nutational motions, the nature of its stability or instability. By means of motion pictures taken from an airplane we may determine facts of importance concerning the motion of a rapidly rotating projectile dropped from the plane. The recoil, jump and other motions of guns may be studied by photographic methods. By similar methods the times and positions of high angle shell bursts may be obtained from observational balloons. Gyro stabilizers, microphones, string galvanometers, oscillographs, piezo-electric apparatus, vacuum amplifying tubes, Kenetrons, old and new devices in physics—they all may be used to reduce the problems which I have been discussing to those of an exact science.

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BOARD OF SURVEYS AND MAPS OF THE FEDERAL GOVERNMENT

ON December 30, 1919, the President of the United States by executive order created a Board of Surveys and Maps to be composed of one representative of each of the following organizations of the government:

1. Corps of Engineers, U. S. Army.
2. U. S. Coast and Geodetic Survey, Department of Commerce.
3. U. S. Geological Survey, Department of Interior.
4. General Land Office, Department of Interior.
5. Topography Branch, Post Office Department.
6. Bureau of Soils, Department of Agriculture.
7. U. S. Reclamation Service, Department of Interior.
8. Bureau of Public Roads, Department of Agriculture.
9. Bureau of Indian Affairs, Department of Interior.
10. Mississippi River Commission, War Department.
11. U. S. Lake Survey, War Department.
12. International (Canadian) Boundary Commission, Department of State.
13. Forest Service, Department of Agriculture.
14. U. S. Hydrographic Office, Navy Department.

The individual members of the board were appointed by the chiefs of the several organizations named. The board is directed, by the executive order, to make recommendations to the several departments of the government or to the President for the purpose of coordinating the map-making and surveying activities of the government and to settle all questions at issue between executive departments relating to surveys and maps, in so far as their decisions do not conflict with existing law. The board is also directed to establish a central information office in the U. S. Geological Survey for the purpose of collecting, classifying and furnishing to the public information concerning all mapping and surveying data available in the several government departments and from other sources. The executive order further directs that the board shall hold meetings at stated intervals to which shall be invited representatives of the map-using public for the purpose of conference and advice.

All government departments, according to the executive order, will make full use of the board as an advisory body and will furnish all available information and data called for by the board.

The order of the President rescinds the advisory powers granted to the U. S. Geographic Board by the executive order of August 10, 1906, and transfers those powers to the Board of Surveys and Maps. The executive order of August 10, 1906, reads as follows:

EXECUTIVE ORDER

The official title of the United States Board on Geographic Names is changed to UNITED STATES GEOGRAPHIC BOARD.

In addition to its present duties, advisory powers are hereby granted to this board concerning the preparation of maps compiled, or to be compiled, in the various bureaus and offices of the government, with a special view to the avoidance of unnecessary duplications of work; and for the unification and improvement of the scales of maps, of the symbols and conventions used upon them and of the methods representing relief. Hereafter, all such projects as are of importance shall be submitted to this board for advice before being undertaken.

THEODORE ROOSEVELT

THE WHITE HOUSE,
August 10, 1906

The representatives of the federal organizations mentioned in the executive order of December 30, 1919, met on January 16, 1920, and perfected the organization by the enactment of by-laws for the government of the Board of Surveys and Maps.

The officers of the board are: Chairman, Mr. C. O. Merrill, chief engineer of the Forest Service; vice-chairman, Dr. William Bowie, chief of the Division of Geodesy of the U. S. Coast and Geodetic Survey; secretary, Mr. C. H. Birdseye, chief geographer of the U. S. Geological Survey.

Standing committees have been appointed to care for the various phases of surveying and mapping. Those committees are:

1. On coordination of work among the federal bureaus.
2. On cooperation between federal and other map-making and map-using organizations and agencies.
3. On technical standards.
4. On topographic maps.
5. On highway maps.
6. On general maps.
7. On hydrographic charts.
8. On control surveys.
9. On photographic surveys.
10. On information.

In addition to these committees there was also organized the Map Information Office, with headquarters at the U. S. Geological Survey, which was directed by the Executive Order.

On all except a few of the standing committees of the Board of Surveys and Maps, representatives of outside organizations will also be appointed.

The public meetings of the board will be held in Washington, D. C., on the second Tuesday of January, March, May, September and November of each year and there will be executive meetings held immediately after those public meetings and also on the second Tuesday of February, April, October and December.

It is interesting to know the steps by which the Board of Surveys and Maps came into existence. The National Research Council had its attention called to the desirability of having an organization that would prevent duplication and provide for cooperation among the federal map-making organizations. The matter was discussed by the National Research Council and was then submitted to the Engineering Council for consideration. On July 1, 1919, the chairman of the Engineering Council, Mr. J. Parke Channing, wrote a letter to the President of the United States in which he called attention to the necessity for the completion of the topographic map of the United States at an early date to meet the needs of the country in its commerce, industries, etc. The Engineering Council recommended the creation of a Board of Surveys and Maps to consider the whole question of coordination of the work of the government in those branches of engineering.

On July 27, 1919, the President of the United States directed the Secretary of War to call a conference of representatives of the surveying and map-making organizations of the government for the purpose of considering the recommendation of the Engineering Council.

This conference held a number of meetings in September, 1919, and on the last of that month sent a report to the President, recommending, among other things, that the Board of Surveys and Maps be created. Added to the report of the conference were a number of exhibits which show the surveying and map-making work carried on by each of the several organizations of the government. The executive order of the President and the organization of the board are considered in the early part of this article.

It is believed that the creation of this Board of Surveys and Maps is a step that will have very far reaching consequences in completing the topographic mapping of the country and in planning standard methods for carrying on work connected with the surveys and map making of various kinds employed in both government and other organizations and agencies.

Maps have been made in this country ever since the colonists first landed but there has never been any coordinating agency by which

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