large stocks bought during the boom, and of the forward contracts which many of them had made. But such difficulties could have been much reduced by organisation on their part along some such lines as did in fact take place, and in any case it may be doubted whether the termination of restriction in 1926 would have involved them in losses more serious than those which they actually incurred in 1928. Taking all things into account, the American rubber manufacturers would not have had any really substantial ground for serious complaint.

If, however, the risks of summary termination seemed too great, the obvious alternative was to continue restriction with, if anything, a reduced pivotal price, say 15, and in general such modifications as seemed calculated to bring it to as successful an end as might be within two or three years. For in 1926 the information available concerning the new plantings of Dutch native rubber was at least sufficient to point unmistakably to the absolute necessity of terminating restriction in British territories before these plantings reached maturity. The game was up, and the failure of the Colonial Office and the R.G.A. to realise this far more fully than they appear to have done, is one of the several mysteries in the history of rubber restriction. This failure will later be considered in more detail, but while it was undoubtedly a factor of importance, it was not of decisive importance. For even if the necessity to terminate restriction at any early date was not appreciated, it is now clear that there was no possible justification for the raising of the pivotal price from 15, $d., to 15, $d. This matter is still wrapped in more or less impenetrable mystery. It is known that some leaders of the industry, both in London and in Malaya, emphatically condemned the move at the time,
while many more were extremely uncertain as to its wisdom. It is not known whether the London Advisory Committee was formally consulted on the matter, and if it was, how the voting went. It seems fairly certain that the Government of Malaya neither proposed any such scheme, nor were consulted by the Colonial Office. The only official information on the subject is contained in the speech of the Secretary for the Colonies during the House of Commons debate on the termination of restriction. The relevant passage is as follows:

"The conclusion we came to then, rightly or wrongly, was not to abolish the scheme, but to endeavour to make the scheme more elastic. We approved of a substitute scheme giving wider steps and enabling the control to adjust itself more rapidly to the rise and fall of prices. At that stage you could also alter the pivotal price."

"From first to last I was in close touch with Lord Stevenson as chairman of the advisory committee, and, as I understood, he was either formally meeting or informally keeping in the closest and continuous touch with the members. I also personally attended more than one meeting of that committee. I will say this: The general view of all those I had to deal with, and as reported to me by Lord Stevenson, as well as one of the great American consuming interests, was that the essential thing was stability, and that to declare, when the price for over a year had been well above £s., that £s. was our pivotal figure would have no relation to reality at all. At that time large forward contracts were being made for long periods, and, more than that, being refused at over £s.. At that time it seemed entirely proper and reasonable, if you wished to secure stability, to secure it on a figure somewhat nearer than £s. to that which the industry thought would be the price for years to come.

"I would say that if there be any blame for fixing the figure of £s., I will take it myself. I will also say it was only after weeks of discussion with Lord Stevenson that I persuaded him to come down from the figure which he wished and to make the pivotal figure £s.."

"At first sight and with our present knowledge this explanation seems either too ingenious to be the whole truth and nothing but the truth, or to reveal what seems to-day a simply astounding disregard of the essential features of the situation, and of the needs of the immediate future so far as the policy of restriction was concerned. This tendre care for the interests of consumers in respect of stocks already bought and contracts for future delivery, hardly tallies with the earlier or with the later conduct of restriction. The reference to one of the great American consuming interests is correct as it stands, and must not be taken as implying reference to the American Rubber Association, though it is of course true that American manufacturers were not by any means displeased with the decision to raise the pivotal price, and that others of them may have been impressed by the unfortunate position of the American manufacturers, could possibly have justified to himself the idea of maintaining prices at a figure more than double the average costs of production: prices which were bound to give a most powerful stimulus to further new planting in the Dutch East Indies and elsewhere, and to the rapidly increasing use of reclaimed rubber. If the conditions of demand and supply proved to be such as to keep the price above £s., restriction would be unnecessary and could remain in abeyance; the industry could safely be left to look after itself, for any price above that level was reasonably, if not extremely, profitable. If a price of £s. was really deemed desirable in the future interests of the industry, and if such a price were not maintained naturally, it could only be so maintained by restriction, and the resulting increase in costs of production would probably go far to rob such a price of its assumed advantage. Lord Stevenson could not have been prepared deliberately to sacrifice the best interests of the producing industry for the temporarybenefit of the manufacturers, and the only reasonable conclusions are either that he did so for some other and perhaps altogether base reason, or that the reason was the desire to strengthen the American exchange, which was weak at the time as the result of the restoration of the gold standard in this country. In their view, Mr. Churchill, then Chancellor of the Exchequer, was the villain of the piece, and Lord Stevenson merely his accomplice. Doubtless the effect on the American exchange was considered, as well as the effect on the American manufacturers, but there is no available evidence that the former, any more than the latter, was the decisive factor. We are therefore left with the conclusion that

*April 28, 1928.*
Lord Stevenson laboured under an entirely erroneous view of the situation, and genuinely believed that at least no harm could come to the producing industry if the pivotal price was raised.

With our present knowledge of subsequent history, this may seem incredible. But it is necessary to rid our minds of all such knowledge and to try and appreciate the outlook as it was in the minds of Lord Stevenson and many others at the beginning of 1926. It has been said above that a strong case could have been made out, even at the time, for supposing that conditions of excess supply would not have continued for long, and that equilibrium might have been achieved in, say, eighteen months' time. This conclusion has been used above in support of the contention that restriction could have, and should have, been removed without causing producers too serious losses. But to Lord Stevenson and others at that time, it may quite well have seemed a solid argument in favour of continuing restriction so as to bridge over the eighteen months' interval and minimise the losses of manufacturers and the difficulties of producers during the period before equilibrium was re-established. It must be remembered that London was extremely ignorant about Dutch native rubber and even reclaimed rubber; and very sceptical as to the information which it did possess.

The general opinion was that in view of the events of 1925 and the enormous expansion in consumption, the available supply of rubber would be inadequate in three or four years' time, and that condition would have been fortified by the beliefs of the American manufacturers. Thus it is not really so incredible as it now appears that Lord Stevenson may have visualised a famine price-level in, say, two or three years' time. With such an idea, it naturally seemed absurd to allow prices to be forced down to the original pivotal level of 1s. 3d. (and even probably below that, for restriction would necessarily take time to curtail supplies), if a little later they were to shoot up violently. The greatest possible stability was desirable in the interests of all concerned, and to maintain the original pivotal price would be simply to provoke extreme instability, whereas to hold prices at a level of 1s. 6d., or even higher, by a temporary return to a restricted production seemed a perfectly sound and reasonable policy from the producers' point of view, and was, of course, eminently satisfactory to the manufacturers.

The raising of the pivotal price was an act of folly in the light of after events, but it was not wholly inexorable, except in so far as it can be said that at the time London ought to have paid far more careful attention than it did to Dutch native rubber planting and the development in the use of reclaimed rubber. Nevertheless, the scepticism which was directed to these two matters, might well have been extended to the general proposition of any attempt to hold up prices artificially at a level roughly double the cost of production, however well that may have suited the desires of the manufacturing consumers at the moment. It seems difficult to deny that the boom of 1925 had engendered that lack of normal caution in the minds of all those concerned with the producing industry, of which history shows so many examples in similar circumstances. With the raising of the pivotal price, the restriction scheme of 1922 may be said to lose all interest for the student of the economics of conscious control. The other revisions made in 1926 were undoubtedly a step in the right direction towards the improvement of the elasticity of the scheme. But the raising of the pivotal price really turned the scheme into a mere attempt at monopoly, and a more foolish one than most of the many which history records. As has been said, the game was up already, and the only sound policy was to retreat in such a manner as was best calculated to retain as far as possible such advantages as had been secured. Much might still have been saved. Restriction had got the industry, and indeed the Government of Malaya, and Malaya also, out of a very nasty hole in 1922, and while the boom had antagonised consumers and stimulated a great deal of new planting in other countries, it had also given the British industry an opportunity to build up reserves, both financial and agricultural, on a substantial scale, the lack of which had made the crisis of 1922 so dangerous. Restriction up to 1926 may be judged to show a favourable net balance from the point of view of the British industry, though its exact extent must be entirely conjectural. From 1926 onwards this favourable net balance was almost deliberately turned into a serious net loss, the extent of which cannot yet be determined. If the industry was deliberately sacrificed on the altar of the American exchange, the issue must be judged on wider and national grounds, and the sacrifice may have been justifiable. But if all such objectives are ruled out, we are left with the melancholy but important reflection that Mr. Hoover may be right in maintaining that all attempts at artificial control inevitably degenerate sooner or later into attempts at monopolistic extortion, and that the real objections to conscious control are not economic, but arise from the weakness of human nature under the dominance of self-interest, greed, and vanity.
As has been said above, from 1926 onwards the restriction scheme ceases to have the same interest as a genuine experiment in conscious control. The problem of Dutch native rubber receives special consideration in Section V below, while the subject of reclaimed rubber is most conveniently treated in the next section along with other developments on the consumer’s side. The Unused Coupon problem, which provided such controversy during 1927, both in Great Britain and Malaya, does not require detailed treatment, for as an immediate practical problem retrospective legislation was a virtual impossibility, while its permanent interest lies in the lesson that any future scheme should provide for a definitely limited period of validity. At the time no one foresaw the proportions which this problem might assume, and for this oversight there is considerable excuse. If the problem had been foreseen, it could easily have been solved; there would have been no hidden difficulties or inequities in limiting the validity of all forms of export rights to a period of, say, one year, or even six months. These were the main issues during the closing stages, and little more need be said except perhaps to stress the platitude that as the British control of production fell from approximately 75 per cent. to the neighbourhood of 55 per cent., so more and more drastic restriction was required in order to effect the same reduction in the world output, quite apart from the additional difficulties created by the accumulation of unused export rights and coupons. When Great Britain controlled 75 per cent., a 20 per cent. reduction of the world output could be achieved by restriction to the extent of 30 per cent., but with only 55 per cent. control, the necessary degree of restriction rises towards 40 per cent. as the Colonial Secretary pointed out to the Home of Commons in the debate on the termination of restriction. “We were discovering that our power to fix the price was growing less and less by day. We were discovering it increasingly during 1926 and 1927.” The point is obvious, but very important.

There was no need to be so much concerned as of the present study, to trace the gradual realization by the Government, the industry and the general public that restriction was doomed, or the resulting growth of a militant opposition. Equally little good will be served by disquisition on such issues or by the successive official announcements in the autumn and winter of 1927–28 were unfair and misleading, deliberately or otherwise, whether the Committee of Civil Research was or was not a “packed jury,” whether sufficient care was taken as to the exact hour of the Prime Minister’s announcement of the death sentence, or how much New York gained by the actual conduct of that affair. These and similar issues have little more than temporary interest, except in so far as they provide material for study and reflection on the general problem of the relations of Governments to particular industries. The decision to terminate and the method of termination by the giving of six months’ notice in advance, do, however, offer some problems of more permanent interest, which merit attention from the point of view of this study.

Something must first be said as to the attitude of the various parties immediately concerned. The attitude of the Advisory Committee and the R.G.A. was that while restriction could not, and should not, be continued indefinitely, there was no necessity for immediate repeal, and that the proper course was to reduce the pivotal price, preferably in stages, and to introduce other modifications aimed to achieve 100 per cent. release in say, two or three years’ time, when it might be supposed that demand would have expanded to the necessary extent. It was their opinion that immediate repeal would leave the work of restriction only much done,* or that at least much might still be salvaged from the wreck. It must be remembered that London was still extremely sceptical about Dutch native rubber planting, having taken no steps to investigate the matter. The attitude of the Colonial Office is a matter of conjecture. We know from Mr. Amery that the Colonial Office had refused to adopt the still higher pivotal price desired by Lord Stevenson in 1926. It may be that the price as actually fixed was agreed upon only with misgivings, and that these misgivings grew rapidly during 1926. For it seems a significant point that on the death of Lord Stevenson in June 1926, an administrator, Sir Matthew Nathan, and not another business man, was appointed chairman of the Advisory Committee. It is just possible that the Colonial Office had already realised that Lord Stevenson’s insistence on a higher pivotal price was a mistake so fundamental that the liquidation of the scheme in the near future was inevitable. But if the Colonial Office had been convinced of the urgent necessity of repeal, there was no reason whatever why it should not have terminated the scheme on its own initiative.

* The Colonial Secretary gave a figure of 50 per cent., but this is too low.
Probably the Colonial Office was much more fearful about the future, especially in respect of Dutch native rubber, than the R.G.A., but the fact that no such action was taken, and that the Cabinet took over the matter, at least suggests that the Colonial Office was either on the side of the industry or in a most undecided state of mind. There are many well-informed persons who are convinced that it was the Foreign Office which really brought the matter before the Cabinet as the result of diplomatic pressure from the U.S.A. Such a suggestion was made by the Leader of the Opposition in the House of Commons' debate, but it was categorically denied by the Secretary for the Colonies. The prompting in this matter came from the Colonial Office and from nowhere else. The Under-Secretary for the Colonies on April 12th, in Singapore, emphatically denied that America was either thought of or discussed when the Cabinet considered the question of an inquiry. From opinions and such evidence as can be collected in the U.S.A., there is no evidence that the earlier diplomatic representations were continued into 1928, or that any serious pressure was ever applied. Mr. Hoover has often bemoaned the limitations of the diplomatic weapon in connection with foreign controls of raw materials, and never held out to the rubber manufacturers much hope of relief by that means. While the historian cannot, unfortunately, place too much reliance on the statements of Ministers, due weight must be given to the work of experts or that at least from the work of London was not due to Dutch native rubber, which probably had no machinery to be set in motion at the time it was employed. It is quite possible that the Colonial Secretary had become very worried about the whole position and prospects, but that even if he had not absolutely decided on termination, yet in view of the much less fearful attitude of the industry and its general opposition to the idea of repeal, he decided to consult his colleagues, as he alleges that he did, rather than take action on his own initiative. In his apology to the House of Commons, he cited five main reasons for taking this step: first, the increase in production of natural rubber by the N.E.I. and other producing countries outside the scheme; secondly, that restriction was proving detrimental to productivity, and therefore to competitive efficiency; thirdly, that it was proving more in accord with the general position to support the future prospects of our balance of trade; fourthly, the very great difficulty of dealing with smuggling and the corruption of native staffs; and fifthly, the growing opposition to restriction in Ceylon. All these considerations weighed in our minds, but we finally, as from the Colonial Office, approached the Cabinet towards the close of the year and asked the Cabinet for an independent impartial inquiry, and he goes on to justify the appointment of an independent impartial inquiry in words which strongly suggest that he knew the Advisory Committee would not favour termination. The matter thus brought before the Cabinet, he probably found strong support for...
his own feelings, especially perhaps from the Foreign Office and the Treasury. Restriction had proved a thorough nuisance from the point of view of our political relations with the U.S.A., while it must inevitably have been a thorn in the side of the British delegates to the Geneva Conference of 1927. From the Treasury's point of view, the scheme had outlived any useful purpose which it had ever served. In general, the Cabinet either clinched Mr. Amery's mind or gave him the necessary assurance of support against the probable attacks from the industry. In short, the British Government decided to terminate restriction as soon as might be because they had reached the conclusion that the present and prospective advantages of restriction were now being far outweighed by its inherent difficulties and drawbacks; its administration was, and always had been, a thorough nuisance from the point of view of the Government, and now British interests were getting nothing out of it. In all this, there is little directly at variance with Mr. Amery's account, except that it seems hard to believe that the Cabinet was not in fact the jury, and the Hambling Committee a judge whose only duty was to pronounce an inevitable sentence.

We therefore reach an interesting question, whether the Colonial Office knew what was in the true interests of the industry better than the industry itself; or in other words, was a more or less summary termination of restriction the right policy? Looking backwards, we can now see that at the end of 1928 production and consumption would have been very nearly in equilibrium, even if there had been no restriction. Without much doubt the 100 per cent release would have been reached under a modified restriction scheme such as the R.G.A. desired with a pivotal price of, say, £1.50 by the end of 1928, and then in accordance with their proposals the scheme would have been terminated. Undoubtedly this would have saved serious losses; as the present writer said in August 1929: "It would seem, in the light of after events, that the time and manner of the removal actually chosen had the effect of sacrificing the fruits of restriction just when they were about to be secured. But it must be remembered that in the spring of 1928 no one foresaw the enormous increase in the U.S. consumption during the second half of 1928; nor is it reasonable to suppose that it should have been foreseen. Even in July 1928 the expert statisticians of the American rubber manufacturers were forecasting the U.S. absorption in 1928 at 390,000 tons, whereas it eventually totalled 440,000 tons. Moreover, it may be remarked that the inevitable inelasticity of a quarterly sliding scale, however carefully modified, might possibly have led to another squeeze of prices which would have created a very difficult situation. Equally no one foresaw the great increase in normal yields which had come about in Malaya, but which was put down for many months to "flush" production. If restriction had been removed when 200 per cent. was reached at, say, the beginning of 1929, production would have quickly made up any shortage of convenient stocks, and then shot ahead of demand as it actually did. By the autumn of 1929 producers would have been little better off than they actually were. Nevertheless, if the increase in consumption had been foreseen, restriction should undoubtedly have been continued in a modified form as the R.G.A. desired.

Assuming, however, that this increase in consumption was not foreseen, as was the case, there can be little doubt that speedy termination was the right policy. In order to cover the increased costs of a restricted output, the pivotal price could easily have been less than £1., and probably if the rubber industry had had its way, it would not have been less than £1.30 and possibly £1.36. Even at £1.50 this would have been playing with the fire of the Dutch native rubber potential production. Summarising the conclusions which will be reached in Section V, it may be said that this price a sufficient supply of labour would have been attracted to obtain the potential output from at least a large proportion of the East Indian plantations and new plantings; that in 1923-24 planting had been resumed on an extensive scale, and these trees would have reached tappable age, on normal standards, from 1929 onwards. The policy of attempting to reach 100 per cent. exportable output from at least a large proportion of the East Indian plantations and new plantings would have been very badly burned. There is here no assumption of a special interest with reference to the often-quoted example of the East Indian rubber industry must know its interests better than a Government Department, and the corollary that if the Government of a country decides on a scheme of restriction, the industry is bound to be limited to a certain extent by the wishes of the industry in so far as it could be done without damage to the Government itself. While the British Government may have felt that its own interests were served by the termination of restriction, the interests of the industry itself may have been served better by the retention of restriction. The British Government may have felt that its own interests were served by the termination of restriction, the interests of the industry itself may have been served better by the retention of restriction.
that if the Government of a country must take a hand in a scheme of artificial control, that hand should be limited to implementing the wishes of the industry in so far as that can be done without damage to the interests of the State. While the British Government may have felt that its own interests, and especially those of the Government of Malaya, would be prejudiced by the continuation of restriction, this was mainly because it felt that the continuation of restriction would be prejudicial to the interests of the industry. The interests of both are so largely intertwined. It if be asked why the industry favoured continuation, the answer must be that all business men instinctively think in terms of the short period, and it is only the comparatively few who can rise above instincts which have been bred in them perhaps by their early training. This is specially true of rubber production, because while the producer must try and think seven years ahead, the very length of that necessary period of gestation means that all his thoughts and plans rest on the most insecure premises, and by experience he knows that the unexpected enters at every turn. On the issue of restriction, all the main interests in the trade had their special reasons for preferring extension: restriction at a price of 1s. 6d. or even of 1s. 3d., producers would fare better, or as well, even if that involved restriction to 60 per cent., than they will under full production and a price of say, 9d. Manufacturers were naturally in favour of a stationary or even a gradually declining price as compared with a sudden drop, on account of their stocks and forward purchases. Brokers, a by no means uninfluential section in London, naturally preferred restriction and a relatively high price, because their remuneration is on a percentage of the sales price, and they could hardly expect to handle double as much rubber if the price were halved. Thus all the main interests in the industry had reasons of their own for desiring a continuation of restriction, and if in their quieter moments they reflected upon the long-run possibilities, there could be no certainty that even the most obvious and probable results would be actually realised. There are times when outsiders, and even Government officials, can see more clearly than the experts, and there is no fundamental reason why a Government should not operate a scheme of economic control at least as well if not better than the industry concerned.

This general approval of the British Government’s policy of the speedy termination of rubber restriction must, however, be qualified. For the decision to give six months’ notice there is little to be said. The only substantial argument in favour of this course was that immediate repeal would result in a terrific scramble for labour among themselves by the plantations in Malaya. It cannot be conceded that six months’ notice wholly avoided this difficulty—a very considerable scramble ensued as it was—and it is certainly open to serious objections in respect of the effect on stocks and prices, for if there had not been such an increase in consumption during the latter half of 1928, the position would certainly have been much more awkward and difficult than it actually was. Mr. Amery’s defence was that he was besieged by persons inside and outside the House pleading him to give an undertaking that the scheme would continue at least until the end of the current restriction year. In the main, these appeals must have come from manufacturers and merchants, who, fearful as to their stocks and forward purchases, yet hoped that a postponement would hold up prices to some extent, and enable them to beat a more orderly retreat. Such hopes were ill-founded, for the market promptly based the price on the probable position on November 1. Nothing could have saved the inevitable losses on stocks and forward contracts, and the interests of producers were not really benefited by the notice. It may be said to have lacked the courage of its convictions, and the experience of rubber restriction suggests a general prima facie case that if a scheme of conscious control is failing, its demise should be achieved in the swiftest and most unexpected manner possible. In that way much loss may be avoided to producers, while manufacturers will not be able to complain that their fellow competitors had the luck to steal a march on them by securing inside information or by any other means.  

* The history of sugar restriction in Cuba points to the same conclusion.
IV.—RESTRICTION FROM THE MARKET.

For practical purposes, the point of view of the consumer of rubber means the point of view of the American rubber manufacturers and not of the government and citizens of the United States, since the U.S.A. consumed 65-70 per cent. of the world’s total absorption during the restriction period; moreover, in no other country was the rubber manufacturing industry of sufficient importance to impress its views on the Government or the public, and partly for this reason the final consumer was nowhere else stirred to action in his own defence. The United Kingdom is the second most important consuming country, but while the India Rubber Manufacturers’ Association vigorously protested at the imposition of restriction, the interests of the producer naturally outweighed the interests of the consumer, while the appointment of a representative of the manufacturers on the Colonial Office Advisory Committee was far to pacify their instinctive opposition. In this section an effort is made to trace the reactions which restriction evoked on the other side of the Atlantic, but no general survey of the reactions in other countries is attempted.

As late as September 1922 the general opinion of the U.S. manufacturers was that restriction would not be imposed, and that if it was, it would not effectively raise the price, since with a current rate of consumption estimated at not more than 200,000 tons per annum, and in view of the heavy stocks already in existence, ample supplies seemed available for a long time. It must also be emphasised that the vast majority—it might almost be said all with the exception of the U.S. Rubber Company, which was already a big producer—were ignorant of even the outstanding features of the crude rubber situation, and, in general, quite unfamiliar with the economic characteristics, organisation, and problems of the rubber producing industry. The announcement that restriction would begin on November 1 came as a surprise. On October 26 the directors of the Rubber Association of America met to consider the position. They decided to try private commercial negotiations before making any approach to the Government, and appointed a special committee for the purpose. This committee took the line that neither the U.S. manufacturers nor the U.S. Government could do much by way of interference in view of American rubber manufacturers’ views of the necessity of the rubber control scheme, the sisal control, pools in the American copper industry, etc., and that the only feature of the scheme to which objection could reasonably be raised, was its lack of sufficient elasticity. Mr. Firestone, however, thought otherwise; in his view, the restriction scheme was a deliberate attempt at monopolistic extortion, which should be attacked and opposed in every possible way. But he failed to carry the committee with him, and therefore resigned from the Rubber Association so as to be free to pursue such a policy himself. The committee then decided to invite the Rubber Growers’ Association to send a delegation to discuss plans for the protection of the mutual interests of consumers and producers. The R.G.A. at first refused, but after further correspondence accepted, and sent over three persons, Sir Stanley Bois, Mr. E. Miller, and Mr. F. J. Burgess. Between January 17 and February 10 this delegation was touring round innumerable factories, and met informally a large number of the leaders of the American industry, various consultations were held between this delegation and the special committee of the Rubber Association of America. When the R.G.A. delegates had made it clear that any refusal of restriction was not out of the question, the American manufacturers were prepared to concede that they would not effectively raise the price, so as to ensure against any sudden rise of price above the prevailing level due to war or other changes in demand, or against a temporary squeeze of prices by speculative manipulation, which they felt the scheme might easily facilitate. The British delegates returned with a definite request from the Americans that the R.G.A. should get the British Government to declare its willingness to allow emergency releases if the scheme proved insufficiently elastic. The R.G.A. replied with a refusal to recommend any greater elasticity in the scheme on the ground that it would be undesirable to attempt to meet a hypothetical position which may not arise. But the American manufacturers later maintained that they had received at this time verbal promises from Lord所得税 and Mr. Miller that action would be taken in the event of prices getting out of hand; but this request in detail below. The report of the British Council of the R.G.A. on the conditions of the American manufacturers under the following heads:

1. 1. There is general agreement in respect of the relative size of the market.
2. 2. There is general desire to expand the market.
3. 3. There is objection to any drastic measures to the extent of a general reductions of 10 per cent.
4. 4. The proposition of U. S. rubber being sold at a lower price than the present is rejected.
5. 5. It is admitted that the market is at present insufficiently elastic. The U.S. rubber industries were required to work more heavily in proportion to their capacity and the surpluses must be used, and that the parts of the requirements will be reduced.

The general tone of the U.S. manufacturers was by no means hostile, but on the contrary, friendly. The question was not one of the British Government’s approval of the scheme, but whether the American rubber manufacturers were willing to make any concessions. The fact that the R.G.A. included representatives of the British Government and the rubber manufacturers in all the discussions was seen, for example, by the general leading manufacturers as an effort by the Committee on Foreign Commerce into the consumption and exportation of natural rubber. The following evidence of Mr. F. A. Sohls, the general manager of the Rubber and Canada Rubber Company, in this connection will be seen, for example, by the general leading manufacturers as an effort by the Committee on Foreign Commerce into the consumption and exportation of natural rubber, in the following words. The rubber in Akron is in such quantity that it could produce rubber in excess of the demand of the consumer and the market, and could be used, and that the parts of the requirements will be reduced.
of prices getting out of hand - this matter will be considered in detail below.

The report* of the British delegates to the Council of the R.G.A. on the general attitude of the American manufacturers was summarised under the following heads:

1. There is general appreciation of the need for the legislative measures taken.
2. There is keen desire to see stability of price.
3. No objection is taken to the pivotal price as a general level.
4. The fear is definitely expressed that the scheme is insufficiently elastic.
5. It is admitted that if their (American) forecasts of U.S. requirements are too optimistic, the results will fall on producers more heavily than on themselves as manufacturers; also that with present prices more reclaimed rubber will be used, and that their crude rubber requirements will be proportionately reduced.

The general tone of the report is that the U.S. manufacturers were by no means actively hostile, but on the contrary more or less complacent. With the exception of Mr. Firestone and the investors in the Firestone interests, which they have facilitated. The report contains a definition of what the R.G.A. hope to declare as a natural and the small firms as a group. This latter form of competition arises mainly because the former buy forward their requirements three to six months ahead, whereas the latter buy only one or two months ahead. Consequently when rubber prices are rising, the small firms feel the pinch, and the big firms try and push them out of business by refusing to raise the price of their products until they in turn have to replenish their crude rubber supplies; conversely when prices are falling, the small firms score. Though there was comparatively little spirit of organised co-operation amongst the American manufacturers; each appears to have been absorbed in the problems of competitive manufacture, and to have assumed that ample supplies of crude rubber would be available. Restriction was not raising prices to an exorbitant level; indeed, the continuous decline

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from October 1923 to midsummer 1924 seemed to them to suggest that restriction was not to be taken very seriously, and with prices falling, and apparently ample supplies regularly available, if, therefore, also seemed to them only commonsense and prudence to reduce their stocks to a bare minimum.

After the visit of the R.G.A. delegates, the scene in fact shifts from Akron and New York to Washington. The same day that the R.G.A. accepted the invitation of the Rubber Association to send over a delegation, Mr. Firestone 

* decided to make an independent investigation of the restriction scheme, and sent Mr. W. D. Hines to England and Europe to study and report. * * Following the return of Mr. Hines, he interviewed President Harding, the Department of Commerce and Senator McCormick, * presenting facts and figures to show the effect the restriction would have on America. * On January 9 Senator McCormick addressed the Senate on the subject, and he later wrote a letter to Mr. Hoover, then Secretary of Commerce, on the general subject of rubber production as linked with the promotion of Latin-American trade. Mr. Hoover replied that in his view, both on account of the existing restrictions and the probability that a rubber shortage would be encountered within a few years, with or without restriction, an exhaustive crude rubber survey was desirable, and should be authorised by the Department of Agriculture for scientific experiments. The Department of Commerce therefore, established a special crude rubber section, which, with the assistance of an advisory committee appointed by the Rubber Association at the Department's invitation, began a survey of the world's actual and potential resources of raw materials essential to American industry, including rubber, and voted a sum of $600,000 for the purpose, of which however one-fifth was in the President's discretion, and he allotted it to the Department of Agriculture for scientific experiments. The Department of Commerce thereupon established a special crude rubber section, which, with the assistance of an advisory committee appointed by the Rubber Association at the Department's invitation, began a survey of the world's actual and potential resources of crude rubber, and parties were sent out to the Middle East, Para, the Caribbean Islands, etc., and the Philippines during the summer of 1923.

Meantime brief reference must be made to the further activities of Mr. Firestone. On February 27, 1923, he had organised a conference of rubber manufacturers, automobile manufacturers and automobile accessory manufacturers, at Washington; in all 200 representatives attended, and also Mr. P. H. Lockhart, of the India Rubber Manufacturers Association of Great Britain, who was then making an unofficial visit to the U.S. Mr. Firestone's own account * of the results is as follows: "The conference passed resolutions by the Department of Commerce, and to co-operate with the British manufacturers in opposing the legislation, and to protest against it in any way that seemed practicable." He then continues: "I was unsuccessful in obtaining the desired cooperation of other American manufacturers. I presume the reason for this was that they did not appreciate the conditions created by the Rubber Restriction Act, and had confidence in the assurances which were given them by the Rubber Growers' committee. Mr. Firestone was, however, undecided; he proceeded immediately to the establishment of a head-quarters in Washington for the gathering of data, statistics, and information from all rubber-growing countries, and in May he * decided to conduct an independent investigation of new sources of supply, as I realised that the Government investigation would require considerable time, and could only report upon conditions without making recommendations as to what action should be taken by American manufacturers. He first turned his attention to the Philippines, but found the political situation still less stable; his experts being "hustled out by the outbreak of a revolution." Panama was also turned down owing to shortage of labour. In December 1923 he tried Liberia, and was so well pleased with a preliminary report that in April 1924 he sent a larger party which took over an old abandoned plantation of 2,000 acres, and did some preliminary work in clearing the jungle in order to determine the character of the labour and the actual cost of planting. Early in 1926 he was able to tell the Committee on Interstate and Foreign Commerce that he had spent 10 years on this plantation, and that his eventual scheme was to develop one million acres. In September 1925 he leased 35,000 acres in Mexico with 350 workers, paying no dividends from 1906 to 1921 until the property reverted to the Liberian Government.

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acres already in Hevea and several thousand more in Castilloa. But he told the Committee that owing to labour shortage and unsettled political conditions, he feared he might not be able to make much of a development in Mexico. Whatever may be said of the wisdom of Mr. Firestone’s efforts, the lonely courage with which he followed up his convictions cannot fail to meet with applause.

Returning to the course of events in Washington, it may be noted that Mr. Hoover, as Secretary of Commerce, was not content to let things rest after the establishment of the crude rubber survey. Throughout the summer of 1923, a large number of articles, inspired by the Department of Commerce or in general under its ægis, appeared in the Press. These articles are careful to stress the point that the real reason for the Crude Rubber Survey was the anticipation of a rubber shortage by 1928-30,* and that it was not merely a reply to the British restriction scheme, which, however, was considered a very serious aggravation of the trouble, because, while it continued, there would be no new planting in Malaya and Ceylon. In March 1924 Mr. Hoover was roused to more definite activity. He addressed a public letter to Senator Capper on combinations of raw material producers, outlining the need for legislative relief through the legalisation of co-operative purchasing of imported raw materials where there is positive combination in control, just as exporters and manufacturers are permitted by the Webb-Pomerene Act to undertake joint selling agencies abroad under certain conditions. This was in a sense a revival of an idea already mooted by the Rubber Association, for almost exactly a year previously it is known that representatives of the Association consulted with the Solicitor to the Department of Commerce on the subject, though there was no practical outcome at the time. Even now, in March 1924, Mr. Hoover’s action was premature; a bill for the necessary extension and amendment of the Webb-Pomerene Act was introduced into the Senate, but it was not supported by the manufacturing interests and oil and rubber regardless quarterly periods until market stabilised. We refer to assurances Lord Stevenson to

"to convey to the authorities in charge of restriction our earnest request that they use discretionary power which we have been assured is vested in the administrators of the restriction act to relieve dangerous emergency at present time, which has also created a lack of confidence extremely harmful to the future, and we suggest increase immediate release crude rubber regardless quarterly periods until market stabilised." We refer to assurances Lord Stevenson to

* The estimates in those articles are somewhat varying in the light of the present day; world consumption in 1928 is estimated at 560,000 tons and production at 455,000 tons; the figures actually proved to be respectively 580,000 tons and 426,000 tons; and the anticipated shortage in the more distant future was not confined to American opinion, and by 1923-25 many British producers were convinced; see p. 41. 
A short passage in a speech made by Lord Stevenson, President of the Rubber Association, in 1923. "Certain critics of the scheme both in America and at home have contended that as it is laid out, it is not sufficiently elastic to deal with a situation that may arise if our calculations as to the amount of rubber required are wrong. I just want to say that it won't be necessary to repeal the legislation in order to deal with that situation; it should occur."

This seems to undermine the practical value of the official denial by suggesting that the Colonial Office was prepared to alter the exportable percentage if the scheme, as laid out, proved insufficiently elastic. Since it cannot be supposed that the American story is simply an ingenious invention, it may be concluded that assurances of some sort were given, among them that "discretionary power" was vested in the administrators of the restriction act, and would be used if necessary.

The only alternative, and the only reasonable conclusion, is that there was some misunderstanding between the two parties as to the exact circumstances in which the discretionary power would be used. On this assumption, also, the absence of any explanation by the British side becomes intelligible, for whatever Lord Stevenson or Mr. Miller might have said in their own defence would have failed to carry conviction in the minds of the Americans, as it is unfortunately always the case with verbal misunderstandings when the interests of one party have been adversely affected and their ideas correspondingly fixed.

Nevertheless, from the historian's point of view, it is to be wished that a clear statement of the British side were available.

In its absence, the nature of the misunderstanding is a matter of more or less educated guess-work. It must be realised that the determination of the initial exportable percentage at which the whole scheme would start work, was a factor as important as it was uncertain. One could be certain how far and how quickly the price might rise, but it could not be estimated to itself, and the effect on the market was so uncertain that the different conclusions of the expert estimators led to the impression that the price might go up to a very high level, or it might stay about the same, or it might even fall. No one knew how the price might go. The American story was simply an ingenious invention, but it cannot be supposed that the American story is not correct. Since the scheme both in America and at home have contended that as it is laid out, it is not sufficiently elastic to deal with a situation that may arise if our calculations as to the amount of rubber required are wrong, it is necessary to assume that the scheme both in America and at home have contended that as it is laid out, it is not sufficiently elastic to deal with a situation that may arise if our calculations as to the amount of rubber required are wrong. I just want to say that it won't be necessary to repeal the legislation in order to deal with that situation; it should occur."

Mr. Miller's reply was as follows:

"From tone of your cable it would appear that your members do not realise their own share of responsibility for present situation which would never have arisen if they had shown reasonable foresight and pursued sound buying policy during past 12 months instead of hand to mouth. Working on your figures and usual seasonal slowing down July-August and 20 per cent. release August and November, I calculate lowest crude stocks will be passed this month. Am struck by absence of American orders for August even at enormous discount. What is the explanation?"

So far as I have been able to discover there is no further documentary evidence as to the British side of this affair. The cable correspondence ceased with Mr. Miller's reply as above, and neither he nor Lord Stevenson ever directly referred to the matter in public. Some subsequent events may be attributed to a question in the House of Commons on March 19, 1923, in answer to which the Under Secretary for the Colonies stated that "no modification of the scheme (the Stevenson Scheme) is under contemplation.

But against this has to be set a short passage in a speech made by Lord Stevenson about one month later, at the annual dinner of the Rubber Association in 1923. "Certain critics of the scheme both in America and at home have contended that as it is laid out, it is not sufficiently elastic to deal with a situation that may arise if our calculations as to the amount of rubber required are wrong. I just want to say that it won't be necessary to repeal the legislation in order to deal with that situation; it should occur."

The manager of the Rubber Association then called:

"Referring to last exchange cables U.S. consumption first four months 1925 approximately 133,000 tons. Careful and conservative estimate balance of year average 50,000 tons per month. Our firm belief 10 per cent. release August and November will not meet this need particularly if world consumption taken into consideration. Failure of restriction authorities to release rubber more frequently and in greater quantities than provided by a quarterly period to meet present emergency stresses rapidly growing belief that administrators of restriction have not kept faith with American manufacturers. We again refer to assurances by Lord Stevenson and yourself to members of our Association that you could and would control additional releases of rubber in case of a shortage or price crisis which now exists. We now call on you to make good these assurances in order that we may advise our directors at a meeting which will be called immediately upon receipt of your cable reply."

Mr. Miller's reply was as follows:

"Mr. H. S. Hotchkiss, Vice-President of the U.S. Rubber Company; the latter was chairman and Mr. Work a member of the Rubber Association's special committee which conferred with the R.G.A. delegation in 1923."

American demand failed to reach the level that might have been expected, and the restriction of supplies became a point of view that would not have been taken into consideration if the whole scheme had broken down. The American market was in a condition to absorb the whole production of rubber and there was no fear that the price might go up to a very high level, or it might stay about the same, or it might even fall. No one knew how the price might go. The American story was simply an ingenious invention, but it cannot be supposed that the American story is not correct. Since the scheme both in America and at home have contended that as it is laid out, it is not sufficiently elastic to deal with a situation that may arise if our calculations as to the amount of rubber required are wrong, it is necessary to assume that the scheme both in America and at home have contended that as it is laid out, it is not sufficiently elastic to deal with a situation that may arise if our calculations as to the amount of rubber required are wrong. I just want to say that it won't be necessary to repeal the legislation in order to deal with that situation; it should occur."

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The only alternative, and the only reasonable conclusion, is that there was some misunderstanding between the two parties as to the exact circumstances in which the discretionary power would be used. On this assumption, also, the absence of any explanation by the British side becomes intelligible, for whatever Lord Stevenson or Mr. Miller might have said in their own defence would have failed to carry conviction in the minds of the Americans, as it is unfortunately always the case with verbal misunderstandings when the interests of one party have been adversely affected and their ideas correspondingly fixed. Nevertheless, from the historian's point of view, it is to be wished that a clear statement of the British side were available.

In its absence, the nature of the misunderstanding is a matter of more or less educated guess-work. It must be realised that the determination of the initial exportable percentage at which the whole scheme would start work, was a factor as important as it was uncertain. One could be certain how far and how quickly the price might rise, but it could not be estimated to itself, and the effect on the market was so uncertain that the different conclusions of the expert estimators led to the impression that the price might go up to a very high level, or it might stay about the same, or it might even fall. No one knew how the price might go. The American story was simply an ingenious invention, but it cannot be supposed that the American story is not correct. Since the scheme both in America and at home have contended that as it is laid out, it is not sufficiently elastic to deal with a situation that may arise if our calculations as to the amount of rubber required are wrong, it is necessary to assume that the scheme both in America and at home have contended that as it is laid out, it is not sufficiently elastic to deal with a situation that may arise if our calculations as to the amount of rubber required are wrong.
American demand failed to reach expectations, the price might fall to a very low level before the restriction of supplies became adequate, and the whole scheme brought in jeopardy from the producers' point of view. The determination of 60 as the initial percentage was necessarily somewhat of a leap in the dark, and it would be only a matter of time for Lord Stevenson to obtain an understanding with the Colonial Secretary that he would be prepared to change it if, when the scheme began to work, that seemed advisable. In other words, the discretionary power would apply until the scheme was seen to be working satisfactorily on the initial percentage chosen. It must be remembered that in the first restriction quarter the price shot up rapidly and averaged over 11.25, while in the second quarter (February-April 1923) it averaged nearly 13.56. The American manufacturers had been surprised themselves at the extent of the increase in actual absorption, and had done their best to impress this on the R.G.A. delegation. Probably at the time of the delegation's visit, the American view of the danger of elasticity was mainly confined to the immediate future and not to a possibility in the remote future. The inelasticity seemed to be manifesting itself every day with a fresh rise in price. Assurances were therefore given, but confidentially because any open promise would have nullified the automatic mechanical basis of the whole scheme. When Lord Stevenson made the statement in April 1923, which has been quoted above, he was probably thinking for Lord Stevenson to apply for the discretion of the Secretary that he would be prepared to change any official information about these conversations were continued for some months. No official information about these conversations has been published; the historian at the time of Lord Stevenson's assurance, and genuinely believed that if any reason the price did soar, whether in 1923 or at any future time, discretionary action would be taken. Assuming this explanation of Lord Stevenson's meaning, the next question is whether the Americans misunderstood the limited nature of his assurance, and genuinely believed that if ever prices got out of hand, additional releases would be promptly sanctioned, or whether they understood perfectly well its limited nature, but deliberately converted it into a useful weapon of retaliation in 1925. The answer to this question seems to depend mainly on the supposed attitude of the Americans during 1923-24. Those who believe that in allowing stocks to dwindle almost to vanishing point and the price to fall lower and lower, the Americans were deliberately trying to wreck the restriction scheme, will have a fairly solid foundation for the further belief that they deliberately distorted Lord Stevenson's assurance when these plans recoiled upon their own heads in 1925. Those who, with the present writer, believe that the Americans made no deliberate attempt to wreck the scheme in 1924, will take the view that the Americans genuinely misunderstood the limited nature of Lord Stevenson's assurance, and will include this in their explanation of the American attitude in 1924. It is a commonplace how easily such verbal misunderstandings may come about even under far easier and simpler conditions than probably attended the present example, and the historian may well feel some confidence in this suggested explanation of the whole matter, because it does fit in with the essential facts and features of the situation, while the only alternative involves the imputation of dishonesty to one or other party. After the cables exchanged with Mr. Miller, the Rubber Association therefore turned to their own Government requesting that political representations be made in view of the damage to the American consumer. The U.S. Ambassador in London was instructed to make representations to the Colonial Office, and conversations were continued for some months. The American view of the danger of elasticity was not to a possibility in the remote future; the inelasticity seemed to be manifesting itself every day with a fresh rise in price. Assurances were therefore given, but confidentially because any open promise would have nullified the automatic mechanical basis of the whole scheme. When Lord Stevenson made the statement in April 1923, which has been quoted above, he was probably thinking for Lord Stevenson to apply for the discretion of the Secretary that he would be prepared to change...
most diplomatic variety. The rumour, which found credence in certain quarters in England, that the U.S. Government were threatening retaliation by an export tax or some measure of monopolistic control over American exports of cotton, appears to have had no serious foundation whatever. The American Ambassador almost certainly made representations only, probably along the lines that full production should be allowed forthwith, and the whole scheme abolished as soon as possible, that all Government controls were to be condemned primarily on the ground that they were conducive to international friction and ill-feeling, as was abundantly clear in the present instance, and that Great Britain, as a large consumer of imported raw materials, should see, just as well, that she had more to lose than to gain if such controls became widespread, and that Great Britain, as a large consumer of imported raw materials, should therefore join with the U.S.A. in a campaign to re-establish free trade in raw materials.

If British popular opinion on this kind of issue was at all reflected in the British Government’s reply to these propositions, it may perhaps be assumed that that reply was in the nature of a tu quoque to the U.S. in respect of free trade in manufactured goods, and there matters would have ended in a deadlock. Certainly these conversations did end in a deadlock, and were entirely barren of results, unless, indeed, the grant of the additional 5 per cent. release at from February 1, 1926, to bring the percentage exportable up to 200 per cent., be accounted a result. It must, however, be repeated that the actual substance of these negotiations is not known, and will not be known until sufficient time has passed for the respective governments to allow access to their archives.

That these political negotiations were protracted may be judged by the fact that it was not until the beginning of December 1925 that Mr. Hoover began to supplement words by actions. On December 10 he wrote a long public letter, addressed to Senator Capper, outlining the necessity for further legislation to give protection to British rubber, and a protest against rubber monopolies, with special reference to the British rubber restriction scheme. "What can we do," he asks, "to defend ourselves against the trade war being made upon us?" The measures that we can take of course vary with each combination. I do not wish to favour trade reprisals. Some of the following measures would ultimately afford relief if we had them organised and all are wholly defensive in nature:

1. Our bankers can be discouraged from giving American credits to the support of these combinations.

2. We should initiate a strong systematic campaign for voluntary saving in the use of every sort of the commodities where these combinations become extortionate.

3. We should stimulate the manufacture and use of substitutes.

4. We should stimulate production in countries where the commodities in question are not likely to be subject to such combinations.

5. I might set up some sort of properly controlled machinery for emergencies, which would prevent our many hundred buyers from bidding against each other."

The course of events in the United States during the remainder of the restriction period may be said largely to consist of the attempted translation of this programme into practice. It seems, therefore, more convenient at this point to abandon the chronological method which has hitherto been pursued, and to deal separately with these suggestions and their outcome. The general case for greater protection led almost immediately to a resolution in the House of Representatives directing the Committee on Interstate and Foreign Commerce to investigate the control of the shipments of crude rubber and other imported raw materials by rubber manufacturers and to report its findings and make recommendations. The Committee went to work at once, and after taking a large volume of evidence from the Department of Commerce, rubber manufacturers, automobile manufacturers, etc., issued preliminary majority and minority reports in April 1926, stating that it would make a further report later "if the occasion should require it." This has apparently not yet been the case. As regards rubber, the Committee took the line that in so far as the present and the immediate future was concerned, the conservation campaign had proved a highly successful weapon, which was rapidly bringing the crisis to an end; their ultimate solution was to grow rubber under the American flag or within its shadow, e.g., in Central and South America. While this report is a most important document for the student of artificial control schemes in general, its importance from the point of view of the present study, is inconsiderable.

* The minority opposition comes from members of the Democratic party who contends that as long as the U.S. itself pursued a highly protective tariff policy, no complaint could legitimately be made against Government controls, such as the British rubber restriction, which were in effect similar to protective duties.

* Though the majority opinion of the Committee on Interstate and Foreign Commerce, the Democrats, of course, hold the same line. Several members of this committee seem to have been impressed with the large profits made by the tyre manufacturers during 1925.

* The outcome of Mr. Hoover’s suggestion will now be considered in the light of the fact that it has been at all reflected in the U.S. Government’s present attitude toward free trade in raw materials, and the British proposal for a conference on rubber, is not at all the Government’s major concern. It is not as yet to possess the power to terminate the rubber war, but rubber could be profitably used for other than rubber purposes.
The outcome of Mr. Hoover’s specific suggestions will now be reviewed with the exception of the first in the list, for the issue of the proposed restraint on foreign loans did not, of course, arise in the case of rubber.*

(1) Conservation in Use.

On December 21, 1925, Mr. Hoover summoned a conference of representatives of the Rubber Association and of the National Automobile Chamber of Commerce, to consider the conservation of crude rubber. At this conference the manufacturers decided to initiate an advertising campaign, showing the fault of the British for the unreasonably high price of crude rubber and therefore of tyres, and asking motorists to use and repair tyres so as to prolong their life to the utmost possible extent, and thereby reduce the consumption of crude rubber. This campaign was publicly blessed by the Secretary of Commerce. He was, in fact, very largely responsible for its initiation, though not for its conduct. He was, it is true, ardently supported by Mr. Firestone and a number of “radicals,” but the vast majority of the rubber manufacturers would never have made such a move on their own initiative. The actual price of rubber was not their primary concern: what really bothered them were the fluctuations of the price, and the consequent fluctuations in the cost of each manufacturer’s rubber as compared with that of his competitors, and conservation would do nothing to stop fluctuations. But for appearances’ sake, and in order not to offend Mr. Hoover or public opinion, they had to give their nominal support.

It is not easy to judge the real effect of this conservation campaign. It is true that the U.S. absorption of crude rubber declined by 28,000 tons in 1926, whereas 1924 and 1925 had seen increases of 30,000 and 55,000 tons respectively. If we include reclaimed rubber on the basis of average of reclaimed to 1 of crude, the decline in total consumption in 1926 is only 12,000 tons as compared with 1925; on the other hand though 1924 shows no additional increase, the increase in 1925 becomes 85,000 tons. The real issue, therefore, is whether, if there had been no such conservation campaign, the total consumption of rubber (crude and reclaimed) might have been expected to show an increase in 1926, and since there can be little question that all the reclaimed rubber which could be produced was used, any increase in this total may be taken as involving an increase in crude absorption by that amount. The great difficulty is to separate the, so to speak, natural effect of the high prices of tyres, etc., in reducing demand, from the artificial effects of the conservation campaign. The high prices might normally be expected to have a considerable effect, but it must be remembered that the U.S. was in an extremely prosperous condition in 1926: the effects would certainly have been much greater if the high prices had coincided with a general trade depression or even a stationary purchasing power. It seems probable, therefore, that the high prices alone would not have completely checked the normal advance. The total increase of 85,000 tons in 1925 must, of course, be regarded as abnormally large, even allowing for the introduction of the balloon tyre with its greater rubber content than the high-pressure tyre; there is, indeed, some evidence that in 1925 motorists bought forward ahead of their actual replacement requirements in anticipation of a further rise in tyre prices.* But in making the large future delivery contracts, which they did make during 1925, it seems fairly clear that the manufacturers expected a further increase of consumption in 1926, even if they anticipated some shortage of supplies; and they were certainly left with stocks much exceeding a level of mere convenience by the end of that year. During 1926 the number of cars registered in the U.S. was 70 per cent. greater than in 1925, and the cost of each manufacturer’s rubber as compared with that of his competitors, and conservation would do nothing to stop fluctuations. But for appearances’ sake, and in order not to offend Mr. Hoover or public opinion, they had to give their nominal support.

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...in the price of rubber goods was due to the action of the British Government and the British rubber producers. It is most difficult to determine the degree or quality of the anti-British feeling which was aroused. If one were to judge by the American Press, one’s impression would be that every American was aroused to white-hot indignation and that a declaration of war upon Great Britain might be expected at any moment. But it must be remembered that the average American motorist is used to a sensational Press, and his reactions are therefore much smaller than an Englishman’s would be if English newspapers suddenly appeared with the type of article and the headlines which the American Press used in connection with the rubber problem. If popular feeling had been really seriously aroused, it would have been reflected in Congress, whatever Mr. Hoover might have done to prevent it in accordance with his declared determination that the matter should not become a major political issue. What his feelings were at this time, no one knows except himself. After the refusal of any alleviation by the British Government, he could hardly be blamed if he had definitely reversed his 1925 policy; there can be little doubt that he could have fanned the flames much more vigorously. On the other hand, it is possible to suppose that he became somewhat appalled at the extent of the confusion which he had helped to stir up, but he certainly took no steps to damp it down. Neither of these extremes, therefore, seems a tenable hypothesis. Probably he felt that it would not do the British Government any harm to learn the truth of his contention that all Government hypothesis. Probably he felt that it would not...

(2) Reclaimed Rubber as a Substitute.

It is often thought that reclaimed rubber was a new invention, brought about and developed by the rubber boom of 1925. This is very far from the truth. In 1917 nearly 90,000 tons of reclaimed rubber were used in the U.S., giving a ratio of nearly 37.5 per cent. to crude consumption, a figure which has never yet been repeated. The price of crude rubber was then averaging about 21.70 per ton, and had never been below 23. This extensive use of reclaimed was, of course, partly due to war conditions and war requirements, and the results were far from satisfactory. In 1919 and 1920, when crude prices averaged about 55, the ratio of reclaimed absorption to crude absorption fell to about 33 per cent., and when in 1921 and 1922 the price of crude dropped to a ninepenny level, the ratio fell to 19 per cent.* It is, indeed, remarkable that the production of reclaimed could be adjusted so rapidly to such an entirely different price-level; it would not have been surprising if the reclaimed industry had virtually disappeared altogether. This suggests that even at this date inquiries would have elicited the fact that for certain purposes manufacturers had already found positive advantages in the use of reclaimed as compared with crude. In the years 1923 and 1924 the ratio was practically steady at 23 per cent., but with the increase in consumption, this meant an increasing production of reclaimed, which in 1924 amounted to 76,000 tons. This boom in the price of crude, and in 1925 the absorption of reclaimed reached 137,000 tons, a ratio of 35 per cent. It seems probable that there must have been a reserve of plant for the production of reclaimed, since otherwise such an increase in a single year seems impossible. To prove this, however, it is necessary to eliminate possible objections. The rubber producing industry would probably not have been so completely by surprise if it had condensed itself to study the doings of its chief customers. In 1926 crude rubber averaged nearly 25, as compared with nearly 35 in 1923, and the absorption of reclaimed mounted to 164,500 tons, a ratio of 45 per cent. to crude absorption. In 1927 the corresponding figures were 200 and a ratio of 59 per cent.

*It is possible that the statistics of reclaimed are not accurate during these earlier years, but there is no direct evidence to that effect, and the error could not be significantly large.
tons, and a ratio of 50% per cent., though the average price was down to 15. 6d. Gradually Mincing Lane realised that under restriction, reclaimed rubber had come to stay, but its use was still expected to decline if prices went below 14. In 1928 this condition was satisfied, but the ratio of reclaimed remained the same, and even with crude rubber averaging under 6d, in 1930 the ratio was over 42 per cent.

The commercial history of reclaimed rubber, therefore, points to a very important general conclusion, namely, that before the producers of a raw material embark upon any scheme of output or price control, it is as necessary to know all there is to be known about the consumption of that material, as it is to investigate the potentialities of production outside the jurisdiction of their scheme, and that while the scheme is in operation, the most constant study and vigilance is required in both cases. This, in fact, should be one of the cardinal rules in the technique of operating all artificial controls. The R.G.A. may be said to have completely destroyed its potential use in the U.S. The next few years showed that it would be limited to a maximum of about 30 per cent., and in 1925 the tyre manufacturers were driven to use it, and the raising of the pivotal price and the resulting maintenance of relative high prices for crude, induced them to continue using it, and to learn its merits as well as its limitations. The letter is simply a question of the proportions which can be satisfactorily used from the consumer's point of view. Its merits arise from the fact that it is no easy matter to compound dry powders, like carbon black, etc., into raw rubber; it takes much time and much machinery, while there is some damage to the properties of the raw rubber as the results of the necessary masceration. Reclaimed rubber makes this task much easier, because it is already amalgamated with filling materials; broadly speaking, every pound of reclaimed contains as much "fillers" as rubber gum. Thus its use simplifies and cheapens manufacture, and as long as the proportion is restricted, the consumers' interests are equally well served. In the case of tyres and tubes, reclaimed must be limited to a maximum of about 30 per cent., if the wear of the tyre is to be satisfactory on modern standards. So far, the maximum ratio which has yet been used, taking the whole of U.S. production of tyres and tubes, is approximately 20 per cent., so that there is still a large potential field here for the further use of reclaimed without a greater sacrifice of the interests of consumers than would be warranted if crude prices were high. Apart from this, there is little additional scope in the U.S., for in the manufacture of rubber products other than tyres and tubes, reclaimed rubber is used in the proportion of 2 to 1 of crude, and until some new important product appears in which a still larger proportion can be safely used, it is unlikely that this ratio will be much increased. Broadly speaking, therefore, it may

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* The figure of 30 per cent. is to some extent theoretical, and probably the limit was lower in 1925 because of the improvement which has been effected in reclaimed rubber, hence the qualification. Some producers of crude rubber believe that the limit was reached in 1925-26, and that the large demand for reclaimed rubber in the next few years. It is possible, however, that the bad wear was due more to generally cheap methods of manufacture than to the use of reclaimed.
be said that the ratio of reclaimed to crude absorption in the U.S. is unlikely to exceed 55 per cent, whatever the price of crude, while a guess may be hazarded that so long as the price of crude remains above 45¢, the ratio will not fall much below 40 per cent. 1

Mr. Firestone was making great plans in Liberia, and lesser plans in Mexico, but neither the U.S. Rubber Company, nor the Goodyear Company, the only two American companies already in the producing industry, embarked on any greatly increased planting programme at that time. In his evidence before the Committee on Interstate and Foreign Commerce, Mr. Hoover announced with great satisfaction 2 that the American Automobile Industry had organised a company with $10 million initial capital, as a contribution to freeing the consumers of rubber from unreasonable rubber prices. “I gather,” he said, “from the discussions I have had with their members that they will devote their energies more to the stimulation of production rather than themselves entering production; that is, to assist others to get into the production of rubber, to stimulate the production of wild rubber as part of the immediate relief, to interest themselves in joining American and Dutch capital in the expansion of plantations in the Dutch Indies, and of course, will they interest themselves in such developments as they may be able to do in the Philippines.”

1 Much would depend on the length of time for which the crude rubber price remained at a low level; if it were considerable, the ratio might eventually fall lower.

2 The ratio of reclaimed rubber exported from U.S.A. was 5-8°, per lb., in 1919.

† Statistics are lacking, and all estimates are largely guess-work.
tion whether the market is favourable to the product and against the manufacturer, or vice versa.

As asked by the Committee why other companies were not following his example, Mr. Seger, the President of the U.S. Rubber Company, replied, "It is a question of money. With all due respect to our American capitalists, I think it is not out of place to say that they are not in the habit of putting up capital for a long pull such as is involved in the cultivation of rubber. We in this country have become accustomed to a rather quick turnover of our money, so if we are to raise sufficient capital, we have got to raise it as an assessment against the industry, or we have got to have some kind of tax, import or what not, that will create a fund which can be used under proper regulation to develop plantations in areas where we are reasonably assured that we will not have a repetition of the present situation."

With this may be compared Mr. Siebeling's remarks on the same subject: "We Americans are inclined to make money quickly overnight. We like to watch the ticker, and the planting of rubber is a matter of ten years, throwing your money on the table and waiting ten years for your return. American capital is not used to doing that. British capital is trained to it for years, going into foreign countries and taking chances. We do not do it in this country."

Before the war, the U.S. required all its available supply of capital at home, and investing were not tempted to take greater risks abroad so long as it was out of place to say that American capital is not used to doing that. British capital is trained to it for years, going into foreign countries and taking chances. We do not do it in this country.

By 1925, this position had, of course, altered, but the above quotations suggest why rubber production as a line of investment fails to appeal. The manufacturers realised that it would probably be impossible to borrow from the public for the purpose, and their own reserves could be most profitably employed in expanding their factories. Mr. Seger mentioned that, "a group of rubber manufacturers discussed some months ago the possibility of making an arbitrary, or rather a voluntary, assessment against their companies, which would be put into a pot and used for the purpose of forming a national company to develop rubber in countries under the American flag, or where we have got to some assurance that we shall not be subjected to such a condition as we have to-day. It has been talked of but nothing ever came of it."

Mr. Siebeling advocated such a scheme to the Committee.

Thus both the rubber and the automobile manufacturers were thinking along the same lines, and it seems clear that any action which might have been taken would have been of a co-operative rather than of an individual nature. If the planting could have taken place under the American flag, it is possible that something might have developed. The Crude Rubber Survey of the Department of Commerce had shown that the Philippines were by far the most promising territory from the point of view of climate, etc., but the land laws were a difficulty, and also there was doubt whether an adequate supply of labour could be mobilised, while the virtual certainty of Philippine independence in the not too distant future was a prospect which made planting in Dutch or even British territory appear relatively more desirable in the long run. Thus there were many difficulties to be faced in developing this long-term remedy, and nothing was done during 1925. By 1927 information as to the extent of the new native plantings in the N.E.I. was beginning to filter through, and in July of that year Dr. Whitford was sent out on his first investigation. With his report, the rubber manufacturers gave up all ideas of new planting; before they could bring any plantations into bearing, the output of these native plantations would be available to check any considerable rise in price, and they concluded, more or less correctly, that they could with safety rely on this safety-valve for many years to come. It may be that in, say, five or seven years from to-day they will again feel the need for sources of production more immediately under their control, but the factor of the American temperament is not to be overlooked.

The American temperament is not to be overlooked.
loss. It may well be true that these commitments would not have averaged more than 2s. 6d. a lb., if as much, but with the prospect of a fairly rapid return to the pivotal price of 11, it is doubtful whether these private efforts played any decisive part in the British Government's decision. It is nevertheless true that most of the American manufacturers were pleased rather than the reverse when the pivotal price was raised in April to 11. 9d. it would set a limit to their potential losses, or at least provide further time for liquidation. Naturally, however, they prudently disguised such feelings, and joined in the general expression of opinion that now at last the British restriction scheme had unmistakably shown its true colours as an extortionate monopoly.

As the months passed by, however, their fears began to revive. In the May-July quarter 1926, the new pivotal price was only exceeded by 0.0017 penny, and in the following quarter the average barely exceeded 11.8d. The American manufacturers then formed the opinion that even the reintroduction of active restriction might not suffice to maintain the old price. The smaller manufacturers, who had not bought so heavily or so far ahead, were in a relatively happy position; it was the large firms who still had heavy inventories. Mr. Hoover's conservation campaign had only made matters worse from their point of view. In October 1926 plans began to be discussed, and in December the Rubber Buying Pool was formed.

As will be seen from its later history, there must always have been considerable doubt as to the legality of this organisation under the Anti-Trust laws, and therefore it is not surprising that little or no direct documentary evidence is available, at any rate as yet, for the historian. Such evidence as is available comes mainly from hearings and debates on the Newton-Jones Bill to amend the Webb-Pomerene Act so as to allow combinations in import as well as export trade. This Bill will be considered in due course. From these sources, from some fragmentary newspaper reports, and by inferences drawn from the extremely reticent remarks of certain persons directly concerned, the following account has been built up, but it must be stressed that the accuracy of even this meagre information cannot be in any way guaranteed, and the historian of the future may be able to give a very different picture.

The membership included the "Big Five" rubber manufacturers (U.S. Rubber Co., Goodrich, Firestone, and Fisk) together with the Kelly-Springfield Tyre Company, the Ajax Rubber Co., and the General Motors, Studebaker, Willys-Overland, Dodge and Packard automobile companies. According to Mr. Raskob, the President of General Motors Corporation, the initiative came from these automobile manufacturers, and in his evidence before a committee on the Newton-Jones Bill, he said, "We immediately got into touch with the Rubber Association of America and Mr. Firestone, as well as the Department of Justice and the Department of Commerce. . . . To make a long story short, we evolved a plan that resulted in the formation of a $50 million buying pool, which dealt in rubber throughout the whole year 1927." This statement also suggests that Mr. Hoover and the Department of Justice gave informal assurances that the legality of the organisation would not be attacked by the Government itself. The finance was provided by credits from New York banks secured on rubber purchases backed by the collective guarantee of the members, for there is no suggestion that the losses which were ultimately made fell upon the banks. There seems to be little doubt that the pool bought more or less steadily throughout 1927, and that when the end of restriction was announced in April 1928, it was holding between 40 and 60,000 tons of rubber. But as to its operations on the selling side up to that time, virtually nothing is known. In its issue of June 17, 1927, the Washington Post gave a short account of the pool, and stated that the "specific purpose was to protect American manufacturers against excessive prices. The formation followed the announcement by the British Government of proposed further restriction of crude rubber exports." This passage is quoted and apparently accepted by Mr. Donaldson in his International Economic Relations. But in the first place, the British Government's action, to which reference is made, is pre­sumably the official revision of October 1926, which merely confirmed and supplemented in detail the preliminary revision of the previous April, and contained no new departure of importance whatever. Secondly, the troubles of the rubber and automobile manufacturers were not caused by too little rubber at the pivotal price, but by too much rubber at that price relatively to their imports. The rubber pool expected to keep the price high and even if the idea of a pool were abandoned, the pressure of a surplus of stocks in the hands of manufacturers' stocks and speculation, and the rapid price increase would have been maintained, the pool was not an essential condition. It was simply an expedient for securing a uniform price so as to avoid further complications in the rubber industry.
not caused by too little rubber at too high a price, but by too much rubber at too low a price, relatively to their inventories of crude rubber and of tyres and tubes. Finally, how could the pool expect to lower prices by buying? And even if the idea was to accumulate a reserve against the possibility of a repetition of 1927, it would have been madness to buy while manufacturers' stocks were still mounting rapidly, prices falling, and a growing evidence that restriction was doomed. My own impressions are that the objective of the pool was of a two-fold nature—to hold up the price so that the manufacturers could liquidate their surplus stocks, and at the same time to prevent any individual firm obtaining a competitive advantage in buying his raw material. In other words, the price was to be stabilised, probably at or near the new $5 of pivotal price of the restriction scheme; if the market price fell below this level, the pool would buy, while if any manufacturer found himself in the position of having to buy at a market price appreciably above this figure, he could turn to the pool. The pool would thus have a buying price and a selling price, separated by a small margin for costs of warehousing, etc., the costs of the actual finance required being met by a levy of some kind on the members as a whole, since all would reap the benefits of the stabilisation, and the prevention or at least reduction, of any competitive advantage by those who could wait for the operation of the British restriction to reduce prices again. Those who could not wait and buy for themselves would probably never require to function, for despite the application of more and more restriction the market price could not be maintained anywhere near the pivotal level. The pool therefore bought to the limit of its resources, and in April 1928 was left with a vast holding of rubber, bought at something like double the price which ruled during the rest of the year. The pool was therefore working to the same end as the British restriction scheme, and there are grounds for concluding that the R.G.A. and the pool co-operated to some extent by the mutual exchange of information and ideas, while more may have been done by individual members. The general opinion amongst British producers is that the pool was a factor of little importance. This can only rest on the assumption that the American manufacturers concerned would have bought as much rubber individually as they did collectively. To some extent this must obviously be true, but it seems a large assumption in its entirety. American manufacturers are equally convinced that it had a very considerable effect upon the course of prices, and it may therefore be concluded that the truth lies between the two views. Very possibly the actual moments at which the pool chose to buy were at least as important, from the manufacturers' point of view, as the additional amount it bought over that which would otherwise have been purchased.

It must be stated again that these ideas as to the pool's projected activities and methods of operation are largely the result of guesswork and deduction from the most scanty data, and the above account may well be wide of the mark. If, however, it is correct in outline, the student of conscious control must regard the pool as a most interesting experiment, and in the interests of scientific study, if for no other reason, it is to be hoped that the full story will be made available as soon as may be.

Reference has been made above to the Newton-Jones Bill to legalise buying combinations in the import trade. The hearings and debates on this Bill leave little doubt that the initiative came from the pool, and particularly from General Motors Corporation. It would seem as if the pool became frightened towards the end of 1927 lest, despite the understanding arrived at with Mr. Hoover and the Department of Justice, some one would invoke the Sherman Act and force the Government to set the Federal Trade Commission to work. It was virtually admitted by some of the supporters of the Bill that one of its important results would be to legalise the rubber pool, which was defended on the ground that there is 'no suggestion that our trade is in any way restrained or our commerce interfered with, and this buying power has unquestionably operated in the interests of the American user of rubber,' and that therefore the part played by Mr. Hoover and the Department of Justice was in order. But the same speaker went on to argue that the Bill was necessary 'for the purpose of removing all doubt,' while other speakers maintained that there was sufficient uncertainty about the pool's legality to warrant Congress in placing its position beyond all doubt. The Bill was not debated in the House of Representatives until April 6, 1928, two days after the British Prime Minister had announced the termination of restriction with the result that the price had been cut in half, and the pool stood to lose $15-20 million, according to the popular
estimate. If the debate had taken place earlier, the whole situation would have been different, and the U.S. might have taken a step at least as important as the passage of the Webb-Pomerene Act. In fact, the bottom had been knocked out of the whole affair, and no one expected anything but the defeat of the Bill.

With its legality still in doubt, the pool had to face the liquidation of its stocks. There is no information on this point. The Associated Press reported on March 20 that a certain banking and trust company in New York had supplied the pool with a further credit to the amount of $60 million, and the Editor of the Washington Post suggested that, while the pool had lost money on its present holdings, "it is probable that rubber purchased with the new loan will advance in price enough to offset the earlier losses." So far as can be ascertained, there is no confirmation of any such desperate scheme, and it seems somewhat improbable. The pool without much doubt had to shoulder a heavy loss, but even so, from the rubber manufacturer member's point of view, all suffered alike, whereas otherwise some might have fared better than others. This applies only to the big manufacturers, since they alone were concerned in the pool, as a group of course, they fared worse than the smaller concerns, whose inventories and commitments were not so great. All of them would naturally have preferred gradual rather than abrupt repeal, but on the whole their general reaction to the British Prime Minister's announcement was a feeling of thankfulness that, even though they might be ruined, such an incalculable factor and such a thorough nuisance as the British restriction scheme was at last eliminated from their business problems.
V.—THE DUTCH NATIVE RUBBER INDUSTRY.

It was argued above that in the summer of 1922 the Dutch attitude to the proposed restriction scheme was little influenced by fears concerning the native rubber industry in the Outer Possessions of the N.E.I., because at that time no one, even in Java, was paying much attention to the potentialities of this source of supply. The statistics of native rubber exports, such as they were, suggested a very considerable decline in 1923 as compared with the two previous years, and though these export statistics were most incomplete and unreliable at this period, there seems little reason to suppose that the output of Dutch native rubber would tend to decline from a maximum of 36,000 tons in 1925 and 1926 to 20,000 tons in 1930. In other words, on this matter he was about as wrong as he could well have been, but there can be no doubt that he followed the general opinion at that time, for he was certainly not deliberately misled or misinformed, and the rest of his study testifies to his ability, experience, and thoroughness as an investigator. Had he visited Java a little later, his findings might have been very greatly modified.

Reference must also be made to another early investigation. Mr. H. A. Bluett, the British Commercial Secretary at Batavia, had become as interested as any of the Dutch planters, and when he heard that Dr. Pekelharing had gone to Djambi on a visit of investigation, he decided to follow him, though quite independently. The results of his investigations appeared in his D.O.T. report on the year ending July 1924 (published at the end of the year). 'The planting of rubber trees by the inhabitants throughout the Outer Islands is of the greatest importance, and a native industry has come into being based on scientific knowledge. The number of trees planted yearly is amazing, and there can be no doubt that the native rubber industry of the N.E.I. is going to have an early influence on the world's rubber market. . . .

While the sceptical Straits' rubber planter who have not seen the districts in question.' If in certain particulars Mr. Bluett's knowledge at that time was somewhat misleading, he was more right than wrong when he stated, and make some contribution. Eventually finance was made available for a more extensive investigation than was at first contemplated, and if it is true that the bulk of the cost was borne by the Government of British Malaya, the subsequent indifference and apathy of British interests towards the results, seems all the more extraordinary.

As further evidence of the ignorance of the Dutch regarding native rubber until the latter part of the year 1923, it may be observed that Mr. Figart, the U.S. Department of Commerce investigator, concluded his field work in the Middle East in February 1924. In his extremely able report, 'The Plantation Rubber Industry in the Middle East,' he concluded that the output of Dutch native rubber would tend to decline from a maximum of 36,000 tons in 1925 and 1926 to 20,000 tons in 1930. In other words, on this matter he was about as wrong as he could well have been, but there can be no doubt that he followed the general opinion at that time, for he was certainly not deliberately misled or misinformed, and the rest of his study testifies to his ability, experience, and thoroughness as an investigator. Had he visited Java a little later, his findings might have been very greatly modified.

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tacitly approved, the general proposition that "the rubber trade will follow in the lines of the copra trade, and yearly become more and more a native culture." *

During the spring and summer of 1925 the first reports of the Native Rubber Investigation Committee began to appear. In general, they showed that what Dr. Pekelharing had discovered in Djambi applied more or less throughout the other suitable districts of Sumatra, though with great variations, and also in Dutch Borneo. The general features of the situation were clearly revealed and were admirably summarised by Dr. Rutgers, Director of Agriculture in the N.E.I., in a lecture at Amsterdam on November 27, 1925. His conclusion was most definite and most conservative, even in view of the evidence then available; the output of Dutch native rubber in 1930 would certainly be double that of 1925, unless the price went below 15 per lb., and on his estimate of the 1925 output the 1930 output would therefore be not less than 150,000 tons.

Beyond the publication in January 1927 of the Final Report of the Dutch Committee with its summary of the whole position, no further substantial investigation or addition to the available information was forthcoming until the autumn of 1928 when Dr. Whitford's report on "Estate and Native Plantation Rubber in the Middle East" was circulated to the members of the Rubber Association of America. The report was a confidential document, as it was feared that its contents might stimulate the operations of bear speculators, and so militate against the stabilisation of price for which the "Pool," just as much as the Colonial Office and the R.G.A. were then working. Under due safeguards a number of copies of the report were circulated in London, but even a year later the pledges given by the Dutch Government were faithfully observed, as the present writer knows by experience. It must, however, be realised that no such secrecy or speed of the reports of the Dutch Native Rubber Investigation Committee. An article in the Bulletin of the Rubber Growers' Association in May 1923 reported from the Malay Straits Budget Mr. Cumming's account of the three weeks which he had spent with Dr. Pekelharing in Djambi during the previous July and August. The June 1925 issue of the Bulletin contained quite adequate extracts from Dr. Pekelharing's report on the Djambi Residency, and attention was given to the other reports of the Committee as they appeared, while the reports were translated into English and published in Kuala Lumpur. Dr. Rutgers' lecture at Amsterdam in November 1925 was also published in English, while the official British commercial representative in Batavia had reported his general confirmation. It cannot be maintained that the leaders of the plantation industry both in Malaya and London, and the British Colonial Office, did not have access to the facts in time,

The June 1925 issue of the Bulletin of the Rubber Growers' Association in May 1923 reported from the Malay Straits Budget Mr. Cumming's account of the three weeks which he had spent with Dr. Pekelharing in Djambi during the previous July and August. The June 1925 issue of the Bulletin contained quite adequate extracts from Dr. Pekelharing's report on the Djambi Residency, and attention was given to the other reports of the Committee as they appeared, while the reports were translated into English and published in Kuala Lumpur. Dr. Rutgers' lecture at Amsterdam in November 1925 was also published in English, while the official British commercial representative in Batavia had reported his general confirmation. It cannot be maintained that the leaders of the plantation industry both in Malaya and London, and the British Colonial Office, did not have access to the facts in time. During the spring and summer of 1925 the British industry was apparently more and more convinced of the necessity of restriction, and yearly became more and more tacitly accepted, the general proposition that the British failure to appreciate the significance of the Dutch native rubber position was a matter of such importance in the history of restriction, that the successive stages of its revelation have been thus recited in detail, and a further brief discussion of the matter seems to be justified before a summary of the facts is attempted.

No one can doubt that the leaders of the British industry must have read and considered the facts and their bearing upon the policy of restriction. In extenuation of their failure to agree to the raising of the pivotal price, it can be urged that the stress laid upon the cessation of new planting in the period 1920-22, suggested that any increase in the output of Dutch native rubber in 1926 and 1927 might be supposed to have stimulated the maximum possible production. The error in such an idea was due to the failure to grasp the time-lag between high prices and their effect on labour migration, which must necessarily be a matter of six months or so, and the failure to appreciate that such migrant labour will not immediately return even when prices have fallen considerably—more will be said about this below. But with the warnings of the Dutch investigators and of Dr. Rutgers, it should have been evident that the British industry must ultimately fail, and in their suit, it seems clear that the whole conduct of the British industry they shaped must have been factor necessitated. They realised that, despite the current boom in price, and at the increase in the output of Dutch native rubber, the pivotal price would have been radically different from 1926 onwards; the folly of raising the pivotal price would have been realised by all, and steps would have been taken to end the scheme as soon as could be. It is because the British failure to appreciate the significance of the Dutch native rubber position was a matter of such importance in the history of restriction, that the successive stages of its revelation have been thus recited in detail, and a further brief discussion of the matter seems to be justified before a summary of the facts is attempted.

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a policy of maintaining the price at 1s. 9d. was, to say the least of it, playing with fire, while as regards the more distant future all the evidence pointed to the conclusion that such a price would maintain the maximum possible rate of new planting. In this respect the leaders of the British industry may have been misled by the belief based on European estate experience, that much of the new planting would merely replace the old areas which would by then have been tapped to exhaustion; no one, even the Dutch investigators, fully realised at that date the vital difference between estate and native culture. But this is an excuse which becomes very weak as regards an indefinite continuation of new planting on a large scale, and it should have been clear that Dutch native rubber was a revolutionary factor in the more distant future, rather than in the immediate outlook for the next two years. From that more distant point of view, we are left with two alternatives, either that the leaders of the British industry simply disbelieved the whole evidence about the rate of planting, or that they believed but deliberately suppressed their belief for their own purposes, by which is meant no faintest suggestion of individual gain, but simply in order so far the interests of the British plantation industry as a whole in the best ways which they could conceive. These are virtually the only alternatives, and led to the conclusion that such a policy is not capable of definite solution; the historian can only form an opinion. As the result of discussions with a number of well-informed persons in Java, Malaya, and London, my own impression is that a sharp distinction must be drawn between the attitude of representative men in London, whereas London was not merely sceptical but almost contemptuous in its disbelief, while the City, or "haves," of all kinds are well-known in the Athenians in respect of new things. In this case their scepticism may well have been reinforced by suspicion of anything of Dutch origin, while the participation of the Malayan Government and certain British planters may have been regarded as mere playing into the enemies hands, and not as any guarantee of good faith and accuracy. It is, in fact, unthinkable that the leaders of the R.G.A. should have deliberately suppressed and disregarded the matter if they had believed, for the truth pointed only one way towards salvation, and therefore broadcasting and not suppression would have been their policy. Malaya probably did believe, but Malaya failed to convert London, and therefore,

for its own peace of mind, the best course was to push the spectre down as far as possible out of sight, since nothing could be done about it. Thus such suppression as there was in Malaya was no part of a deliberate policy, but simply the last resource of haunted minds. Similarly there seems little doubt that the Malayan Government believed, but it failed to convince the Colonial Office in the face of the utter disbelief of the City. It seems likely, however, that the Colonial Office did gradually come to believe, but not with sufficient assurance until probably well on in 1927. The realisation of the truth about Dutch native rubber may indeed have caused the definite breaking of the first strand of the rope which bound the Colonial Office to the industry for so long. So far as the R.G.A. was concerned, it needed another year or more, and Dr. Whitford's report, to convince them that the extent of Dutch native rubber planting was a subject worthy of investigation. At the end of 1928 Messrs. Tayler and Stephens were commissioned for the purpose, and after visiting the four chief centres of native production during March–June 1929, their report was presented in the following November. While an official disclaimer is for obvious reasons included in the Foreword, it can presumably be concluded that the R.G.A. was at last convinced, after an unnecessary and immeasurably expensive delay of four or five years.

An attempt must now be made to summarise the economic features of the Dutch native industry. No detailed study of particular districts will be undertaken, for which reason must be made to the various reports mentioned above, and since each district has its peculiarities, so much so that virtually no two are alike, it must be realised that any generalised description will fail to fit all the facts in any district. Nevertheless, while these district variations must not for one moment be forgotten, a broad survey has a very definite utility of its own, and will suffice for a general comprehension of the position of the native industry vis-à-vis the European plantation industry, both in the recent past and in at least the near future.
dealers and through returning pilgrims. During the boom of 1915, a few wealthy Malays started a little planting, but it was not until prices began to rise again at the end of 1925 that planting commenced on an appreciable scale, first in Borneo and the Djambi Residency of Sumatra, and later in Palembang, Sumatra East Coast and Riau. The fall in prices in 1920 appears to have put a stop to further planting, and to some extent curtailed output. But towards the end of 1922 the plantings from 1916-19 began to come into bearing, and at the same time the rise in prices began to stimulate a resumption of planting. In 1923 and 1924 the amount of planting increased, but was still comparatively small. Then the boom in prices stimulated the maximum possible rate of planting, and this continued more or less through out 1926. In 1927 the pace slackened and still more in 1928, though it was still considerable. Even in 1929 planting still continued, at any rate in Djambi, and there are some authorities who would dispute Messrs. Taylor and Stephens' limitation to that residency. It is, indeed, doubtful whether in all an appreciable amount of new planting is not still in progress even to-day, though every one admits that it is relatively insignificant as compared with 1925 or 1926.

Some of the earliest planting may have been specifically and solely for rubber, since it was undertaken by chiefs and comparatively wealthy persons who were directly copying what they had seen in Malaya. But from 1920 onwards, and even during the height of the planting boom in 1925 and 1926, the planting of rubber has been exclusively a quasi-by-product of the planting of rice. Every year the native must clear about two acres of jungle in order to grow rice for himself and his family; he takes one, or sometimes two, rice crops from this clearing, and it then reverts to jungle for perhaps ten or fifteen years, and often very much longer, before it is cleared again. As the gospel of rubber penetrated up the many rivers and along the very few high roads the Chinese storekeepers began to stock seed, and from 1923 onwards to press it on their customers, urging them to fill their pockets with the current price of rubber, but since they might otherwise be choked. Later on the trees are about four years old and, for the first operation i.e. two years clearing with rubber before he abandons it, the annual increase in the area planted with native rubber can suddenly increase. If, however, he ceases planting for two or three years, there will be the same reserve as in 1925, and a sudden increase in the planted area would be possible at any future time.

In all probability the general practice of planting far more trees per acre than is customary on European estates arose in the beginning from a natural inclination towards mathematical conclusions on the part of the native; the more trees per acre the more rubber, as any one but a white man would appreciate! The practice has, however, more than one very solid economic advantage. In the first place the dense stand of trees means an appreciable amount of shade within two or three years, and this helps to retard the growth of scrub, and so enables the rubber trees to rise above it when they might otherwise be choked. Later on the shade becomes extremely heavy, and this undoubtedly helps to keep the ground temperature lower than it would be on a European estate in the same situation. Probably also it
Means a greater humidity, while even the purely mathematical conclusion is correct up to a point; the average yield per tree is relatively low compared to that on a European estate, but the yield per acre is higher than most European estates can show, and probably would be even by European systems of tapping. The fall in the mathematical conclusion concerns the bearing life of the trees, but since planting costs next to nothing, and the supply of land is still virtually unlimited, this is of minor importance to the native. Given these two fundamental conditions, it is clear that a policy of extensive cultivation is the correct policy for the native, and he has therefore a very solid basis for the dense planting of 300-500 trees per acre as compared with the usual standard of 80-100* trees on European estates.

Perhaps most commonly the planting takes place with the first rice crop, which is then followed by a second crop, so that the trees get a comparatively good start; after that, they must take their chance, for little or no upkeep is attempted, and usually when tapping commences the first operation is to cut a way among the trees with the local equivalent of a scythe. The extent of precautions against fire, and against the depredations of wild pigs, etc., vary in different districts, and also apparently with the current price of rubber, but in general it does not appear that an upright fence, or the felling of the trees to prevent them touching each other, is used. Loss has occurred, except perhaps among the planters of the last two or three years which may have received no attention at all. Once the trees are about four years old, the risk of loss is comparatively small. Tapping usually begins between the end of the fifth and the seventh year, depending on whether the tap has been tapped when two to three years of continuous tapping. The first bark renewal is, however, of the utmost importance, as the tapping is done by hired labour and the owner desists from that operation, while when prices are low the hired labour cannot make a living, and though the owner has then to take his place he cannot as a rule tap all the trees which he owns, and this has become more universally true as each year passes. Thus when prices are low some of the trees get a rest, and these will be the trees which must want a rest, for the owner will probably tap only the highest yielding of his plots. Again in the intermediate stage of prices, when the hired labour is tapping but finds it difficult to make a living, only the highest yielding trees in a plot will be tapped and the remainder will get a rest, while as soon as the hired labour begins to drift away, and there is not sufficient labour available to tap the whole area even in this selective fashion, the lowest yielding plots will be completely rested. It is only on the supposition of high prices throughout the period that continuous tapping on a period of seven or eight years will normally take place, and there has so far been no such period, nor is it very likely to occur in the near future.

In my opinion there has been a good deal of needless controversy and confusion on this subject of the “life” of native rubber. Those who consider that at say fifteen years the life of a native rubber garden ceases to be a practical proposition even for the owner, are probably correct on the assumption of continuous tapping, but they do not always make this assumption clear. Equally those who maintain that the life of a native rubber garden is likely to be as long, or nearly as long, as that of a well managed European estate, do not always make it clear that they assume intermittent tapping and comparatively frequent periods of rest, an assumption which has so far been, and is likely to be, a well-founded assumption in actual practice. It is the usual kind of confusion which so often arises between the theorist, or the pure scientist, and the practical man.
man. Both are right on their respective assumptions, but the assumption of the practical man is the more likely to be realised in practice.

The above discussion has been solely on the basis of bark consumption and renewal conditions; account must, however, be taken of the possible effect of diseases. This is a technical question upon which the present writer is in no way equipped to discriminate between the arguments of experts. But the non-technical man may perhaps be permitted to remark that sufficient time has not yet elapsed to supply proofs of the real effect of disease upon yielding-power, and that arguments, based on the conditions of European estates and their cultivation, usually seem to require considerable modification when applied to native gardens. And it must not be forgotten that behind this whole issue of the productive life of native gardens lies the fact that new planting is a more or less automatic process, and that unless and until the native entirely loses faith in rubber, he will continue to plant his annual clearing at least intermittently. Even such intermittent planting will probably balance any wastage by disease or obsolescence, and the prospect of any substantial reduction in the potential capacity of the Dutch native production is therefore remote.

Resuming our general description, it has already been made clear that the planting is usually done by the resident owner and his family, though at the peak of the planting boom some hired assistance was doubtless often obtained, the owner becoming a manager pure and simple. On the other hand while prices remained reasonably high, that is until the spring of 1928, the bulk of the tapping was performed by labour hired on the bagi-dua system, the tapper retaining the market value of one-half of the results of his labour. The supply of tappers came from a variety of sources. In some cases local is there is a local supply of labour which normally obtains its livelihood by working for others; such labour transferred itself from one to another and the Malay was able to do the same. In many districts, therefore, it has been necessary to rely on immigrant labour. This is of two kinds: immigrants, or really migrants, from other districts of Sumatra or of Borneo, and immigrants from Java. There has always been a good deal of immigrant labour within Sumatra, but with the establishment of rubber in the eastern and southern districts, the stream from the northern and western estates became more clearly marked and extensive. In the main these migrant labourers do not colonise but return home as soon as the harvest is finished. On the other hand, migrants from the west coast of Sumatra have been a regular source of supply for tapping labour since 1927, and the period of renewed tapping in Djambi and Pekanbaru was little emigration from Java to Sumatra or Borneo until the rubber boom of 1925, other than that of contract coolies. In eastern estates the demand for coolies, however, quickly stimulated a large traffic, and with the decline in prices of tapping labour they returned home as soon as the harvest was finished. But with this exception there was little emigration from Java to Sumatra or Borneo until the rubber boom of 1925, other than that of contract coolies. In eastern estates the demand for coolies, however, quickly stimulated a large traffic, and with the decline in prices of tapping labour they returned home as soon as the harvest was finished.

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seems to him more severe than it would do if tapping in Sumatra offered only a similar remuneration! For practical purposes the position may be summarised by saying that it takes a lot to induce the Javanese to emigrate, and while once he has taken the plunge, he may, despite reduced earnings, delay his return for a time in the hope that the situation will improve, he will return in due course. Rubber alone has so far been able to induce him to emigrate, the initial stimulus and the duration of the stay varying in degree and duration with the current economic conditions in Java relative to the possibilities of profit as a tapper; but not even rubber will induce him to colonise.

As the price of rubber declined during 1927, the immigrant tapper found it more and more difficult to obtain what he considered an adequate remuneration. Some drifted away to other occupations or to their homes, and those who remained were often unsuccessful in demanding two-thirds instead of the customary half share. These developments did not, however, mean a great decline in the output of native rubber, for when the hired tapper stops, the native owner has to take his place in order to maintain his money income. Broadly speaking, the Malay has at any given time a definite standard of living. When the price of rubber is high, he can get this through hired tappers, and so he himself takes a rest, but the height of the boom even his wife and children were allowed to do the same! When the hired tapper ceases to find tapping a profitable occupation and goes off, the Malay owner must start tapping himself. The lower the price falls, the more must the Malay exert himself in order to maintain his standard of living. In the more remote districts, however, such a London price means a low rate of remuneration even to the better situated native owner, yet in the absence of more lucrative employment, and since labour is his only cost, he will probably continue the production of rubber, and if necessary reduce his standard of living. In the more remote districts, however, such a London price may be a local price approaching zero, and if his local market thus disappears, production must perforce cease.

The problem as to the exact price level at which hired tapping will start, and that at which it will stop, is therefore exceedingly complicated, depending as it does on so many variable causes. The price needed to start hired tapping may be taken as considerably higher than the price at which it will stop; for in the first instance the dislike of emigration must be overcome, whereas once having taken the plunge, a man will try and get a good run for his trouble in emigrating. The price needed to start emigration depends not only on the prospective money gain to the tapper, but on the prospective real gain, which largely depends in its turn on the price of rice, for this governs the emigrant's cost of living. The prospective real gain must then be compared with the prospective real gain of remaining in Java; if conditions of employment and living in Java are severe, a given price of rubber will be a more effective stimulus than if Java is thoroughly prosperous. It might, indeed, be said that, whatever the price, there would be little or no emigration if times were good in Java, but it must be remembered that even when times are relatively good, the native population is so great that it is always, so to speak, treading on the verge of subsistence according to the current standard. Much the same sort of factors apply to migrant tapping labour from other districts of Sumatra and Borneo. It is necessary to take into account the current prices of pepper, coffee, etc., and also the current supply of ready cash circulating in the interior, for this greatly affects the purchasing power of a given money wage, as well as the degree of necessity to earn. Finally it should be noted that the relation between the world price of rubber (e.g., Singapore or London) and the price in the up-country markets is not always constant. A rise in the world price usually appears to cause a more than proportionate rise in the price offered by
the merchants at the markets of the interior, because the merchant reckons on the possibility or probability that by the time the rubber has reached Singapore, its value will have appreciated still further; conversely, a fall in the world price usually means a more than proportionate fall in the interior price, the extent in both cases depending upon the distance of a particular interior market from Singapore, the suddenness of the change in the world price, and also the frame of mind of the Chinese dealers. Hence arguments based on past experience—and that has so far been small enough—should not be regarded as trustworthy; there are far too many variables which it is next to impossible to evaluate. At the present time account must also be taken of the probability that the Chinese merchants are cutting their customary margins on rubber, in the hope of making good this deficiency by the maintenance of the usually extremely lucrative trade in imported goods for native consumption.

Consideration of the quantitative aspects of this problem, as also of the problem of the potential capacity of Dutch native rubber production, need now be postponed only in order to round off this general qualitative survey with a few remarks as to marketing. Almost universally the native prepares his rubber in the form of thick wet slabs, and until about 1925 half the business of rubber production, especially in the district of Djambi, consisted in how much material other than rubber could be packed inside these slabs, without arousing the buyer to make a more than average allowance for the same in his price! Some districts were, however, much better than others in respect of the mixture of moisture and dirt, etc., and the Dutch Investigation Committee’s reports show percentages from 50 for Djambi down to as low as 10 for smallest producers such as Indragiri and Tapakul. The average is reckoned at 33½ per cent, for the period 1925–25. In 1925 the Dutch government officials began to introduce legislation prohibiting adulteration and excessive moisture, and though for a time, especially in Djambi, there was difficulty in enforcing the more drastic regulations, there has been a steady though small diminution in the moisture content, which is now probably about 28 per cent, and a great improvement as regards adulteration, the grosser forms of which have virtually ceased. The imposition of the export tax on native rubber in 1925 had an extremely good effect, because, being payable on the weight of rubber, the middlemen and exporters were careful to make a suitable discount for the tax they would have to pay on very high moisture content or adulterated rubber. While the diminution in the average moisture content will probably continue, there will be no radical change so long as the Dutch native continues to produce wet rubber for remilling rather than dry rubber as prepared by small-holders in British Malaya. This is perhaps not very likely, for the cost of remilling in special factories is not so great as to leave much margin, while since the transport of Dutch native rubber is so high by water, it is doubtful whether the Dutch remilling factories or to the Chinese plants in Singapore, unnecessary weight is of less importance than it would be when land transport is considered.

Up to about 1925 the buying of their rubber from the natives was almost entirely in the hands of Chinese shopkeepers and dealers. Since then Malays and Arabs have in many districts successfully taken up the business of buying up-country at the native’s garden or some small village market. These up-country dealers take the rubber to the principal market town of the district, and there dispose of it to the larger Chinese dealers who export it to the remilling factories at Singapore. Natives near these big markets, however, usually themselves transport their rubber thither. But in 1925 the supremacy of the Singapore mills was attacked by the establishment of the Rubber Unie with its local mills at the principal centres. The Rubber Unie was promoted chiefly by the Dutch shipping companies who wished to prevent the native rubber going to Singapore, mostly by Chinese steamers, and hence, after remilling, in British instead of Dutch bottoms to Europe and America. The N.E.I. Government, however, was keenly interested on the ground that a more independent coating business in the hands of Chinese dealers who in turn do not object to some element of speculation might be installed. The Rubber Unie, however, has had a somewhat stormy and difficult career. Its inevitable and perhaps somewhat excessive overhead costs made competition with the Chinese dealers most difficult. Furthermore, the Chinese mills buy their rubber mill it, and then sell it; in other words, they are prepared to take a speculative position, and this aids the Chinese dealers who in turn do not object to some element of speculation in their own operations. The Rubber Unie, however, adopted the policy of selling in New York, and then buying in sufficient quantity to cover themselves. But this meant a definite limitation of its buying price, and by indulging in a little speculation the Chinese dealers often starved the Rubber Unie mills of supplies. In 1926 several of the mills were closed down, and it seems clear that the future of the organization was hopeless when the proposal for the end of rubber by the end of 1926 was put forward. But judging by the relative percentage increase in the price of remilled rubber, the Unie had probably already been engaged in making headway against its competitors.

The way is now clear for a study of the subject. For the present the only thing that can be done is to consider the potential capacity for production of actual production, which is of course in regular and irregular years. While easy to formulate, the task is not easy, and it may be said that the answers as can be given are of very little importance as subjects to a very great extent on possible error, especially should the actual production as the expenditure be carried on. The results of such an expenditure would be the first to allow, as the second to contribute, a very important influence.

The earliest definite estimate of the potential production of Dutch native rubber appears to have been made by the Rubber Committee of the Dutch Ministry of Agriculture in the lecture at Amsterdam in November 1925, and has been substantially confirmed by the Dutch Native Rubber Investigation Committee, which in the next few years will have practically reached the same conclusions. The area planted in rubber is about ½ million acres, and the potential capacity of the area is possibly 200,000 tons, but the actual production in 1925 was not more than 75,000 tons and that at the end of 1926 had not been exceeded. The area is divided between two and three million acres, and the rubber growth is not only very variable, but is also subject to attack by plant diseases. The rubber of course, is subject to attack by other diseases as well as to varying degrees of infestation by insects. The Dutch are perhaps more unfortunately affected by insects than by any other form of injury to rubber, and the effects of attack by insects vary from year to year. As conditions are not yet in any way consistent, it is not easy to give any figures as to the area attacked by insects, but the total is not more than about one-quarter of the potential area, and the extent of the area attacked by insects is not yet sufficiently known. The Dutch are perhaps more unfortunate in their climate and is so high in the interior, so that the average rainfall is very low, and the general climate is so different from that of the interior.
were closed down, and it seemed that the whole concern was on the verge of disaster. A drastic reorganisation was however put in hand, and at the end of 1929 the prospects appeared more hopeful. But judging by the absence of any proportionate increase in the N.E.I. exports of remilled rubber, the Union has not yet been able to make much headway against its Chinese competitors.

The way is now clear for a quantitative study of the subject. For present purposes this can be confined to two issues, first, the potential capacity for production, and secondly the probable actual production at different price levels, both of course in relation to specific dates. While easy to formulate, these problems are, in quite different ways, most difficult of solution, and it may be said here and now that such answers as can yet be given should be regarded as subject to a very considerable margin of possible error, especially in the case of actual production, as the experts on the subject would be the first to admit, even though at the moment there is tolerable agreement between them. The potential capacity will be considered first.

The earliest definite estimate of the future production of Dutch native rubber as a whole appears to have been made by Dr. Rutgers, the Director of Agriculture in the N.E.I., in his lecture at Amsterdam in November 1925. His forecast that unless the price went below 15. per lb., the output in 1930 would be double that of 1925, and therefore not less than 150,000 tons, has already been quoted. The final report of the Dutch Native Rubber Investigation Committee, issued at the end of 1926, concluded that the actual production was already between two and three times the area planted before that date (i.e. the area not yet in bearing as compared with the area already in bearing), that the actual production of 1925 and 1926 was very near the full potential production at that time, that owing to the absence of planting in 1920 and 1921 the output would not show any appreciable increase in 1927, but that from 1928 there would be a continuous and very considerable increase, and that the production of 200,000 tons in the future was "not impossible."

The Dutch are perhaps by nature of a cautious disposition, and in addition the more cynically-minded observer may point out that it was not to their advantage in 1926 to blast the already waning British faith in restriction forecasts of a more sensational nature than was compatible with the facts revealed. Most probably, however, these estimates were made in perfect good faith; it was hard enough for any one at the time to credit the idea of even 200,000 tons, and London could not get that far. It is now virtually certain that these Dutch estimates were too low, but their practical significance was the same as if they had been much higher. The necessary correction was made by Dr. Whitford in his first report, published in the autumn of 1928. He followed the Dutch investigators in tackling the problem by attempting to estimate the proportions of old rubber (i.e. planted before 1922) and of new rubber (i.e. planted since 1922), and then applying this proportion to the estimated potential output of the old area, rather than by any direct estimate of the planted acreage and the average yield per acre. The only alternative is to estimate the average yield per acre and the potential capacity of the old area, thus arriving at an estimate of the acreage of the old area, and then multiplying this by the estimated proportion between the old and the new plantings in order to arrive at the acreage of the new area, and so at its potential capacity. This was the method adopted by Messrs. Taylor and Stephens, but it is really essentially the same as Dr. Whitford employed, so far as potential capacity is concerned, and the estimates of acreage depend upon the average yield per acre, which is a most difficult matter to ascertain during a short visit, as Messrs. Taylor and Stephens openly admit. Doubtless it is desirable to have some idea of the acreage old and new, and of the yield per acre, but after all what chiefly matters is the total potential capacity.

Dr. Whitford does give estimates of acreage and yield, but as he particularly points out, these may be quite erroneous without in any way falsifying his estimates of potential capacity.

Dr. Whitford's estimate of the potential production of Dutch native rubber in 1925 was 350,000 tons, and in his second report (issued December 1929) this figure is unaltered. He put the potential capacity in 1927 at 300,000 tons, and his fundamental estimate is that the new area was three times the old area, i.e. the area in bearing in 1947. This means a production of 300,000 tons from the new area, and to this is added 50,000 tons for the old area, the capacity of which is expected to decline rapidly after about 1931. Messrs. Taylor and Stephens estimate that between 1935 and 1937 the potential production "might total as much as 300,000 tons." Bearing in mind that these estimates are essentially rough approximations only, there is little disagreement as to the
general order of magnitude. It seems tolerably certain that the Dutch native industry will be physically capable of producing 300-350,000 tons of rubber by 1935. There is also general agreement that the increase of potential capacity becomes very marked between 1931 and 1933, when the heavy plantings of 1925 and 1926 reach peak production.

As regards the total acreage and yield per acre, however, these investigators differ very greatly. Dr. Whitford in his first report inclined to the view that the average yield per acre was about 440 lbs., and therefore put the total planted acreage at about 2,000,000 acres. In his second report he revised the average yield figure, as the result of further investigation, to 360 lbs. per acre, and he therefore reduced his estimate of the total planted area to 1,600,000 acres. Messrs. Taylor and Stephens assume that the average yield was not less than 700 lbs. per acre — the lowest figure compatible with our investigations — and therefore calculate the total planted area at 1,050,000 acres.

It is clear, therefore, that there is as yet no certainty whatever as to the normal average yield per acre, or as to the planted area, but as has been said, the really important fact is the potential capacity, and on this there is sufficient agreement for all practical purposes.

Our second quantitative problem, namely, the actual output to be expected at different prices, is perhaps even more difficult because, as has already been described, it involves a large number of highly variable factors, many of which are not susceptible to accurate evaluation even at any given moment of time. Summing up his judgments on all the factors involved and the evidence available, Dr. Whitford in his first report considered that up to 1932 the local supplies of labour outside without help would produce 90 per cent of the potential capacity (which he reckoned would have amounted to about 360,000 tons in the year named) if the New York price were maintained between 20 and 30 cents per lb., i.e. a London price of say 1s. 6d. to 1s. 10d. After 1932 he considered that outside help would be required, and that a price of at least 30 cents, or say 1s. 10d., would be necessary to stimulate immigration. In the extent necessary to produce 90 per cent of the potential capacity, which would reach 350,000 tons in 1935. In his second report Dr. Whitford was less definite. He is clear that to harvest the full potential capacity in 1935 outside labour will be required in most districts, unless the competition for labour by other products, such as coffee and pepper, is relatively weak, but in his second investigation he appears to have been impressed by evidence that the percentage of the new area owned by families whose rubber gardens are not unusually larger than the members of the families living in the old area. Hence he confirms the proposition in his first report that even with very low prices the actual output will not fall below 50 per cent of the potential output at any time, but for the rest he will not go beyond the vague conclusion that "should the price of rubber be low, the indigenous labour would fall short of producing the total estimated potential capacity of 350,000 tons by 1935. With more attractive prices enough outside labour might be obtained to produce much nearer the potential capacity." Messrs. Taylor and Stephens' conclusions are both frank and summary: "It is impossible to suggest any scale of probable outputs correlative to varying prices of rubber. But the evidence collected points to the outputs approaching the potential with a price of 1s. 6d. per lb." The Dutch experts have been even more guarded: "in July 1929 they would only commit themselves to the view that "at a constant price of 1s. the population will tap as much as possible," adding, however, that "potential production is not quite obtained" owing to shortage of local labour. Attention may, however, be drawn to the use of the present tense in the latter quotation, for this suggests that the available supplies of local labour, taking the rubber producing areas as a whole, was not even adequate to realise the full potential output of 1929; if this is true, it would be entirely inadequate to realise the greatly increased potential output from 1931 onwards.

My own inquiries in Java during the spring of 1930 convinced me that the best informed Dutch opinion is unanimous in viewing the problem in terms of the price level required to stimulate sufficient immigration into the rubber districts from other districts in Sumatra and Borneo, and from Java itself, particularly the latter; they discount the idea that even allowing for the natural growth of population, the local supplies of labour are adequate to produce much more than half the potential production from 1931 onwards. I therefore conclude, though with much hesitation, that probably Dr. Whitford has an exaggerated idea of the available supplies of local labour, taking the rubber producing areas as a whole. He is very likely right in insisting that even with very low prices the actual output will not fall below 50 per cent of the potential output, though it may be wondered whether even he now appreciates the probable output from the districts outside Java.

The report was probably written earlier in the year, when the price was rising and had nearly reached 1s. 6d. So the views of the Dutch that he overestimated the size of the potential capacity (which he reckoned would have been 90 per cent. of the potential production from 1931 onwards) but I differed from the former to the extent that 100,000 tons in the next two years might be possible, at 1s. 3d. per lb.; and of the latter Dr. Whitford was less definite. He is clear that to harvest the full potential capacity in 1935 outside help will be required in most districts, unless the competition for labour by other products, such as coffee and pepper, is relatively weak, but in his second investigation he appears to have been impressed by evidence that the percentage of the new area owned by families whose rubber gardens are not unusually larger than the members of the families living in the old area. Hence he confirms the proposition in his first report that even with very low prices the actual output will not fall below 50 per cent of the potential output at any time, but for the rest he will not go beyond the vague conclusion that "should the price of rubber be low, the indigenous labour would fall short of producing the total estimated potential capacity of 350,000 tons by 1935. With more attractive prices enough outside labour might be obtained to produce much nearer the potential capacity." Messrs. Taylor and Stephens' conclusions are both frank and summary: "It is impossible to suggest any scale of probable outputs correlative to varying prices of rubber. But the evidence collected points to the outputs approaching the potential with a price of 1s. 6d. per lb." The Dutch experts have been even more guarded: "in July 1929 they would only commit themselves to the view that "at a constant price of 1s. the population will tap as much as possible," adding, however, that "potential production is not quite obtained" owing to shortage of local labour. Attention may, however, be drawn to the use of the present tense in the latter quotation, for this suggests that the available supplies of local labour, taking the rubber producing areas as a whole, was not even adequate to realise the full potential output of 1929; if this is true, it would be entirely inadequate to realise the greatly increased potential output from 1931 onwards.

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price of 4d. when he wrote his second report in the autumn of 1929. But it involves no contradiction of this proposition to maintain that not much more than 50 per cent. will be realised unless and until the price rises very substantially. Assuming the validity of the general order of the magnitude of the potential capacity, hired tapping labour will be required to harvest much more than 50 per cent. of the potential capacity which is now just beginning to increase so greatly. The crucial question, as was pointed out in our qualitative study, is the price required to attract hired tapping labour. My inquiries in Java led me to believe that in the general economic conditions then prevailing (February 1930) little or no hired tapping would begin again unless and until the price rose very substantially. Assuming the validity of the general capacity, hired tapping labour will be required to harvest much more than 50 per cent. of the potential capacity which is now just beginning to increase so greatly. The crucial question, as was pointed out in our qualitative study, is the price required to attract hired tapping labour. My inquiries in Java led me to believe that in the general economic conditions then prevailing (February 1930) little or no hired tapping would begin again unless and until the price rose very substantially. Assuming the validity of the general capacity, hired tapping labour will be required to harvest much more than 50 per cent. of the potential capacity which is now just beginning to increase so greatly. The crucial question, as was pointed out in our qualitative study, is the price required to attract hired tapping labour. My inquiries in Java led me to believe that in the general economic conditions then prevailing (February 1930) little or no hired tapping would begin again unless and until the price rose very substantially.
VI.—THE AFTERMATH OF RESTRICTION, THE PRESENT AND THE FUTURE.

On November 1, 1928, British producers became free from the bonds, or as some felt, the supporting bands, of restriction and Government regulation, but even to those who took the former view, the prospect, both near and far, must have seemed about as gloomy and hopeless as it does to most ex-prisoners. Fortunately, perhaps, the full realisation of the fundamentally critical position* of the plantation industry in general, and of the British section of that industry in particular, as it appeared at that time, was confined to the comparatively few persons who were in a position to look beyond the immediate future. The vast mass of British rubber shareholders, and the man in the street, saw little further than the next six months, and that seemed bad enough. While consumption seemed to have resumed a rapid rate of expansion during the autumn, and while stocks in consuming countries had everywhere been reduced to the lowest possible level, yet both estates and small-holders had resumed full production as quickly as possible during the summer, and huge quantities had been accumulated for shipment from November 1 onwards; the price was but a little over 8d., and it seemed likely that the supplies released on November 1 would be more than adequate for all requirements. Restriction had apparently left the price but a little better in relation to costs of production than it found it, and altogether the outlook for 1929 was most unsatisfactory. But it should be understood that the average shareholder projected his thoughts so far, the situation did not seem to him altogether devoid of hope: for though he realised that there had been a good deal of new planting in the N.E.I. world consumption might be expected to out-balance that and more, especially with American prosperity, apparently firmly in the saddle and quickening the pace daily. Eventually there would be room for everybody at prices of 12d. and meantime all that was necessary was to show a little British bulldog tenacity during a temporary crisis. It was on this further outlook, however, that the experts knew better, even though they may have kept their dismay more or less to themselves. Their realisation of the apparent impasse with which the plantation industry was faced may not perhaps have been complete so early as November 1, 1928, for the truth about the Dutch native rubber situation met with a great deal of scornful disbelief and hardness of heart in London even at this time, though the Dutch planters were completely converted and correspondingly fearful. But many British as well as Dutch leaders of the industry appreciated the essentials of the situation sufficiently well in November 1928 to make excusable any slight anachronism in the following summary of the position as it appeared in the winter of 1928-29.

Though subsequent developments were to alter radically the outlook as it then appeared, the changes thus brought about cannot be fully and properly appreciated without an understanding of what was changed. Stress must be laid upon the point that this summary refers to 1928, and is not a summary of the position as appears to-day in 1931.

The full production was resumed after April 1929, more or less as fast as the necessary labour force could be procured; it does not appear that the members of the R.G.A. paid much heed to the official exhortations of their leaders in the undesirable of accumulating large stocks against November 1. Many estate managers in Malaya were surprised at the unexpectedly large yields of their trees, but this was almost universally attributed to "flush production" following the enforced resting which restriction had entailed. On the assumption that these high yields would be temporary only, average costs were believed to be about 6d. Mr. Ormsby Gore, in the report of his official visit to Malaya, Ceylon, and Java during 1928, gathered from discussions in Malaya that a few large estates could produce at 6d. per lb., but the majority's costs were between 6d. and 6½d. at 100 per cent. output; he is here referring to f.o.b. costs only. An average of ½d. for "all-in costs" may perhaps be on the low side, and is certainly not above the beliefs current in 1928 as to what long-period normal costs would prove to be when the flush production was over. In comparison with European estates, the Asiatic estates could certainly produce much more cheaply, and though the life of their trees might be shorter that was a factor in the comparatively remote future. As regards the much more important small-holding production, the natives were obtaining yields per acre far above those on most European estates; partly this too was flush production, but nearly all European planters were convinced, even in 1928, that the small-holder was over-tapping, and that ultimately he would run short of bark, though owing to the restriction period he was starting with a good supply, and therefore a very heavy output could continue even for some time. Clearly the European estate was faced with a serious crisis, for this was really comparing the estates of Java and Sumatra to those of the British colonies in their natural state, with the difference of cost apart. Mr. Ormsby Gore, in the report of his official visit to Malaya, Ceylon, and Java during 1928, gathered from discussions in Malaya that a few large estates could produce at 6d. per lb., but the majority's costs were between 6d. and 6½d. at 100 per cent. output; he is here referring to f.o.b. costs only. A average of ½d. for "all-in costs" may perhaps be on the low side, and is certainly not above the beliefs current in 1928 as to what long-period normal costs would prove to be when the flush production was over. In comparison with European estates, the Asiatic estates could certainly produce much more cheaply, and though the life of their trees might be shorter that was a factor in the comparatively remote future. 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* No reference to the present slump is here intended; that was not foreseen by any one in 1928. The reference is simply to the apparent impasse now about to be discussed.
Rubber Association of America in the autumn of 1928, was shortly to report an estimate of 350,000 tons. There could be no certainty as to the exact figure, but there was little doubt that the potential production of Dutch native rubber was so large as almost to take care by itself of any probable increase in the world's demand for many years, while in the next two or three years the potential production would add considerably to the excess supplies which were in sight from other sources. Much, however, depended on whether this potential production would be realised. This again was a problem incapable of exact solution, since the conclusions of the Dutch Investigation Committee, shortly to be confirmed in general by Dr. Whitford, was that a London price of £1, or a little over, would be sufficient to draw out the whole of the potential supply. Here lay the crux of the problem from the point of view of Malaya, and also, with modifications, of Ceylon.

If average estate costs were in the region of £1, to £11, the price would have to rise above 10s. before any reasonable profits could be reaped, and it would have to rise considerably higher still before new planting on any large scale would be undertaken. The plantation industry was in a cleft stick; with prices below 10s. the potential output of Dutch native rubber could be kept shut in, but estates would make quite inadequate profits; and with prices above 11s. estates would be in a profitable position, but the resulting output of Dutch native rubber would probably be impossible to maintain prices at that level, for the experts were agreed that though tapping of pre-restriction plantings, and from that source there was little likelihood of any further substantial increase. The menace lay in the enormous acreage planted during the restriction period. The Dutch experts considered that by 1935 the potential output would be not less than twice, and not more than three, the output of 1928, or say between 200,000 and 300,000 tons. Dr. Whitford, who had been sent out by the

Perhaps there was some rubber so smuggled in 1928 also, but it would not be very much as that year.
crop. The only justification for the plantation system is "the application of greater intelligence and skill than the native can reasonably be expected to acquire," hence the great stress which he laid on the importance of research work, etc., by the plantation industry.

The outlook from the point of view of the Malayan estates was indeed as bad or worse in the long run as in the short. In point of fact, this has been laid on the factor of Dutch native rubber, the situation was greatly complicated by the native production within Malaya itself, with its similar absence of overhead costs, and of elaborate labour code, and with almost immediate results which the native owners might make in their standard of living. For, unlike the Dutch native, the Malay small-holder has few other sources to which he can turn for a cash income, and therefore he would continue production at prices which would have ceased to attract the Dutch emigrant labour required to supplement the labour of the resident owners if full potential production were to be achieved. The only chance for estates seemed to be to discover and adopt a greatly improved technique of production, and so regain some part of the lead which they had once enjoyed.

Thus was the outlook at the end of 1928. During the year 1929, however, restriction was to be present to the plantation industry with a quite unexpected aftermath of such a nature as materially to alter this outlook in various ways. The dictionary defines the word "aftermath" as "a second crop of grass in a season," and this very aptly describes what happened. The harvest of restriction, such as it was, had been reaped, but there was to be an aftermath, and one of far greater importance than the harvest itself. The export figures for November and December 1928, and to a lesser extent for January 1929, of course of swollen by the stocks which had been accumulated in preparation for the month of restriction on November 1, but as the subsequent months passed, the return of which was as at all has been anticipated. The highest standard production of the restriction period, that for the restriction year 1926–27, had been 335,000 tons, and the general estimate for Malayan production in 1929 was in the neighborhood of 250,000 tons. A sample rate of under 300,000 tons a month. This total, however, was not enough to meet the increased demand of the standard production of the restriction period, which totalled 260,000 tons in 1926 as compared with a standard production of 250,000 tons in 1926–27, the year of highest assessment. Other countries, with the partial exception of Ceylon, showed no appreciable increase above expectations, but if they had, the discontinuities of the statistical prophets could hardly have been much greater.

By the end of 1929 the real significance and the true nature of this great increase in the output of Malaya was alike beginning to be understood. All explanations in terms of flush production had worn extremely thin as month after month the shipments showed little or no reduction. Gradually came the conviction that there had come about a more or less genuine and permanent increase in normal yields per acre. So far as estates were concerned, this increased yield was a more or less direct aftermath of restriction. During that period, and especially during the last three years, most estates at one time or another had a reserve of labour in order to be able promptly to meet any increase in the percentage exportable. This labour was employed in cultivation, e.g. bunding, construction of silt pits, aeration drains, etc., the importance of which had everywhere begun to be realised. The enforced resting gave the trees a chance to benefit fully from these improved methods of cultivation, and the combination of wintering, the shipments of Malayan production settled down at a level of about 300,000 tons. This was enormously more than had been anticipated. The highest standard production of the restriction period, that for the restriction year 1926–27, had been 335,000 tons, and the general estimate for Malayan production in 1929 was in the neighborhood of 250,000 tons. A sample rate of under 300,000 tons a month. This total, however, was not enough to meet the increased demand of the standard production of the restriction period, which totalled 260,000 tons in 1926 as compared with a standard production of 250,000 tons in 1926–27, the year of highest assessment. Other countries, with the partial exception of Ceylon, showed no appreciable increase above expectations, but if they had, the discontinuities of the statistical prophets could hardly have been much greater.

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tapping earlier in the morning, were three most beneficial changes among many, and these new practices further assisted not merely towards flush production, but the maintenance of new life and vitality which the resting and the improved cultivation during restriction had conferred upon the trees. It would be idle to deny that especially favourable climatic conditions during the year, or other undiagnosed temporary causes, may have contributed to some small extent towards this great increase of yield, in the main it unquestionably is of a permanent nature, due to the above-mentioned causes.

As regards the even greater increase in small-holdings, the tale is rather different. In the first place, there is no doubt that on the standard of what would have been produced if there had been no restriction, the small-holders were very much under-assessed, at any rate during the later years of restriction, and a considerable allowance must be made on this score before any genuine increase in yields can be conceded. But the increase is too great to be explained entirely in this way, and therefore it is reasonable to suppose that the more widespread copying and adoption of European practices, especially the greater care bestowed on the actual operation of tapping, and even some attempts at drainage, etc., may have made some contribution in yielding capacity. There remains the question as to how far the result involved over-tapping, that is a too rapid consumption of bark to allow sufficient time for renewal. A good deal has already been said on this general subject. In 1929 a certain proportion of the small-holders were without much doubt over-tapping, but it is doubtful whether this proportion, and the degree of over-tapping, were sufficient to make any material contribution to the total output.

It must be reiterated once more that bark renewal is undoubtedly more rapid on small-holdings than on the average estate, that the native will tap bark which is too thin to be tapped according to estate standards, and that under the physical conditions of small-holdings the rubber tree will stand a great deal of rough treatment for a period of years rather than months, even though its ultimate life may eventually prove to be shorter than the life of trees on European estates. In the early spring of 1930, the general opinion of European planters was that there would be a big fall in the output from small-holdings before the end of that year, but Government officials and others who have studied the native industry with care and with an open mind, were doubtful as to the validity of this conclusion, and some were expressing the view that the native would continue to make his trees yield at the current high rate for a much longer period. The decline in prices during 1930 has, however, very considerably changed the position; whereas the output of native holdings has been maintained during 1929, there seems little doubt that the native has been tapping more heavily than in 1929, and on the assumption that by native standards this heavy tapping has involved serious over-tapping, there may be a considerable decline within the next few months. The validity of that assumption, however, remains to be proved; the native may be killing his trees, but while they are alive, he may succeed in obtaining nearly the recent rate of yield, and it may take five or ten years to kill them, even temporarily!

To return to the estates, the causes of the aftermath of restriction have been explained, but it remains to consider its significance. The result on costs of production has been little short of revolutionary. The mere increase in the total output meant that overhead costs per lb. of rubber produced were very considerably reduced. But this increased output was obtained not by tapping all the trees on the estate more or less regularly and continuously, but only a proportion, for on an A B C system, for example, one-third of the estate is always resting. This means a still higher yield per acre actually being tapped, and therefore a large reduction in the direct costs of tapping, though not so large as it would have been if the individual tapper's task had not been greatly reduced, as has in general been the case. The combined result of all the altered conditions is that average normal "all-in costs" to-day (i.e. allowing for proper expenditure on cultivation, upkeep, etc.) are probably under 46d. per lb.

The data for any mathematical calculation of such an average are almost completely lacking though inferences can be drawn, with suitable modifications, from the cost statistics of which many companies have now resumed publication. It may well be that the average is really nearer 5½d., for there are many estates, most of them far above the average size, whose normal costs are probably under 44d. At the other end of the scale there are a few estates whose normal costs are 7½d. or over, but these are old estates whose soil or trees have been irretrievably ruined by the malpractices of the early days, or whose site was badly chosen.

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* See, for example, the comments of Mr. Gordon Carrie on the official statistics.

* The great difficulty in estimating normal costs is to determine the extent to which actual costs of the present time represent economies which can only be temporary, e.g., reduced wage bills and temporary economies in upkeep, etc.
the first place. As a general working proposition, it may be concluded that the full normal costs of at least 85–90 per cent of the output of Malayan estates would now be covered at a price of 9d.

The aftermath of restriction, therefore, brought down Malayan estate costs to the same sort of level as the costs of the Dutch estates in Java. The supposedly great difference in prices was really fictitious. All that had happened was that in Java the effects of the advance in productive technique had been realised steadily and visibly, whereas in Malaya restriction had concealed this advance, and dammed up the effects, so that they burst through in visible and accumulated form as soon as restriction was removed. But a still more important result was the entirely altered appearance of the European estate versus the Dutch native as a system of rubber production. A reasonable capitalisation of existing estates would be in the region of £60 per acre, and the average yield may be taken at 400 lbs. per acre. On this basis and with "all-in" costs at 6d., a price of 9½d. would be necessary to give a return of 25 per cent on the capital, and if this is considered unnecessarily high, a price of 9½d. to 10d. would suffice for a return of 10 per cent. But it must be remembered that many estates have unplanted reserve areas, and these extensions can be planted up at a much smaller capital cost, say from £20–40 per acre. Further, such extensions can to-day be planted with material yielding at least twice the 400 lbs. per acre which is the basis of the above calculation, and with these larger yields the costs of production would be lower. Hence a price level of 6d. to 9½d. would be more than ample stimulus to the planting of extensions, and would give a satisfactory profit to even the marginal producers. But the total unplanted reserve lands will not for long enable production to expand sufficiently to meet the probable increase in consumption; new estates will have to be established in the more undeveloped territories. This is much more costly than the extension of extensions; it would probably cost 50–80 per acre, or, with interest during the development period, perhaps as much as 150 per acre. Nevertheless, planted with material yielding 800 lbs. per acre, the all-in costs would not exceed 5d. at the outside, while to pay 15 per cent on the capital would require another 1½d. Thus a price leaves of 9½d. to 10d. should afford an ample stimulus even to the extensive planting of completely new estates. These calculations certainly do not err on the low side; an average price level of 9½d. to 10d. will be quite satisfactory from the producers' point of view.

From the point of view of the estate industry, therefore, there is now no need for prices to rise as high as 1½d., and in 1928, and even in 1929, the general opinion of the experts was that there would be only a comparatively small increase in the Dutch native production so long as the price remained below that figure. To-day, at we hope the lowest point of a world slump, conditions in the N.E.I., as everywhere else, have changed considerably; wages in Java are said to have been reduced, opportunities for normal employment have become less, and, on the other side of the problem, rubber is cheap, and the native owners are willing to give tappers on the bagi-dua system two-thirds and more instead of the customary half share. If one could conceive of these conditions remaining as they are, and the price of rubber rising to 10d., it seems quite possible that the Dutch native output would increase substantially. But this is a remote possibility, and there is little to suggest that when the world depression passes, the native emigrant wage-earner will find rubber-tapping a sufficiently attractive proposition so long as the London price remains below ½d. The menace of the vast native rubber areas of Sumatra, Borneo, etc., is a menace to the existence of the European industry no longer, it remains a most important factor, especially in respect of the future expansion of the plantation industry—a matter which will shortly be considered—but there is now no prospect that "rubber will go native." On the contrary, the year 1929 completely reversed the situation, and, so to speak, put the estate system at least ten years ahead of the native, and with every prospect of an eventually complete supremacy. The aftermath of restriction was of no mean order.

Consideration has been given first of all to the long-planting aspects of the aftermath of restriction because of their fundamental importance, but the immediate results of such a great increase in the supply of rubber must now claim attention. This, however, involves a consideration of the demand side as well, for the surprises of 1929 were not confined to Malaya. Mention has already been made in another connection of the enormous and totally unexpected increase in the world's demand, which began in the autumn of 1928 and continued until the autumn of 1929. The increase in world absorption of advance, 68,000 tons, was the result of the consumption of 10,000 tons in the U.S., 10,000 tons in the United Kingdom, 15,000 tons in Continental Europe, 6,000 tons in India, and some 3,000 tons in the rest of the world. If Malaya's production were to be increased by 40,000 tons—which is quite a reasonable estimate—some 60,000 tons of rubber would be available for the rest of the world, which was not the case only a year ago. The remedy for this unexpected increase in world consumption, as well as the increased absorption of the U.S., depended upon an increase in the world's price level, and this, together with the increased absorption of the U.S., had to be met by the industry as well. The only way open to the industry was to increase its own production, and this at any price. The sudden and unseasonal increase in demand had a good deal to do with this, for the rising prices of the Wall Street crop when the March shipments of 1929 started to arrive in London, were accompanied by a return of the daily strengthening of rubber prices, which had been discounted almost to a minimum in expectation of another rubber crash. Thus the daily strengthening of London prices began in October and November of 1928, and the price had a good deal to do with the sudden increase in the supplies of rubber when the March shipments of 1929 began to land in London. The menace of the vast native rubber areas of Sumatra, Borneo, etc., was a menace to the existence of the European industry no longer; it remains a most important factor, especially in respect of the future extension of the plantation industry—a matter which will shortly be considered—but there is now no prospect that "rubber will go native." On the contrary, the year 1929 completely reversed the situation, and, so to speak, put the estate system at least ten years ahead of the native, and with every prospect of an eventually complete supremacy. The aftermath of restriction was of no mean order.
which began in the autumn of 1928 and continued until the autumn of 1929. In 1928 the world absorption of crude rubber had totalled 680,000 tons, an advance of 80,000 tons on 1927, for most of which increase the U.S.A. was responsible. Estimates for 1929 were in the neighbourhood of 700,000 tons; actually the figure proved to be no less than 820,000 tons, and of the actual increase the U.S.A. was responsible for only 30,000 tons. The continued increase of the U.S. demand was somewhat unexpected, but the real surprise was the increased absorption by Europe. In part the increase in Europe and the rest of the world probably represented some rebuilding of manufacturers’ stocks, which had been allowed to fall to a minimum in anticipation of huge supplies, and consequently very cheap prices, after November 1, 1928, when the accumulated stocks in the East would become exportable.

But by September 1928 the market had more or less fully discounted this possibility, and with the daily strengthening of demand, the price fell but little further even under the flood of exports in November and December. The accumulated stocks were easily disposed of, and by January 1929 a definite rise in price was beginning which culminated in an average of just over 1s. for the month of March. Undoubtedly the general expectation that the shipments from Malaya would fall off as the supposed “flush-production” came to an end, had a good deal to do with this rapid rise, and when the March shipments showed no reduction, there was a relapse to an average of 10½d. level. By mid-June the realisation that the tapping holiday was a sharp break in the price. By mid-June the realisation that the tapping holiday was a sharp break in the price. By mid-June the realisation that the tapping holiday was a relatively low level at the end of 1928. But the May tapping holiday had been arranged by a more or less unofficial body, known as the Anglo-Dutch Liaison Committee, and negotiations were continued until on June 24 a public statement as to its findings was issued by the R.G.A. The main points were as follows:

1. No voluntary restriction scheme can be effective.
2. Without restriction, the industry is endangered.
3. The avoidance of distress requires Government intervention.
4. Regulation must include native production, must be based on 9d. per lb. as a pivotal price, and must be flexible.
5. Details must be agreed on in consultation with representatives of the industry.
6. Governments should pro tem. discourage extensions to the planted area.
7. No particular scheme has yet been considered.

The R.G.A. implied its approval of restriction in principle, but everything depended on

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the attitude of the Dutch producers. The crucial meeting was held early in July, and while a motion in favour of requesting Government intervention was carried, the results of the voting later showed producers of 25,095 tons against, and of only 38,905 tons in favour. Although the minority included 17,800 tons in American ownership, the existence of a relatively substantial Dutch opposition was definitely revealed. The market gave up all hopes of a preservative result, and by mid-July the price had reached 51d. During August the decline in price was much slower, but at the beginning of September there was a further break from a little under 52d. to 4fd., and again at the end of the month to 35fd. The first of these breaks was occasioned by official statements following conversations between the Governor-General of the N.E.I. and the High Commissioner of the Malay States, to the effect that neither Government would interfere, and that economic factors must be allowed to run their course. The second break appears to have been due to the further troubles of Wall Street at the end of September, but fundamentally the whole course of prices during 1930 must be viewed in terms of the inability and/or unwillingness of merchants and speculators to carry additional stocks, their unwillingness varying with course with the current odds on any successful restriction movement. To complete the break of price movements up to the end of 1930, it is only necessary to say that towards the end of October a sharp recovery to a little under 4fd. occurred, due initially to heavy buying by French consumers in anticipation of the imposition of an import duty. Contrary to most expectations, this level was more or less maintained for some time after the burst of French buying had died away; this was probably due to the inadequate deliveries to manufacturers outside the U.S.A. during the months of July and August. But with the New Year came fresh weakness.

For the purposes of the present study, it has not been thought necessary to deal with the history of the last two years in any great detail, except in reference to the fundamental changes which have appeared in the general situation on the supply side. Before this study is closed with a few observations as to the future outlook, some comment seems desirable on the issue of restriction in 1930. For practical purposes, restriction appears now a dead horse so far as the rubber industry is concerned, and most people to-day consider that horse not only dead but buried in a very deep grave. This may be true, but it is conceivable that the grave may not really be so deep, and minor miracles still occur even in the twentieth century. (See footnote.) In any case, to the student of artificial control the issue of restriction in 1930 suggests something of very considerable theoretical interest. As in 1921, the rubber producing industry was faced with a temporary but acute decline in demand as the result of a world-wide trade depression. As in 1921, it cannot be said that there is to-day any serious excess of producing capacity, in comparison with demand, either in existing or potential conditions, which have appeared in the general situation of the过去的two years in any great detail, which might be an effective stimulant to the native under today's economic conditions. This may be true, but it is conceivable that the Dutch native output maj' have altered as much in consequence of the economic conditions of the last few years as in consequence of the economic conditions of the last two years. Now in actual fact, restriction by producers in British territory alone, was quite out of the question in 1930—here lies a difference as compared with 1922—and even with the co-operation of all estates in the N.E.I., it would still have been a somewhat dangerous proceeding, because of the existing and potential Dutch native production, any control of which is still virtually impossible, both on physical and political grounds. Moreover, however, that restriction could have been applied to the whole of the production of the Middle East, restriction versus laissez-faire in 1930 then becomes a most interesting theoretical problem.

Despite a surge in rubber prices in 1931, the attitude of the Dutch producers was not to resell. Sir George Marwell's memorandum was sent to the printer. Sir George Marwell's proposal for a cooperative restriction movement, in his capacity as chairman of the Anglo-Dutch Rubber Commission, had now held another meeting. Whether these two meetings would lead to any serious steps to be taken, the attitude of the low-cost Dutch producers may have altered as much in consequence of the economic conditions of the last few years as in consequence of the economic conditions of the last two years. For the purposes of the present study, it has not been thought necessary to deal with the history of the last two years in any great detail, except in reference to the fundamental changes which have appeared in the general situation on the supply side. Before this study is closed with a few observations as to the future outlook, some comment seems desirable on the issue of restriction in 1930. For practical purposes, restriction appears now a dead horse so far as the rubber industry is concerned, and most people to-day consider that horse not only dead but buried in a very deep grave. This may be true, but it is conceivable that the grave may not really be so deep, and minor miracles still occur even in the twentieth century. (See footnote.) In any case, to the student of artificial control the issue of restriction in 1930 suggests something of very considerable theoretical interest. As in 1921, the rubber producing industry was faced with a temporary but acute decline in demand as the result of a world-wide trade depression. As in 1921, it cannot be said that there is to-day any serious excess of producing capacity, in comparison with demand, either in existing or potential conditions, which have appeared in the general situation of the past two years in any great detail, which might be an effective stimulant to the native under today's economic conditions.
Let us suppose that production had been restricted to 75 per cent of capacity until the price reached a level of, as the Anglo-Dutch Liaison Committee is said to have suggested, 

realise their potential output, though this might possibly be less than it is now if only because of the excessive tapping during the period of low prices. Even this, however, would result in little permanent damage to the low-cost estates and the new plantations, for as the latter came into bearing, the price would fall and the native would be gradually forced out of production, the assumption being that he could not permanently compete with rubber at say, which would be seriously resented by the estates. Thus in the long run laissez-faire would appear to have certain advantages for the low-cost estates over restriction. For under restriction there would be no pruning of capacity, and no serious danger would be struck at the native industry, which would remain a dominant factor in the situation for perhaps another generation.

The opposition of the low cost Dutch estates to restriction has been more or less openly declared on these grounds, and it may be surmised that certain British interests take much the same line. From the consumers' point of view, restriction has little to commend it. It is true that the pruning of capacity which will take place under laissez-faire, if the revival of demand tarries, may result in a somewhat serious shortage of supplies when demand resumes its normal volume and upward trend. But prices cannot remain really high for more than a few months, because at is, or over the potential Dutch native supply will begin to become available, and this constitutes a very big protection from the consumers' point of view. Such a rise in price would, moreover, greatly stimulate new planting by estates, and in due course the normal price would be restored. Under restriction, the consumer would lose his present advantage of very cheap rubber, such as it is worth, and what is much more important from his point of view, new planting by estates, and therefore the ultimate lowering of marginal costs, would be postponed. On balance it seems reasonable to suppose that the consumer would gain more under laissez-faire by the earlier resumption of new planting than he would lose by the relatively high prices which may temporarily occur if the mortality amongst the high cost producers is on a large scale, and therefore that he would gain more under laissez-faire than under restriction because restriction necessarily involves a delay to new planting. Hence while there is no fundamental theoretical or general objection to restriction as a remedy for a temporary decline in demand, capacity being normal, there are special factors in the rubber situation of to-day which suggest that on balance restriction would
The truly formidable nature of the world depression, and in particular the state of affairs in the U.S., are now even more apparent than six months ago, and any significant revival of demand until well on in 1931 seems most improbable. It is also becoming more certain that even another six months of present prices will see a substantial curtailment of estate output, and at least an appreciable pruning of actual capacity in Malaya if nowhere else. It is also clear that the output of Dutch native rubber is being slightly reduced, while in all probability the Malayans small-holders are seriously over-tapping, and though their output may be maintained for many months yet, this will only be achieved at the expense of the future. Given a fairly drastic pruning of existing productive capacity, it also seems clear that when the world depression passes, there will be something at least approaching a shortage; for world depressions do pass, and rubber is certainly a commodity for which the demand is expanding and will continue to expand. These producers who survive will doubtless reap fortunes in a few years’ time, for it will be necessary to draw substantially on the Dutch native potential supplies, and that means a wide margin of profit for all estates whose costs are in the region of 4½ to 5½. The really vital question is, what will happen then?

The ultimate interests of the consumer lie in the extension of the plantation system of production, and not with the native. This implies no prejudice against the native, or favour towards the interests of European shareholders. It is simply that the plantation industry offers a better chance of cheap rubber in the future, and that alone is in the long run the criterion by which the two systems must be judged. The plantation system has already shown that it can produce rubber profitably at a price of not more than 6½, and in select cases much less; moreover, there seems no reason why the plantation system should not produce all the world requires at such a price. It is extremely doubtful, however, whether the native either in Malaya or the N.E.I. can continuously produce rubber in the requisite quantity, still less of the requisite quality, at such a price. But though there may be some element of doubt on this matter in the present, there can be little doubt about the future. Rubber production is as yet only on the threshold of a veritable revolution in technique. To-day it is possible to plant material which can be relied upon to give yields of at least 800 lbs. an acre and upwards. This figure is roughly double the average estate yield to-day, but it almost certainly errs greatly on the low side, so that as the future is concerned. The selection and propagation of strains for bud-grafting, and even the art of seed selection, is still in its infancy, and no one can foretell the potentialities of the planting material which may become available within even the next ten years. Similarly, further great strides will undoubtedly be made in the near future in respect of general cultivation, particularly manuring. If the latter cannot compete with his extensive methods of cultivation to-day, he will certainly not be able to do so in the future, and such scientific cultivation is not for this generation of natives, either in Malaya or in the N.E.I., nor for the next. In the former territory, there is not more land available in the Malay reserves, and replanting as opposed to new planting will be necessary. Apart from anything else this involves a reduction of the native’s income for many years, and in general seems a most unlikely development. In the N.E.I., the native industry has a less gloomy future, for every year the native must clear more jungle for his rice crop, and in time he may learn to appreciate and utilise the discoveries of science. But the native mind does not readily grasp the technicalities of scientific cultivation, and it will need much exhortation from the Chinese dealers and shopkeepers to educate his ideas, while even the mere physical operation of bud-grafting is no child’s play. Moreover, the available supply of the best bud-wood will for many years be inadequate to meet the demand of the plantation industry, and any extensive new planting develops in the near future. Admittedly in time the native may follow where the European industry is leading the way, but he is at present at least ten years behind, and dropping further backwards every day, while if the advance of technique continues more and more rapidly as is likely, he may eventually give up the chase altogether.

But the future of the plantation industry depends not only on the progress made in productive technique, but on the speed with which that improved technique is translated into effective practice. Here lies the heart of the problem.
Even supposing the anticipations of the low cost producers are realised, the price cannot for long remain much over 18., or say at the most between 15. 3d. to 15. 6d. Will such a price level induce the European investor to provide the money for new planting? It will certainly enable the surviving estates to plant up their reserve land, and possibly to replant their estates purchased for a more song during the slump. But replanting on a large scale is not very feasible in view of the necessary cessation of revenue. It is, however, possible that really means opening up Pahang in Malaya, or some similar undeveloped territory in Sumatra or Borneo. In his present state of mind, the ordinary English investor is only beginning to realise the recent decline in costs of production; he still thinks of 15. 3d. or 15. 6d. as a barely profitable price level, and he has no comprehension of the possibilities of modern planting material. The first, and perhaps the most important, task before the leaders of the industry, especially in Great Britain, is to educate the investing public to the realisation of the present situation and the potentialities for the future, to drive home the fact that the normal long period price level has fallen for ever well below 18., to emphasise that the objective of the next ten years should be to produce profitably at 7d. to 8d., and that new planting propositions which are based on expectation of yields enormously greater than investor to present average, and prices in the neighbourhood of 6d. and less, are sound and legitimate propositions and not mere fantasies. Without such an education of the investing public, it cannot be doubted whether an adequate supply of capital will be forthcoming, except at prices which will strengthen the hold of the Dutch native industry to the ultimate detriment of the consumer and the European producer alike.

But even if new capital is thereby made available in sufficient quantities, there is also a physical difficulty confronting the plantation industry, especially the British section, namely, the possibility, in fact the probability, that the supply of first-class proved planting material will be insufficient, and therefore indefinitely expensive. As has been said, the Dutch have the advantage of a long start here, and with such a subject as the rubber tree, research work cannot be expected to bear fruit for a period of ten or fifteen years. The Rubber Research Institute of Malaya was not established until July 1925, and until 1929 it lacked any experimental plantation of its own. Proposals for its establishment were made in 1921, and as a result the Department of Agriculture was forbidden to undertake research connected with rubber, and such work as was in hand was summarily stopped. At the same time the slump began, and the industry was wholly occupied with restriction proposals. As a result of restriction and Government red tape combined, practically five whole years were wasted in discussion, a crime for which the Malayan Government must share responsibility even if the industry must carry most of the blame, and for which both will pay a heavy penalty. The record of Ceylon in the matter of research is better, but still leaves much to be desired, and the work has necessarily been on a small scale. There has, however, been a limited amount of experimental work by individual private interests, and within a year or two a small supply of Malayan produced bud-wood of some quality will be available. Unless the gods are kind, however, the supply of planting material will not be what it ought to be, either in quality or quantity, and, in any case, the Dutch will be in a better position than Malaya.

In connection with this competitive aspect, Malaya must further reckon on the possibility that Sumatra despite higher labour costs, and even perhaps Dutch Borneo, will offer greater attractions to the planters of the future than Malaya. This is a very complicated and many-sided issue, and it is not proposed to make any attempt to consider it in detail. But stress must be laid upon the possibility that the expansion of the future need not necessarily take place in Malaya, and it behoves the British Government to keep this possibility in mind. Equally a bare mention only will be made of the question of depreciation in the output of existing estates, as raised for example by Lt.-Colonel Kunhardt in "The Future of Rubber." We may agree with Colonel Kunhardt that there will be a shortage of rubber within a few years, but of a rather different kind and for somewhat different reasons. If its ideas of depreciation are correct, the shortage will be somewhat intensified, but it must be remembered that we have postulated the destruction of an appreciable proportion of the existing capacity, and there seems little likelihood that the surviving average and low cost capacity will be greatly affected by depreciation in the near, whatever may be true of the distant future. The truth is that we have as yet quite...
insufficient data to determine the age at which the output of rubber trees begins to decline, at any rate under modern conditions of estate cultivation and management. The odds are perhaps that the capacity which survives the next two years will maintain its productivity at least as long as it ought to be asked to do so, i.e. until the time comes for new and better capacity to be substituted in its place.

This brief disquisition on the outlook for the future is not intended to do more than draw attention to certain salient factors in the situation. Even what has been said may require modification before the printer has done his work, for the goddess of rubber delights in the discomfiture of her prophets. This study may appear to some as of a historical interest only, on the ground that never again will the rubber industry experiment with restriction or any other form of artificial control. If the writer shared this belief, he would probably have left his task to some one else, even though the interest of this study is not confined to the rubber industry. But whatever the fate of every remark made above concerning the future, the writer feels some real confidence in prophesying a resurrection of artificial control, perhaps at no distant date. Neither producers nor consumers can contemplate with equanimity an indefinite continuance of such instability as has characterised the rubber industry up to the present time, and further experiments will inevitably be made in conscious control before we can feel satisfied of the superiority of the unconscious control of laissez-faire. It is in the anticipation of such further experiments that the present study has been attempted, and while it seems to the writer to be of considerable interest from a general economic point of view, he hopes that it may be also of some small practical utility to the rubber industry itself in making its next experiment in this direction.

As has been said in a previous footnote, the text has been left as it was originally written, but the resurrection of control which I had in mind was to be in two or three years' time, when the present depression passed away, and in the form of a permanent stabilisation scheme. I was not anticipating the revival of restriction as a remedy for the existing situation, in which form, as indicated above, I doubt the ultimate desirability, as long as the nature of the general economic situation remains unchanged. (March 21st, 1931.)
APPENDIX.

TABLE I.
WORLD PRODUCTION, CONSUMPTION AND STOCKS.
(000 Tons.)

<table>
<thead>
<tr>
<th>Year</th>
<th>Net Exports*</th>
<th>Estimated Absorption</th>
<th>Apparent Increase or Decrease in Stocks</th>
<th>Recorded Change in Visible Stocks</th>
</tr>
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<tr>
<td>1919</td>
<td>598</td>
<td>530</td>
<td>- 68</td>
<td>-</td>
</tr>
<tr>
<td>1920</td>
<td>354</td>
<td>310</td>
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<td>+ 29</td>
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<tr>
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<td>290</td>
<td>270</td>
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<td>420</td>
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<td>587</td>
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<tr>
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<td>697</td>
<td>767</td>
<td>+ 14</td>
<td>+ 14</td>
</tr>
<tr>
<td>1928</td>
<td>581</td>
<td>667</td>
<td>+ 36</td>
<td>+ 36</td>
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<tr>
<td>1929</td>
<td>818</td>
<td>718</td>
<td>+ 108</td>
<td>+ 108</td>
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</table>

* As estimated by Rubber Growers' Association.
| Note.—For reasons which need not be detailed here, my personal opinion is that not exports are a better measure of current supplies than net imports.
| 1 As with the B.G.A. and against the American statisticians.

Neither net exports nor net imports are, of course, anything more than an approximation to actual physical production, and it seems to me (as compared with absorption, instead of net exports as above), the agreement between the apparent and the recorded changes in stocks (cols. ii. and iv. above) is on the average neither better nor worse. As regards absorption, the U.S. Department of Commerce estimates differ from the B.G.A. estimates given above by 20-20,000 tons from 1919-23, but the difference is not pronounced insignificant.

TABLE II.
NET EXPORTS OF CRUDE RUBBER, 1910-1929. (Tons.)
(As estimated by Rubber Growers' Association.)

<table>
<thead>
<tr>
<th>Year</th>
<th>British Malaya</th>
<th>Netherl. East Ind.</th>
<th>Ceylon</th>
<th>Indo. Brit.</th>
<th>Surawak</th>
<th>French Indo.</th>
<th>Siam, etc.</th>
<th>Total</th>
<th>South America</th>
<th>Other</th>
<th>Total</th>
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<td>120</td>
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<td>100</td>
<td>4,000</td>
<td>44,000</td>
<td>50,000</td>
<td>4,000</td>
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<tr>
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<td>180</td>
<td>100</td>
<td>1,000</td>
<td>22,000</td>
<td>25,000</td>
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| Note.—Most of the figures in this table have been obtained from official sources. The exports of Plantation Rubber have been adjusted to allow for moisture, etc., in native rubber and for rubber smuggled out of Malaya during the period of regulation of exports.

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### TABLE III

**World Absorption of Crude Rubber by Manufacturers.**

(As estimated by Rubber Growers' Association.)

<table>
<thead>
<tr>
<th>Col. V.</th>
<th>Rickinson's estimates to Doc. 1926; subsequently estimates by U.S. Dept. of Commerce. These latter are more accurate.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Col. I.-IV.</td>
<td>From Dec. 1923 figures from Rubber Quarterly.</td>
</tr>
</tbody>
</table>
TABLE V.
AVERAGE QUARTERLY PRICE, AND PERCENTAGES EXPORTABLE AT THE MINIMUM RATE OF DUTY UNDER THE RESTRICTION SCHEME AND AVERAGE PRICE FOR SIMILAR QUARTERS SUBSEQUENTLY.

(Coal, 500 lb.) Tables relating to Rubber Industry.

<table>
<thead>
<tr>
<th>Period</th>
<th>Price Exportable</th>
<th>Average Price</th>
<th>Percentage Exportable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restric­tion Quarter No.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nov.—Jan. 1922-3</td>
<td>2.285</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Feb.—April 1922-3</td>
<td>2.178</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>May—July 1922-3</td>
<td>2.038</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Aug.—Sept. 1922-3</td>
<td>1.942</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>Oct.—Dec. 1922-3</td>
<td>1.991</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Nov.—Jan. 1923-4</td>
<td>2.017</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Feb.—April 1923-4</td>
<td>1.907</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>May—July 1923-4</td>
<td>1.938</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Aug.—Sept. 1923-4</td>
<td>1.943</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>Oct.—Dec. 1923-4</td>
<td>1.991</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Nov.—Jan. 1924-5</td>
<td>1.917</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Feb.—April 1924-5</td>
<td>1.858</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>May—July 1924-5</td>
<td>1.879</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Aug.—Sept. 1924-5</td>
<td>1.938</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>Oct.—Dec. 1924-5</td>
<td>1.991</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Nov.—Jan. 1925-6</td>
<td>1.879</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Feb.—April 1925-6</td>
<td>1.858</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>May—July 1925-6</td>
<td>1.858</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Aug.—Sept. 1925-6</td>
<td>1.917</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>Oct.—Dec. 1925-6</td>
<td>1.991</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Nov.—Jan. 1926-7</td>
<td>1.858</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Feb.—April 1926-7</td>
<td>1.858</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>May—July 1926-7</td>
<td>1.858</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Aug.—Sept. 1926-7</td>
<td>1.917</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>Oct.—Dec. 1926-7</td>
<td>1.991</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Nov.—Jan. 1927-8</td>
<td>1.858</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Feb.—April 1927-8</td>
<td>1.858</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>May—July 1927-8</td>
<td>1.858</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Aug.—Sept. 1927-8</td>
<td>1.917</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>Oct.—Dec. 1927-8</td>
<td>1.991</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Nov.—Jan. 1928-9</td>
<td>1.858</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Feb.—April 1928-9</td>
<td>1.858</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>May—July 1928-9</td>
<td>1.858</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Aug.—Sept. 1928-9</td>
<td>1.917</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>Oct.—Dec. 1928-9</td>
<td>1.991</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>

TABLE VI.
"STANDARD PRODUCTION" IN BRITISH MALAYA AND CEYLON FOR RESTRICTION YEARS.

(From Coal, 500 lb.)

<table>
<thead>
<tr>
<th>Year, Nov. 3-Oct. 31.</th>
<th>Malayan</th>
<th>Ceylon.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1922-23</td>
<td>274,000</td>
<td>60,014</td>
</tr>
<tr>
<td>1923-24</td>
<td>266,500</td>
<td>62,282</td>
</tr>
<tr>
<td>1924-25</td>
<td>276,784</td>
<td>60,807</td>
</tr>
<tr>
<td>1925-26</td>
<td>314,551</td>
<td>64,475</td>
</tr>
<tr>
<td>1926-27</td>
<td>335,599</td>
<td>72,539</td>
</tr>
<tr>
<td>1927-28</td>
<td>314,085</td>
<td>76,980</td>
</tr>
</tbody>
</table>

TABLE VII.
CARRY-OVER OF UNEXPLODED EXPORT RIGHTS IN MALAYAN RESTRICTION AREA AT END OF EACH QUARTER OF THE LAST TWO RESTRICTION YEARS. (Tons.)

(From Reports of Malaysian Rubber Controller.)

<table>
<thead>
<tr>
<th>Quarter Ended</th>
<th>Tons.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct.—Dec. 1927</td>
<td>23,544</td>
</tr>
<tr>
<td>Nov.—Jan. 1928</td>
<td>18,970</td>
</tr>
<tr>
<td>Feb.—April 1928</td>
<td>13,631</td>
</tr>
<tr>
<td>May—July 1928</td>
<td>10,544</td>
</tr>
<tr>
<td>Aug.—Nov. 1928</td>
<td>15,188</td>
</tr>
<tr>
<td>Dec. 1928—Jan. 1929</td>
<td>10,544</td>
</tr>
<tr>
<td>Feb.—April 1929</td>
<td>4,952</td>
</tr>
<tr>
<td>May—July 1929</td>
<td>6,831</td>
</tr>
<tr>
<td>Aug.—Nov. 1929</td>
<td>3,551</td>
</tr>
</tbody>
</table>

TABLE VIII.
PRODUCTION OF RUBBER IN THE NETHERLANDS EAST INDIES. (000 lbs.)

(As estimated by R.G.A. to 1928. Messrs. Harrisons & Crosfield estimate.)

<table>
<thead>
<tr>
<th>Year</th>
<th>Estate Rubber</th>
<th>Native Rubber</th>
<th>Total.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1921</td>
<td>21</td>
<td>50</td>
<td>71</td>
</tr>
<tr>
<td>1922</td>
<td>20</td>
<td>56</td>
<td>76</td>
</tr>
<tr>
<td>1923</td>
<td>23</td>
<td>58</td>
<td>81</td>
</tr>
<tr>
<td>1924</td>
<td>23</td>
<td>55</td>
<td>78</td>
</tr>
<tr>
<td>1925</td>
<td>22</td>
<td>60</td>
<td>82</td>
</tr>
<tr>
<td>1926</td>
<td>20</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>1927</td>
<td>18</td>
<td>56</td>
<td>74</td>
</tr>
<tr>
<td>1928</td>
<td>16</td>
<td>55</td>
<td>71</td>
</tr>
<tr>
<td>1929</td>
<td>22</td>
<td>54</td>
<td>76</td>
</tr>
<tr>
<td>1930 (forecast)</td>
<td>150</td>
<td>50</td>
<td>200</td>
</tr>
</tbody>
</table>

TABLE IX.
RELATIVE ABSORPTION OF CRUDE AND RECLAIMED RUBBER IN THE U.S.A.

(From Statistics published by U.S. Dept. of Commerce.)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total.</th>
<th>Ratio of reclaimed absorption to crude absorption.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1921-22</td>
<td>100</td>
<td>57-7</td>
</tr>
<tr>
<td>1923-24</td>
<td>100</td>
<td>53-5</td>
</tr>
<tr>
<td>1925-26</td>
<td>100</td>
<td>52-2</td>
</tr>
<tr>
<td>1927-28</td>
<td>100</td>
<td>50-5</td>
</tr>
<tr>
<td>1929-30</td>
<td>100</td>
<td>48-3</td>
</tr>
<tr>
<td>1931-32</td>
<td>100</td>
<td>46-1</td>
</tr>
</tbody>
</table>

* For statistics of Absorption of Crude Rubber in U.S.A., see Table III.
### TABLE X.
**ESTIMATED BRITISH AND NON-BRITISH EXPORTS OF CRUDE RUBBER, 1922-1930**
(By courtesy of Messrs. Harrisons & Crosfield, Ltd.)
(Thousand tons)

<table>
<thead>
<tr>
<th>Year</th>
<th>British Empire</th>
<th>British control in Foreign Countries</th>
<th>Total British</th>
<th>Non-British Control</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Quantity tons</td>
<td>Per cent of Total.</td>
<td>Quantity tons</td>
<td>Per cent of Total.</td>
<td>Quantity tons</td>
</tr>
<tr>
<td>1922</td>
<td>274</td>
<td>66.5</td>
<td>27</td>
<td>6.7</td>
<td>301</td>
</tr>
<tr>
<td>1923</td>
<td>255</td>
<td>62.8</td>
<td>23</td>
<td>5.7</td>
<td>278</td>
</tr>
<tr>
<td>1924</td>
<td>241</td>
<td>59.2</td>
<td>24</td>
<td>5.6</td>
<td>265</td>
</tr>
<tr>
<td>1925</td>
<td>283</td>
<td>64.4</td>
<td>29</td>
<td>5.7</td>
<td>311</td>
</tr>
<tr>
<td>1926</td>
<td>312</td>
<td>69.0</td>
<td>42</td>
<td>6.7</td>
<td>425</td>
</tr>
<tr>
<td>1927</td>
<td>143</td>
<td>56.5</td>
<td>40</td>
<td>5.6</td>
<td>227</td>
</tr>
<tr>
<td>1928</td>
<td>589</td>
<td>59.1</td>
<td>53</td>
<td>6.4</td>
<td>343</td>
</tr>
<tr>
<td>1929</td>
<td>561</td>
<td>56.5</td>
<td>54</td>
<td>6.6</td>
<td>357</td>
</tr>
<tr>
<td>1930</td>
<td>564</td>
<td>67.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TABLE XI.
**ESTIMATED AREA UNDER RUBBER AT 31ST DECEMBER, 1929**
(As estimated by Dr. G. Rae, R.G.A. Bulletin, Feb. 1931.)
(Thousands of Acres)

<table>
<thead>
<tr>
<th>Country</th>
<th>Year of planting</th>
<th>Up to 1922</th>
<th>1923</th>
<th>1924</th>
<th>1925</th>
<th>1926</th>
<th>1927</th>
<th>1928</th>
<th>1929</th>
<th>1930</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaysia</td>
<td></td>
<td>2,329</td>
<td>46</td>
<td>47</td>
<td>54</td>
<td>103</td>
<td>86</td>
<td>69</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>Malaya Est., India</td>
<td></td>
<td>390</td>
<td>4</td>
<td>3</td>
<td>11</td>
<td>20</td>
<td>13</td>
<td>11</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>N.E.I. Est., Borneo</td>
<td></td>
<td>850</td>
<td>27</td>
<td>44</td>
<td>55</td>
<td>81</td>
<td>71</td>
<td>60</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Dutch N. B.</td>
<td></td>
<td>126</td>
<td>3</td>
<td>6</td>
<td>12</td>
<td>15</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sarawak</td>
<td></td>
<td>65</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>French Indo-China</td>
<td></td>
<td>65</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Other provinces</td>
<td></td>
<td>40</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Total (excluding N.E.I. Native)</td>
<td></td>
<td>1,075</td>
<td>92</td>
<td>119</td>
<td>169</td>
<td>299</td>
<td>227</td>
<td>273</td>
<td>153</td>
<td>5,107</td>
</tr>
<tr>
<td>N.E.I. Native</td>
<td></td>
<td>100</td>
<td>7</td>
<td>15</td>
<td>17</td>
<td>19</td>
<td>20</td>
<td>15</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Grand Total</td>
<td></td>
<td>1,175</td>
<td>102</td>
<td>134</td>
<td>186</td>
<td>318</td>
<td>347</td>
<td>338</td>
<td>168</td>
<td>5,265</td>
</tr>
</tbody>
</table>

(a) Tayler & Stephens, 1929.
(b) Whitford, 1929.
### TABLE XII.
**Estimated World Production of Rubber, 1929-1930.**
*(As estimated by Dr. G. Rae.)*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Europe</td>
<td>Asia</td>
<td>Total.</td>
</tr>
<tr>
<td>Malay</td>
<td>762,923</td>
<td>64,307</td>
<td>827,230</td>
</tr>
<tr>
<td>Ceylon</td>
<td>48,000</td>
<td>60,000</td>
<td>108,000</td>
</tr>
<tr>
<td>N. E. I.</td>
<td>4,000</td>
<td>4,000</td>
<td>8,000</td>
</tr>
<tr>
<td>Indo China</td>
<td>8,000</td>
<td>8,000</td>
<td>16,000</td>
</tr>
<tr>
<td>B. N. Borneo</td>
<td>4,500</td>
<td>4,500</td>
<td>9,000</td>
</tr>
<tr>
<td>Sarawak</td>
<td>1,700</td>
<td>1,700</td>
<td>3,400</td>
</tr>
<tr>
<td>F. Indo-China</td>
<td>8,700</td>
<td>8,700</td>
<td>17,400</td>
</tr>
<tr>
<td>Other countries</td>
<td>600</td>
<td>600</td>
<td>1,200</td>
</tr>
<tr>
<td>Total Plantation</td>
<td>847,400</td>
<td>64,307</td>
<td>911,707</td>
</tr>
<tr>
<td>Wild</td>
<td>270</td>
<td>270</td>
<td>540</td>
</tr>
<tr>
<td>Grand Total...</td>
<td>847,670</td>
<td>64,577</td>
<td>912,247</td>
</tr>
</tbody>
</table>

### TABLE XIII.
**Estimated Monthly Output of Malayan Rubber, 1929 and 1930.** *(Thousand tons.)*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1929</td>
<td>207</td>
<td>208</td>
<td>186</td>
<td>191</td>
<td>41</td>
<td>41</td>
<td>184</td>
<td>192</td>
<td>193</td>
<td>193</td>
<td>194</td>
<td>195</td>
<td>1029</td>
</tr>
<tr>
<td>1930</td>
<td>207</td>
<td>208</td>
<td>186</td>
<td>191</td>
<td>41</td>
<td>41</td>
<td>184</td>
<td>192</td>
<td>193</td>
<td>193</td>
<td>194</td>
<td>195</td>
<td>1030</td>
</tr>
</tbody>
</table>

(By courtesy of Messrs. Harrisons & Crosfield, Ltd.)
LIST OF SPECIAL MEMORANDA PUBLISHED
BY THE
LONDON AND CAMBRIDGE ECONOMIC SERVICE

Price: Five shillings each.

No. 1. Stocks of Staple Commodities, by J. M. Keynes, assisted by R. B. Lewis. April, 1923.
No. 5. Relative Changes in Price and Other Index-Numbers, by A. L. Bowley. February, 1924. (Out of print.)

No. 29. Stocks of Staple Commodities, by J. M. Keynes and J. W. F. Rowe. August, 1929.

* Photostat copies of Numbers out of print can be obtained.