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Nature Study, the elementary form of Science, is best suited to the immature mind of the child of first, second, and third grade level because:

1. It links the child’s interest with his background.
2. It opens the door to the enchanted book of nature and gives him an insight into the wonders of the world about him.
3. It furnishes unlimited opportunities for delightful experiences and recreation.
4. It lays a groundwork for the future study of science.

Areas of pupil interest which are used as a framework are:

1. Animals; including birds and bees.
2. Weather; sun, wind and rain.
3. Plants; including seeds.

As we progress with our study we encounter many interesting exceptions, or oddities, as we call them. There are numerous misconceptions about nature which, if the work is carefully done, will be replaced by intellectual honesty and accuracy of observation.


This problem, which is an amplification of the work of Coghill, reveals that embryos of Rana pipiens, Bufo americanus and Pseudacris nigrita triseriata show a sequence of developing behavior patterns for the oral region similar to that found by Coghill in Ambystoma. However, Coghill also demonstrated that Ambystoma, a carnivorous feeder, showed a feeding or snapping reaction. Rana, Bufo and Pseudacris, herbivorous or omnivorous feeders as larvae, do not show this sort of response until after metamorphosis.

In all forms included in this study, the onset of a local mouth response to tactile stimulation occurs in stage 23*. It is at this stage that cross sections of Rana reveal the presence of fibrillae in the myoblasts of the buccal region.

Bufo, in most cases, initiates regular respiratory movements in late stage 23. In Rana, ventilatory rhythm is first evidenced in early stage 24 embryos, while the onset of regular breathing movements is delayed in Pseudacris embryos until late stage 25. Therefore, spontaneous mouth movements occur at a later developmental stage than do mouth movements in response to tactile stimulation.

*Staging follows that propounded by Shumway, Anatomical Record 78: 139–148.
On the Growth Requirements of Streptobacillus Moniliformis. M. Dumoff and C. E. Duffy, Medical School, University of Arkansas, Little Rock.

Cultivation of *Streptobacillus moniliformis* on a liquid, but not a solid, medium composed of proteose peptone, salts and starch, as reported by Heilman in 1941, was confirmed. Heilman reported the failure of dextrose, maltose and dextrin to replace the starch in the above medium. In this laboratory the dextrin containing medium appeared to support minimal growth of the organism. It has been established that glycogen is equally as active as starch. Repeated attempts to cultivate the organism on tryptose phosphate broth plus ether extract of fresh cream were unsuccessful, in contrast to Heilman's findings. An ether extract of bovine serum also failed to support growth when added to the same basal medium. The ether insoluble fraction of the serum supported growth as well as whole serum. The addition of lecithin or bovine serum albumin (Cohn's Fraction V) to tryptose phosphate broth in lieu of whole bovine serum results in a medium which supports fair growth of *Streptobacillus moniliformis*. The medium used for the assay of preroylglutamic acid failed to support growth even upon the addition of serum. Growth did occur following the addition of proteose peptone and serum. (The work reported herewith was supported by a grant, from the National Institutes of Health, United States Public Health Service.)

New Genera and Species of Oniscoid Millipedes (Desmonidae; Polydesmoidea) Nell B. Causey, Fayetteville.

A key is given to the known Desmonidae and the following are described: *Desmonus tennesseensis*, gen. et sp. nov.; *Papillomonus louisianensis*, gen. et sp. nov.; *Bolimonus puicus* (Boll.) gen. nov.; *Desmonaria arka* and *D. sequoya*, gen. et sp. nov.; *Calomonos magnoliensis*, gen. et sp. nov.


Soil samples taken from selected experimental plots have been plated at weekly or biweekly intervals for a three year period. Variations in the number of the various types of soil microorganisms (molds, bacteria, actinomycetes, yeasts) have been studied in relation to the fluctuation of environmental factors during that time. Particular attention has been directed toward some of their more significant activities. Regular nitrogen determinations (Kjeldahl method) have been made. Limited taxonomic studies are included.


An application of the chi-square test for linkage as devised by Penrose (1935) between genes responsible for variation in head width and sex shows that these genes may be located on the homologous portions of the X- and Y- chromosomes. However, an application of the $\phi^2$ test for linkage as described by Kloepfer (1946) does not support this conclusion. The $\phi^2$ test is a variation of the $\phi$ test devised by Penrose (1938). Also, no evidence by either of these two tests was found to indicate that genes causing variations in head length or cephalic index are located on this portion of the sex-chromosomes.

Measurements for head width and head length were taken on 152 sibs in 25 families. The measurements were adjusted for age and sex differences before applying the tests for linkage. In all probability, the results of further studies will show random assortment between sex and head width, even though the one test in the present study suggests the possibility of incomplete sex linkage.
ABSTRACTS

Further study should either confirm this possible gene location or place it elsewhere. Other traits known to be incompletely sex-linked are total color blindness, Xerodermia Pigmentosa, Ogouï’s Disease, Spastic Paraplegia (Haldane, 1941), Recessive Epidermolysis Bullosa, Retinitis Pigmentosa (Burks, 1937), and Hemorrhagio Diathesis (Snyder and Palmer, 1943).

LITERATURE CITED


CHEMISTRY SECTION

Chairman: P. G. Horton,
Henderson State Teachers College

C-1-11


The calorimeter is of the isothermal air-stream type, constructed of Pyrex glass, containing a built-in, mercury-filled, glass spiral heating coil; a brass, mercury-sealed thermometer well; a sealed-in, submerged air inlet tube; and a sealed-in, baffled air outlet tube. A Beckman thermometer is immersed in the mercury-filled well to observe constancy of temperature. The calorimeter proper is enclosed in a liner Dewar flask, which is placed in a copper submarine, the whole being immersed in a large thermostat. Pure, dry air is bubbled through the liquid under study, passing the vapor-laden air out the baffled outlet tube, through a heated conveyor tube to a tared spiral condensor immersed in a suitable freezing mixture. The last traces of vapor are removed in a chemical trap. The heat of vaporization is offset by an electric current through the heating coil, potentiometrically measured across a standard resistor in series with the heater.

The apparatus has been calibrated with distilled water, and is accurate to 0.5 per cent. Studies of the heat of vaporization of dioxane-water solutions as a function of the dielectric constant are being made.

C-2-12

Paper from Lespedeza Sericea. Maurice E. Barker, Department of Chemical Engineering, University of Arkansas, Fayetteville.

It has been determined by a group of chemical engineering students at the University of Arkansas that excellent paper pulp can be made from *Lespedeza sericea* stalks by a modified sulfate cooking process and that such pulp can be converted to paper by standard paper making equipment and processes.
Lespedeza sericea is a perennial legume that may be grown from Virginia west to Kansas through the south central tier of states. The plant grows well on poor land that is marginal or sub-marginal for other crops. After the second year the plants grow to a height of nearly six feet and the ground is so densely covered that it takes hard labor for a man to force his way through the growth. The plants grow annually from the roots and from seed that fall to the ground so that the growth improves year after year for at least fifteen years.

One acre of relatively poor ground will produce from two and a half to three tons of stalks suitable for paper making per year and about five hundred pounds of seed per acre can be harvested. In addition the leaves and small stems fall to the ground and improve it while the roots add more and more nitrogen to the soil so that after five years of sericea the yield of both corn and cotton is increased nearly five times the pre-sericea yields.

The economics of the growth of sericea as a combined source of paper and as a means of soil improvement promises the development of a major new industry over a considerable area of the United States.

C-3-13

The Effect of Brewer's Yeast and of Riboflavin on the Growth Suppression Brought About by a High Level of Glycine and Choline in Rats. Barbara Kelley and Martha Norhtrup, Department of Biochemistry, School of Medicine, Little Rock.

It has been previously reported by Keith et al. that glycine fed at a level of 10 per cent to weanling rats brings about a growth suppression which is partially but not completely overcome by PGA (pyruoylglutamic acid). We have also found that rats receiving a 10 per cent glycine diet have an elevated neutral liver fat, which elevation is prevented by the addition of PGA to the diet. It was thought that the depressed growth and increased liver fat might be due to a choline deficiency if choline were being used to detoxify the glycine. Experiments were carried out in which weanling rats were fed a diet containing 2 per cent choline and 10 per cent glycine. This diet was found to completely suppress the growth of the animals. PGA alone or in combination with \( B_4 \) would not overcome this suppression. The addition to the diet of brewer’s yeast at a level of 2 per cent almost completely overcame this growth suppression. Since choline oxidase is known to be a flavin-containing enzyme, riboflavin was also tried and it was found that the riboflavin was also capable of partially overcoming this growth suppression. It would thus seem that additional choline will not aid in the detoxication of high levels of glycine in the rat and that in fact this combination is very toxic. Riboflavin, a component of the choline oxidase enzyme system, will overcome the toxicity induced by the added choline.

*This work was supported by grants from the National Institutes of Health, United States Public Health Service.

C-4-14

Chemical Effects of Nuclear Transformations. R. R. Edwards and R. F. Overman, Nucleonics Department, Institute of Science & Technology, University of Arkansas, Fayetteville.

The reaction \( N^1^4 \ (n, p) C^1^4 \) has been studied on a sample of pyridine irradiated for thirty days in the Oak Ridge reactor. It is known that a large amount of energy (about 0.61 Mev) is involved in this transformation. The amount of energy given to the recoil nucleus (41 keV or 9.5 \( \times 10^4 \) kcal/mole) is far greater than the amount of energy required to rupture the chemical bonds in the pyridine ring (about 85 kcal/mole).

A quantitative study was made of the efficiency of exchange of recoil \( C^1^4 \) atoms with \( C^1^2 \) atoms in pyridine rings. The counting method and counting errors involved are given. The chemical purification steps are outlined. A critique of what constitutes “purity” is offered.
C-5-15
The Effects of X-Irradiation on Chicken Bone Marrow Enzymes. James S. Dinning, I. Meschan, and Paul L. Day, Departments of Biochemistry and Radiology, School of Medicine, University of Arkansas, Little Rock.

Adult hens were exposed to one whole body irradiation of 300 r given in 32 minutes. Hens were killed after intervals of 1, 2, 4, 8, and 17 days following the treatment. A leucopenia was observed as early as 20 hours after the exposure to the X-rays. Bone marrow preparations were obtained by the method previously described (Dinning, J. S., Keith, C. K., Davis, P., and Day, P. L., Arch. Biochem., 1950, in press). Endogenous oxygen consumption, choline oxidase, and succinic oxidase were determined on the marrow cell suspensions. The values are given as microliters of oxygen consumed per mg. of nitrogen per hour. The average values and range for the five control birds were: endogenous oxygen consumption, 16.51 (7.19-27.43); choline oxidase, 3.68 (2.99-4.48); succinic oxidase, 9.65 (5.61-13.69). The average values and range for the five X-rayed chickens were: endogenous, 8.50 (6.36-11.18); choline oxidase, 0.51 (0-1.23); succinic oxidase, 0.98 (0-2.63). The X-irradiation reduced the average endogenous oxygen consumption to approximately 50 per cent of the control values. Bone marrow choline oxidase and succinic oxidase were almost completely inhibited by the X-ray treatment.

*Supported by a grant from the National Institutes of Health, United States Public Health Service.

C-6-16

It is well known that the properties of functional groups in organic compounds may be affected by the presence of other groups in the same molecule. The principle of vinylology is concerned with the transmission of these effects through ethylenic linkages.

The present work involves a study of the validity of this principle in connection with physiological properties. The property chosen was sweetness, since the tests would be relatively easy to carry out. The substances used for this purpose were vinyllogs of dulcin and related sweet compounds.

In order to carry out the investigation several new compounds have been synthesized, the preparation and properties of which are described. To date, the study indicates that the principle of vinylology as applied to these compounds is valid in some cases but not in others.

C-7-17

Electrical porcelain, in many cases, requires a higher fired strength than the usual type of ceramic product in order that it might withstand high mechanical stresses during use. The transformation of the clay into compound mullite with liberation of silica is one of the main factors in introducing strength to fired compositions. Other investigators have added alumina to combine with this liberated silica to form more mullite. The composition of the glassy bond undoubtedly has a great effect on the fired strength. Tests were made on a special electrical porcelain mix with additions of alumina and alumina tri-hydrate to determine their separate effect on fired strength. Both of these materials increased the fired strength, but the tri-hydrate was much more effective. X-ray data showed that no crystalline mullite was apparent in the experimental mix, but the fact that the tri-hydrate entered into the glass to give it a composition more nearly that of mullite probably influenced the higher fired strength obtained.
ARKANSAS ACADEMY OF SCIENCE

C-8-18

The Methylation of Guanidoacetic Acid by the Rat. Edward M. Popp, James S. Dinning, and Paul L. Day, Department of Biochemistry, School of Medicine, University of Arkansas, Little Rock.

Sprague-Dawley rats weighing from 150 to 200 grams were fed a purified diet containing 18 per cent casein and the usual vitamins given the rat. Preliminary experiments were carried out to determine the excretion of creatine and creatinine by rats of this size.

The diet was then modified by addition of 0.585 per cent guanidoacetic acid to the basal diet. The increased creatine excretion observed under these conditions was attributed to methylation of the guanidoacetic acid with the consequent production of creatine. The extra creatine was computed as per cent of the theoretical amount which could have been produced if all the added dietary guanidoacetic acid had been methylated. It was found that under these conditions the extra creatine excreted was 16.5 per cent of the theoretical quantity. In other experiments rats were fed the diet containing 0.585 per cent guanidoacetic acid plus 0.70 per cent guanidoacetic acid plus 0.70 per cent choline chloride to act as a source of methyl groups for methylation of the guanidoacetic acid. Under these conditions the excretion of extra creatine was 28.2 per cent of the theoretical quantity. Data will be presented showing the effects of folic acid and vitamin B₁₂ on the methylation of guanidoacetic acid by the rat.

*Supported by a grant from the National Institutes of Health, United States Health Service, and a contract between the Atomic Energy Commission and the University of Arkansas Institute of Sci. and Technology.

C-9-19

Spectrophotometric Determination of Empirical Formulae. Aubrey E. Harvey and Delmer L. Manning, University of Arkansas, Fayetteville.

A new spectrophotometric method has been developed for determining the empirical formulae of colored complexes in solution. This method applied to four complexes of varying stability gave results in agreement with those established by older methods. Advantages and limitations of the method are discussed. The dissociation constants of the complexes studied were determined by a new technique.

GEOLOGY SECTION

Chairman: H. B. Foxhall,
Director of Division of Geology
Arkansas Resources and Development Commission

G-1-20

The Relationship Between the Coefficients of Permeability and Storage and the Age of Rocks in the Arkansas Coastal Plain. Harlan B. Counts, U. S. G. S., Ground Water Div., Little Rock.

An aquifer is defined as a formation, group of formations, or part of a formation that is water bearing, or yields water readily to wells.

To determine certain hydrologic properties of an aquifer, data must be acquired from pumping tests, which are water level observations at and in the vicinity of pumping wells. From these observations the coefficients of permeability and storage are determined. Several such pumping tests have been run in the Coastal Plain area of Arkansas and included aquifers ranging in age from Cretaceous to Recent. The coefficients of permeability and storage from these tests were tabulated and are seen to vary as to age and depth of the formation. In general it was found that the older the formation the lower the coefficient of permeability and
storage. It was noted that the coefficient of storage is less at greater depths in the same formation. This is probably due to greater compaction by overlying materials.

G-2-21


The Sparta formation is the chief deep artesian aquifer in the southern and southeastern part of the coastal plain of Arkansas.

The Sparta formation is of Eocene age and is a member of the Claiborne group. This group is made up of the Cane River, Sparta, Cook Mt., and Cockfield formations respectively from bottom to top. The Claiborne group is composed of two depositional onlap-offlap cycles. The lowermost cycle included the Marine Cane River and the Nonmarine Sparta formations. The upper cycle includes the Marine Cook Mt. and the Nonmarine Cockfield formations.

The Sparta formations appear to be made up of two separate units, a lower sand unit and an upper silt, clay and lignite unit. The lower sand unit is made up of thick lenticular sand bodies, showing very good sorting. The upper unit is mainly floodplain and deltaic silt, sand, clay and lignite.

The distribution of the two units seems to suggest that the bulk of the Sparta was deposited in eastern Union County and Ashley County. This would be the delta area. There is a suggestion of estuarine or marine conditions existing in the Arkansas syncline during Sparta time.

The Sparta sands produce water of very good quality where they are tapped, but due to the lenticularity of the sands and the variation in grain size within each lenticular unit it is not always possible to develop high capacity wells.

G-3-22

Tripoli of Northwest Arkansas. Denny P. Schafer, Seismograph Service Corp., Tulsa, Oklahoma.

For many years the word Tripoli has been used to mean nearly any mineral that is white, rose or cream in color, friable, minute grain size and 90 to 99.8 per cent silica; thus, gathering within its bounds a number of siliceous substances. The Tripoli of Northwest Arkansas has been classified by producers as "amorphous silica" or as "cryptocrystalline Tripoli" for the purpose of placing their Tripoli on the market as "crystalline." This segregation has satisfied the market and of course the producer.

Northwest Arkansas holds Tripoli deposits equal in magnitude to any other locality. The siliceous material in Benton County is snow white, friable and very fine grained. X-ray spectra analysis shows without a doubt that the material is crystalline.

Chertification is absent within the body of the flat beds of Tripoli of the major deposits near the center of Benton County, but a noted presence of cherts and line inclusions are found at locations in the northeasterly, northwesterly and southeasterly directions near the extremities of the county. Oval shaped masses of line are found buried in the material of the major deposits. These masses are at obtuse points and sparse in number throughout the Oak Ridge Silica mine and the abandoned Corona Silica mine near the town of Rogers.

Northwest Arkansas Tripoli is found near the mid-section of the Boone formation of lower Mississippian.

G-4-23

Stratigraphy of the Eastern Part of the Philpot Coal Field. Edward W. McRae, University of Arkansas, Fayetteville.

The Philpot coal field contains the northern-most section of important coal-producing formations in Arkansas. It lies in the Philpot syncline, just a few miles
south of the Boston Mountains. The effect of the field's position on the extreme northern edge of the Arkansas Valley has been to think all of the post-Atoka formations down to approximately one-half the thickness present in the Charleston and Paris fields.

This series of rocks (the Atoka, Hartshorne, McAlester, and Savanna formations) are Pennsylvanian in age and consist of sandstone beds alternating with thicker beds of shale. Some of the shale beds also contain coal and underclay.

In general, the sandstone beds are all very similar and since they vary laterally at a rapid rate in both lithology and thickness they are hard to distinguish in the field.

One of the interesting features in the stratigraphy of this area is the presence of diastems in some of the more persistent sandstones. They probably represent channels in the underlying shale. Where normally the sandstone is medium-bedded and relatively fine-grained, the channel shows an abnormal thickness of large-grained massive or cross-bedded sandstone.

Another feature is a split in the Philpot coal shown by the presence of two seams in most of the area but only one at the east end.

G-5-24
Stratigraphic Relationships and Lithologic Character of the Brentwood Limestone. W. D. Diggs, University of Arkansas, Fayetteville.

The Brentwood Limestone member of the Bloyd formation is lower Pennsylvanian; Pottsville in age.

The Brentwood was originally called the Pentremital Limestone because of the large number of the Blastoids of the Genus Pentremities that were found in it. The member was named by G. L. Adams and E. O. Ulrich in 1904 for the town of Brentwood in Washington County, Arkansas.

The unit consists of several limestones interbedded with shales; with sandy limestones and some thin sandstone beds present. The character of the unit, the variations between different beds within the formation itself, and the variations of the same bed at different locations is as given.

The Brentwood rests conformably upon the basal Bloyd Shale and is overlain in places conformably by the Bloyd Shale. Farther East in the section observed it is overlain with a slight angular unconformity by the Atoka.

The thickness observed in the sections studied, the variations, comparisons, and the correlations are as given.

G-6-25
Para-Ripples in Limestone. V. O. Tansey, University of Arkansas, Fayetteville.

The purpose of this paper is to briefly summarize studies made by Bucher in the United States, Kindle in Canada, and Cornish in England on para-ripples, and then to set down the features of those shown in the Mississippian Boone limestone that indicate their inclusion with those previously described by the above authors.

MATHEMATICS SECTION
Chairman: C. L. Perry,
University of Arkansas

M-1-26

The inhomogeneous wave equations satisfied by the electromagnetic potentials have been the subject of extensive investigations by many mathematicians and
various methods of solution have been developed suitable for different types of boundary conditions. The method of quadruple Fourier integral expansions with respect to the space and time coordinates, which is applicable at least for certain particular boundary conditions and charge and current space-time distributions, does not appear to have been exploited to any extent in the mathematical literature. In some modern theoretical physics investigations related to these equations, use is made of so called relativistic Dirac functions, which implies the employment of quadruple Fourier integrals, but the method is entirely formal (the "Dirac function" is not a function in any possible mathematical sense of the word).

The few results to be presented are derived by fairly elementary means. Further possibilities inherent in the method employed are still under study.

M-2-27

This paper is a brief consideration of some of the values of mathematics other than being the mere tool of the "Sacred Cow of Science" as was charged recently by Anthony Standen in Science is a Sacred Cow, (widely publicized by reviews in Time and the Saturday Review). The influence of mathematics in the artistic and esthetic development of the individual, the wealth of mathematical heritage in the growth of race culture, the value of experience in unprejudiced logical thinking and the use of the theory of limits in setting and approaching goals in other fields are offered. Special emphasis is given to the application of mathematical expectancy in the evaluation of seemingly contradictory ideas.

M-4-29
The Evaluation of the Rate Constants of a Chemical Reaction. Clifton Bob Clark, University of Arkansas, Fayetteville.

The mathematical description of a chemical reaction is given by the equation:

\[
\frac{2n - (x + y)}{a} - 2e^{-k_1t} + \frac{k_1}{k_2 - k_1}(e^{-k_2t} - e^{-k_1t}) = 0^*
\]

The parameters \(k_1\) and \(k_2\) are to be evaluated statistically from this equation and the quantities \(x, y, a, \) and \(t\), which are experimentally measurable. Several functions of \(k_1\) and \(k_2\) are formed from the experimental data. Using simultaneous pairs of these functions and Newton's successive approximations method extended to functions of two variables, several values of \(k_1\) and \(k_2\) are determined. From these, best values may be obtained.

*Amis, Kinetics of Chemical Change, Macmillan Company.

M-5-30
On the Elliptic Plate with a Hole. C. L. Perry, University of Arkansas, Fayetteville.

The deflection of a thin elliptic plate with a specially oriented hole is considered. The deflection is due to a load which is normal to the surface and to the conditions imposed on the edges of the plate. The edges are either clamped, simply-supported, or free. Some solutions to the linear plate equation describing the deflection are presented. These consist of series solutions of Mathieu functions or of hyperbolic and trigonometric functions. Finally the methods used for the solution of the linear equation are modified in such a way as to afford solutions of the non-linear plate equations (von Karman equations).
ARKANSAS ACADEMY OF SCIENCE

PHYSICS SECTION

Chairman: L. B. Ham,
University of Arkansas

P-1-31
The Learning Process in the Physics Laboratory. L. B. Ham, University of Arkansas, Fayetteville.

In reviewing efforts at improvement of teaching methods for faster ways of learning, many college instructors in physics believe that the laboratory approach to learning needs the most attention at present. A recent questionnaire circulated among some of our students indicates that experiments having the most educational value, utilize at the same time the senses of both sight and sound. Attractive surroundings, system, and good working equipment are important for good morale.

The Kundt's tube experiment received a high rating on the questionnaire. The "dust" heaps equally spaced are visualized at the same time that a frequency of constant pitch is heard by the ear. Other experiments receiving high rating are the resonance tube, Young's modulus and gravitational acceleration.

From an educational point of view, the principles of physics become more real, more easily remembered and more clearly understood from an operational viewpoint. The experiences gained bring one to a quicker and better understanding of the practical importance of the principles studied, and contribute in definite understandable patterns to certain mental habits important in a scientific age.

P-3-33

Magnesium hydroxide takes up water normally in small amounts until a high value of relative humidity is reached. Then there is an unaccountable increase in the amount of water taken up by the material*. X-ray diffraction techniques have been used to determine the possible origin of this anomalous water absorption. Both back reflection and transmission powder patterns photographs have been taken. The data collected from these films indicate that a distortion takes place in the Mg (OH) crystal lattice. This distortion and the large amount of water taken up may be due to an insertion of water molecules into the crystal lattice.

* E. S. Turner, Master's Thesis, University of Arkansas.

P-5-35

Magnetized iron has been used by a number of investigators in studies involving the deflection of cosmic ray particles.

A preliminary report will be made of experimentation which has been initiated in the University of Arkansas Physics Department to determine suitable arrangements for the deflection of penetrating cosmic ray particles in magnetized iron. This should be useful in the investigation of the spectral distribution of energy for both positive and negative cosmic ray particles.

P-6-36
Intensity Determinations of Magnetic Fields by Photoelectric Means. Z. V. Harvalik, University of Arkansas, Fayetteville.

A constant electric current is produced in a conventional circuit using commercial alkali-type photocells when they are exposed to a light source of constant intensity. Magnetic fields applied to the photocells change the current intensity
in the circuit because of deflection of the electron beam emitted from the photosensitive alkali surface. The variation of current intensity is used to determine the intensity of the applied magnetic field.

\textbf{P-7-37}


A simplified description of the gas multiplication process will be given.

Recent advances in electronics have extended measurements to below 1 kev. This is made possible by the introduction of the unknown into the counting volume in the gas phase; thus removing necessity for a window and eliminating self absorption corrections. At the present time, no other method is applicable for this low energy.

The experimental setup at the Nucleonics Department (University of Arkansas) will be described. The preliminary work is in its final stages. Results of a qualitative check of equipment by determination of the Cl\textsuperscript{14} spectrum will be presented.

\textbf{P-8-38}


X-ray diffraction patterns of the pararosaniline hydrochloride-palladous chloride complex* have been made using both a Debye-Scherrer Powder Camera and a rotating crystal camera with monochromatic x-rays.

A method was found whereby the bare material could be mounted in the camera so that the pattern obtained did not have to be corrected in any way for the scattering from a sample holder. The resulting patterns are of the type characteristic of amorphous materials.

From the position of the intense maximum of scattering, an important inter-atomic or inter-molecular distance of about 14 Angstroms is obtained from the Keesom-Ehrenfest equation.

These results may point to a molecular weight of around 1,200, but further work is being carried out in this connection.

*P. W. West and E. S. Amis, Industrial and Engineering Chemistry, 18, 400, June 15, 1946.

\textbf{SOCIAL RESEARCH SECTION}

\textbf{Chairman:} F. Adler, University of Arkansas

\textbf{S-4-42}


With reference to (1) the United States Public Health Service Center at Hot Springs, Arkansas, as a place for treatment of syphilis, (2) the general idea of having blood tests for possible syphilitic infection, (3) clinical treatment versus treatment by a private physician, (4) the willingness or unwillingness to pay for treatment, and (5) advice to others about syphilitic infection, the attitudes of the patients at the center are favorable to "free," clinical treatment. However, this investigation raises more questions than it answers.
Ethics Cannot be Based on Emotions. Maximilian Beck, Central College, North Little Rock (presented by Dr. Ann Beck).

I. Moral responsibility implies equal chance for every moral person.
   a. Emotions depend upon causes beyond man's free control.
   b. Moral will and charity are not emotions but free acts of Reason or Spirit. Kant's fight against the assumption of natural virtues rooted in emotions is justified.

II. The aim of moral behavior cannot be emotional either.
   a. All the eudaimonistic theories fail because well-being or "happiness" defined as satisfaction of natural desires does not depend upon man's free will and effort; again Kant's restriction of morality to the good will or intention (Gesinnung), apart from any success, is correct.
   b. And the eudaimonistic theories fail also because the emotion of natural happiness, whether one's own or of the greatest number, is the ideal of the philistine. The ideal of the moral person is doing his duty—even if it hurts.

HISTORY (BIOGRAPHY, GENEALOGY, METHODS OF RESEARCH SECTIONS)

Chairman: John P. Anderson,
Hendrix College, Conway

The German Social Democracy's View of the Revolutionary General Strike as a Proletarian Weapon Against War. Richard J. Hostetter, University of Arkansas, Fayetteville.

The general strike of a nation's working class as an effective Socialist weapon against war was one of the most controversial concepts in the pacifist discussions of the Second Socialist International. The original impulse in favor of adopting such an anti-war measure came from the revolutionary syndicalists, chiefly in France and Italy. However, to the extent that the various European Socialist parties of the Second International were committed to the policy of an evolutionary, i.e., legal, approach to power during the decade before 1914, the use of such a revolutionary and extra-legal technique was rejected.

Of the national sections of the Second International, the German Social Democratic Party (Sozialdemokratische Partei Deutschlands) stood most consistently against a general strike commitment in case of war, and since the SPD retained its hegemony in the Second International up to the outbreak of war, European Socialism ignored completely the general strike as a possible means of preventing the conflict. By no means is this the complete explanation of the Socialist parties' support of their respective governments in 1914, for it would ignore the nationalist propulsions acquired concurrently with the vital decision to accept the Revisionist (i.e., anti-revolutionary) interpretation of Marx's prescription for the attainment of governmental power through class struggle. To the extent, however, that the rejection of the general strike formula weakened the position of international Socialism vis-a-vis war, the German Social Democracy, as the dominant party of the international organization, was responsible for the astounding alacrity with which European Socialism supported the bourgeois governments in 1914. This paper is an attempt to clarify the position of the SPD with regard to the general strike as an anti-war weapon during the decade prior to World War I.
H-4-52

Alexander Turrentine and His Descendants. G. R. Turrentine, Arkansas Polytechnic College, Russellville.

My name is an unusual one. All the Turrentines I ever heard about as a child were my near relatives. I heard family traditions in my childhood; but never gave them much thought. They were stories of pioneering, hunting, fishing, war, bushwhackers and refugeeing. When my father died in 1927, I returned his body to the old home community for burial. Many of the older relatives whom I had not seen for several years attended the funeral. Visiting with them, I heard many of these stories again. I realized that these were oral traditions and that unless someone put them into writing they would be lost when all the older generation had died.

After returning home from the funeral, I wrote to a cousin who was older than I and asked him to put into writing all that he knew of the family. In due time I received his response. I also learned that an uncle of mine had some correspondence with a Turrentine in North Carolina and that these letters were in possession of his daughter in Little Rock. I found an opportunity to read these letters and I wrote to the author, Dr. S. B. Turrentine, president of a college in North Carolina. He gave me more information and I was launched on a new hobby—the genealogy of the Turrentines.

I learned to secure data from county records, census records, relatives, libraries, archives, foreign university matriculations, and European baptismal records.

Data must be organized to be of value. After trying several systems of charts, outlines and "family trees," I found the Lincoln System most satisfactory. It is flexible and permits unlimited additions and insertions without the necessity of changing the index of any existing name in the outline. It is cumbersome for the general reader but I find it unexcelled for a work outline.

H-5-53


Charlotte Stephens, 96, of Little Rock, daughter of one of Chester A. Ashley's slaves, is an intelligent living link between slave days and the present. Cultured, fair-minded, and with a zeal for school teaching, she taught for seventy years in Little Rock before retiring in 1939. At nine, she took part in the first celebration of Emancipation day by her race, January 1, 1864. She observed the influx of freedmen into Little Rock after its capture, and relates events of those early days. Becoming at sixteen the first Negro ever employed by the Little Rock School Board as teacher, she soon went up to Oberlin College, making her first trip via Memphis before the railroad was completed between Little Rock and Memphis. At Oberlin a new world opened up for her. She made A in Latin to Max Eastman's father and did well in all subjects. Back in Little Rock, she developed a particular knack in teaching English, and her high ideals and cultured spirit helped to guide her race through seven decades. "Strive for better things, don't fight for them," she always advised. Now she looks about her at the expanded opportunities and recognition given her race and says, "The Lord hath done great things for us, whereof we are glad."

H-6-54


The purpose of the paper was to study Cephas Washburn's philosophy and theology and to place his ideas along side those of 1950, and especially those of the early New England settlers. Attention was also given to the fact of his appear-
ance in a period of transition, that is, of rapid change from the Calvinism of the seventeenth century to liberal religious thought.

Cephas Washburn was born at, or near, Randolph, Vermont, on the 25th of July, 1793. The son of a farmer, he expected to follow his father's vocation until he sustained a broken leg. On March 17, 1860, he passed to his eternal reward at the home of his life-long friend, Dr. R. L. Dodge, in Little Rock. This places the Reverend Cephas Washburn's birth in the last decade of the eighteenth century and his death in the third quarter of the nineteenth. It also takes him from Puritan New England to the new country west of the Mississippi River.

This transition took Mr. Washburn from membership in the Congregational Church to that of the Presbyterian Church. This change was made before and at the time of his pastorate of a small church in Fort Smith. It seems that Mr. Washburn thought of the difference of the two denominations as being one of government. There were not many members of the Congregational Church in Arkansas then.

To reach a decision on the characteristics of this missionary, opinions of a wide range of people have been quoted in the paper. Among these are Mr. Washburn’s descendants, recent scholars, his associates at Dwight and in Arkansas, and his letters and other writings.

**H-7-55**

*Shall We Improve Rivers for Navigation?* Elmer S. Jack, Arkansas State College, Jonesboro.

Our historical attitude in the United States has been to spend taxpayers’ money for river improvement. A portion of the money spent is chargeable to better navigation. Evidence is presented that this expenditure is uneconomical in that the returns do not justify the outlay.

**GENERAL SECTION**

Chairman: R. H. Austin,

**II-58**

*Arkansas Water Resources.* Harrison Hale and G. A. Billingsley, University of Arkansas, Fayetteville.

The most valuable natural resource of Arkansas is the quality and abundance of its water supply. The fundamental importance of water in modern industry is obvious. Analyses of all public supplies of Arkansas, made since September 1945, show that in general the quality of water is good. Forty-five per cent of the cities have water with a hardness below 50 parts per million, and fifty-eight per cent less than 100. The average hardness of the water used is below five grains per U. S. gallon, so that at any state within 400 miles of the east and of more than a thousand miles in all other directions, only Mississippi and Louisiana have waters of equal quality.

Work has been done in cooperation with the Water Resources Branch of the U. S. Geological Survey, which began stream gaging from an office at Fort Smith in 1928. Daily sampling stations with analyses of ten day composite samples were established at seven points in 1945, and have increased to twenty-four at present. These analyses together with those of many spot samples show that with a few exceptions including the Arkansas River, the surface water is of good quality. Bulletins on Public and Surface supplies and on Ground Water in certain areas have been published.
Some Botanical Aspects of Petit Jean Mountain. Dwight M. Moore, University of Arkansas, Fayetteville.

Petit Jean Mountain offers a great variety of botanical habitats in a small area. Aquatic—Lake Bailey with its prominent zonation from submerged to forest types; Mesic—Much of the top, north slope and certain ravines; Xeric—Exposed south facing cliffs mostly covered with lichens and xeric ferns.

Unusual plants include large stands of the tiny and elusive pteridophyte Pilularia; and the only Arkansas station for Asplenium platyneuron, var. Hortonae (closest other record is Vermont).

The Need for Additional Training Facilities for Public Welfare Personnel in Arkansas. Sylvia Childs, University of Arkansas, Fayetteville.

An analysis of the education and training of the workers in the Arkansas Department of Public Welfare demonstrates a need for additional training facilities for this personnel. When the available training programs are compared with those necessary to provide a satisfactory background for the discharge of job responsibilities, some specific recommendations can be made for expanding these programs.


   A. Exclusive patronage of rare book dealers is: 1, Expensive; 2, Boring; 3, Unimaginative.
   B. Less obvious techniques are: 1, Less costly; 2, Stimulating; 3, Edifying.
   C. For many collectors "B" may be achieved through: 1, Developing reputation in field through: a) articles, b) broadcasts, c) ghosting, d) researching, e) talks; 2, Thereby having items offered gratis or at small cost; 3, Getting leads on data through "shop talk" with friends; 4, Browsing personal libraries encountered: a) a "find" to you may be slated for ash heap; 5, Seeking cooperation of junk buyers: a) second hand store proprietors, b) old gold buyers; 6, Buying duplicates at small cost (for trading); 7, Spending part of vacation time prowling book shops.

2. Preservation.
   A. Bind pamphlets with: 1, Cloth, 2, Cardboard, 3, Glue, 4, Stapler.
   B. Catalogue and file negatives.
   C. Catalogue and file positives.

3. Use.
   A. For efficient use must be library not hodge-podge collection: 1, Classify, 2, Catalogue.
   B. Cost of professional service will be outweighed by: 1, Availability of all material; 2, Perpetual inventory of items; 3, Guard against expensive reduplication.

4. Examples of practicability of techniques.
   A. Adelina Patti.
   B. Hiram Abiff Whittington.
Effect of Monochromatic Light on Color Perception. Z. V. Harvalik, University of Arkansas, Fayetteville.

Twenty subjects have been exposed to various monochromatic light sources (60 footcandles at the eye of the subject) while they observed a narrow band (0.8 millilambert) of spectroscopically produced visible radiation. The shift of the color transition was recorded and compared with the transitions of the dark adapted eye.

The color transition (e.g. from red to orange, etc.) moves toward the pre-exposing color.

It is pointed out that the color range shift is partly responsible for the change of color perception in objects illuminated by monochromatic and fluorescent light sources.

Abstract Thinking and Personal Adjustment. Henry N. Peters, Veterans Administration Hospital, North Little Rock.

A report of the experimental results so far obtained in a research project on Semantics of Personal Adjustment.

The purpose of the investigation is twofold. (1) First is to test a hypothesis, which is central to the General Semantics of Korzybski. The hypothesis is that social maladaptation, or personal adjustment, is positively related to a tendency toward abstract thinking. Since a particular test was used of social adaptation, the hypothesis involves a postulate, proven in preceding experiment, that a particular test does measure social adaptation. (2) The second purpose is to develop a test of abstractness of thinking.

The design of the experiments is rather simple. First a large group of subjects were measured with the test of abstractness. The upper and lower quartiles on this test are then given the social maladaptation test. Fisher’s t-test is then applied to the two sets of scores.