

muscle often cause a myoplastic reaction on the part of said smooth muscle with a result that an "adenomyoma" is formed.

These ectopic endometrial growths offer themselves both before and after the menopause as foci for neoplasia. Sampson has been able to identify them as long as thirteen years after the natural menopause, although they undergo involution which, however, is similar to the histological changes present in the senile uterus. It has been shown by the writer that in rabbits the transplanted tissue persists at least five months following bilateral oophorectomy and shows the same atrophy as the uterus.

Many of the cysts obtained in uncastrated animals are strikingly like the so-called multilocular cystadenoma of women, at least in most respects except size, and Dr. Sampson in a personal communication states that more careful examination of a series of cystadenocarcinomas of the human ovary has resulted in his finding at times small areas of apparently normal endometrial tissue in the lining of some loculi. A definite relationship between the implantation growths of Müllerian type and many of the papillary and cystic epithelial tumors of the ovary would seem to be an altogether reasonable and logical hypothesis.

While the clinical observations and the pathological and experimental studies would seem to satisfy all reasonable requirements in explaining the genesis of the menstruating cysts of the ovary and the more scattered implants, another theory for the origin of the primary ovarian lesion must be mentioned. This concerns the power of the germinal epithelium of the ovary postnatally to produce endometrial tissue. In the embryo the germinal epithelium gives rise to totipotential cells of the sex glands, but the application of this fact to the condition under discussion seems exceedingly farfetched, although it will probably always be utilized by those who find themselves unable to accept Sampson's conclusions.

Much argumentation would be obviated were it known conclusively that the germinal epithelium could give rise postnatally to ciliated epithelium. Since the endometrial cysts of the ovary are usually lined in part at least by ciliated epithelium (or to the same extent as is the uterine mucosa) and since, when rupture of such a cyst occurs, its lining may come into direct contact with the germinal epithelium in the process of healing, it becomes imperative more closely to examine any case where the peritoneum of the ovary is in continuity with ciliated cells. The writer as well as several other pathologists in large hospitals and a few biologists consulted have never seen what they could regard as an actual metaplasia of ovarian peritoneum into ciliated epithelium. Nevertheless, this change has been described by a

few observers. Characteristic Müllerian stroma has not been noted as an accompaniment, however, and this is an important element in the production of the picture here described.

The strongest argument against a peritoneal origin for these menstruating "mülleriomas" is the fact that the ovary need not be involved at all in the primary dispersion of epithelium through the oviduct, but that there may be widespread "adenomata" of Müllerian type throughout the pelvis. It is not plausible to assume that this sudden crop of such growths is caused by a kaleidoscopic change in the pelvic peritoneum to ciliated epithelium with the simultaneous production of endometrial stroma.

The facts that this ectopic endometrial tissue may be found upon any pelvic structure, that it usually occurs in multiple foci, that the autotransplants have stroma typically endometrial in structure and function, and that they usually do not develop until the last fifteen years of menstrual life would seem to eliminate (a) the germinal epithelium of the ovary as their mother cells, and (b) the possibility of their being derived from *congenital* Müllerian rests rather than their being new growths acquired by implantation during the menstrual age of the individual.

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The electronic structure of organic compounds in relation to their heats of combustion: M. S. KHARASCH. Upon examination of the experimentally determined values of heats of combustion of organic compounds, certain remarkable relationships can be traced between the electronic structure of the compounds and their total energy values. If we ascribe the heat liberated in the combustion of methane to the displacement of the electrons between the carbon and oxygen atoms, then the molar heat of combustion of methane would be X times 8, if X is the amount of heat liberated by the displacement of an electron between the carbon and oxygen atoms.

The electric moments of typical organic molecules: CHARLES P. SMYTH. The electric moments of typical organic molecules calculated from the dielectric constants, together with other experimental data, are smaller than those obtained from theories of molecular structure because of the displacement of electrons within the molecules, the magnitude of the difference depending largely upon the mobility of the electrons. The moments of a number of alcohols are compared with those of water and the ethers. These values, which should agree if there were no distortion of the molecular symmetry, show that the groups attached to the oxygen repel each other, the amount of repulsion varying with their bulk

and altering the moment. The principal doublet in a molecule induces secondary doublets in the rest of the molecule so that the moment of the whole tends to increase with increasing size of the molecule. Moments calculated for a large number of hydro-carbons, aldehydes, ketones, amines and halides resemble in their behavior those of the alcohols and ethers.

A study of ionization produced in gaseous reactions: A. K. BREWER and FARRINGTON DANIELS. Ionization has been detected in every gaseous reaction which has been investigated. The apparatus permits the measurement of currents small as 10^{-15} amperes at temperatures up to red heat, with a potential gradient as high as 2,700 volts per cm. The reactions studied include the oxidation of nitric oxide with oxygen and with ozone, and the decomposition of ozone, of nitrogen dioxide and of nitrogen pentoxide. In every case the ionization is proportional to the voltage and to the number of reacting molecules. The currents are very small, only one pair of ions reaching the electrodes for approximately 10^{13} molecules, which react.

Antagonistic actions of radiations of different frequency: S. E. SHEPPARD. A brief history is given of the observations, commencing with Ritter, of opposing effects with different rays. New experimental material is presented, showing effects of this character occurring entirely within the ultra-violet region of the spectrum. The early relation of the conception of antagonism to that of polarity in the theory of chemical affinity is noted, and its later development into the radiation hypothesis of chemical reaction. The limits of utility in guiding experimental work are discussed.

On tertiary X-radiation: GEORGE L. CLARK. When primary X-rays fall upon a secondary radiator there are produced scattered rays with the same wave-lengths as those characteristic of the target; fluorescent rays characteristic of the elements in the radiator; and tertiary rays produced by the impact upon neighboring atoms of secondary photo-electrons, which are completely ejected from atoms by the primary rays. Tertiary rays appear as bands in the spectrum with the short wave-length limit defined by the equation $\lambda = \lambda, \lambda^2/\lambda^2 - \lambda^1$, where λ^1 is a primary wave-length and λ^2 is the critical absorption wave-length of the radiator element. Experiments with tungsten primary rays and secondary radiators with atomic numbers 6 to 60, and with molybdenum primary rays and secondary radiators with atomic numbers 3 to 17 confirm the above tertiary ray mechanism rather than the shift in wave-lengths predicted by the quantum theories of Compton, Debye and Jauncey or the theory of D. L. Webster that the tertiary rays are produced by the impact of electrons in the same atom.

The temperature-entropy diagram for nitrogen: W. H. RODEBUSH and J. B. TAYLOR. By performing a Joule Thomson experiment on liquid nitrogen at a given temperature and pressure, the heat content of the liquid can be calculated from the percentage vaporized after the expansion. The heat contents of liquid nitrogen have been determined from the boiling point to the critical temperature. The entropy of the liquid is

readily calculated and the entropy of the vapor can be calculated from existing data. Since heat losses can be minimized at low temperatures it is believed that the diagram obtained for nitrogen is the most accurate that has been obtained for any liquid. Some interesting conclusions can be drawn as to the temperature range over which a liquid may be used as a refrigerant.

Negative catalysis and chain reactions: HANS L. J. BÄCK STRÖM. Certain of the photochemical reactions that are known to be chain reactions are also known to show the phenomenon of negative catalysis. Examples are the hydrogen-chlorine combination and the photodecomposition of hydrogen peroxide. Christiansen has recently advanced the idea that some thermal reactions may also be chain reactions and that this may explain the fact that they can be negatively catalysed by small amounts of certain substances. To test this idea the autoxidation of benzaldehyde has been studied. The photochemical reaction has been shown to be a chain reaction and it has been found that, in general, substances that inhibit the photo-reaction also inhibit the thermal reaction and vice versa. It seems likely, therefore, that this is a case of a thermal chain reaction. Other reactions are being studied.

The point of minimum catalytic activity: F. O. RICE and MILTON BERGSTEIN. Karlsson has measured the rate of hydrolysis of acetic acid esters in buffer solutions and has found that a point of minimum catalytic activity occurs near $\text{pH} = 5$; this is not in agreement with the results of Wijs, who studied the autocatalytic hydrolysis of methyl acetate in pure water; Wijs obtained a minimum rate at 10^{-6} N acid concentration and by assuming (1) that the total hydrogen ion and the total hydroxy ion are catalytically active and (2) that the ratio of the activities of hydroxyl and hydrogen ions is 1400/1 he calculates K for water to be 2×10^{-14} . We may, however, assume that only the unhydrated ions are catalytically active, that their activity is approximately equal and that at $\text{pH} = 5$ the concentration of dry hydrogen ion equals the concentration of dry hydroxyl ion. Support for this second view is obtained by observations on a number of different reactions which all have a point of minimum catalytic activity at $\text{pH} = 5$.

The temperature coefficients of chemical reactions: F. O. RICE and CHARLES F. FRYLING. On the basis of some considerations recently put forward it has been predicted that chemical reactions will fall into comparatively few classes; this can be illustrated by the acid hydrolysis of fatty acid esters, their halogen derivatives, the cyano-esters and hydroxy esters, all of which have a temperature coefficient $k_{35}/k_{25} = 2.4$ (approximately). Any reaction catalysed by a strong acid and which is not hydrolytic in character should have $K^{35}/K^{25} = 3.01816$. This has now been confirmed for a number of reactions between ketones and halogens in dilute solution which have widely different velocities but identical temperature coefficients.

Carbon monoxide as a poison in the ethylene-hydrogen combination in presence of metallic copper: ROBERT N. PEASE and LELAND A. STEWART. Previous measurements have shown that carbon monoxide is much more

strongly adsorbed by catalytic copper than either ethylene or hydrogen, indicating that it should act as a poison in the ethylene-hydrogen combination. Experiments have shown that this is the case. The efficacy of the carbon monoxide is of another order than was to be expected from the adsorption measurements, however. Thus, it was found that a sample of copper which would adsorb at a few mms pressure approximately 1 cc of either ethylene or hydrogen or 5 cc of carbon monoxide was deprived of 90 per cent. of its activity by so little as 0.05 cc of carbon monoxide. The activity could be restored merely by pumping out at 250°. This result seems to indicate that only a small fraction (1 per cent.) of the catalyst surface which is active in adsorption is also active in catalysis. This is in agreement with previous results in the poisoning of copper by mercury and the deactivation of copper by heating.

Metallic calcium as a hydrogenation catalyst: ROBERT N. PEASE and LELAND A. STEWART. Considerations as to the preferential adsorption of hydrogen by hydrogenation catalysts, such as copper and nickel, lead to the prediction that the metals which form hydrides should be good hydrogenation catalysts. This has been verified for metallic calcium using the ethylene-hydrogen combination as a typical hydrogenation reaction. Rapid reaction occurs at 200°. Calcium takes up hydrogen as fast as let into the bulb at this temperature, the total volume of hydrogen corresponding approximately to the dihydride. In the presence of ethylene, however, the hydrogen goes almost entirely to form ethane, as shown by analysis. Ethylene is also slowly taken up by the hydrogenated calcium, a part being at the same time converted to ethane. The absorbed ethylene is not given off at 300° and does not markedly affect the catalytic activity of the preparation. Evidence of solution of hydrogen in calcium hydride was obtained.

Equilibrium in the vapor phase between ethyl alcohol, ether and water: ROBERT N. PEASE and CHI CHAO. YUNG. Previous measurements on the kinetics of the catalytic dehydration of ethyl alcohol to give ether and water in the vapor phase in presence of alumina having indicated an approach to a state of equilibrium at 275° and 300° corresponding to about 65 per cent. (mol) conversion of the alcohol, further measurements have been carried out to fix more precisely the position of equilibrium. The results show that equilibrium corresponds to the conversion of 62.0 per cent. (mol) of alcohol at 275°. Measurements were also carried out at 130°, using concentrated sulphuric acid as catalyst, which gave 86.5 per cent. (mol) as the maximum conversion at that temperature. The above figures correspond to equilibrium constants of 0.665 and 10.27, respectively. The latter in turn give 8,290 cal. as the average heat of reaction, which is to be compared with 6,700 cal. calculated from thermal data.

Heats of fusion of trinitrotoluene, tetryl and picric acid: C. A. TAYLOR, WM. H. RINKENBACH and R. E. HALL. Data obtained in determining the freezing point curves for the binary systems of TNT-Tetryl, TNT-Picric Acid and Tetryl-Picric acid were used in calculating the

heats of fusion of the compounds. The heat of fusion in gram calories per gram of substance obtained were: TNT, 20.73; Picric Acid, 19.46; Tetryl, 20.58.

The specific heats of trinitrotoluene, tetryl, picric acid and their molecular complexes: C. A. TAYLOR and WM. H. RINKENBACH. The specific heats were determined by means of the liquid oxygen calorimeter first described by Dewar. Small masses of the material being tested are dropped into liquid oxygen and the oxygen volatilized by the heat liberated by the mass is measured. The specific heat of lead has been accurately determined, so lead was used as a standard and determinations were made alternately with lead and the compound being tested. Check determinations were made on naphthalene whose specific heat is known. The specific heat of TNT, tetryl, picric acid and their molecular complexes was calculated for 10 degree intervals from 0° C. to their melting points.

Irregularities in the specific heats of liquids: J. W. WILLIAMS and FARRINGTON DANIELS. Temperature-specific curves have been determined for 15 organic liquids. Of this number benzene, ethyl benzene and carbon tetrachloride exhibited irregularities which have been studied further. The irregularities indicate a transition from one molecular species to another. No corresponding irregularities could be found in the vapor pressures or in the densities. It is likely that specific heat measurements offer the best means for determining different molecular species in liquids.

Vapor pressure of liquid ammonia: ALFRED T. LARSON and CHARLES A. BLACK. The ammonia content of the gas phase for the system NH_3 (liquid) — NH_3 (gas — $(3\text{H}_2 + \text{N}_2)$) has been determined for total pressures ranging from 50 to 1,000 atmospheres, and temperatures ranging from +18°C. to —22°C. The deviation of the apparent vapor pressure of ammonia from that calculated for an ideal gas increases with both the temperature and the pressure in this system. No data are at present available which make it possible to predict the extent to which the vapor pressure of ammonia would be increased in this compressed liquid-gas system.

The fugacity of hydrogen and hydrogen ion at pressures to 1,000 atmospheres: D. A. MACINNIS, W. R. HAINSWORTH and H. J. ROWLEY. The measurements of the effect of hydrogen pressure on the electromotive force of the cell:



previously reported to 400 atmospheres, have been carried to 1,000 atmospheres with improved apparatus and increased accuracy. At the highest pressure the fugacity has been found to be over 100 per cent. higher than the corresponding gaseous pressure. Of this difference between fugacity and pressure about three fourths are due to the departure of hydrogen from the perfect gas laws and one fourth is due to a decreased activity of the hydrogen ion, due presumably to the solubility of the hydrogen.

A study of the liquid junction potential between hydrochloric acid and saturated potassium chloride by means of the flowing junction: GEORGE SCATCHARD. A report of measurements of the electromotive force of the

cells: Pt, H^2 | HCl (c), AgCl | Ag and Hg | HgCl, KCl (sat) | "HCl (c), AgCl | Ag ("= flowing junction), with (c) varying between 0.01 M and 1.5 M. The potentials are reproducible to within 0.1 millivolt. The first cell measures the mean activity of hydrogen and chloride ions; the second, the activity of the chloride ion assuming that the liquid junction potential is constant. This assumption is concordant with the MacInnes assumptions of individual ion activities between 0.01 M and 0.1 M, but becomes increasingly discordant with increasing concentrations. In no part of the range is it concordant with the assumption that the activities of the hydrogen and chloride ions are equal.

Grain growth in 99 per cent. lead 1 per cent. antimony alloys: R. S. DEAN and W. F. HUDSON. The relation of time and temperature of annealing and degree of deformation to the grain size 99 per cent. lead-1 per cent. antimony alloy has been studied. From the results some conclusions are drawn concerning the mechanism of grain growth.

Reactions in phosgene solution. III. Reactions with metallic oxides, sulfides and carbonates: ALBERT F. O. GERMANN. It has been shown in previous papers that, while pure phosgene does not react with metals except at high temperatures, when it is largely dissociated into chlorine, liquid phosgene containing dissolved aluminum chloride reacts readily with certain metals, the rate of the reaction depending in part on the solubility in phosgene of the chlor-aluminate formed, and in part on the thermal effect. Chauvenet and others have shown that metallic sulfides and oxides will react with phosgene vapor at high temperatures; Nuricsan showed that cadmium sulfide will react with phosgene above 270° C. Liquid phosgene at 20° C. reacts extremely slowly with cadmium sulfide. Phosgene containing dissolved aluminum chloride reacts rapidly with cadmium sulfide, yielding carbon oxy-sulfide and a slightly soluble cadmium compound, the composition of which has not yet been determined. Magnesium oxide and carbonate react rapidly with liquid phosgene containing dissolved aluminum chloride, yielding carbon dioxide in each case, and calcium and magnesium chloraluminate, respectively.

Further studies on the luminescence of Grignard compounds: W. V. EVANS and EDW. DIEPENHORST. In order to investigate the intensity and wave length of the light given out when aromatic Grignard compounds are oxidized we have made a great many of these compounds in fourteen different solvents. We have discovered that all the aromatic Grignard compounds we have been able to produce give this luminescence on oxidation, provided the magnesium is attached to a carbon in the benzene ring. The intensity of the luminescence when the same compound is produced in different solvents depends on the physical properties of the solvent. We have also investigated: (1) The effect of another group in the ring on this luminescence. (2) The effect of the position of this group or groups on the luminescence. (3) The occurrence of this phenomenon among the derivatives of anthracene and naphthalene. At present we are engaged in attempting to secure spectrographs of this light.

The luminous efficiency of the glow of phosphorus: ELLIOT Q. ADAMS. The efficiency of light production by chemical reactions proceeding at ordinary temperatures appears not to have been measured hitherto. Such a measurement in the case of phosphorus was made by saturating a stream of specially purified (atmospheric) nitrogen with phosphorus by bubbling through saturated solutions of phosphorus in refined cottonseed oil, with finely divided phosphorus in suspension, and allowing the saturated gas to escape into the air. The intensity of the "flame" was matched by illuminating an annulus of filter paper with a flashlight bulb, sliding on a vertical rod. Approximate color match was secured by a suitable green light filter. The data of Centnerszwer on the vapor pressure of phosphorus, together with the heat of combustion of phosphorus and the rate of flow of nitrogen, gave the energy input. The rate of light production to energy input was found to be slightly less than one lumen per kilowatt, and not to differ materially at 25° and at 40°. The work is being continued and extended to other photogenic reactions.

The use of subscript and superscript exponents in mathematics and in chemistry: ELLIOT Q. ADAMS. Subscripts and superscripts are used in logic, in algebra and in higher mathematics in a manner consistent enough to permit the generalization that subscripts are used to designate the various members of a series or group of related symbols, while superscripts denote the same operation as would be represented by the repetition of the symbol to which the exponent belongs, a number of times indicated by the exponent. It would conduce to clearness of thought and ease of expression to preserve this distinction in the notations of arithmetic and of chemistry. In arithmetic the value of a given digit depends on its position relative to units place, the possible values of the digit forming an infinite geometric series of numbers, the ratio between successive terms being ten. To designate a particular value of a digit, the principle stated above calls for a subscript indicative of its position in that series. The logical starting point is units place, *e. g.* $3^0 = 3$, $6^3 = 6000$, $c = 2_{10}9986$, $h = 6_{-27}554$. In chemical symbols the suggested use of sub- and superscripts would give: $H^2O = HHO$, and would make Li_6 and Li_7 represent two different atomic species of the element lithium, the subscripts being in this case the atomic weights of the two known isotopes of lithium.

Note on the efficiency of photosynthesis by Chlorella: ELLIOT Q. ADAMS. The efficiency of photosynthesis by *Chlorella* has been found by O. Warburg and E. Negelein from 33.8 per cent. with blue light to 59 per cent. with red; in one experiment 63.5 per cent. calculated from the heat of formation of glucose 674 Kal/mol. The heat of the reaction: $CO_2 \times 3H_2O = 2H_2O_2 + HCHO$ (aqueous sol.) is -171 Kal/mol. The energy of two mol quanta each at 0.666 and 0.640 μ (absorption max. for a- and b-chlorophyll) is 175 Kal. Since 6 mols HCHO are required to form 1 mol glucose, the max. efficiency to be expected is $674 / (6 \times 175) = 64.2$ per cent.

A spectrophotometric study of colored halite: T. E. PHIPPS and WALLACE R. BRODE. Stassfurt blue halite and

halite colored artificially with sodium or potassium vapor were studied by means of a spectrophotometer and an auxiliary electric furnace, over wide ranges of temperature. The Stassfurt blue halite showed a slight absorption in the green and a deep absorption in the red. The latter band shifted with rising temperature towards the yellow, until, in the neighborhood of 589μ (temperature 250°C), the color faded completely. The artificially colored halite showed a sharp absorption band at 589μ (purple colored crystal), or near 556μ (pink colored crystal). The color in all cases varied widely with different heat treatments of the crystal, but faded to a light yellow color in the temperature range $600\text{--}650^{\circ}\text{C}$.

Studies in photographic sensitivity. V. Action of arsenites and oxidizing agents on sensitivity: E. P. WIGHTMAN, A. P. H. TRIVELLI and S. E. SHEPPARD. Experiments with solutions of arsenites containing various quantities of soda were made to test Clark's theory of the action of such solution on the photographic plate. The results of these experiments are somewhat in disagreement with his and certain of his conclusions appear incorrect. He states that there is no interaction between monosodium arsenite and silver bromide. We have obtained strong evidence that there is some action. At least the bromide is slightly soluble in the arsenite solution, and on addition of developers, silver can be precipitated from the solution. With the higher sodium arsenites solutions saturated with silver bromide, a spontaneous decomposition occurs with deposition of silver. Our experiments indicate that the action of arsenite in producing developability is partly to dissolve the silver bromide grains; the silver arsenite, complex in the solution or adsorbed then decomposed depositing silver, probably on the preexistent sensitive nuclei. The reason for reversal with excessive treatment may be due simply to increasing amounts of sodium bromide being formed and adsorbed to the sensitive spots, thus lessening developability.

Adsorption of iodine by phosphorus and charcoal: JOHN KRANTS and NEIL E. GORDON. The adsorption of iodine by phosphorus from various organic liquids was determined for different concentrations of the iodine and at different temperatures. Both the concentration and the temperature had marked effects on the adsorption of the iodine. Results were compared with other investigators where charcoal was used in place of phosphorus. The results were figured out molecularly and it was found that where no chemical action took place between the solvent and iodine the adsorption was the greatest from the liquid in which the iodine was the least soluble.

The adsorption of mercuric sulfide by chromium hydroxide: HARRY N. HOLMES and M. A. DIETRICH. In the hydrogen sulfide group HgS will not be precipitated if the ratio of chromium to mercury is too high. When mercury is in excess the chromium may be dragged down with the HgS . This mutual adsorption explains a peculiar difficulty with the $\text{NaOH}\text{--}\text{Na}_2\text{S}$ reagent. When the sulfides of Group II are heated with this reagent chromium sometimes appears as chromium hydroxide peptized by the alkali. The test for mercury

often fails due to the fact that this colloidal chromium hydroxide adsorbs the mercuric sulfide and carries it into suspension. This trouble does not occur with fresh solutions of chromium salts. Nor will it occur if an old solution is boiled with considerable HCl . This indicates the slow hydrolysis of chromium salt solutions. There is never any difficulty with solutions of chromium sulfate and curiously enough, this solution yields practically no colloidal chromium hydroxide on hot dialysis. The complex ion effect enters here.

Adsorption of precipitates VII. The coagulation of sols by electrolytes in the presence of non-electrolytes: HARRY B. WEISER and CHARLOTTE M. SCHALER. The influence of non-electrolytes on the critical coagulation concentration of electrolytes is determined by the effect of adsorption of the non-electrolyte in question (1) on the adsorption of the ions present in the sol and (2) on the adsorption of the precipitating and stabilizing ions of the electrolyte added to effect precipitation. Depending on the conditions, therefore, the precipitation value of an electrolyte may be raised, lowered or remain unchanged in the presence of a non-electrolyte. The conclusions have been reached from a study of adsorption during the precipitation of both positive and negative sols.

The use of motion pictures in the study of Brownian movement and protective action of hydrophilic colloids: WESLEY G. FRANCE. Preliminary report. Suspensions of basic lead carbonate electrolytically precipitated in the presence of gelatin and containing particles varying in size from 0.2 to 2.0 microns, diameter, were microphotographed at a magnification of 1,000 to 1,500 diameters with a motion picture camera. The negatives thus obtained were then projected on a calibrated screen such that a total magnification of from 50,000 to 200,000 diameters was attained. Measurements of the magnitudes of the Brownian movements of the various sized particles were then made and compared with those of similar sized particles prepared in the absence of any protecting colloid. Some microphotographs were also made of the Brownian movements in gold sols observed with the ultra-microscope.

A simple kinetic principle underlying colloid phenomena: JEROME ALEXANDER. Specific surface is compared with kinetic motion, a catch-all factor. In the colloidal zone these balance; on approaching true solution kinetic motion becomes excessive; in coarser subdivisions both decrease. Therefore, with increasing dispersion colloidal characteristics rise to a maximum and then fall off. This accounts for zone of maximum colloidalilty.

Colloidal suspensions in phosphorus: CLAUDE HAINES HALL, JR. The author has continued his previous work on colloidal suspensions in phosphorus (black phosphorus) by means of a modified apparatus and has prepared suspensions of various degrees of density of mercury, lead and other metals. Many properties of these suspensions are described. Thénard's work has been repeated and confirmed as well as the conclusions of the previous paper.

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(To be continued)