and reflection. It was carried out by means of a special photometer, allowing the use of any desired angles of incidence and of reflection. Among the surfaces tested were plaster of Paris, several kinds of unglazed paper, compressed powders of several kinds, powders not compressed, but gently smoothed with a metal plate, and finally a surface made by allowing fine plaster dust to settle from suspension in the air on a suitable plate. These surfaces in the order named, showed decreasing polarization of the reflected light, and less approach to specular reflection. The fine dust surface showed no polarization, and almost no tendency to regular reflection. The results with this surface, as shown by sets of curves, follow pretty closely the old Lambert's, or cosine, law,

$$\text{Intensity} = A \cos i \cos r.$$

with some departure when both angles were very large. With all the other surfaces the departure was very great for angles greater than 70°. Contrary to the results of Mr. Wright (*Phil. Mag.*, Feb., 1900), these experiments were quite in accord with the demand of theory that the intensity of the reflected ray should be expressed as a symmetric function of the angles of incidence and reflection.

WILLIAM S. DAY,
Secretary.

CHEMICAL SOCIETY OF WASHINGTON.

THE regular meeting was held on December 13, 1900. The first paper was read by Dr. Bigelow and was entitled, 'The Composition of the Ash of Meat Extracts,' by W. D. Bigelow and E. McK. Chace. The relation between solids and ash and between the several ash constituents were discussed in analyses of about 40 commercial meat extracts and of juices prepared from fresh beef.

The second paper, read by Dr. Cameron, was entitled, 'Formation of Sodium Carbonate or Black Alkali by Plants,' by F. K. Cameron. The view popularly held, to which Hilgard, Goss and others have called attention, is found to be correct. It seems probable that the phenomenon is very widespread, but does not assume practical importance, except under special conditions in the arid regions. A discussion of the rôle of mineral nutrients in soil solutions accompanied the consideration of the data experimentally determined.

The last paper, read by Dr. Cameron, was entitled, 'Resistance by certain Plants to Black Alkali,' by F. K. Cameron. It has been found that a few plant specimens exist which can grow in soils containing much sodium carbonate. Three such plants were examined. It was found that these plants had an organic acid or acids formed on their surface, sufficiently strong to decompose alkaline carbonates. It is believed that this acid, or acids, aid in lowering the concentration of the alkaline carbonates in the soil immediately about the plants, and thus protect the root crowns from the caustic action of the black alkali.

WILLIAM H. KRUG,
Secretary.

PHILOSOPHICAL SOCIETY OF WASHINGTON.

THE 527th meeting was held January 5th, the new President, Mr. Walcott, Director of the Geological Survey, in the chair. The evening was devoted to geodetic papers.

Mr. Eimbeck presented informally the question of an apparent error arising in transit observations from the fact that at a locality where there is local attraction of the plumb line the geodetic meridian and the astronomical meridian differ sometimes as much as 30″.

The first regular paper was read by Mr. Isaac Winston on 'The Thirteenth General Conference of the International Geodetic Association,' held at Paris last fall, at which 17 countries were represented, and to which he was a delegate. The principal papers presented there dealt with recent work at gravity stations, the question of variation of latitude, the proposed revision of older triangulations in France and Peru, the nickel-steel alloy with small coefficient of expansion, and the recent and prospective measurements of terrestrial arcs. [This paper is printed above.]

Mr. Schott followed with an interesting historical account of such measurements, pointing out that the Clarke spheroid agreed better than Bessel's with the American observations. Mr. Hayford described more fully the simple new nadir-zenith apparatus of Cornu, to which ref-

erence had been made, the purpose of which is to determine the zenith distance of stars culminating very near the zenith.

The second regular paper was by Mr. Hayford on 'The New Precise Leveling Instrument' of the Coast and Geodetic Survey, with exhibition of it. The instrument is very low and stable, the new iron nickel alloy is used, the level tube is sunk well into the telescope tube, the parts are not reversible as formerly, and an auxiliary telescope with mirror is provided for the left eye to read the ends of the bubble. Field experience shows that both rapidity and accuracy of working have been much increased by the use of the new instrument. [The full description will be published elsewhere.]

CHARLES K. WEAD,
Secretary.

DISCUSSION AND CORRESPONDENCE.

WHOSE FAULT AT THE U. S. NAVAL OBSERVATORY.

TO THE EDITOR OF SCIENCE: It is natural and very proper that the Superintendent of the Naval Observatory should defend his institution, even vigorously, against charges, where he conceives there is ground for believing there has been lack of fair play. The delicate task imposed upon the Board of Visitors should evidently have been sufficient motive for safeguarding their report against the suspicion of unfairness, if any has been shown, by first giving full credit to the existing organization in preparation for their suggestions looking to an improvement. Otherwise, the entire affair will degenerate into a dispute, and that is the most hopeless basis upon which to approach Congress for remedial legislation.

Your editorial in SCIENCE of January 4, 1901, on the 'Naval Observatory Report' does not seem to be free from the objection that it charges against the administration of the Observatory certain results which do not in reality belong there. You blame it for the removal of the Magnetic Observatory to its present site, and for the imperfections of the instrumental apparatus acquired during the past thirty years. It is very easy to misplace responsibility, but in a discussion of this kind it ought not to be done; and the fact is admitted that in such matters of administration the executive acts upon the advice of his subordinates. Now, certainly, there could not be two more conspicuous examples chosen to show that, where the astronomers have had their own way, the blame is being shifted to the chief. For it is well known that the magnetic observatory was moved by the counsel of the Astronomical Director, in cooperation with that of a prominent visiting English astronomer, and against the arguments of the professor in charge of the magnetic work, and all others in Washington interested in magnetic observations. The action of neighboring trolleys and dynamos was pointed out, but the wish to possess the equipment overruled the interests of science. The fact that the work of the magnetic observatory has not been otherwise efficient is partly due to the appointment of untrained officers of the Navy to conduct the operations, and this is of course a matter of administration. In the planning of new instruments the astronomers have for a long while had their head, and if they chose to experiment in novel constructions and to entrust the building of the instruments to American firms, they ought at least to relieve the administration, which simply expressed their decisions, of the blame for an unsatisfactory outcome of that kind.

This brings up the problem of administration. There are two types of organization, the first, where there is a strong head and a corps of subordinates who are his assistants, and over whom his decisions are final, of which the observatories at Cordoba and Harvard College are examples; then there are staffs formed of practically independent professors whose real bond of union is cooperation, of which the Naval Observatory is an example; other observatories have a mixed system in operation. The first type is calculated to put out a large mass of routine work, and to do immense pieces of observation and reduction along well-understood simple lines; the second type is suited for scientific researches into unexplored territory, where the initiative and the successful progress depends entirely upon the personality of the astronomer. No chief by executive order can aid his research, and the heads of institutions are always only too glad to support the work of men