integers $a+bi$. Several errors appear on page 376; in the line below (2) and that above (3), m must be replaced by m_1; while the use of $\rho_1, \rho_2, \cdots$ for $\delta_1, \delta_2, \cdots$ is merely an oversight. At the bottom of page 255 the author speaks of introducing ideals into a number field.

Many of the proofs employed by the author in his case of quadratic fields are mere substitution of 2 for n in the standard proofs on algebraic fields of degree n. In one place he says: "This proof could have been somewhat simplified had greater use been made of the fact that the realm under consideration was quadratic, but it seemed desirable to give the proof in a form at once extendable to realms of any degree." The reference is to his three-page proof that every quadratic field has a basis! Now the real justification of a special treatment of the quadratic field lies in the fact that particularly simple proofs may be given and the reader made acquainted with an important example without the algebraic difficulties inherent in the general field. The above remarks will serve to show how the author has filled 300 pages with properties of quadratic number, without entering upon a discussion of the class number, characters, genera and other important topics on quadratic numbers.

In the matter of references the author has been particularly unfortunate. In a book barely entering upon the threshold of the theory, a scarcity of references would have been entirely justifiable. But to give hundreds of references to a certain report on the subject (excellent although it be) and to completely ignore the literature and not even mention the names of the discoverers of the theorems is against all scientific traditions.

L. E. DICKSON

SPECIAL ARTICLES

THE RELATION OF COLLOIDAL SILICA TO CERTAIN IMPERMEABLE SOILS

THE interpretation of recent soil bacteriological studies upon the Truckee-Carson Irrigation Project at Fallon, Nev., is in many cases difficult because of the impermeability to irrigation water on certain shortly defined areas. These impermeable areas support practically no crop growth, although the soil is very similar to that of the good areas in appearance and soluble salt content. During the past two years it has been my belief, based upon rough estimations of the silica that could be washed out from samples of soil from good and poor spots upon the United States Experimental Farm at Fallon, Nev., that at least in some instances the permeability and impermeability bore some relation to the occurrence of silica in a colloidal condition. Certain peculiarities of the behavior of soil samples from good and poor spots toward colloidal silica have been noted in the laboratory. These facts are only indirectly connected with our soil bacteriological studies and seem of themselves of sufficient interest to warrant publication at this time.

The following is a brief summary of laboratory results which seem to confirm the theory that in certain soils impermeability is associated with the occurrence of colloidal silica:

One-gram samples of good soil shaken in ten cubic centimeters of carefully dialyzed colloidal silicic acid of specific gravity of 1.0108 coagulates in from three to eight hours at 28° C.

One-gram samples of bad soil similarly treated not only do not coagulate the silica but hold it in a colloidal condition even after the check tube of pure silicic acid has coagulated.

The mixing of small quantities of calcium chloride, calcium sulphate or dilute acids with samples of bad soil before their addition to the silicic acid enables them to coagulate the tube of colloidal silicic acid in as short a time as that necessary for samples of good soil.

The treatment of samples of bad soil with calcium chloride, calcium sulphate, or dilute acids destroys their impermeable character, in some cases enabling water to percolate through them as rapidly as in the case of good soils.

In these experiments it has been found that the two essentials are, first, a high degree of purity of the colloidal silicic acid; and,

second, the preparation of the colloidal silicic acid at such a concentration that in its pure condition it will remain uncoagulated for about ten days. If the preparation is much more dilute than this it may fail to coagulate even with the good soils, while if it is much more concentrated it coagulates, presumably from mechanical reasons, almost instantly upon adding soil samples from either good or poor spots.

Whether these results may have a practical bearing upon the management of the refractory soils in question can be determined only by rather extensive field experiments. It is believed, however, that the action of calcium sulphate (gypsum) will improve these soils in the field as it has in the laboratory and that the crop-producing power of the poor areas may then approach that of the good areas.

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THE BOTANICAL SOCIETY OF AMERICA

The annual meeting of the Botanical Society of America was held at the University of Minnesota, Minneapolis, Minn., December 27 to 30, 1910.

The officers for 1911 are:

President—W. G. Farlow, Harvard University.

Vice-president—A. W. Evans, Yale University.

Treasurer—Arthur Hollick, New York Botanical Garden.

Secretary—Geo. T. Moore, Missouri Botanical Garden.

Councilors—F. E. Clements, University of Minnesota; C. L. Shear, Bureau Plant Industry; R. A. Harper, University of Wisconsin.

The following associate members were elected to full membership: O. W. Caldwell, University of Chicago; E. W. Olive, South Dakota College of Agriculture; R. H. Pond, Texas Agricultural Experiment Station; A. D. Selby, Ohio Experiment Station; M. B. Thomas, Wabash College; and the following botanists were elected to associate membership: Harley Harris Bartlett, Bureau of Plant Industry; Frederick K. Butters, University of Minnesota; H. L. Bolley, North Dakota Agricultural College; Merritt Lyndon Fernald, Gray Herbarium; Douglas Houghton Campbell, Stanford University; William Crocker, University of Chicago; Abel Joel Grout, Curtis High School, New York City; Hans Th. Guessow, Dominion Botanist, Ottawa, Canada; Frederick De Forest Heald, University of Texas; E. C. Johnson, U. S. Department of Agriculture; Frank D. Kern, Purdue University; C. H. Kauffman, University of Michigan; Ivey Foreman Lewis, Randolph-Macon College; Emile P. Mienecke, Bureau Plant Industry; Raymond J. Pool, University of Nebraska; Chas. V. Piper, U. S. Department of Agriculture; Leigh H. Pennington, Syracuse University; Carl Otto Rosendahl, University of Minnesota; Paul C. Standley, National Museum; Fred J. Seaver, New York Botanical Garden; Josephine E. Tilden, University of Minnesota; Chas.-Edw. Amory Winslow, College of City of New York; Herbert Hice Whetzel, Cornell University; E. Mead Wilcox, University of Nebraska.

The symposium on "Some Aspects of Plant Pathology" was held at the Agricultural College on Thursday and participated in by Professor L. R. Jones, who spoke on "The Relation of Plant Pathology to Other Sciences"; Professor B. M. Duggar, who spoke on "Physiological Plant Pathology," and Professor E. M. Freeman, who spoke on "Resistance and Immunity in Plant Diseases." These papers, with the discussions, will be published and reprints distributed to the members of the society.

At the close of the dinner for botanists, the conference on botanical teaching was held, in which Professor C. E. Bessey, O. W. Caldwell, F. E. Clements, J. M. Coulter, R. A. Harper and F. C. Newcombe participated. This discussion will likewise be published and distributed to the members.

Following are abstracts of the papers presented at the scientific sessions held on Wednesday and Friday afternoon.

Light as a Formative Factor in the Habit of Growth of Asparagus plumosus: Frederick C. Newcombe, University of Michigan.

The shoots of this house plant grow erect for a time, and then turn their tips to the horizontal position. Although this horizontal bend is geotropic, as shown by the klinostat, the process of bending is profoundly influenced by the presence of light. The new shoots which start up from subterranean buds are indefinitely nourished in the dark by the older shoots left in the light.

If a new shoot, a day before the bend was to be made, were covered by an opaque inverted cone of paper, the horizontal bend would occur without noticeable change from the normal. If the light were excluded two days before the time for the