standards of accuracy could be established for the guidance of surveyors and map-makers. In fact, such an organization as the American Society of Civil Engineers, which is vitally interested in surveys and maps, has no committee to consider these important matters.

It is hoped that the engineers and scientists of the country will cooperate with the Board of Surveys and Maps by making their wants known. If they will do this the board will be able to make the maps of the government of even more use to the public than they have been in the past.

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THE CINCHONA TROPICAL BOTANICAL STATION AGAIN AVAILABLE

THE lease of the Cinchona Station by the Smithsonian Institution on behalf of a group of contributing American botanists was interrupted by conditions existing during the war. It has now been resumed and the laboratory will be available for American botanists during the coming year.

This tropical laboratory in a botanical garden containing scores of exotic trees, shrubs and vines and other scores of herbaceous perennials from all quarters of the earth is located within a half-hour's walk of an undisturbed montane rain forest, on the southern slope of the rugged Blue Mountains of Jamaica. In the well-kept garden of ten acres and on other parts of the Cinchona plantation of six thousand acres, the visiting botanist can find well-developed specimens of many economic or ornamental plants such as cinchona, tea, coffee, rubber trees, silk oaks, ironwoods, several species of eucalyptus and many others. The dry ridges and sunny valleys of the south side of the Blue Mountains offer many types of peculiar ferns, of epiphytic bromeliads, grasses, mistletoes and lianes. In the rain forest are to be found scores of species of ferns ranging from the very diminutive epiphytic polypodiums of but an inch or two in height to the scrambling pteridiums or gleichenias or climbing lomarias of many yards in length, and to great tree ferns, forty feet in height. Mosses and liverworts are present here in like profusion and grow on all sorts of substrata from the damp soil of the forest floor, the trunk of a tree fern, or even to the leathery surface of the leaf of a climbing fig or fern. There are also dozens of interesting native trees, shrubs and vines and many herbaceous forms which together make parts of the forest a practically impenetrable jungle.

As the vegetation of the main ridge of the Blue Mountains differs from that of the southern ridges and valleys, so that of the beclouded northern slope, especially the hot, moist lower slopes differs from both. In the deep valley of the Mabess River, five miles north of Cinchona, many peculiar mosses, ferns and seed plants, including a wealth of interesting epiphytic species are to be found. There are whole square miles of these northern slopes of the Blue Mountains within a day's walk of Cinchona that have never been explored by the botanist, nor even by the collector.

Botanists wishing to work on plants of the lowlands or the sea coast can make their headquarters in Kingston. Such workers have always been granted the privilege of using the library, herbarium and laboratory at Hope Gardens. These gardens also contain a fine collection of native and introduced tropical plants offering much material for morphological and histological study. Cacti, agaves and other xerophytic plants of the sea coast and the algæ of the coral reefs along the shore afford still other types of vegetation of great ecological, developmental and cytological interest. Castleton Garden, the third botanical garden of the island, has a very different climate from either Cinchona or Hope, for it is located in a hot, steaming valley, twenty miles north of Kingston, where cycads, screw pines, palms, orchids, figs, ebonies and the gorgeous amherstias and other tropical trees grow luxuriantly.

All in all Jamaica probably offers the botanist as great a variety of tropical conditions within a day's walk of Cinchona and a day's drive from Kingston as can be found anywhere in an area of equal size. One of our botanists

who has collected ferns in many tropical regions of both the old and new world says "none equals Jamaica in either number of species or of individuals." Five hundred pteridophytes are known on the island. Another botanist, a student of the mosses, says "the facilities for the study of these plants at Hope Gardens and at Cinchona are probably unequaled anywhere else in the tropics except at Buitenzorg." It is thus evident that the opportunities for the study of many sorts of botanical problems are abundant at Cinchona, Hope and Castleton. It is also clear that there are many botanical problems of prime importance which can be studied only in such environments. There is then every reason to believe that this American tropical station, which is now available, can be made as notable by the work of our own investigators as the famous Dutch garden at Buitenzorg in Java has become in consequence of the work of the Dutch and other European investigators.

Further details concerning the types of vegetation found and the opportunities for research in Jamaica may be found in Science, 43: 917, 1916, and in *The Popular Science Monthly* for January, 1915.

Any American botanist wishing to work at Cinchona may be granted this privilege by the Cinchona Committee, consisting of N. L. Britton, J. M. Coulter and D. S. Johnson. Inquiries for this privilege and for information regarding the conditions under which it may be granted should be sent to the writer.

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ENTOMOLOGY IN THE UNITED STATES NATIONAL MUSEUM

The day has long passed when American scientific activities can be restricted to a narrow field. Whether we regard the economic needs or the intellectual development, we find ourselves compelled to consider the whole range of science, limited only by our resources and the powers of the human mind. In the field of entomology this involves, among other things, access to adequate collections of insects, including not only those found in North America, but the species of the whole world. The leading European countries have long appreciated such needs, and have built up collections to which Americans have to make pilgrimages when engaged in comprehensive studies of insect groups. There is no reason why we should not possess facilities for work at least equal to those of any other country. We have the greatest material resources of any nation at the present time, and certainly are not lacking in the ability to carry on the work.

The species of insects are far more numerous than those of any other group of animals; in fact the described forms exceed those of all other groups combined. Very many of them are of supreme importance and interest to man, as destroyers of our crops, carriers of the germs of disease, enemies of other injurious insects, or sources of some of our most important economic products. All know the value of the silkworm and the honey bee, but few realize the services of the host of parasitic insects, which keep down the enemies of our crops, and without which agriculture would be impossible. All are aware that numerous insects are injurious to plants, but comparatively few know that many of the most harmful of these have been introduced from abroad. The great danger to our crops, or even to our health, may arise from insects accidentally brought from foreign countries through the operations of commerce. The San José scale, dangerous enemy of many fruits, came from Asia; the cottony cushion scale, which once threatened the extinction of the orange industry in California, came from Australia. The gypsy moth, which has cost this country hundreds of thousands of dollars to fight, is European. The cotton boll weevil, even more to be dreaded, invaded the United States from Mexico and Central America. For urgent practical reasons, therefore, as well as in order to complete and organize our knowledge, we need to know the insects of all countries, and to have them represented in at least one American collection.

This obvious requirement of a great collection representing the insects of all lands, can