The Importance of Plant Classification in Hevea

More than 40 years work with one species of Hevea has resulted in great improvement in yield. An organized effort is now being made to select from numerous wild species living material offering new characters for disease-resistance and increase in yield.

RICHARD EVANS SCHULTES*

Introduction

Whenever a plant-utilizing industry is built upon a fragmentary understanding of the quality, potentialities and limitations of wild plant materials which could be made available to it from nature, then only a limited utilization of wild stock results and the progress which might otherwise be effectuated never materializes. Such is the situation in the rubber industry.

Hevea is one of the most recently domesticated of economic plants. Phenomenal improvements in strains of one species in it have been made during the last fifty years, but we may justifiably expect a fuller understanding of Hevea in its wild state to open up avenues of betterment and diversification which would astonish the scientific and commercial world. Studies and utilization of wild progenitors in cotton, sugar, potatoes, cereals and many other ancient cultivated plants have produced improvements in these crops, and comparable improvement might be achieved in Hevea through greater knowledge of all species in the genus and use of them in hybridization. Few of the specific and sub-specific variants of Hevea have entered into the programme of the extensive rubber plantation industry which is based almost exclusively on material of H. brasiliensis originally from one small area—the Rio Tapajoz—of the vast Amazon Valley.

As a result of the short period—seventy years—of domestication of Hevea, the difficulty of travel where Hevea is native, and unavailability, until recently, of funds commensurate with the task of adequate exploration, we still lack intensive field studies upon which a definitive classification of the genus may be made.

Plant classification—or taxonomy—is a science. Many people, even today, do not understand its scope nor appreciate its aims. It has two general phases, the academic or theoretical, and the practical or applied. There never can be a sharp boundary between pure and applied science; the one is as important as the other to a scientist, even though one phase may interest him more than the other. While the numerous academic problems in Hevea, which only a taxonomic and phylogenetic study can solve, are of profound interest, I shall discuss in this brief article merely the practical value of taxonomy to a dollar-and-cents-conscious industry.

History, Distribution, Characteristics

Hevea is a genus belonging to the Euphorbiaceae, a world-wide family comprising some 7,000 species. Hevea leads all other genera in this economic-
ally important family both from the point of view of financial investment and from that of influence on human progress. Native to South America and there confined to the Amazon Valley and several contiguous regions, *Hevea* inhabits an area three quarters the size of the United States.

Its taxonomic history began in 1775 when the French botanist, Aublet, described the genus from French Guiana. He called the type species *Hevea guianensis*. Knowledge of the genus advanced with painful slowness, however, until the field work of that most sacrificing of explorers, the Englishman Richard Spruce, whose collections from the Rio Negro of Brazil, made in 1852–53, provided the material for the description of eight additional species. The earliest synopsis of *Hevea* was published in 1873–74 by Mueller who recognized 11 species. Huber, working along the Amazon in Belem do Pará at about the turn of the century, greatly augmented the number of concepts until there were held to be 24 species. Later Pax classified the genus into 17 undoubted species. The most recent treatment is that of Adolpho Ducke who, after nearly half a century of field investigations, recognizes 12 species and numerous varieties and forms.

Although a relatively small genus, *Hevea* shows a most remarkable range of variation in the wild. Probably geologically a young genus still in a state of evolutionary flux, its classification often poses exasperatingly complex problems. There are a great number of subspecific variations, many of them biologically stabilized and with definite geographical correlations, others mere responses to environmental conditions. By intensive study of large populations in the wild state we may hope to gain a clear insight into the significance of variation in *Hevea*. Since cultivation often tends to induce additional and artificial variation, the only method is to track *Hevea* down in its native haunts. This must be done if we are to take advantage of the wide natural range of variability.

The rubber of *Hevea guianensis* and of *H. guianensis* var. *lutea* is often weak and of limited commercial application, but both the species and the variety show a most extraordinary range of variation. If fully understood taxonomically, these concepts might prove of unexpected significance in breeding work. They are jungle giants and prefer well drained

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![Fig. 1. The earliest fundamental investigations on the species of *Hevea* were carried out in the Rio Negro area of Brazil by that most self-sacrificing of explorers, the Yorkshireman Richard Spruce. (Drawn by Gordon W. Dillon from an old photograph preserved in the Gray Herbarium of Harvard University).](image)