short atmospheric temperature changes from without, such as would not be otherwise recorded, may make an impression on the 8 P.M. graph. This, however, would not bear upon the 1922 graph as a whole, from July 24 to August 14. Supposing, moreover, that the closed region within is in some way modified thermally by the high exhaustions (carried to within .001 mm.), it seems hardly probable that the apparatus would take so long to return to the normal condition of 1921.

What has gone down during this series of measuremeents is the vacuum and one would therefore conclude that states of high exhaustion (a few hundredths or tenths of a mm.) are (like the plenum) more susceptible to the presence of radiant activity than the lower exhaustions of a few mm. Thus, night observations presupposed, the radiant forces pass through a minimum in a partial vacuum of several millimeters or more, and the best conditions for observation are then at hand. To test this further, I exhausted the apparatus on August 14. The morning observations August 15, twelve hours later (see figure) are again abnormally high.

It not infrequently happens that night values are low when day values are high and, in general, there is a tendency of the graphs to converge toward rainy or densely cloudy weather. All this conforms with the view that the needle is screened from radiation by the large attracting mass M and that the radiant forces act with gravitation, if the temperature-time coefficient $d\theta/dt$ is positive, and act against gravitation when $d\theta/dt$ is negative, as elsewhere explained. I have been tempted to envisage a coefficient $d\theta/dt$, which is not all temperature; for there may be some other radiation or agency behind the recent rains (for instance), as well as behind the difference in the character of the results of 1922 and 1921 as exhibited by the figure. It is difficult, in other words, to surmise what the nature of the radiant discrepancy may be, which clings to the apparatus so persistently in July and early August. If it were merely thermal, or dependent on a kinetic mechanism associated with $d\theta/dt$, its behavior would seem to be incompatible with the daily cycle, which is practically immediate. However, if the slopes of the curves giving the static elongations, y, of the needle in the lapse of time, are enhanced by the higher degrees of exhaustion, these curves would also ultimately intersect, so that even negative values of Δy, referable to causes within the apparatus would not be unexpected.

On my return to the laboratory in September, I resumed the work (upper curve). The vacuum had in the mean time decreased to about 3 mm. Under these conditions the night observations (8^h) are again normal and compare favorably with the corresponding graph of 1921, as was anticipated.

CARL BARUS

BROWN UNIVERSITY,
PROVIDENCE, R. I.

THE AMERICAN CHEMICAL SOCIETY

(Continued)

DIVISION OF DYE CHEMISTRY

William J. Hale, *chairman*
R. Norris Shreve, *secretary*

SYMPOSIUM ON METHODS FOR STANDARDIZING AND TESTING DYES

R. E. Rose, *chairman*

Introductory remarks: ROBERT E. ROSE.

Chemical control of dyestuffs: WALTER M. SCOTT. This paper presents a general discussion of various methods for estimating the strength of dyestuffs as follows: (1) Colorimetric comparison of standard dyestuff solutions. (2) Titration of a solution of known strength of dyestuff with a standard solution of titanous chloride in an atmosphere of carbon dioxide. (3 Determination of the percentage of nitrogen by the Kjeldahl method. (4) Estimation of the inorganic salts which have been used in the standardization of the dyestuff. In connection with the materials used in dyeing there is such a great variety that it is only possible to discuss a few of the more common types. This paper gives an outline of the general methods of analysis used and also suggested specifications for the following: acetic acid, sulfuric acid, ammonia, black iron liquor, commercial "nitrate" of iron, di-sodium phosphate, Glauber's salt, common salt and soap made from olive or red oil.

The estimation of erythrosine: W. C. HOLMES. A method is outlined for the direct evaluation of dye in sample of erythrosine, based upon the gravimetric determination of the color acid, which is shown to have relatively excellent accuracy. The results obtained confirm the conclusion of Gomberg and Tabern that the dried dye contains a molecule of water of concentration. In the absence of interfering substances the consumption of acid involved in the precipitation of the color acid is determined by the dye and soda ash present and may be utilized as a convenient means of estimating the latter. A further investigation is being undertaken to determine the applicability of the methods to other dyes of the Eosine group and to afford evidence regarding their constitution.

The dangers of the titanium chloride method for determining the strength of dyes: EDWARD H. GAMBLE and ROBERT E. ROSE. The quantitative method, as described by Knecht for the estimation of the quantity of dyestuff in a sample by means of titanous chloride, is one which is very valuable; however, it must be used with great discretion and a full understanding of the material being tested. The method is sensitive to changes in chemical composition which are not accompanied by corresponding changes in tinctorial value and, therefore, may be extremely misleading.

Laundering of textiles: A. F. SHUPP. (1) Gross volume of business transacted; persons employed by; annual payroll. (2) Development of standard formulas for laundering cotton, linen, wool, silk and artificial silk fibers. (3) Effect of repeated laundering on cotton goods. (4) Discussion of the proper method for the use of low titer and high titer soaps. (5) Samples of textiles that have been improperly laundered. (6) Samples of textiles that have been poorly constructed. (7) American Institute of Laundering.

Dyeing as an art: J. MERRITT MATTHEWS. Dyestuffs and methods of dyeing have long been employed by many nations as a means of art expression, principally for the production of decorative effects on wearing apparel. The early eastern nations, such as the Indian, Chinese and Javanese, were especially prominent in this line of art work, although we also find a somewhat similar development of this form of art among the early Incas of Peru. The early nations, in contradistinction to our own of the present day, nearly always incorporated their art work in the actual utilities of their everyday life, and as their clothes were the nearest thing to them, they employed their art in the decoration of the fabrics used for their wearing apparel. We are more inclined to make our art work distinct in itself and with little or no connection with the things we use and wear. To us an art object is generally something that is set aside or put in a museum or cabinet, or hung on the wall, and must not be desecrated by using it or wearing it.

The tinting of white papers: W. C. HOLMES. For the tinting of newsprint stock and of white papers of the lower grades the basic dyes are exceptionally well adapted. The acid dyes are well qualified to serve the requirements of medium grade paper. In the tinting of white papers of the best quality it is necessary to resort to colors of the pigment type. The ultramarines, indanthrene dyes and the recently developed phosphotungstic lake products are employed, of which classes of colors each affords relative advantages in various essential respects. In the latter field none of the tinting materials available at present can be considered entirely satisfactory and it would appear probable that products of superior general excellence could be developed in other pigment types, of which the dyes derived from the anilids of beta-hydroxy-naphthoic acid are suggested as one of the more promising fields for investigation.

The relative stability of paper colors to bleach: W. C. HOLMES. Eighty representative paper colors are classified in respect to their relative susceptibility to calcium hypochlorite as determined by laboratory dyeing tests in which the essential conditions of beater operation were duplicated. In general the superior stability of pigment colors to photochemical attack finds an analogy in a corresponding stability to bleach, but little or no agreement is found between the relative susceptibility of the soluble dyes to the action of light and of bleach. From the point of view of coloring considerations it is preferable to eliminate residual bleach from the stock by washing rather than by the employment of anti-chlors.

Use of bichromates in wool dyeing (as mordants): WINTHROP C. DURFEE. Bichromates early used as mordants on wool when dyewoods benefited by oxidation were principal dyestuff. Oxidation is not usually beneficial to synthetic mordant dyes: is generally injurious. Synthetic mordant dyes as organic acids require suitable basic mordants. Bichromates furnish chromic acid peculiarly suited for absorption into wool fiber and conversion into basic chromes. Basic chrome should be combined in fiber with weak organic acid. Tartrates suitable for source of organic acid. Best results in mordanting require careful consideration of combining weights of reduced chrome. Amount of chrome used as mordant should have as near as practical a weight adjusted to combining weight of quantity of dye to be used.

Influence of tin weighting on the dyeing of silk: L. J. Matos.

Quercetin, constitution and uses: Geo. L. Terrasse. A brief synopsis of the constitution of flavone, flavonol and quercetin is given and attention is called to the brilliant synthetic work on these bodies performed by chemists of repute, these researches leaving no doubt about the correctness of the accepted formulas of the substances just mentioned and other bodies similarly constituted. In spite of the technical importance of quercetin and allied dyes the commercial synthetic non-production of them is emphasized. The color of quercetin in relation to its constitution is discussed and the reasons for the adjective dyeing qualities of this dye are considered. The influence of tautomerism, of the alpha hydroxyl and of the hydroxyls in other positions in the molecule are touched upon, as well as the influence of the quinoid formulation on its color. The application of quercetin to the various fibers with several different mordants is recorded and the characteristics of these dyeings are mentioned. The use of this dye on leather is also given and the analogy of the usual commercial forms of the dye to the tannins is indicated. The production of the various lakes of this color is likewise touched upon. It is pointed out that until the necessary original intermediates be produced much cheaper, or that entirely new and cheap syntheses be developed, quercetin must continue to be produced from natural sources.

An outline of the history and chemistry of the important natural dyestuffs: David Wallace and Emil Lesser, Ph.D. This paper covers the history of natural colors as used in ancient times and the impetus given to the industry by the discovery of America with its source of valuable natural dyestuffs, particularly logwood, fustic, hypernic and quercitron bark. Mention is made of the history of the development of the use of these colors. The chemistry of natural dyestuffs presents an interesting and complex study. It received years of study by such men as Chevroul, Erdmann, Graebe, Kostanacki, Herzig and Perkin. Most of their work was done on hæmotoxylin and brezilin, the coloring principles of logwood and hypernic. In this country, the work of Perkin has been thoroughly reviewed and extended in the search of a method for producing additional dyestuffs from natural sources. The sources, chemistry and application of the above mentioned dyestuffs are discussed. A brief mention is made of the present status of the industry.

Color and constitution: M. L. Crossley and P. V. Rosenvelt. A study was made of the effect of isomerism on the color of certain azo dyes. It is shown that there appears to be a definite relation between the reactivity of the naphthol sulfonic acids of beta-naphthol and the color of the dyes produced from them. The effect of the sulfonic acid group on the beta-naphthol ring appears to be greatest when it is in position 3. In this position it acts as a bathychromic group, while in position 7 it acts as a hypsochromic group. The influence of the nitro group on the benzene ring in an ortho position to the diazo group shifts the absorption of the dyes toward red. This effect is manifested to a maximum degree by the nitro group in the ortho position. When the nitro group is in the meta position it acts as a hypsochromic group, shifting the color of the nitrobenzene-azo-beta-naphthol-sulfonic acids in the entire series toward the yellow and beyond that of the corresponding benzene-azo-B-naphthol-sulfonic acid series. The methyl group substituted on the benzene ring has less influence on color than the nitro group. Chlorine appears to have very little influence on the color of the chlorobenzene-azo-B-naphthol-sulfonic acids. Bromine in the ortho position to the diazo group acts as a bathychromic group in dyes resulting from F acid and R salt but has no influence on the color of the dyes resulting from G salt and B-naphthol-3.6.8-trisulfonic acid. The sulfonic acid group introduced on the benzene ring shifts the color of the benzene-azo-B-naphthol-sulfonic acids towards yellow, the maximum effect being manifested by the meta position.

Constitution and chemical reactivity: M. L. Crossley and P. V. Rosenvelt. It is shown that there is some apparent relation between chemical constitution and reactivity in the B-naphthol-disulfonic acid products. The 2-naphthol-3.6-disulfonic acid, R salt, couples readily with azo compounds to give corresponding dyes, while the 2-naphthol-6.8-disulfonic acid and the 2-naphthol-3.6.8-trisulfonic acid, both of which contain a sulfonic acid group in the 8 position, do not react under ordinary conditions for coupling, with certain diazo compounds, particularly those containing a methyl group in an ortho position to the diazo group. Since the hydrogen atom in the adjacent position to the hydroxyl group is the only one of the several on the naphthol ring replaced by a diazo group, since the naphthol-sulfonic acids having a sulfonic acid group in position 8 do not form nitroso compounds, and since the substitution of an aryl radical for hydrogen of the hydroxyl group diminishes the reactivity of the adjacent hydrogen atom, as is evidenced by the fact that coupling no longer takes place on the naphthol ring, it is suggested that there is a dynamic relationship between the hydroxyl radical and the adjacent hydrogen atom, that this relationship is enhanced by a sulfonic acid group in position 3 and inhibited by a sulfonic acid group in position 8. It is further suggested that this condition of a "loose" hydrogen atom when position 8 is not occupied constitutes a condition of an "open field of reactivity," while the condition of the hydrogen atom when position 8 is occupied constitutes a condition of a "closed field of reactivity." An open field of reactivity is considered necessary for the formation of preliminary addition products, before any can result in the formation of stable reaction products.

Rhythmic bands of dyes on filter paper by evaporation. The refractivity, surface tension, conductivity, viscosity and Brownian movement of dye solutions: Earl C. H. Davies. (Lantern. Illustrated). Striking bands of dyes have been obtained, by a method of evaporation, in filter paper and with unglazed porcelain. There are no marked relations between the formation of these bands and the physical properties of the dye solutions, but it is probable that the viscosity of the very concentrated solutions is important. Oriented adsorption takes place in rhythmic band formation. A study was made of 62 dyes with 3 varieties of filter paper.

Adsorption phenomena in the application of dyes to plain and mordanted fabrics: L. W. Parsons and E. D. Lord. This paper deals with adsorption phenomena which occur in the dyeing of wool and mordanted cotton. The results are treated by the Freudlich adsorption equation, $\frac{x}{m} = kc\frac{1}{n}$, where $\frac{x}{m}$ is the grams of dye adsorbed per gram of adsorbent, c is the concentration of dye in the bath in equilibrium with the dyed fibres, and k and $\frac{1}{n}$ are constants for each individual dye. Characteristic samples of pure dyes containing various chromophore groupings were studied, the data applied to the adsorption equation and the factors affecting the exponent, $\frac{1}{n}$, are discussed. (1) In azo dyes the value of $\frac{1}{n}$ is in general high, and only slightly affected by the addition or removal of OH or So_3Na groups. (2) Thiazene dyes have particularly a low value. (3) Xanthene dyes containing the grouping COON or $COOCH_3$ have a low value for the exponent, the value being raised, however, if this group is absent. (4) The nitro group raised the value of $\frac{1}{n}$ provided that there is not a counteracting factor. (5) Triphenylmethane dyes have, in general, a low value. (6) In the case of mordanted cotton $\frac{1}{n}$ is particularly low, indicating that adsorption is a major factor. (7) This work is still in its infancy, but it is believed that a systematic study of such data and an application of it to the dyeing processes will lead to generalities of interest both to the practical dyer and to the physical chemist.

Dyes of the dinitro-malachite green series: T. B. Downey with Alexander Lowy. 2, 4-dinitrobenzaldehyde was condensed with dimethyl-aniline, benzyl-ethyl-aniline and diethyl-aniline (in the proportion of 1 mol. to 2 mols.), yielding 2, 4-dinitro-malachite-green dyestuffs which have the characteristic blue-green color typical of the malachite green series. The properties of the leucobases and dyes derived therefrom were studied. Samples of the dyes and dyeings will be shown.

Catalytic oxidation of anthracene to anthraquinone: C. E. Senseman and O. A. Nelson. The importance of anthraquinone as an intermediate in the manufacture of dyes is shown. Mention is made of the old methods of manufacture, chief among which is the chromic acid method. The catalytic method, patented by Gibbs and Conover, and worked out by the authors, is described in detail. The apparatus consists essentially of: (1) a carburetor, (2) reaction chamber and (3) sublimer for collecting the reaction products. All these parts are made of glass and heated by well-insulated electric heaters. The carburetor is built with two air inlets, one arranged so as to sweep over the molten anthracene and thus carry a definite amount of the hydrocarbon into the reaction chamber, the other arranged so as not to interfere with the work of the first but to vary the air-anthracene concentration as desired. Four methods of supporting the catalyst, vanadium pentoxide, are described. They are: (1) by boats, (2) by discs, (3) by pumice, (4) by fusing to a glass tube. The sublimer, as used during most of the runs, consists of a Kjeldahl flask with neck removed, and joined to the reaction chamber by a ground-glass joint. Tables were compiled showing the influence of different variables in the production of anthraquinone. The maximum yield obtained was 85.3 per cent. of the theoretical.

Equations for vapor pressures and latent heat of vaporization of naphthalene, anthracene, phanenthrene and anthraquinone: O. A. Nelson and C. E. Senseman. This work deals only with the calculated vapor pressures and latent heats of vaporization of naphthalene, anthracene, phenanthrene and anthraquinone, and is an outgrowth of the work published by the authors on the observed vapor pressures of these compounds in *J. Ind. Eng. Chem.*, 14 (1922), 58. The calculations were made by applying the Clapeyron equation of state. A discussion of the derivation of the equation is given. The entropy of vaporization of the same compounds was also calculated and the conclusion arrived at that all form normal liquids. Tables for observed and calculated vapor pressures were given for each compound. In each case the calculated agrees favorably with the observed.

Carbazole, its purification and vapor pressure determination: C. E. Senseman and O. A. Nelson. Carbazole of 82 per cent. purity was washed three times with benzene at a temperature of 50° C. Successive crystallizations from benzene and toluene followed, giving a product melting at 244.8° C. Analysis showed the presence of 8.22 per cent. of nitrogen, while the theoretical per cent. present is 8.38. Using this material vapor pressure determinations were made by the method and apparatus described previously by the authors in *J. Ind. Eng. Chem.*, 14 (1922), 58. Two tables were given. Table I records the pressures and corresponding temperatures. Table II gives the pressures at 5° temperature intervals read from a curve made from the observed readings. The boiling point was found to be 354.76° C. This constant was previously reported in the literature to be 351.5° C. From the Clapeyron equation of state a formula was derived for calculating the vapor pressures at the various temperatures. These calculated pressures closely approximate the observed ones.

The influence of change in concentration on the absorption spectra of dyes: W. C. Holmes. A brief review of the literature on the subject is given. An outline of the preliminary results obtained by varying the concentration of a large number of dyes over a wide range is presented, together with representative absorption curves illustrating various types of behavior. The interpretation of results and their bearing upon the condition of dyes in solution is discussed.

The synthesis of dicyanine A: S. Palkin. In the synthesis of dicyanine by the action of sodium ethylate on an alpha, gamma quinoline intermediate it was found that the relative proportion of dicyanine and cyanine produced varied considerably with the *same sample of intermediate*, in different experiments. The possible presence of other intermediates was not thought to be wholly responsible for the formation of contaminating dyes. A study of the influencing factors resulted in the development of an improved process for this dye, which depends upon the action of sodium sulfide and chloroform on an alpha, gamma quinoline intermediate in alcoholic solution. At least two other types of dyes are formed simultaneously by this method, one showing an absorption spectrum maximum at 6200 Å (kryptocyanine). Optimum conditions have been worked out for the preparation of dicyanine A IV (absorption maximum about 6720 Å). The resulting product was found to have sensitizing power equal to Hoechst Dicyanine. The yield of dye by this method is over twelve times that obtainable by any previous method.

The preparation and separation of the ortho- and nara-chloro-anilines: H. C. Bashioum and P. O. Powers. The work was done to find a method capable of technical development for the preparation of the intermediates. Chloro-benzene was nitrated, and the mixture of o- and p-nitro-chloro-benzene was cooled, separating a part of the para isomer. The remaining mixture of nitro compounds was heated to distill off any remaining chloro-benzene and then reduced by boiling with iron and dilute hydrochloric acid. Steam distillation was used to remove the ortho-chloro-aniline which was obtained very nearly pure. Para chlor-o-aniline can be obtained by neutralizing and continuing the distillation with steam. Several other methods of separation were investigated.

The preparation of phenyl-thioglycol-o-carboxylic acid, thioindoxyl-carboxylic acid, thioindoxyl and thioindigo: M. X. Sullivan. The brick-red precipitate obtained by running H_2S into diazotized anthranilio acid at 0°-5° C. was treated with chloro-acetic acid in slightly alkaline medium and warmed to 75° C. The filtrate therefrom cooled and acidified with HCl gives phenyl-thio-glycol-o-carboxylic acid. This heated with 5 parts NaOH and a little water gradually to

160° with stirring and kept at 160° for 1 hour gives on dissolving in water and acidifying the cooled solution (in ice) thioindoxyl-carboxylic acid. Warming the acidified solution or heating the solid with acetic anhydride gives thioindoxyl distillable with steam. In alkaline solution thioindoxyl-carboxylic acid and thioindoxyl are converted by potassium ferricyanide to thioindigo, the former on heating the latter directly. The motive for the work is, in the present case, biothenical.

DIVISION OF CHEMISTRY OF MEDICINAL PRODUCTS

Edgar B. Carter, *chairman*
E. H. Volwiler, *secretary*

SYMPOSIUM—DEVELOPMENT OF AMERICAN SYNTHETIC MEDICINALS

The American-made "chloramine" antiseptics: P. N. Leech.

Progress in the manufacture of arsphenamine: G. W. Raiziss.

Present status of the field of local anesthetics: E. H. Volwiler

Recent developments in the chemistry of organic mercurials: Frank C. Whitmore.

New medicinal mercurials: Oliver Kamm.

Chemical and pharmacological studies of benzyl compounds: David I. Macht.

A synthesis of thymol from p. cymene. II: Max Phillips. A process for making synthetic thymol from p. cymene is described. The method consists in first preparing nitrocymene, reducing this to cymidine, sulfonating the cymidine to cymidine-sulfonic acid, diazotizing the cymidine-sulfonic acid to diazo-cymene-sulfonic acid, reducing the latter to cymylhydrazine p. sulfonic acid, removing the hydrazine group cymene-3-sulfonic acid, fusion of the sodium salt of this acid with potassium hydroxide and obtaining thymol. An over-all yield of about 15 per cent. of the theoretical one is obtained.

A method for assaying unguentum stramonii: A. R. Bliss, Jr. The U. S. P. IX gives no method for standardizing unguentum stramonii. Bliss and Brown present a method adapted from the U. S. P. assays of extractum stramonii, extractum belladonnæ foliorum, and fluidextractum belladonnæ radicis, which gives very accurate results as shown by experiment data reported. The method consists of the usual treatment with ether-chloroform mixture and ammonia water; followed by thorough shaking and subsequent standing or by centrifuging; extraction with weak sulfuric acid; subsequent addition of ammonia water with final extraction with chloroform, and titration of the chloroformic residue in the usual fashion.

Some hypnotics of the barbituric acid series: H. A. Shonle and A. Moment. Of the various di-alkyl and alkyl-aryl barbituric acids prepared and tested, isoamyl-ethyl barbituric acid was found to have the greatest hypnotic activity combined with a low toxicity. Isobutyl-ethyl and n-butyl-ethyl barbituric acids were next in activity. Benzyl-ethyl and benzyl-propyl barbituric acids, while possessing hypnotic activity, caused tetanic convulsions. Increasing the length of the chain of both alkyl groups tends to cause muscular incoordination. It appears possible that the optimum activity lies in those members of the series which are more oil soluble and also chemically less stable. The usual method of synthesis was used in the preparation of this group of compounds.

Germicidal assays with special reference to colloidal silver compounds: Herbert C. Hamilton. Tests of germicides other than the coal tar compounds should be carried out under conditions similar to those under which the substance would be used, particularly time of reaction and organism. The values so obtained have more practical significance than the official hygienic laboratory coefficients. Colloids appear to vary in value more greatly than some other disinfectants, making it difficult to obtain a true valuation. Tests were made with some common disinfectants on a variety of organisms including those isolated from a typical case of "pink eye," also *B. pyocyaneous,* diphtheria, pneumonia and others. The substances tested include colloidal silver iodide, colloidal metallic silver, silver nitrate and other well-known disinfectants. Considerable data are included.

The chemistry of digitalis: Herbert C. Hamilton. This is a continuation report on the active agents of digitalis with some additional data on their purification and activity.

Hypnotics of the nirvanol series—phenyl butyl hydantoin: E. H. Volwiler and E. B. Vliet. Nirvanol, or phenyl-ethyl hydantoin, was at first acclaimed as the hypnotic *par excellence,* but in recent years it has been found to occasionally produce severe rash and fever. A number of other substituted hydantoins have already been prepared and investigated, but none of them appeared promising. The various analogous members of the hydantoin series and of the barbituric acid series seem to have no particular relationship from the hypnotic side, for example, the dialkyl hydantoins have practically no hypnotic action. Phenyl n-butyl hydantoin was prepared and found to have no hypnotic action whatsoever.

Chemotherapeutic studies of various aromatic organic arsenicals: GEORGE W. RAIZISS and JOSEPH L. GAVRON. The authors have found that in experimental trypanosomiasis due to infection with *T. equiperdum* complete cures may be effected by employing very pure samples of the two pentavalent organic arsenicals—p-arsanilic acid and 3-amino-4-hydroxyphenylarsonic acid. The chemotherapeutic indices $\frac{\text{maximum tolerated dose}}{\text{minimum curative dose}}$, which are 6.7 and 10, respectively, are of particular interest in view of the favorable results obtained by various French investigators in the treatment of human syphilis with the above arsenicals. Furthermore, by utilizing these compounds as coupling agents the authors have prepared various arsenical dyes and found them to possess but feeble trypanocidal properties. Methods for the preparation of pure p-hydroxyphenylarsine and 3-animo-4-hydroxyphenylarsine have also been developed.

Experimental work in the prediction of physiological action: OLIVER KAMM. Considerations from the standpoint of molecular magnitude are of value in predicting certain toxicity data of mono-hydroxy alcohols. From the physiological results obtained with aliphatic members it was possible to predict corresponding effects of alcohols of the benzyl type, thus showing that benzyl compounds are devoid of certain specific effects sometimes credited to them.

CHARLES L. PARSONS,
Secretary

THE AMERICAN ASTRONOMICAL SOCIETY

THE twenty-eighth meeting of the society was held at the Yerkes Observatory, Williams Bay, Wisconsin, on September 5 to 8, 1922. This was the twenty-fifth anniversary of the opening of the observatory and also of the founding of the society, which grew out of the conference of astronomers held in connection with the dedication of the observatory in 1897. The members and visitors, who numbered about one hundred, were quartered at the Y. M. C. A. Camp on the shore of Lake Geneva.

Sessions for papers extended over three days, and the social events included a reception at the home of Director and Mrs. Frost, a boat ride on Lake Geneva, and the annual dinner. On one evening Professor E. E. Barnard gave an illustrated lecture on "Some Peculiarities of the Comets," and the anniversary celebration included reminiscences of the twenty-five years of the observatory and of the society. A series of astronomical moving pictures was also exhibited.

Nineteen new members were elected to the society, bringing the total membership up to three hundrd and ninety. The society elected to honorary membership Professor H. H. Turner, director of the University Observatory, Oxford, England.

Officers for the ensuing year are as follows:

President: W. W. Campbell.

Vice-presidents: John A. Miller, Henry Norris Russell.

Secretary: Joel Stebbins.

Treasurer: Benjamin Boss.

Councilors: Philip Fox, Caroline E. Furness, A. O. Leuschner, John M. Poor, Charles E. St. John, Frank Schlesinger, Frederick Slocum.

Members of the National Research Council: W. W. Campbell, Edwin B. Frost, Henry Norris Russell.

The next meeting of the society will be held in affiliation with the American Association for the Advancement of Science at Boston and Cambridge in December, 1922.

The program of papers was as follows:

A spectroscopic method of deriving the parallaxes of A-type stars: WALTER S. ADAMS and A. H. JOY.

Partial explanation, by wave-lengths, of the K-term in the B-types: SEBASTIAN ALBRECHT.

Trigonometric parallax of the Pleiades: HAROLD L. ALDEN.

The variable star, M 5, Bailey 33: E. E. BARNARD.

Saturn's rings when the earth passed through their plane in 1920-1921: E. E. BARNARD.

Redetermination of secondary standards of wave-length from the new international iron arc: KEIVIN BURNS, C. C. KIESS and W. F. MEGGERS.

The orbit of the spectroscopic binary H. R. 6532: J. W. CAMPBELL.

Nova Scorpii No. 3 (1922): ANNIE J. CANNON.

Measurements of planetary radiation: W. W. COBLENTZ and C. O. LAMPLAND.

On the light variations of Beta Lyræ and Delta Cephei: R. H. CURTISS.

The parallax of Capella from desentitized plates: ZACCHEUS DANIEL.