pedition this year. These gentlemen, with Dr. Kellas, who is already in India, complete the party of six from this country who will make the reconnaissance, and will, if conditions are favorable and the reconnaissance has clearly revealed the best route, make an attempt this year to reach a considerable height on the mountain. The survey operations will be entirely in the hands of the Survey of India, and we learn from the surveyor-general that Major Morshead and Captain Wheeler were under orders to leave Darjeeling about April 1 to carry forward a good triangulation on to the plateau of Tibet with a view to the ultimate determination of the deviations of gravity north of the Himalaya, the question of the first importance to Indian geodesy. At the request of the government of India an officer of the Indian Geological Survey will also accompany the expedition. The commander-in-chief in India, Lord Rawlinson, has responded very kindly to the request that he should assist the expedition by the loan of transport, and a letter has been received recently from the quartermaster-general detailing orders which have been issued for the selection of trained mules and their accompanying personnel. The transport train was to have assembled at Darjeeling on May 12, and the value of this assistance can hardly be overestimated.

At a recent party at Buckingham Palace the president was summoned both by the King and Queen to give them the latest news of the organization and plans of the expedition, and His Majesty has graciously shown his kind interest in the project by contributing the sum of £100 from the Privy Purse to the expedition's funds. The chief of the expedition, Colonel Howard Bury, was received before his departure by H.R.H. the Prince of Wales, Vice-Patron of the society, who, with the Duke of York, spent an hour examining the plans of the expedition, and expressed his keen interest and good wishes for its success; an expression that was followed almost immediately by a generous contribution of £50 to the funds of the expedition.

As a result of the appeals made by the president of this society and the Alpine Club a sum has been collected which is approximately sufficient for the work of the first season, but leaves little reserve. It is, therefore, greatly to be desired that all fellows of the society who are jealous for the success of the first important enterprise undertaken since the war, should, if they have not already done so, send subscriptions according to their means to the funds of the expedition.—*The Geographical Journal.*

SPECIAL ARTICLES

AN OUTLINE FOR VASCULAR PLANTS [1]

IF an attempt is made to prepare a numbered list of the orders and families of flowering plants, there should first be some agreement on the sequence of the major groups. For example, should the monocots precede or follow the dicots? Should gymnosperms and ferns be included in the enumeration, as they are included in our manuals? Unless these points are agreed upon, the enumeration will be premature.

It will first be necessary to bring together the work of anatomists, morphologists and systematists. A list prepared in this way should command the respect of all botanical workers, and all might be expected to follow the list. If this synthetic view is taken, we find the ferns, gymnosperms and angiosperms forming coordinate groups. And this series stands in coordinate relation with the lycopods and horse-tails taken together. It remains for some authority on taxonomy to embody these conclusions in the system. With a view to bringing such a system under criticism, we offer below a tentative arrangement of the larger groups of plants. If some such system is adopted—as must ultimately be—we could best number the orders and families of each class separately. Thus ferns and gymnosperms would have separate numerals from those allotted to angiosperms. It is to be hoped also that the dicots will be given a permanent place at the beginning of the angiospermic series. The entire series of vascular plants would appear thus:

[1] *Cf. Plant World,* 22: 59–70. March, 1919.

Lycopsida
  Order 1. Lycopodiales
    2. Equisetales
Pteropsida
  Class 1. Aspermæ (Ferns)
    2. Gymnospermæ
    3. Angiospermæ
   Subclass 1. Dicotyledoneæ
    Division 1. Archichlamydeæ
     Order 1. Casuarinales
      Family 1. Casuarinaceæ

. . . .

    Division 2. Metachlamydeæ
   Subclass 2. Monocotyledoneæ
     Order 41. Pandanales

. . . .

       51. Orchidales
      Family 284. Orchidaceæ

Henry S. Conard

Grinnell, Iowa,
May 16, 1919

THE AMERICAN CHEMICAL SOCIETY

(*Continued*)

Studies in fluoride equilibria: I. Calcium borofluoride: A. F. O. Germann and Gilberta Torrey. Moissan, in his work with boron trifluoride, passed the gas through a tube containing heated calcium fluoride, presumably to free the gas from any hydrogen fluoride that might contaminate it. Calcium borofluoride, $Ca(BF_4)_2$ is described in the literature, and it seemed reasonable to expect the formation of a similar compound under the conditions of Moissan's work. To determine this, weighed samples of calcium fluoride were heated for several days at a temperature of 200° C. in an atmosphere of pure boron trifluoride under a pressure of 430 mm. Absorption took place slowly, and until one half molecule of the gas was absorbed. Blanks were run to determine the amount of absorption by the glass, etc., of the reaction tube; this absorption was found to be slight. The compound, $2CaF_2.BF_3$, forms by direct union of the constituent molecules under the conditions outlined.

Chromatic emulsions: Harry N. Holmes and Donald H. Cameron. A "solution" of ordinary cellulose nitrate (11 per cent. nitrogen) may be somewhat diluted with benzene and then emulsified with glycerol. A creamy white emulsion of drops of glycerol in the other liquid results. With addition of enough benzene the indices of refraction of the two liquids may be made equal, thus securing a transparent emulsion. With the right amount of benzene a very beautiful yellow emulsion which is a soft blue by transmitted light is produced. The next step up in the "color chromatic scale" is a pink emulsion which transmits green light. Next a lavendar emulsion is made transmitting yellow light. With still more benzene a blue-green emulsion is secured with a sunset red glow by transmitted light. The colors are explained by the great difference in dispersive power of the two liquid phases, transparency being fundamentally necessary to let the light through.

Cellulose nitrate as an emulsifying agent: Harry N. Holmes and Don H. Cameron. By the use of cellulose nitrate as an emulsifying agent emulsions of the "water-in-oil" type may be prepared. Cellulose esters containing about 11 per cent. nitrogen are most suitable. "Water-in-oil" emulsions are far less stable than the more usual "oil-in-water" type. To prepare the former such emulsifying agents as calcium and magnesium soaps, lanolin, carbon and rosin have been used. However, cellulose nitrate is far superior to these agents in the stability of the emulsions produced by its aid. For example, if water be shaken with a suspension of cellulose nitrate in amyl acetate (2 per cent. is suitable) a good white emulsion of drops of water dispersed in amyl acetate is obtained. Instead of amyl acetate any liquid that peptizes ("dissolves") the cellulose ester may be used provided also the two liquids are immiscible. One of the important factors in the formation of this emulsion is the formation of a tangible film around each drop. With a very large drop the film may be observed under suitable conditions. It is probably formed by great adsorption, to the point of coagulation of the cellulose nitrate at the liquid interface.

A theory of the photographic latent image: Harris D. Hineline. The suggested theory concerns itself with the latent image as distinct from the photo-electric effect on the silver halide, and as distinct from the print out image. A reaction between the dissociation products of the silver halide and gelatine which will yield energy enough to account for the energy discrepancy pointed out by other workers, is suggested. In terms of this theory the latent image then consists of a combination between the bromine and substituted ammonia of the gelatine and the silver and amido acid, the amido acid compound being much more easily reducible than the bromine compound of