CHAPTER I

THE HISTORY OF THE USE AND CULTIVATION OF RUBBER

Early Uses.

Probably no raw material of vegetable origin has been put to such multifarious uses as indiarubber. No other vegetable product has risen with equal rapidity from a position of comparative insignificance to one of the highest commercial prominence.

Although the use of rubber by natives of the Western Hemisphere is historically chronicled upwards of 400 years ago, indiarubber was first used in England in the eighteenth century, and then only in the first instance for removing the marks of black lead pencils. The first patent for the employment of rubber for waterproofing purposes was not taken out until 1791. The further development of this use is closely associated with the name of Thomas Hancock, of the firm of Charles Macintosh and Co.; but the modern extensions of indiarubber manufacture only became possible after the discovery by Nelson Goodyear in 1839 of the process of combining rubber with sulphur, which is known as vulcanisation. Goodyear took out a further patent in
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1851 for the manufacture of vulcanite by more complete combination of rubber with sulphur.

Vulcanised Rubber.

The method of vulcanisation, which ranks among the most important of all industrial discoveries, was first found out in America by Goodyear. In England, Hancock shortly afterwards arrived at the same method independently. The following facts will help the reader to realise the far-reaching importance of vulcanisation.

Raw rubber becomes soft and sticky when heated, and when cooled beyond a certain point it becomes stiff and almost horny in consistency. Vulcanised rubber retains its physical properties almost unaltered over a range of temperatures extending from the freezing point to the boiling point of water. After prolonged immersion in water, raw rubber absorbs as much as 25 per cent. of its own weight of moisture. On the other hand, “The water absorption of vulcanised rubber is extremely small—certainly not large enough to appreciably affect the insulation of a rubber cable after five years’ continuous immersion” (Weber). From these facts the enormous increase in the durability and general usefulness of vulcanised rubber at once becomes apparent. Moreover, according to the proportion of sulphur which has entered into combination with the rubber, the physical properties of the finished product can be made to vary from those of the softest elastic up to those of the hardest vulcanite.
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The Discovery of Rubber in America.

As the reader may perhaps have already anticipated, the first notice of the use of rubber comes to us in the history of the voyages of Columbus. Columbus found that the natives of Hayti possessed among other amusements a game of ball. "The balls were of the gum of a tree, and although large, were lighter and bounced better than the wind balls of Castile."

A fuller account was given by Juan de Torquemada in 1615. This writer describes a tree, called by the natives Ulequahuitl (Castilloa elastica), which was held in high estimation in Central America. The method of collection of the rubber, which flows out as a milky white substance when the tree is wounded, is described, and also its coagulation by setting in calabashes and subsequent boiling in water. Sometimes the latex was simply smeared over the bodies of the collectors and allowed to dry—a method still employed by some primitive tribes. The rubber so prepared was used for making balls, and for shoes for tumblers and jesters, whose antics it assisted; and a medicinal oil was extracted from it. Even at this early date the Spaniards themselves employed the milk for waterproofing their cloaks.

The first accurate account of Para rubber is given by C. M. de la Condamine, who visited the Amazon country on an astronomical mission in 1735. He describes
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various uses of rubber by the Omaquas Indians, including that of making syringes or squirts. These instruments appear to have played an important part in social gatherings and even in religious festivals. From this use comes the Portuguese name Pao di Xirringa, the syringe tree. Hence also are derived the familiar terms *Seringa* for rubber and *Seringueiros* for the labourers employed in the collection of this material.

*The Trade in Wild Rubber.*

The recent development of the trade in wild rubber may be traced in the following table, which shows the history for nearly a century of the most important kind, namely Para rubber, the produce of *Hevea brasiliensis*. Prior to the development of the planting industry in the East, the export of Para rubber from Brazil represented about half the world’s total supply of the raw material.

<table>
<thead>
<tr>
<th>Year</th>
<th>Tons</th>
<th>Year</th>
<th>Tons</th>
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<tbody>
<tr>
<td>1827</td>
<td>31</td>
<td>1870</td>
<td>6,601</td>
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<tr>
<td>1830</td>
<td>156</td>
<td>1880</td>
<td>8,679</td>
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<tr>
<td>1840</td>
<td>388</td>
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</tr>
<tr>
<td>1850</td>
<td>1,466</td>
<td>1901</td>
<td>28,161</td>
</tr>
<tr>
<td>1860</td>
<td>2,671</td>
<td>1910</td>
<td>38,200</td>
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</tbody>
</table>

Wild rubbers from Africa and Asia did not begin to come into the market in large quantities until after the
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Brazilian trade was well established. For example the exports from the Congo State rose from 30 tons in 1887 to 2000 tons in 1897. At the same date similar amounts were being exported from Lagos and from the Gold Coast. A thousand tons of rubber were however exported from British India as early as 1873.

Sir Clements Markham proposes Plantations.

Herbert Wright has called attention to the fact that it was Hancock who in 1834 first suggested the possibility of cultivating the best kinds of rubber trees in the East and West Indies. The suggestion arose on account of the difficulties which Hancock and his colleagues experienced even at that date in procuring a sufficient supply of raw material. The actual birth of the rubber planting industry, however, dates only from the seventies, and is specially associated with the names of Sir Joseph Hooker, at that time Director of the Royal Gardens, Kew, of Sir Clements Markham who occupied an important position at the India Office, and with those of the collectors Collins, Cross and Wickham. The success of the introduction of cinchona to the East ten years earlier led Markham about 1870 to take up the question of the introduction of rubber to India. The first step was marked by the preparation in 1872 of a report by James Collins, who had already published an excellent account of the wild species of rubber in 1868.
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The story of the winning of the rubber seeds from America is one full of romantic interest, and speaks volumes for the enterprise and determination of the collectors. The first seeds of Hevea to arrive at Kew were probably those brought by Collins from the Amazon in 1873. In 1875 Cross was shipwrecked whilst on the way home with a consignment of Castillioa plants and seeds. Nevertheless he managed to preserve his precious collection and bring it safe to land. He was sent out again to collect Hevea seed in 1877 and was again successful. Although only a few of Cross’s Hevea seedlings were preserved, there must by this time be a considerable number of trees growing in Eastern plantations which are directly descended from the survivors of this consignment. Cross was also responsible for the introduction of Ceará rubber to Kew about the same date—a less difficult feat owing to the greater powers of resistance possessed by the seeds of Manihot.

By far the largest and most important supply of Hevea seeds to reach Kew was, however, that brought home by H. A. Wickham in 1876. Wickham, who was resident at the time in the rubber country of the Amazon, was commissioned to supply seeds to the Indian Government; but the Brazilian authorities were naturally opposed to the export of the seed, and it was a remarkable chance which threw the required opportunity in Wickham’s way. An ocean-going steamer trading to the Amazon was there abandoned by her supercargoes without a return freight. Wickham boldly chartered
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the steamer on behalf of the Indian Government, and all hands were pressed into the service of collecting seeds. The cargo once aboard was passed by the port authorities as botanical specimens, and upwards of 70,000 seeds were thus safely transported to Kew. Less than 4 per cent. of these seeds, however, germinated. The writer has Mr Wickham’s personal assurance that these seeds came from full-sized forest trees actually being worked for rubber, which grew at a considerable distance from the river on forest-covered plateaux some hundreds of feet above flood-level. The often repeated statement that the parents of the rubber plantations had their origin in swampy ground liable to floods, may therefore be taken to be entirely without foundation.

Although the Government of India paid all the expenses connected with the introduction of Wickham’s seedlings, Ceylon was selected as the site of their chief tropical nursery. A special garden at Henaratgoda, in the low country near Colombo, was opened to receive them, and here were set out some 2000 plants which arrived in Ceylon in 1876 in 39 Wardian cases by the s.s. Duke of Devonshire.

In the same year smaller consignments of plants of Hevea brasiliensis were despatched from Kew to Burma, Java, Singapore, and the West Indies. In 1877 plants were sent to Mauritius and West Africa, and in 1878 to Fiji.

Plants of Hevea Spruceana were first sent to Ceylon in 1883, but they do not appear to have survived.
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Castilloa and Manihot Glaziovii, Ceara rubber, were also distributed by Kew to the same colonics at about the same date.

Hevea brasiliensis in Ceylon.

The principal nursery for the trees, which were to form the origin of the planting industry, was however at Henaratgoda, in Ceylon. Here flowers first appeared upon the trees in 1881, and in the same year Dr Trimen, the Director of the Botanic Gardens, commenced experiments in tapping. The plantation was thinned out in 1882, and in 1883 260 seedling plants were raised, most of which were distributed in Ceylon. In 1884 there were over 1000 trees at Henaratgoda, but it was found necessary to thin the plantation again in 1885, and we read of 450 fine trees existing in 1887. In 1893 about 90,000 seeds were distributed to planters in Ceylon from the Henaratgoda trees, and in subsequent years similar numbers were available. Seeds were also distributed on a considerable scale by the Ceylon Botanic Department to Malaya and elsewhere, and it is curious to remark that in recent years large consignments of seed have been sent back from Ceylon and Singapore to America and the West Indies for planting purposes. At the present day about 40 of the original trees survive at Henaratgoda, the largest being upwards of ten feet in girth.
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Early Experiments.

Some of the earliest experiments in tapping planted rubber trees were begun by Trimen at Henaratgoda in 1888. One of the largest of the original trees was tapped a few times in alternate years. Tapping consisted in making gashes in the bark with a hammer and chisel, in imitation of the methods employed in the Amazon country. The recorded yields were as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>lb</th>
<th>oz</th>
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<tbody>
<tr>
<td>1888</td>
<td>1</td>
<td>11 1/4</td>
</tr>
<tr>
<td>1890</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>1892</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>1894</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>1896</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

Despite the fact that his first estimate of the probable yield of a rubber plantation was a very low one according to modern ideas, and although it was not considered safe in those days to tap the trees at an earlier age than 10 or 12 years, Trimen foresaw that a very handsome profit could be obtained from rubber planting, and strongly advocated the cultivation of this product in Ceylon in his report for 1888. In 1890 the Ceylon Forest Department opened an experimental plantation which was increased to some extent in subsequent years, but on estates little planting took place during the decade immediately following.
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Rise of the Plantation Industry in the East.

In Ceylon in the eighties, when the coffee plantations were practically exterminated, some attention was paid to the cultivation of Ceara rubber, but difficulties of tapping soon caused this product to be almost entirely neglected. From 1900 onwards further trials were made with this species and with Castilla, but it was soon found that neither was so well suited as Hevea for the conditions generally prevailing in the planting districts of Ceylon. In fact, except in Africa, the fortunes of the rubber planting industry are almost entirely bound up with those of the last-named genus. Even in the Dutch East Indies, plantations of Assam indiarubber (Ficus elastica) are now being cut down to make way for Hevea brasiliensis. Our further remarks apply therefore mainly to Hevea.

In 1890 about 300 acres had been planted with rubber in Ceylon, and in 1900 about 1750 acres. Planting continued steadily until 1904, when the area was estimated at 11,000 acres, and then came the historic rush into rubber which characterised the years 1905—1907. In 1906 the first World's Rubber Exhibition was held at the Royal Botanic Gardens, Peradeniya, and by the end of the year 100,000 acres had been planted. The present area under rubber in Ceylon may be estimated at upwards of 250,000 acres.

In the Federated Malay States the development of the industry was even more rapid. In 1897 rubber