A SIMPLE DEVICE FOR SHOWING BY A HYDRAULIC ANALOGUE THE EFFECT PRODUCED ON THE POTENTIAL DIFFERENCE BETWEEN THE TERMINALS OF AN ELECTRIC CELL WHEN THE CIRCUIT IS CLOSED

THE Lodge theoretical paddle wheel device shown by Professor Kimball in Figs. 336 and 337 of his "College Physics" (ed. 1917) suggested to the writer an arrangement which would render possible an actual lecture demonstration.

Into the glass U-tube of Fig. 1 a stream of water is injected at P. The water is removed at the exits E and E', the sizes of which may be controlled by adjustable pinchcocks C and C' on the rubber tubes T and T'. The "current" is controlled by the pinchcock C'' or one's fingers on the rubber tube T." The inflow at I may be controlled by the faucet to which the apparatus is attached. When C'' is closed, h represents the potential difference on open circuit. Upon opening C," level B falls and A rises: $h' < h$ or the potential difference decreases when the circuit is closed.

My friend, Professor F. A. Saunders, has modified the arrangement by placing the water-spout at P' (Fig 2). This is an improvement from the pedagogic standpoint as the source of gross energy in an electric cell lies at the surface of separation between one plate and the electrolyte. He also suggests removing the injected water at but one point, E'' (Fig. 2).

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THE AMERICAN METEOROLOGICAL SOCIETY

THE second meeting of the American Meteorological Society was held at the Weather Bureau, Washington, D. C., on April 22, 1920. The attendance was 40 to 50 at each of the two sessions, held in the morning and in the evening. Professor C. F. Marvin, chief of the U. S. Weather Bureau gave a short address of welcome, which was followed by a program of 15 papers. Brief synopses of the papers and discussions were published in the society's bulletin for May, 1920 (pp. 48–55); and the papers themselves or authors' abstracts are still appearing in the *Monthly Weather Review* (issue shown in parentheses). The program was as follows:

**Temperature scales and thermometer scales:* E. W. WOOLARD. (May.)

Shall we adopt a half-degree absolute centigrade scale instead of the Fahrenheit? CHARLES F. MARVIN. (Not published.)

The physics of the aurora: W. J. HUMPHREYS. (Abstract to be published.)

**The auroras of March 22–25, 1920:* HERBERT LYMAN. (July (?).)

The most intense rainfall on record: B. C. KADEL. (May.)

**New aerological apparatus:* S. P. FERGUSON. (June.)

Temperatures versus pressures as determinants of winds aloft: W. R. GREGG. (Abstract, May.)

**Daily wind charts for stated levels:* C. LEROY MEISINGER. (May.)

Cloud base altitudes as shown by disappearance of balloons and kites: O. L. LEWIS. (July (?).)

**Cloud nomenclature:* CHARLES F. BROOKS. (July(?).)

**Some meteorological observations of a bombing pilot in France:* THOMAS R. REED. (April.)

Project for local forecast studies: R. H. WEIGHTMAN. (March.) (By title.)

Climatic conditions in a greenhouse as measured by plant growth: EARL S. JOHNSTON. (Abstract, April.)

Modifying factors in effective temperature: ANDREW D. HOPKINS. (April.)

Relation of rainfall to the grazing capacity of ranges: J. WARREN SMITH. (June.)

Separates have been or are to be made of those starred, and may be obtained from the U. S. Weather Bureau, Washington, D. C.

The American Meteorological Society, the project of which was announced in SCIENCE, just a year ago (August 22, 1919, pp. 180–181), and of which progress was reported (December 12, 1919, pp. 546–547) and organization in December announced (March 12, 1920, pp. 275–276), has grown with unexpected rapidity to a membership of nearly 1,000. Plans are being made for the organization of a Brazilian division of the society, and it is probable that a Pacific division will be organized when the Pacific section of the American Association for the Advancement of Science meets next summer.

The next meeting will be held in Convocation Week, December, 1920, at Chicago.

CHARLES F. BROOKS,
Secretary

WEATHER BUREAU,
WASHINGTON, D. C.

THE AMERICAN CHEMICAL SOCIETY. III

The Kaufler-Cain formula for diphenyl derivatives: OLIVER KAMM and C. S. PALMER.

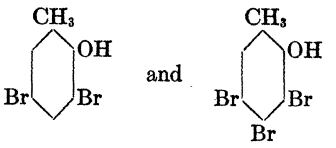
BB'-dichlorodiethyl ether: the oxygen analogue of mustard gas: OLIVER KAMM and J. H. WALDO.

The chlorination of acetone: A. W. HOMBERGER and M. BORRIES. Technical acetone was purified and treated with dry chlorine in sunlight. During the chlorination three distinct steps were noted. The first step was completed at the close of the first half hour. No hydrochloric acid was liberated during this stage. The second step lasted two hours. The heat of reaction was much higher than in the preceding step and whenever the temperature rose over 80 degrees violent reaction, resulting in flames, took place. A third step took place after this second reaction with no violent action and a temperature maintained itself below 80 degrees, and no tendency to burst into flames. During the second and third step hydrochloric acid was liberated, much more during the second than the third step. The resulting liquid of chlorination was submitted to distillation under diminished pressure and three distinct fractions obtained. The three fractions, when redistilled, showed definite and well-defined boiling points and properties. Each of these products is being investigated at present.

The use of a chart in the study of organic chemistry: CHAS. W. CUNO. The studies are divided into three great divisions, the memory studies, the reasoning studies, and the constructive studies. The two great memory studies are history and the languages. History concerns itself with data and dates, or to put it abstractly, with sequence and facts. Language concerns itself with interpretation. If we examine the reasoning studies such as chemistry we find they have a language and sequence and data that need to be made a part of the memory before the student can very well reason intelligently. In organic chemistry the language is exceedingly difficult and the data and sequence very voluminous. The use of a chart such as the one published by the author has its use, therefore, to help the student in acquiring the data, sequence and language of organic chemistry.

The mechanism of some reactions involving the Grignard reagent: HENRY GILMAN. It has been conclusively proved that the reactions of ketenes are not restricted to primary addition to the ethylenic linkage. The benzoate of triphenyl-vinyl-alcohol was obtained when the addition compound of diphenyl ketene and phenyl magnesium bromide was treated with benzoyl chloride. The Grignard reagent, therefore, has added to the carbonyl group. Preliminary experiments on the mode of reaction of the Grignard reagent and phenyl isocyanate (and phenyl iso-thiocyanate), indicate the following: first, but one molecule of phenyl magnesium bromide adds; second, addition takes place on the carbonyl (and thio-carbonyl) linkage; and, third, addition is probably restricted to this linkage, as with the ketenes.

The nitration of certain halogenated phenols: L. CHAS. RAIFORD. In preparing halogenated o-aminophenols with which to test further the migration of acyl from nitrogen to oxygen (*J. A. C. S.*, 41, 2068 (1919)), several of the brominated cresols were nitrated according to the method used by Zincke (*J. pr. Chem.* (2), 61, 561 (1900)), who found that in the meta series the halogen atom para to hydroxyl was replaced by the nitro group, while in the ortho and para series the atom ortho to hydroxyl was replaced. In none of these cases did he report the formation of isomeric nitro compounds in a single experiment. In the present work it has been found that the dibromo and tribromo-ortho cresols, to which Zincke has assigned the structures



both give isomers when they are nitrated as indicated above. The structures of the isomers, as well as the mother substances, are under consideration.

Action of aromatic alcohols on phenols in the presence of aluminum chloride: RALPH C. HUSTON. Earlier work has shown that aromatic alcohols (primary or secondary) are readily condensed with aromatic hydrocarbons such as benzene, toluene, etc., to form diphenyl methane or derivatives thereof. In the present work benzyl alcohol was allowed to react at relatively low temperatures with phenol in