

July, 1923

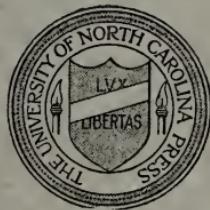
Number 204

UNIVERSITY OF NORTH CAROLINA RECORD

RESEARCH IN PROGRESS

July, 1922—July, 1923

GRADUATE SCHOOL SERIES No. 8



THE UNIVERSITY OF NORTH CAROLINA PRESS

Issued eight times a year from December to July

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RESEARCH IN PROGRESS

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The following pages contain a record of such activities of the Graduate Faculty and of advanced students as are related to the advancement of learning. Publications of a general or popular nature, public addresses of the faculty, and the project work, or elementary research conducted in undergraduate classes, are not included. Abstracts of dissertations of candidates for higher degrees are included, even when these dissertations have not yet been published, because such work comes within the field covered by this bulletin. In the appendix will be found an abstract of the work of the Graduate Club. This organization differs from the other research organizations at the University in that its purpose is to bring about closer relations among the various departments and to show the interdependence of the fields of learning.

During the year, the Special Research Fund of one thousand dollars, established by the Trustees of the University for the purpose of aiding members of the Faculty who are carrying on special investigations, was apportioned to the fourteen projects tabulated below. In pursuance of the policy announced by the Administrative Board at the time when the special fund was created, the money was appropriated in relatively small amounts in order to assist as many workers as possible. Such of these investigations as have been completed are described in the following pages; a brief tabulation is appended for purposes of record and reference.

UNIVERSITY OF NORTH CAROLINA

PROJECT NUMBER	PROFESSOR	SUBJECT	AMOUNT
14	Branson	Social aspects of farm tenancy in the South	\$ 40.00 -
15	Wheeler	Continuation of investigation in juglone	75.00 *
16	Crane	Free association reactions	75.00
17	Knight	Copying documents for research in educational history in the South	75.00
18	Hickerson	Transition spirals in engineering	75.00 *
19	Allport	Scales for personality measurements	125.00
20	Greenlaw	MS materials for investigations in Renaissance literature	45.00 *
21	Prouty	Research in stratigraphy of the Newark Series of North Carolina	100.00
22	Graves	For copying MSS in British Museum	60.00
23	Thrall	Copying MSS of Middle Irish Texts	60.00 *
24	Stuhlman	Materials for research in extension of ultra-violet spectrum	50.00 *
25	Harrer	Photostat work in Italian libraries	25.00 *
26	Saville	Continuation of project 7, sanitary engineering	210.00 -
27	Towles	Photostat materials in French libraries	35.00 *

The University of North Carolina Press has published two books by Professor William Chambers Coker, of the Department of Botany, and has announced for early publication several other works embodying the results of investigations carried on by members of the Graduate Faculty.

EDWIN GREENLAW, *Dean.*

DEPARTMENT OF ANATOMY

W. C. GEORGE. A Note on the Pulmonary Circulation in Vertebrates. *Anatomical Record*, Vol. 25, No. 4, February, 1923.

Abstract given in Research in Progress for 1922, p. 5.

Some Methods in Anatomical Technique. *Proceedings of the North Carolina Academy of Science*, May, 1922.

Description of a method for obtaining cleaned articulated skeletons of small animals and of a method for obtaining sections of dried lung.

DEPARTMENT OF BOTANY

W. C. COKER has published the following books through the University of North Carolina Press:

The Saprolegniaceae, with Notes on Other Water Moulds. Quarto. 201 pages, with 6 half tones and 57 line plates.

This book contains descriptions of all known species and direct observations on and illustrations of all American species of the family Saprolegniaceae. Notes are added on related families, as Leptomitaceae, Blastocladiaceae, and Momoblepharidaceae. Most cytological and physiological details of importance appearing in the literature since Humphrey's work (1892) have been included or referred to under the species involved.

The Clavarias of the United States and Canada. Large Octavo. 209 pages, with 8 colored plates, 71 half tones, and 9 line plates of microscopic detail.

This book contains descriptions of all known species of Clavarias, or coral mushrooms, in the area covered, most of which have been redescribed from the living condition. Both European and American type material has been examined wherever possible, and synonymy established. All but two of the plates have been made from living material.

H. R. TOTTEN. Studies in Fungi. Doctoral dissertation, 1923.

I. Description, Life History, and Mycorrhizal Character of *Rhizopogon parasiticus*, Coker and Totten n. sp.

This paper describes and gives the life history of a new species of *Rhizopogon* found growing parasitically on the roots of *Pinus echinata* and *Pinus taeda*. The fungus attacks the young rootlets and causes them to form a dense glomerulus of very short branches, surrounding them with a light buffy coat of threads, the whole cluster forming a compound, ectotrophic mycorhiza. The fungal threads invade the pine tissue, destroying the enclosed rootlets completely, and forming in the position formerly occupied by them a gleba composed of minute, irregular chambers lined with the hymenium, and the trama plates. The interior breaks down into a dark jelly-like mass, and later the tougher outer coat also breaks down to free the slime with its spores.

A review of the literature on ectotrophic mycorrhizal fungi is given and the parasitic nature of this type of mycorrhiza stressed. References in the literature to compound ectotrophic mycorrhiza are very rare, and the method of forming a sporophore as shown here has not been previously reported.

II. *Coprinus* in North Carolina (with W. C. Coker).

This paper is a study of the genus *Coprinus* in North Carolina, and includes first a description of the species so far found in the state, together with photographs and camera-lucida drawings of detail in most of them.

The second part of the paper describes the growth of mushrooms in pure culture and discusses the sexuality of *Coprinus*. Photographs and camera-lucida drawings are given showing the development of *Coprinus radiatus* from a single spore. Mycelia from a single spore of this species germinated in a broth from horse manure and transferred to the following media formed mature plants: Horse manure, horse manure agar, horse manure broth, cow manure, corn meal agar, and peas.

A review is given of the literature treating the subject of sexuality among the basidiomyetes, and it is shown that *Coprinus radiatus* developing mature sporophores from a monosporous mycelium is monoecious in character. The absence of clamped connections is noted. Camera-lucida drawings are also given for the sprouting spores and the hyphae of *Coprinus Brassicae*, *C. fimetarius*, *C. micaceus*, *C. plicatilis*, and *C. quadridifidus*. Sprouting spores and young hyphae of *Coprinus* are compared with those of *Armillaria mellea*, *Clitocybe tabescens*, *Tricholoma personatum*, *Pleurotus sapidus*, and *Claudopus nidulans*.

DEPARTMENT OF CHEMISTRY

ALVIN S. WHEELER AND I. V. GILES (Ph.D. Thesis).

Para-cymene Studies IV. The Chlorination of 2-Amino-p-cymene. *Journ. Amer. Chem. Soc.*, 44, 2605 (Nov. 1922).

Abstract given in Research in Progress for 1922, pp. 9-11.

ALVIN S. WHEELER AND B. NAIMAN (M.S. Thesis, 1922).

Hydroxynaphthoquinone Studies V. Derivatives of 2-Bromo-5-hydroxy-1, 4-naphthoquinone (Monobromojuglone). *Journ. Amer. Chem. Soc.*, 44, 2331 (Oct. 1922).

Abstract given in Research in Progress for 1922, pp. 13-14.

ALVIN S. WHEELER AND H. M. TAYLOR (Progress on Ph.D. Thesis).

Para-cymene Studies V. The Constitution of 2-Aminobromocymene.

The past year was devoted to the orientation of the bromine atom in 2-aminobromo-p-cymene. This compound was converted by the diazo reaction into 2,5-dibromocymene, melting at 272°, and this was oxidized by dilute nitric acid to 2,5-dibromoterephthalic acid, melting at 315°. The bromine atom is therefore in position 5. However in order to clear up the difficulties encountered by Ira Smithey in his Ph. D. research work in which another line of attack was followed, we oxidized acetoamidobromocymene with permanganate to the corresponding cuminic acid, melting at 217° and hydrolyzed this compound, the hydrochloride melting at 191° and the free base at 166°. Diazotization of this compound gave 2,5-dibromocuminic acid, melting at 149°, a compound of known constitution. How-

ever in some preparations of the aminobromocuminic acid we obtained a compound melting at 151° instead of 166°. This anomaly necessitated its preparation by another method. Starting with thymol we converted this into 3-bromocymene with phosphorus pentabromide, melting at 238°. Oxidation of the product with nitric acid of sp.gr. 1.29 gave 3-bromocuminic acid, melting at 153°. Nitration of this compound with fuming nitric acid, 1.5, gave 2-nitro-5-bromocuminic acid, melting at 138°. Reduction of this compound with ferrous sulfate gave 2-amino-5-bromocuminic acid, melting at 166°. This completely establishes the constitution of our amino-bromo-p-cymene but still leaves as a mystery the occasional appearance of the compound melting at 151°.

FRANK C. VILBRANDT (with S. Lantz Shenefield and James R. Withrow.) Sulfate-free Sulfites for standard sulfur dioxide solutions. *Chemical and Metallurgical Engineer* 25, 953 (1921).

A study of the various methods of making sulfite solutions with inhibitory oxidation agents present was carried out for the purpose of using same as standardizing agents for solutions to be used in ascertaining the pollution of the atmosphere in industrial districts. Preparation and use of calcium sulfite and sodium sulfite under conditions unfavorable to oxidation, such as exclusion of air during preparation, washing, purification and drying, was carried out. Curves on rate of oxidation of sulfite solutions were also ascertained.

Professor Vilbrandt presented before the Elisha Mitchell Society the following papers embodying studies being carried on by him:

The Manufacture of Beet Sugar: February 17, 1922.

A study of the economics of the manufacture of this product with the idea of presenting the gross magnitude of seasonal wastage due to trivial leaks and omissions about the modern plant.

Some Problems in Lubrication: October 10, 1922.

This is a resumé of past work on the problem of lubrication, the fundamental study of the same and a plan of future contemplated researches in an endeavor to understand scientifically the causes and agencies of this automotive necessity.

Publications by Frank C. Vilbrandt:

A laboratory multiple burner. *Journal of Industrial and Engineering Chemistry*, 15, 22, 1923. A description of a multiple burner for chemical laboratories is presented, the burner being unit operative, simple of construction and economical in gas consumption.

Chemical Industries of North Carolina. Paper presented before the North Carolina Section of the American Chemical Society, Greensboro, May 5, 1923.

A study of the geographical location, operation, labor situation, financial status of each industry and its relation to the economic situation in this state is made in this paper. The above paper is to appear shortly in the *Journal of Industrial and Engineering Chemistry*.

FRANK C. VILBRANDT AND J. A. BENDER. Solubility of Nickel Sulfate by the Floating Equilibrium Method. *Journal of Ind. and Eng. Chem.* 15, 1553 (July, 1923).

In the determination of solubilities of various solutes in different solvents, much time is lost in making gravimetric determinations. The proposed method consists in determining the quantity of solvent required to bring a solution of a substance at a definite temperature to the same concentration as a gravimetrically standardized solution of the solute, the concentration of the solution having been determined by the condition of floating equilibrium of a glass float calibrated for the particular solution. The development of a formula for the rapid calculation of results has also been accomplished.

Mr. Vilbrandt has the following investigations under way:

1. The preparation of potash for soft soaps (with E. V. Kyser).
2. Potash-free yellow pigments.

The following theses were approved by the Department of Chemistry in 1922-1923:

1. Doctoral dissertation submitted by Samuel Clement Smith:

I. The Constitution of N,N, B,B,B-Dichlorohydroxyethylidenebis-nitro-anilines.

The condensation products of CCl_3CHO and $\text{O}_2\text{NC}_6\text{H}_4\text{NH}_2$ yield an hydroxy derivative with alcoholic KOH and methoxy and ethoxy derivatives with sodium methoxide and ethoxide. The question arose as to whether the basic group was attached to the alpha carbon or the beta carbon in the side chain. Of the two possible formulae, $\text{CCl}_2\text{OHCH}(\text{NHC}_6\text{H}_4\text{NO}_2)_2$ and $\text{CCl}_2\text{HCOH}(\text{NHC}_6\text{H}_4\text{NO}_2)_2$, the former is improbable, for the OH group is attached to the same carbon atom as the negative chlorine. The latter was proven to be the correct formula by decomposing the para compounds with hot dilute sulfuric acid and obtaining in all cases p-nitroaniline and p-nitro-dichloracetanilide. The latter was a new compound but its constitution was proven by direct synthesis from p-nitroaniline and dichloroacetic acid. The formation of a compound with oxygen attached to the alpha carbon and also the formation of the same compound from three different basic derivatives proves that the basic group is attached to the alpha carbon. The ortho homologue was obtained by treating the derivatives of the ortho condensation product in the same manner as the para compounds were treated. The meta homologue was obtained by the direct action of the acid on the amine by using P_2O_5 as a dehydrating agent.

p-Nitro-dichloroacetanilide crystallizes from 50% alcohol in needles melting at 127°, soluble in acetone and ether, slightly soluble in benzene. The ortho homologue consists of yellow plates which melt at 70-72°. Soluble in alcohol and acetone. The meta homologue crystallizes from dilute alcohol in light yellow needles which melt at 103°. Soluble in alcohol, acetone and ether.

II. The reaction of Dichloroacetic acid with Aromatic Amines.

Aniline, the toluidines, alpha naphthylamine and m-nitroaniline gave, by direct addition of dichloroacetic acid, an addition product of the amine and trichloroacetic acid. This was proven by comparison of the analysis of the compounds, by the formation of identical compounds from the amine and trichloroacetic acid, by the liberation of the amine on the addition of NaOH and by the formation of the ethyl ester of trichloroacetic acid on the addition of concentrated sulfuric acid to an alcoholic solution of the compound. When the reaction was carried out in CCl_4 solution at 0°, the addition product of dichloroacetic acid was obtained.

The supposition was that there was a rearrangement of a hydrogen and a chlorine atom between two molecules of dichloroacetic acid with the formation of monochloroacetic acid and trichloroacetic acid. This assumption was proven by heating p-nitroaniline and dichloroacetic together then adding P_2O_5 as a dehydrating agent, thereby obtaining a mixture of p-nitro-chloroacetanilide and p-nitro-trichloroacetanilide. These were separated by extracting with CCl_4 and to prove their constitution, they were made direct from the amine and the acids.

There are two theories as to the structure of the compounds. One is that they are simple salts of the acid and amine. Another is that a dihydroxy compound is formed having the formula $\text{CCl}_3\text{C}(\text{OH})_2\text{NHC}_6\text{H}_5$, the compound being rendered stable by the presence of the — CCl_3 and the NHC_6H_5 groups.

The aniline compound crystallizes from water in colorless plates which melt at 163° and which are soluble in alcohol, acetone and ether. The o-toluidine compound crystallizes from water in plates melting at 167-168°, soluble in acetone, alcohol and ether. The p-toluidine homologue crystallized in needles melting at 135°, soluble in water, alcohol, acetone and ether. The alpha naphthylamine product melts at 173°, insoluble in water, soluble in alcohol, acetone and ether. The m-nitroaniline homologue melts at 147°, soluble in water, alcohol and acetone. All of these compounds decompose at their melting point.

The addition products of aniline and ortho and para toluidines all recrystallize from alcohol in prismatic crystals, and are unstable in hot water. The aniline compound melts at 140°, the o-toluidine product melts at 140°, and the para toluidine product at 160°.

p-nitro-chloroacetanilide is insoluble in CCl_4 , recrystallizes from alcohol in yellow prisms which melt at 177°.

p-nitro-trichloroacetanilide crystallizes from CCl_4 in light yellow crystals which melt at 140°.

2. ALVIN S. WHEELER AND J. A. BENDER. Master's Thesis (1923).

A New Ketone Reagent: p-Bromophenylsemicarbazide.

This investigation was undertaken to study the action of various ketones on p-bromophenylsemicarbazide. It was necessary first to prepare this compound as it could not be obtained on the market.

p-bromophenylsemicarbazide was prepared according to the following scheme: p-bromoaniline HCl → p-bromoaniline hydrochloride KCNO → p-bromophenylurea $(\text{NH}_2)_2\text{H}_2\text{O}$ → p-bromophenylsemicarbazide. The substance was purified by passing through the hydrochloride.

Wheeler and Pritchard (2) and Wheeler and Andrews (3) synthesized p-bromophenylsemicarbazide according to the above scheme and made several condensation products. In this study the work was carried further and several new compounds were prepared.

p-bromophenylsemicarbazide yields the following derivatives: A. Acetone p-bromophenylsemicarbazone, crystals, small prisms with a pyramidal top, melts at 174 degrees, recrystallized from alcohol; B. Methyl ethyl ketone p-bromophenylsemicarbazone, crystals, rectangular plates as seen under the microscope, melts at 165-67 degrees, recrystallized from alcohol; C. Benzophenone p-bromophenylsemicarbazone, crystals, small plates, melts at 171-2 degrees, recrystallized from alcohol; D. Chloroacetone p-bromophenylsemicarbazone, crystals, very fine needles, some in clusters as seen under the microscope, melts at 187-9 degrees with decomposition. E. $\alpha\delta$ -Dichloroacetone p-bromophenylsemicarbazone, crystals, fine needles, melts at 200-1 degrees with decomposition.

D and E have not been prepared in their purest form in sufficient quantities for analysis thus far. Further work on them and on other derivatives of this new ketone reagent is being undertaken.

3. ALVIN S. WHEELER AND ERNEST W. CONSTABLE. The Bromination of 2-Amino-p-Xylene. Dyes derived from 2-Amino-5-bromo-p-Xylene, and their Structure.

In previous work on the bromination of this compound (Fischer and Windaus, Ber., 33, 1974, (1900), the location of the bromine atom had not been determined. In this work the bromine atom is orientated thru the following series of compounds whose structure is known: 2-acetoamido-p-Xylene was brominated and treated with hydrobromic acid, thus producing 2-amino-5-bromo-p-Xylene hydrobromide. This in turn was treated with NaOH liberating the HBr and producing a 2-amino-5-bromo-p-Xylene. This is the compound which Fischer and Windaus prepared, though the location of the bromine atom at position five was only conjectural. From the hydrobromide was made also the known compounds 2-5-dibromo-p-Xylene, (m.p. 75.5°); 2-5-dibromoterephthalic acid, (m.p. 313°); and 2-5-dibromo-diethyl-terephthalate, (m.p. 125°). Since one bromine in these compounds is in position five, this proves its position in aminobromo-p-Xylene.

By the diazo reaction the following dyes were prepared: *2-4-(bis-5-bromo-2-p-Xylylazo)-Phenol*, small dark brown scales in mass, pale green under the microscope; solvent, glacial acetic acid; dyes silk ecrù, wool an orange brown; (m.p. 233-4°); *1-(5-bromo-2-p-Xylylazo)-b-Naphthol*, long, scarlet red needles in felted masses; solvent, acetone; dyes silk a light red, wool an opal red; (m.p. 168-9°); *2-4-(bis-5-bromo-2-p-Xylylazo)-m-Resorcinol*, fine microscopic crystals, claret brown in mass; solvent, benzene and acetone; dyes silk ecrù, wool a Brazil red; (m.p. 263°); *2-4-(bis-5-bromo-2-p-Xylylazo)-a-Naphthol*, microscopic crystals of indefinite shape, very dark brown in mass in the sunlight; solvent, alcohol; dyes silk Mars orange, wool a claret brown; (m.p. 222-3°); *4-(5-bromo-2-p-Xylylazo)-p-Anisidine*, microscopic crystals of capucine yellow; dyes silk tawny, wool a chestnut brown. Analysis has not been made on this last compound.

4. H. D. CROCKFORD. Determination of the Latent Heat of Fusion of Various Nitro-Toluenes.

The problem undertaken was the determination of the latent heat of fusion of various nitrotoluenes by calorimetric methods. An apparatus was set up consisting of an inner can surrounded by an air bath which was in turn surrounded by water. The latent heat was to be determined by means of the heat effect produced on a known amount of water in the inner can by the introduction of a weighed quantity of nitrotoluene in the molten condition. This made it necessary to know the specific heat of both the liquid and solid material under study. The method was abandoned in favor of another method that did not require these quantities. This consisted in adding heat in the form of electrical energy to a known amount of the solid material in a can immersed in a bath consisting of a mixture of both the liquid and solid nitrotoluene. The apparatus was constructed and a trial determination made which showed the necessity for some minor changes in the form of the apparatus. This is as far as the work has been carried to date.

5. FRANK C. VILBRANDT AND WILLIAM E. GILES. Thermal Evaluation of the By-Product Coke Industry.

This is a part of a series of studies in progress on the destructive distillation of coals, oil shales and petroleum crude oils by thermal control. A study was made of the coal from the Cumnock coal fields of North Carolina in an effort to properly evaluate this coal as a domestic coal and as a source for illuminating gas. In order to accomplish the above control a special electric furnace capable of producing any desired temperature up to 1800° F and of control of 25° F was constructed in the Department. Thermal control of distillation indicates that the coke by-product, coal tars and gases can be made in the desired quantities and of the desired properties. The products of the refining of the coal tar and gas production prove to be good indicators for the course of the reaction that takes place during the heat treatment. Two distinct changes in decomposition occur on heating Cumnock coals, one at 800° F and the other at 1100° F.

6. A. S. WHEELER AND J. L. McEWEN.

New Derivatives of Dichlorojuglone, (2, 3-Dichloro-5-Hydroxy-1, 4-Naphthoquinone).

The chlorination of juglone in hot glacialacetic acid was first studied by Wheeler and Scott, and later by Wheeler and Dawson. The work of the latter has not been published yet. In this investigation the time required for chlorination was materially shortened. One preparation took an unexpected course and gave a green compound. Further study showed that the hot acetic acid alone was responsible for this. The compound is probably identical with one obtained by Mylius by boiling juglone in water. The formula $C_{20}H_{10}O_7$ was assigned to this.

2-Anilino-3-chlorojuglone was prepared by heating dichlorojuglone with aniline under a reflux for a short time. It crystallizes in dark carmine-violet plates or prisms, melting at 222° , and has the formula $C_{10}H_8O_2Cl\cdot OH\cdot NHC_6H_5$. *2-Toluino-3-chlorojuglone*, $C_{10}H_8O_2Cl\cdot OH\cdot NHC_6H_4CH_3$, was prepared by treating the dichloro-compound with p-toluidine. It crystallizes in reddish-purple plates or prisms, melting at 234° . *2-Chloroanilino-3-chlorojuglone*, $C_{10}H_8O_2Cl\cdot OH\cdot NHC_6H_4Cl$, was formed by treating dichlorojuglone with p-chloroaniline. The compound crystallizes in irregular reddish-purple plates, melting at 243° .

Dichlorojuglone was reduced with zinc dust and sulfuric acid, yielding a *Dichloro-trihydroxynaphthalene*, which has the composition $C_{10}H_8(OH)_3\cdot Cl_2$. It crystallizes in minute crystals, with a metallic lustre, which melt at 157° . This trihydroxynaphthalene was acetylated, yielding a *Dichloro-triacetoxy* compound, which crystallizes in well-developed needles, melting at 182° .

Dichlorojuglone was also treated with sodium ethylate yielding a sodium salt which is a direct dye for both wool and silk. The shades obtained range from a light champagne to a dark bronze-brown, depending upon the concentration of the dye bath. Further work is being done on this compound.

Accepting the Willstätter formula for naphthalene, we place the two chlorine atoms in positions 2 and 3, since the quinone ring with its double bond connecting these positions is quite reactive.

An attempt was also made to obtain an oxime of dichlorojuglone, but the results were negative. First one molecule, and then two, of hydroxylamine hydrochloride were used with no apparent change in the dichlorojuglone.

7. ALVIN S. WHEELER AND E. O. MOEHLMANN.

A Study of the Action of Acetylacetone on Phenylsemicarbazide.

This is one of a series of studies in progress in the Department of Chemistry on the action of phenylsemicarbazide and its derivatives on diketones.

The interaction of acetylacetone and phenylsemicarbazide itself had been the subject of previous study by O. A. Pickett, who presented his results in a Master's Thesis in 1916. Our purpose in this study was to extend the research by taking it up at the point reached by him.

It was found that when phenylsemicarbazide and acetylacetone were allowed to react direct, the main product of the reaction was a white granular compound melting at 255-257° in the purest form obtained. This compound was practically insoluble in all organic solvents, and corresponds to the one described by Pickett as melting at 263°.

When, however, the hydrochloride of phenylsemicarbazide was used and the reaction carried out in the presence of sodium acetate, the main product was a compound which crystallized in transparent needles from absolute alcohol and melted at 68-70°. To this compound Pickett assigned a pyrazole structure, and analyses indicate that it is 1-phenylcarbamyl-3, 5-dimethylpyrazole. In order to gain further proof of its structure, studies of its derivatives, especially its silver salt and bromine substitution products, are in progress.

8. WILLIAM B. SMOOT. Electromotive Force Measurements with Solutions of Hydrochloric Acid Containing Mercuric Chloride and Potassium Chloride, either or both.

Pure hydrogen gas is passed thru a solution of HCl to which a known amount of either KCl, $HgCl_2$ or KCl and $HgCl_2$ has been added. The E.M.F. of the solution against a standard calomel electrode is measured by means of a potentiometer.

Tests extend over a period of time varying from one hour to two days.

Corrections are made for change in temperature.

The results show that the addition of KCl to solution of HCl cause but little change in the H concentration but that $HgCl_2$ even in minute amounts affect the E.M.F. very greatly. The results, however, were not sufficiently reproducible to warrant any conclusions regarding the underlying reasons for the effect.

DEPARTMENT OF CIVIL ENGINEERING

T. F. HICKERSON continues the development of Transition Spirals for Highways to be published in the form of a handbook suitable for engineers in practice.

The real purpose of transition spirals, as applied originally only to railroad location, has been to provide a gradual change of curvature from a straight line to that of a circle, so as to avoid the lurch of abruptness that would occur at the junction of the two. Also, the banking or elevation of the outer edge of curves is necessary to balance the centrifugal force caused by bodies moving in a circular path; and this super-elevation must necessarily be done gradually. Easement and super-elevation therefore pro-

vide both comfort and safety to traffic. It is only recently after the advent of automobiles and hard-surfaced roads that this so-called refinement of location has been considered in connection with the layout of highways, and even then only in the case of sharp curves. If the radius of the circular arc is larger than 500 feet, there is no special demand for a transition or easement spiral so far as avoiding a lurch is concerned, but spirals afford long approaches to curves and they therefore add much to the aesthetic appearance of highways, as well as lessen distances; this last advantage means much money saved when designing hard-surfaced roads at several dollars per square yard.

In every case of a change in direction along highways, where ample distance is available for long approach tangents, it is the opinion of the writer that the most perfect alignment for flat as well as sharp curves consists of two symmetrical spirals coinciding at the center of the curve. This reduces the distance around the bend to a minimum and provides the path of least resistance.

Where the tangent distance is limited, a combination spiral and circle should be used. In extreme cases, as in mountainous country, curves occur so close together that only circles (widened at the center) can be used. For the sake of simplicity and flexibility, formulas and tables have been devised for the following cases: (1) Spirals with no circular curve in between; (2) Two spirals with intermediate circular arc equaling four-tenths osculating circle; (3) Two spirals with intermediate circular arc equaling six-tenths osculating circle; (4) Two spirals with intermediate circular arc equaling eight-tenths osculating circle; (5) Circular arc only.

The formulas dealing with spirals are very complex and uninviting to the engineer in the field. It has been the purpose of the author to simplify the method of application to highway location, since all the literature on the subject at present relates to railroad curves. A constant relative difference in the values of the tangent distances has been discovered to exist in these various cases. This adds greatly to the simplicity of application. By the aid of elaborate tables compiled by the writer, spiraled curves may be laid out in six ways with as much ease as in the case of ordinary circular curves.

Tables and formulas for the extra area of pavement due to widening the roadway around sharp curves in any of the cases mentioned above have been computed to a great degree of accuracy.

The method proposed has the following new and advantageous features:

(1) The length of the complete curve whether entirely or partly a spiral is a multiple of ten.

(2) On account of the fact that the spiral usually coincides with the osculating circle at one of the ten points of equal division, the same equal chord lengths may be used for the intermediate circular curve as was used for the spiral.

(3) The tangent and external distances, as well as offsets and various other parts, are given in tables for any case, and hence the method of laying our spirals is no more difficult than that of the ordinary circular curve.

(4) By means of deflection angles given in tables, any spiralized curve may be laid out completely with the instrument at the P.I., the T.S., or any point along the curve.

(5) The outer and inner edges of the roadway are parallel to the center line and may be laid out with exactness by means of data given in the tables.

(6) The data for locating the inner edge of the widened roadway around sharp curves and the extra area due to the same are given in tables.

(7) All the parts of the curves are expressed as functions of the external angle; and the relative values are so uniform that interpolation gives close results, for long ranges of this angle.

THORNDIKE SAVILLE AND M. A. HILL have nearly completed an investigation of sands used in water filtration plants in the United States. As a part of this study some sixty sands used or proposed for use in plants in North Carolina have been analyzed at the request of the State Board of Health, which has utilized the analyses in passing upon the suitability of the sands for filtration purposes. As a result of the investigation a new cross section paper for making sand analyses has been developed, the ordinates of which are arranged in accordance with the values of a standard probability curve and the abscissae of which are arranged to show sieve sizes and to care for skewness in the probability curve. Mechanical analysis of good sands plots essentially as a straight line on this paper. It is probable that the new paper will be adopted as a standard by the Committee on Filter Sands of the American Water Works Association of which Mr. Saville is a member.

MR. SAVILLE assisted by G. W. SMITH has been engaged in collecting and revising data on stream flow for the North Carolina Geological and Economic Survey. This has necessitated investigation of the weekly and monthly flow of some thirty streams at about fifty gaging stations. Weekly duration curves and hydrographs are being prepared. The data will be published in a bulletin of the State Geological and Economic Survey to be issued sometime this year. It will comprise one of the most elaborate and detailed studies of stream flow ever collected for a single state.

MR. SAVILLE AND G. W. SMITH have prepared a large scale map of the Southern Appalachian States showing the location of all

public utility power developments, both steam and hydro-electric, and the transmission lines in the several states. Large undeveloped water powers are indicated together with the location of stream gaging stations. The map was prepared at the request of the Southern Appalachian Water Power Conference to be used as a basis for discussion at its meeting in Asheville in June. A similar map for North Carolina alone was prepared for the North Carolina Corporation Commission.

MR. SAVILLE AND MR. ROY J. MORTON have been engaged in a study of the characteristics of North Carolina rainfall, a preliminary report on which was made to the North Carolina Academy of Science at its Greensboro meeting in May. An isohyetal map of the state has been prepared, showing lines of equal mean annual rainfall. A map has also been prepared to show lines of equal coefficients of variation from the mean annual rainfall. A study of progressive means at certain selected stations indicates distinct cycles of rainfall, but no definite periodicity. There is pronounced indication that most of the Piedmont and Coastal Plain stations are now in a well defined cycle of low rainfall, and annual rainfall well below the annual mean is predicted for 1923 and 1924. Predictions for 1922 were verified. The study is being continued by investigation of correlation between rainfall and other climatic and natural phenomena.

MR. SAVILLE has also been engaged on the following publications:

Water Powers of Surry and Wilkes Counties. Economic Paper 53, N. C. Geological and Economic Survey. Issued in January, 1923.

In press: The Water Power Situation in North Carolina, Circular of the North Carolina Geological and Economic Survey.

In preparation: Water Power Survey of Clay and Cherokee Counties. An Economic Paper of the North Carolina Geological and Economic Survey.

H. F. JANDA AND R. J. MORTON. M. S. Thesis (1923). Capillary Moisture in Highway Subgrades.

The object of this investigation was to determine the effect of (1) drain tile and (2) a coarse, non-capillary layer on capillary moisture in highway sub-grades.

From the results of these tests the following conclusions have been drawn:

(1) That drain tile do not decrease the percentage of capillary moisture; and that they do not decrease the height of rise of capillary moisture.

(2) That a 6-inch layer of sand when placed above the gravitational water level, cuts off, to a considerable extent, the rise of capillary moisture.

H. F. JANDA, assisted by L. B. AULL, JR. AND J. G. WARDLAW, JR., Research Fellows in Civil Engineering. Experiments undertaken to determine the pressures occurring on pipes under highway fills.

At the suggestion of Mr. C. M. Upham, State Highway Engineer, and Mr. G. W. Hutchinson, Testing Engineer, State Highway Commission, a series of experiments is being undertaken to determine the pressures that occur on pipes that are located under high fills. Knowledge that will be gained from these experiments will have an important bearing on the design and construction of pipes. The experiments are under the direction of Mr. Janda, who, in collaboration with Dean G. M. Braune, designed the apparatus.

DEPARTMENT OF COMMERCE

WALTER J. MATHERLY has published the following studies:

Taxation of Stock in North Carolina Corporations. *North Carolina Law Review*, May, 1923.

A study of the legal and economic aspects of taxing stocks in domestic corporations in North Carolina. An examination of the question as to whether or not corporate stocks are exempted from taxation with an analysis of the advantages and disadvantages of the present system of taxing stocks and a comparison of this system with that of other states.

Last Year's Flood of Stock Dividends. *The Annalist*, March 12, 1923.

An examination of the volume of stock dividends during the year 1922. The cause for the distribution of such dividends with a view to determining whether or not they represent an evasion of taxes under the federal income tax system.

Financial Economies of Simplified Industrial Practice. *The Annalist*, October 16, 1923.

A study of the economies in fixed and working capital due to industrial standardization. The study includes the economies to distributors and consumers as well as to manufacturers.

Fundamental Ways of Reducing Labor Turnover. *Administration*, October 1923.

(For abstract, see Research in Progress 1922).

Studies Accepted for Early Publication:

Proposed Taxation of Stock Dividends. *Journal of Accountancy*. An examination of proposed legislation taxing corporate surpluses out of which stock dividends are distributed. The conclusions are that stock dividends are already adequately taxed and that such legislation is opposed to the principles of corporation finance, involves double taxation and is unnecessary.

Economic Hindrances in Standardizing American Industry. *American Machinist*. This study deals with the economic hindrances which stand in the way of the movement for industrial standardization. Standardization is approached from the point of view of economic change.

Studies in Progress:

Corporate Surpluses. A monograph involving a detailed study of corporate surpluses. An attempt will be made to analyze the sources and objects of corporate surpluses, their accounting and legal aspects, their management and distribution. Special attention will be directed to the surplus of public service corporations.

Master's Theses accepted by the Department of Commerce in 1922-1923:

CECIL KENNETH BROWN: The 1922 Shopmen's Strike in the Light of a Changed Attitude toward the Railroad Problem.

The purpose of this study is to determine the relation of the activities of railroad unionism to the railroad problem, with the idea in view of formulating a more stable basis for the solution of the problem of railroad labor. The 1922 strike of railroad shopmen, being the most recent and one of the most ambitious railroad strikes on record, is studied with particular reference to the newer attitude toward railroad control, as expressed in the Transportation Act, 1920. A cursory examination of the development of the railroad problem and of the attitude held toward it reveals the loss incurred by society due to lack of proper appreciation of the problem. That a further corresponding loss may be avoided in consideration of the problem of railroad labor, it must be realized that unionism is merely a sign of the times and that its long-trend development has been correlated with the long-trend development of society as a whole. The problem cannot be solved apart from this relation.

A study of the history of strikes and of the 1922 shopmen's strike in particular clearly shows the fact that strikes are likely to fail in periods of liquidation and depression, while they ordinarily succeed in times of prosperity. The problem is centered about the periods of falling prices and must be studied in the light of the business cycle.

The economic justification of the transportation service is that the railroads should be economically profitable to their owners. The relation between

cost and value of the railroad service cannot be overlooked. Wages is the largest item of cost or expense, and hence the railroad problem and the railroad labor problem must be solved simultaneously.

JOHN GRADY ELDRIDGE. Co-operative Marketing of Tobacco.

In the past tobacco growers have marketed their product individually, without reference to general economic conditions which affect the price of their product. The product itself is of such a peculiar nature that standardization and proper grading have been impossible. The farmers themselves have not known the quality and value of their tobacco. They have sold either to private buyers before, during, or after harvest at a price largely determined by the buyers or on hundreds of small auction warehouse floors. These warehouses have not furnished a satisfactory system of grading, storing and standardization. Inasmuch as tobacco can be greatly improved by storage and processing, the farmers, having no such facilities, have been compelled to sell their product at a disadvantage. Moreover, the unnecessarily large number of warehouses has necessitated prohibitive costs of marketing, the larger part of which is absorbed by the manufacturers who must keep a large corps of buyers in the markets. Even with this large and costly force of buyers, competition has been very slight and evidence is not lacking that agreements have existed among the buyers. Because of the short selling seasons and the necessity of the buyers moving from one market to another, the farmers have been compelled to sell largely during the months of October, November, and December. A longer selling season is necessary.

The Coöperative Marketing Associations own a sufficient number of warehouses and processing plants to provide an adequate storage and conditioning service to the growers. They are controlled and owned entirely by the growers. They have employed an efficient corps of marketing experts and skilled tobacco men who have standardized the farmers' product, and made possible sales in large volume by sample. These Associations sell tobacco from their own plants only as the trade requires it; and have been able to borrow money on warehouse receipts at 4½% from the War Finance Corporation, and at 6% from a syndicate of bankers. "Time prices" have cost the farmers on an average 26.6% over and above the cash price. By no means the least of their services has been the supplying of timely and instructive information to the farmers concerning methods of cultivation, harvesting, and curing, as well as concerning economic conditions.

The ultimate success, however, of these Associations is predicated on conditions existing among the growers themselves. Farm tenantry has been an obstacle to their success. The removal of tenantry and a more widespread diffusion of business knowledge through education must be effected before the greatest measure of usefulness may be expected from coöperation.

ARTHUR GWYNN GRIFFITH. The Financing of Highway Construction, with Particular Reference to North Carolina.

The purpose of this study is to give a brief historical analysis of the economic and social benefits derived from highways, and from this analysis to formulate certain principles upon which the various governmental units may base their financial policies. It is desired that the operations of these governmental units shall conform as nearly as possible to their recognized functions in order that the most efficient constructive and administrative policies may obtain.

Prior to the advent of the motor vehicle, the roads were primarily of local and community interest. Consequently, it is only natural that the local government should have been the administrative unit. Due to the very limited resources and abilities of these local governments, highway construction was unduly retarded. Only a small amount of taxes were levied and collected for road purposes, the roads being built and maintained chiefly by means of free and convict labor.

The coming of the motor vehicle both increased the demand for a system of roads which should be adequate to serve the whole country and presented new sources of revenue. However, due to the neglect of highways in the past and the rapid increase in the importance of the motor vehicle as a means of transportation, there is a demand for construction in excess of that which is possible from current revenues; consequently, it has been deemed advisable to borrow money for construction purposes. Adequate provision must be made for the maintenance of highways which are built.

In each state the roads have been divided into two classes: (1) roads which are of primary importance as trunk lines constitute the state system, and (2) roads of secondary importance make up the county systems. It is believed that a feasible and equitable division of the burden will be achieved when the state systems are built and maintained by the returns from motor vehicle license fees and gasoline taxes, supplemented by Federal Aid, and when the county systems are financed by taxes upon property.

SAMUEL A. MAUNNEY. Co-operative Marketing of Cotton, with special reference to North Carolina.

The first association for the coöperative marketing of cotton was formed in April, 1921, in Oklahoma and since then state-wide associations have been organized in eight other states and still other states are being organized. Over 200,000 cotton growers have signed legally enforceable contracts to deliver all of the cotton they produce for a period of five years to these organizations. The purpose of this thesis was to study and analyze this movement in the light of economic thought, its fundamental causes, and the movements of a similar nature preceding it.

The successes and failures of coöperative marketing have developed certain fundamental principles of success in the same way in which funda-

mental principles of banking and other established businesses have been developed and as long as these are practiced there is little reason to look for failure.

The economic conditions leading to coöperative marketing of cotton are: (1) lack of attention on the part of the farmer to marketing, (2) economic inequality between the cotton buyers and the farmer-sellers, (3) the "dumping" of cotton during the autumn ginning months depressing the price, (4) damage to cotton because of inadequate warehousing facilities, (5) the need for classing and standardizing to meet mill requirements, (6) the wide difference between the prices received by the farmers and the prices paid by the mills, (7) the bad system of financing the cotton farmer, and (8) the distressed situation of the cotton farmers.

The organization and operation of the North Carolina Cotton Growers Coöperative Association was described in detail as an illustration of all of the associations. The other associations and the American Cotton Growers' Exchange, the national federation of eight state associations, were discussed in one of the chapters.

Some of the conclusions reached in this study are that these associations (1) are efficiently and economically operating on sound principles and are proving successful; (2) have held the cotton off the market in the ginning months and are marketing throughout the year, stabilizing the market; (3) are in full accord with the operation of the economic law that prices must be determined by supply and demand; (4) can not control the price because they can not control the supply; (5) exercise a "bullish" influence on the cotton market by selling orderly when prices are rising; (6) are grading and stapling the cotton and selling according to mill requirements; (7) are giving premiums to the farmers for superior cotton by marketing according to pools; (8) are making satisfactory contracts with the mills and the big cotton merchants and exporters; (9) have improved the credit conditions of the cotton farmers, and (10) because of these things and through the facilities which they exercise for educating the farmers to better and more intelligent methods they should prove successful in getting cost plus a fair profit for the farmers and permanently improve their condition.

The principal sources of material for this thesis are the numerous government publications on coöperative marketing and the production and marketing of cotton, books on marketing, agricultural magazines, commercial and financial magazines, publications of the coöperative marketing associations and the American Cotton Growers' Exchange, and personal visits to the headquarters of the North Carolina Cotton Growers' Coöperative Association in Raleigh and contact with its leaders. Pages 106 to 109 of the thesis give a complete bibliography of material on the subject.

DEPARTMENT OF EDUCATION

EDGAR W. KNIGHT is completing his *Readings in Southern Educational History*, mentioned in last year's report, to be published as a companion study to his *Public Education in the South*, published in 1922. *Education in the South During the Past Twenty-Five Years* is to be published during the early fall by Macmillan. This is a part of a volume inscribed to Professor Paul Monroe, Director of the School of Education of Columbia University, and entitled *Twenty-Five Years of American Education*, prepared in collaboration with other scholars.

Mr. Knight is also engaged in a study of the following subjects: *Educational Theories and Influence of Thomas Jefferson*; *Public Education in South Carolina Before 1860*; *Reconstruction and Education in Alabama*.

Graduate students in Mr. Knight's department continue studies in Rural Education and Educational History as follows:

H. C. Renegar, "Problems, Policies, and Achievements of the State Superintendents of North Carolina."

C. L. Cates, "The County Superintendency in Virginia."

C. H. Weatherly, "Public Education in South Carolina Before 1860."

W. O. Hampton, "The Secularization of American Education."

Abstracts of theses presented to the Department of Education for the degrees of Doctor of Philosophy and Master of Arts in June 1923 are appended:

ROBERT A. DAVIS, JR. A Study of the Academic Training and Experience of Teachers in the Accredited Secondary Schools of North Carolina.

The purpose of this study has been to ascertain (1) the amount and character of academic training of teachers in the accredited secondary schools of North Carolina; (2) the amount and character of teaching experience; and (3) the correlation of these factors with the salaries they now receive and the sort of positions they now hold.

The data used are for the school year 1922-1923, and were obtained by means of questionnaires sent to all high school principals and high school teachers in the accredited secondary schools of North Carolina. Replies were received from 625 teachers, representing a little more than 50 per

cent of the high school teachers in the accredited schools of the state. From these data, tables were compiled and graphs plotted setting forth the results.

The facts show that the great majority of the high school teachers are residents of the state, were reared either in a rural or an urban community (as distinguished from village community), and are sons and daughters of farmers and professional men (as distinguished from other social groups). There is a tendency on the part of men who were reared in a rural or village community to teach in rural and village schools. Women who were reared in a rural or village community tend to migrate to cities as teachers. The better prepared teachers are usually found in the city schools.

In point of academic training and professional experience, the facts show a condition very favorable. The typical teacher in the accredited secondary schools has had four years in high school, followed by four years in college or university work. The greater number of high school teachers are graduates of colleges and universities of A grade. North Carolina state-supported and A grade private colleges prepare more than 50 per cent of the high school teachers whose replies were used in this study. More than one-fourth of the high school teachers have had less than three years teaching experience, and about three times that many, or 73 per cent have been new to their present positions within the last two years. Again, 75 per cent have had previous teaching experience in three or more different school systems, and 87 per cent have had their teaching experience in high school (as differential from elementary school). The average length of total teaching experience, irrespective of location and type of position, is six years. The average length of time that a teacher remains in any one school community is two years. Approximately four-fifths of the men, and three-fourths of the women hold certificates of class A. The median salary of the high school teacher is \$1,450.00.

Correlation of salary with academic training shows that there is little correlation between training and salaries beyond four years' work in college or university. The limit of efficiency, as measured by salary, is reached within fifteen years. The high school teacher's maximum efficiency, as measured by salary, is reached within three years, if he remains in the same school community, a fact which would seem to justify the teacher in moving from one school community to another every two years. Little difference was found between the salaries of teachers who hold certificates of high grade and class and those who hold certificates of a lower grade and class. Correlation of salaries with subjects taught shows that there are certain subjects in the high school which offer better financial opportunities than other subjects. Teachers of practical arts subjects have considerably less training, and receive on the average much higher salaries than teachers of the common academic subjects. The study shows that 43 per cent of the men, and 62 per cent of the women are teaching the subjects in which they specialized in college or university, leaving more than

40 per cent who are teaching in part, at least, work for which they had not specifically prepared to teach. Sixty per cent of the teachers are confining their teaching to a single department of study; 31 per cent distribute their energies over two fields of interest; and about 9 per cent are teaching in three or more departments.

J. T. HATCHER. Compulsory School Attendance Laws and Practices in the South.

The purpose of this study was to ascertain the purpose and necessity for the compulsory school attendance laws in the various Southern states. Incidentally the relation between such legislation and child labor laws is treated briefly. Another purpose has been to suggest how the compulsory school attendance laws may be improved so as to promote the best educational opportunity particularly in the rural sections of the South.

Two fundamental reasons were found for compulsory school attendance legislation. The first reason is economic; it was found that statistics show that practically one-third of the public funds for school maintenance in the South was wasted on account of the low enrollment of the children and their poor attendance. The second reason appears to be humanitarian, the purpose to protect the helpless in his rights to an education and against the ignorance and selfishness of parents and the greed of employers. In treating the purpose and necessity of this legislation a historical sketch of its development is given from the old apprenticeship laws of colonial days to the more nearly modern provisions for school attendance and public welfare. The influence of the educational revival in the South about 1900 appears in the enactment of compulsory school attendance laws and some form of child labor laws in all the Southern states between 1905 and 1918.

The present status of compulsory school attendance legislation and child labor laws is given in tables which exhibit the features of the laws in the various states. A detailed comparison of the various features appears.

The study recommends very few radical changes, but suggestions are offered for making the laws broader and more uniform in regard to age and term limits and in regard to exemptions allowed. The real improvements needed are in the administration of the laws. Other things which will aid in securing the results for which these laws were enacted are suggested, such as consolidation of schools, better courses of study, improved farming and rural social conditions, and more efficient control of epidemics of diseases peculiar to school children.

S. J. HUSKETH. A North Carolina Program of Community Recreation.

This study traces the history of the play movement and the various reasons for fostering it, and the present status of play and recreation in North Carolina communities. The importance of play as a vital factor in education is treated.

Attention is called to the erroneous notions concerning play and recreation in isolated rural communities where play is often considered an agency of the devil to breed discontent in the home and mischief in the community. This idea, along with ignorance, in general is gradually disappearing, the study shows. The present status of play in the United States is given and the number of recreation centers, paid recreation workers, and expenditures of play and recreation are shown.

Answers to a questionnaire sent to representative schools in North Carolina tend to show that the State is expressing a lively and growing interest in play and recreation. This interest seems to have increased greatly since about 1915. There seems to be a growing spirit of coöperation, also, between school and community with respect to providing recreational facilities. Base ball and basket ball are the most popular games, while foot ball, track athletics, singing games, community sings, pageants and motion pictures are popular and profitable forms of amusement and recreation in North Carolina communities. The use of swimming pools and the surf for swimming and bathing is a favorite sport of a limited number of communities.

Though the outlook for play and recreation in North Carolina is very hopeful, there are many just criticisms of the movement at present in North Carolina school systems. Athletics in both colleges and high schools is being so commercialized that the few rather than the many receive the benefit of physical training. Recreation and recreational facilities should be institutionalized rather than commercialized. Group tests and group competition, rather than individual, should be emphasized. The school plant must yield a year-round service and all forms of school and community recreation must be supervised. Summer encampments must be increased, park and playground areas should be increased in number and in size, and the State should see to it that playground apparatus is sold as cheaply as possible. Organized play and physical education should be a part of our regular school program.

GENEVIEVE MACMILLAN. History of the Higher Education of Women in the South.

The purpose of this study is to trace the history of the education of women in the Southern States; to point out the social, economic, and political conditions which have produced changes in the theory and the practices of the education of women in that section of the country; and, if possible, to reach some helpful conclusions concerning the outlook for the future and those policies which should guide the State in the solution of one of the persistent problems of education today: how to furnish adequate educational opportunities for women. The study considers the subject throughout the entire period, from colonial times to the present, but the major part of the study is devoted to changes and conditions since 1860 and to those recent tendencies and movements which have affected the status of women and the new educational problems which the changed status involved.

Historically, the study naturally divides itself, therefore, into two periods: (1) the antebellum period; and (2) the period since the Civil War.

The story of the first period is that of meagre educational opportunities, and a limited curriculum, consisting of the rudiments of learning, music, painting, and embroidery. However, with the advent of the academy, conditions improved and girls were allowed to have instruction in mathematics, the classics, and elementary science.

The second period is a story of steady growth with the exception of a retardation during the Civil War and the years of reconstruction. During the first part of the period many institutions were established for the higher education of women, and, although the latter part of the nineteenth century and the first quarter of the twentieth century has not seen a considerable increase in the number of colleges, yet there has been an improvement in the quality of those already established; a remarkable growth in endowment and material equipment; increase in number of students; expansion and liberalization of the curriculum.

The study shows that woman has the right of a higher education which may or may not be different from that given to men; that the kind of her education should be determined by her individuality; that the policy which the State should adopt is that woman should be given the chance to choose her vocation and the education which will prepare her best for it; that it is the State's duty to do all possible to increase opportunities for women, both educational and social, and break down the traditional conception that woman's sphere is limited to the home. The future of the education of women in America is big with hope and promise, and the South must do her part in giving woman the education which will enable her to play a larger and more useful part in the life of the present and future.

GEORGE B. ROBBINS. A Study of the Professional Training of Teachers in the Accredited Secondary Schools of North Carolina for the Year 1922-'23.

The primary purpose of this study has been to ascertain the amount and character of professional training of teachers in the accredited secondary schools of North Carolina. An attempt has been made to answer six questions:

1. How much professional training have the teachers in the accredited secondary schools of the state had?
2. What has been the character of this professional work?
3. In what college year, or years, as a rule, was professional work pursued?
4. What effect does professional training have upon salaries, the professional reading of teachers, and which courses are judged by teachers to be of most practical assistance to them?
5. What do teachers in the accredited secondary schools of the state read in the way of professional books and magazines?

6. How do teachers in city, village, and rural schools compare in the amount of professional work done and in the amount and character of professional reading?

The data used in this study are for the school year 1922-23. They were secured by means of a questionnaire sent to the accredited secondary schools of the state. Replies were received from 560 teachers, representing about 50 per cent of the total number of teachers in the accredited secondary schools of the state, and from 93 schools representing approximately 50 per cent of the schools accredited by the State Department of Education at the time this study was undertaken.

The findings of this study are in brief as follows:

The teachers in the accredited secondary schools of the state would seem to be fairly well prepared professionally. The median number of professional courses taken per teacher is four and one-half, and the average number of courses taken is five. There are, however, many teachers who have taken no professional training, and more still who have had very little.

Prospective teachers and principals seem to take those professional courses which are designed to fit them specifically for the positions they expect to fill in active work; or, stated differently, there is a fairly high correlation between the types of professional work pursued and the sorts of position now held.

Most of the professional courses were taken in colleges of A grade as Junior and Senior electives, or as graduate work. The professional courses were, therefore, as a rule, based on a fairly good academic foundation.

Professional courses, independent of other factors, would seem to have little direct effect in the way of increasing salaries. It is clearly shown, however, that professional work does tend to develop a more professional attitude as is shown by the amount of professional reading done by teachers now in service.

General subjects, as a rule, were reported by the teachers as being of the least practical assistance, and Special Methods courses as being of the most practical assistance.

As a group the teachers in the accredited secondary schools of the state have done a fair amount of professional reading, but many teachers are doing no professional reading at all.

Contrary to what is generally asserted, the teachers in the rural accredited secondary schools have had as much professional training as those in the city accredited secondary schools, and are reading more professional books and professional magazines.

The data used in this study are presented in carefully compiled tables, and the results are shown in carefully plotted graphs and charts.

SAMUEL HUNTER THOMPSON. Public Education in Tennessee before 1860.

The purpose of this study was to show the educational theory and practice in Tennessee before 1860. Moreover, an attempt was made to show the development of the early means of school support in its relation to the public lands. It was shown that these lands were the first impulse toward the development of the first means of school support. Various financial difficulties in which the State became involved were also pointed out, the most important one being the controversy over the public lands, in which the United States, North Carolina, and Tennessee were involved. These confusing land deals were found to hinder the development of the colleges, academies, and the public schools.

The study traced the development of the schools from the earliest inception of educational interest, beginning with the home schools and ending with the system as it existed at the time of the Civil War. The major part of the study, however, was confined to the public acts of the State, and the laws dealing with the public lands.

The study concludes that:

(1) The State of Tennessee was very unfortunate in having her schools connected with the public lands. Much of the delay in establishing a school system was due to the land controversies between the United States government, North Carolina, and Tennessee, and between the colleges and academies on one hand, and the people on the other. It was only after the settlement of these disputes that a wholesome educational interest arose.

(2) The various school systems indicated the presence of too many minor executive officers without a controlling and supervising head. The office of superintendent of public instruction was created in 1836, but the first superintendent elected, McEwen, through an unwise use of the funds, brought the system into such public disfavor that the office was abolished, and legal proceedings were instituted against the school executive. Through this unwarranted action of the superintendent the system received a shocking setback which was felt for many years.

(3) The unfortunate association of the term "pauper" with the early public schools served to discourage the patronage of the general public.

(4) In spite of its weakness, the school system actually set up in Tennessee before 1860 contained some few elements of a modern school system and was moving forward at the outbreak of the Civil War.

The following doctoral dissertation was accepted by the Department in 1922-1923:

EDWIN MCKAY HIGHSMITH. American State Normal School Curricula.

The problem in the study is that of determining the principles underlying the development of American State Normal Schools as reflected in the historical setting of certain current practices and tendencies in curricular administration.

The phases here presented center around the number of curricula, their year length, types and academic status. The data were secured from catalogues from 142 institutions for 1919-1920 and 1922-1923. The historical material was gotten from all available sources.

The conclusions and recommendations are given separate summaries.

It is shown that:

(1) The schools of the North Central States are most liberal regarding all phases of curricular administration studied, those of the West standing next, Southern third and Eastern last;

(2) That Senior Normal Schools are uniformly more liberal than those of Junior standing;

(3) That all the State Normal Schools are increasing the number and year length of curricula, offering more varied curricula and raising the entrance requirements;

(4) That sub-college professional curricula are practically gone from these institutions;

(5) That the Normal Schools usually offer only professional curricula;

(6) That these schools are offering constantly more highly specialized curricula;

(7) That State Normal Schools are placing increasing emphasis on preparing rural teachers and high school teachers, especially the Senior Schools of Teachers' Colleges;

(8) That entrance requirements to normal schools approximate current college standards but are more liberal;

(9) That the State Normal School came to meet nation-wide educational, moral, political, economic and social demands;

(10) That these factors operated in different sections of the country to produce the widely varied types of present day institutions and current practices regarding curricula;

(11) That this sectional grouping is rapidly giving place to a movement towards displacing State Normal Schools with State Teachers' Colleges;

(12) That this movement is a natural evolution harmonizing with American Educational development and current demands;

(13) That in this evolution colleges and normal schools have come into harmful and needless conflict and misunderstanding;

(14) That this conflict is rapidly giving place to coöperation.

It is recommended that:

(1) All progressive American educational interests should concede the State Normal School its rightful place and function as a State Teachers' College;

(2) That the Teachers' College status should come as a gradual evolution properly safeguarded;

(3) That one State Teachers' College should be established within the School of Education of the State University;

- (4) That these institutions should be developed in such numbers as needed to meet the State's demands for trained teachers;
 - (5) That the curricula be confined to the undergraduate level and to the professional type only;
 - (6) That two-year curricula should continue to be offered in these institutions;
 - (7) That the entrance requirements should continue under liberal administration but be made more selective along personal lines;
 - (8) That the State Teachers' College should develop along progressive lines, in response to current educational needs, as an essential part of the public school system;
 - (9) That it should leave to the University School of Education the preparation of research workers, normal school instructors and college teachers;
 - (10) That the State Department of Education should have a State Director of Teacher Training with adequate assistance and authority to unify the State's teacher training efforts;
 - (11) That all this implies increased expenditures for providing public facilities for professional training of public school teachers.
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DEPARTMENT OF ENGLISH

EDWIN GREENLAW is chairman of the General Group Committee of the Modern Language Association of America. This committee constitutes a research council which coöperates with the thirty-five research groups which have been formed by members of the Association. Mr. Greenlaw is also actively connected with the Spenser-Milton Group of the Association, and is editor in chief of the projected variorum edition of Spenser which is in process of preparation through the coöperation of a number of American scholars. In June, he addressed the Conference of British and American Professors of English, in New York, on "Problems of Research," and he is a member of the executive committee of that organization. During the year he completed the following studies: "Problems in the History of English Thought in the Seventeenth Century." Before the Journal Club of Bryn Mawr College, October.

A survey of current investigation, with suggestions concerning further work. The emphasis was upon seventeenth century literature as a reflection of certain intellectual currents of the time.

"Some Old Religious Cults in Spenser." *Studies in Philology*, XX, 2.

The paper supplements two previous studies of aspects of Spenser's philosophy of Nature (*Studies in Philology*, XVII, 330 ff; 439 ff.). In the previous essays the discussion was concerned mainly with the sources and significance of the Garden of Adonis, the sources and characteristics of Spenser's conception of the cosmos, and his debt to Lucretius. The starting point of the present investigation is Spenser's reference, in *Mutability*, to "Aleyns Pleynt of Kinde" as the source of Chaucer's description of Natura in the *Parlement of Fowles*. It has commonly been held that the reference indicates nothing further than acquaintance with Chaucer. But examination of *De Planctu Naturae*, Chaucer, and Spenser, reveals that Spenser drew nothing from Chaucer except a clue to material for further study, while many details of his description of Nature came directly from the twelfth century tract of Alanus de Insulis. This thesis is strengthened by evidence, here first given, that an important episode in another part of the *Faerie Queene* (The Castle of Alma) is derived directly from Alanus.

The paper also points out the relationship of *De Planctu Naturae* to the ancient cult of the Great Mother of the Gods, which originated in Asia Minor, established relationships with Egypt, and flourished at Rome as the chief rival of Christianity. That Spenser was interested in this philosophy is proved not only by *Mutability* and *The Garden of Adonis* but also by several passages in other parts of the *Faerie Queene*. For these he drew on several sources, chiefly Plutarch's treatise *Of Isis and Osiris* and the *Argonautica* of Apollonius Rhodius. Taken together, therefore, we find a considerable body of material relating to theories of the origin of life, a sort of eclectic biology which while not scientific in the modern sense is remarkable in Elizabethan literature.

"The Captivity Passage in Sidney's *Arcadia*." *Manly Anniversary Volume*.

The story of the captivity of the two princesses by the wicked Cecropia (*Arcadia*, Book III) throws some light on the political and philosophical thought of its author. Reasons are given for supposing that the episode as a whole refers to Sidney's sense of the peril to England involved in the proposed French marriage. Cecropia is probably intended to represent Catherine de Medici; her plot was to get control of England through forcing upon Elizabeth a marriage with her son. The paper thus completes an earlier discussion by the same author published in the *Kittredge Anniversary Papers*. The second and third parts of the present essay deal with philosophical matters. Cecropia's injunction to Pamela to make use of her beauty is one of many Renaissance treatments of the "religion of beauty in woman," and is closely related to a passage in the *Faerie Queene* and to one in Milton's *Comus*. More important is the debate on the nature of the universe, which is shown to be a sustained and eloquent refutation of the

Lucretian physics. Lucretius was regarded in Sidney's time and later as one of the chief enemies of religion. Sidney's interest may have been awakened through the book against atheism written by his friend Duplessis Mornay, of which he left an incomplete translation. Evidence for this supposition is given through an analysis of the translation, but the essay holds that Sidney's own argument shows first-hand knowledge of Lucretius and was intended by its author to be a reply to that doctrine. The significance of the whole study is found in the light it throws upon Sidney's own intellectual curiosity and it helps to explain why, for example, a man like Bruno, himself deeply interested in the problem of the origin of the universe, should have dedicated to the young Englishman a number of his philosophical works.

NORMAN FOERSTER published, in March, his book on *Nature in American Literature* (New York: The Macmillan Company). Pointing out that American literature has developed in an age of romanticism and naturalism, Mr. Foerster holds that the theme of nature, handled both descriptively and philosophically, accounts for whatever measure of unity our apparently heterogeneous literature may possess. Selecting for special study Bryant, Whittier, Emerson, Thoreau, Lowell, Whitman, Lanier, Muir, and Burroughs, the writer has catalogued their knowledge of nature and has viewed their philosophy of nature in relation to their outlook on life as a whole. An underlying purpose of the book is to deal critically with the modern enthusiasm for nature as contrasted with the waning enthusiasm for the classical and Christian traditions.

Mr. Foerster is now at work on a study of literary criticism in America, in which he proposes to consider critically the leading criteria that have been expounded and applied by American critics. He has completed his study of Poe, part of which he read before the Modern Language Association a year ago, and another part of which is published in the July, 1923, number of *Studies in Philology*; and his study of Emerson, which is unpublished.

He has also published, in the March, 1923, number of *Publications of the Modern Language Association*, a descriptive bibliography of work done by American scholars in the year 1922 in the field of American literature, and will publish a similar survey for the year 1923.

THORNTON S. GRAVES has published:

Some Aspects of Extemporal Acting. *Studies in Philology.* October, 1922.

A considerable mass of material is brought together to show that, in spite of the repeated protests of critics, extemporizing by actors was extremely common in the Elizabethan theatres and continued to be a popular practice until fairly recent times. The paper points out that the chief reasons for these numerous departures from authors' texts were the precedent of early Italian players, the desire to evade sundry government regulations, the carelessness or laziness of actors, and the ability on the part of players to save the situation on the stage in spite of blunder or accident.

Recent Literature of the English Renaissance. *Studies in Philology.* April, 1923.

A classified bibliography of the more important productions of 1922 dealing with the English Renaissance. Some of the books included in the bibliography are reviewed, and brief notes accompany various articles which seem to call for annotation.

Ben Jonson in the Jest Books. Volume published in honor of Professor John M. Manly.

Ben Jonson, like Scogan, Tarleton, Quin, Garrick and others, was a popular hero with the compilers of early jest books. The paper handles the various anecdotes which had sprung up regarding the much discussed dramatist prior to the publication, about 1731, of *Ben Johnson's Jests*, and demonstrates that other entertaining stories about Jonson continued to be circulated until the end of the eighteenth century or even later.

Some Pre-Mohock Clansmen. A paper read before the Faculty and the Graduate Students in the Departments of Modern Languages at the University of Iowa, April 3, 1923.

The literature and state papers of the time contain abundant evidence to prove that numerous bands of organized roisterers very similar to the notorious Mohocks operated in England from the days of Elizabeth to the end of the seventeenth century. Considerable new light is thrown on the practices and personnel of such secret organizations as the "Damned Crew," the "Tityretues," the "Bugles" or "Oatmeals," and the "Hectors."

MR. GRAVES has completed the following productions which will be printed shortly:

1. Strolling Players in the Eighteenth Century.

A note supplementing the knowledge recently contributed to the subject of early itinerant players by Captain Elbridge Colby and Professor Alwin Thaler.

2. Some Chaucer Allusions (1561-1700).

Some forty allusions to Chaucer not contained in Miss Caroline F. E. Spurgeon's elaborate *Five Hundred Years of Chaucer Criticism and Allusion*.

3. On the Reputation of John Heywood.

The paper contains considerable material not utilized by Mr. Robert W. Bolwell in his recent book on Heywood—further evidence that Heywood was not only held in high esteem during the late sixteenth and early seventeenth centuries as a collector of proverbs and a writer of epigrams but that his works were rather freely consulted by Elizabethan dramatists and satirists.

At present Mr. Graves is engaged on the following papers:

1. Experiences of a Certain Stage Ghost.

A short stage history of the Ghost in *Hamlet*.

2. Complete Illusion on the Stage.

Numerous striking instances of the literal acceptance of action on the stage, together with an explanation of such phenomena.

W. F. THRALL has completed a study of a second phase of the problem of the origin of the Irish *imram* as a narrative type. This study, which appears in the John Matthews Manly volume (1923) under the title "Clerical Sea Pilgrimages and the Irish *Imrama*," supplements a previous study (*Modern Philology*, 1917) in which reasons were given for rejecting Zimmer's theory that the *imram* was modeled on Vergil's *Aeneid*, in favor of the theory of native origins.

In the fully developed *imram* (a romantic account of an adventurous voyage upon the sea in which the hero reaches the Otherworld) two streams of native Irish tradition are united: the Otherworld Journey, based chiefly upon Celtic fairy-lore and heroic legend; and the romantic accounts of actual experiences of Irish clerics upon the sea. The presence in the *imrama* of large bodies of material drawn from the Otherworld Journey, a type which is pre-Christian in origin, has led some students to regard the Christian materials embodied in the *imrama* as superpositions upon the pagan Otherworld Journey. But the evidence of Adamnan's *Vita Sancti Columbae*, which antedates the *imrama*, and from other hagiographical literature, strongly suggests that the *imram* may have developed primarily from accounts of real experiences of Irish clerics of the sixth and seventh centuries, who made dangerous voyages in frail coracles either to seek a sea-hermitage, *eremum in oceano quaerere*, to find the fabled *terra re-*

promissionis sanctorum, or to carry out some other pious purpose. The pagan materials are perhaps best regarded as borrowed embellishments, some of the borrowings being especially pertinent because they are taken from tales bearing some similarity to the *imram*.

Mr. Thrall is also revising and preparing for publication another study in the same field, an effort to discover the original historical setting of *Imram Snedgusa ocus Mic Riagla*, prepared originally as a University of Chicago dissertation.

A. C. HOWELL. Sir Thomas Browne and Seventeenth Century Scientific Thought. Read before the Philological Club, May 8, 1923.

The average reader of Browne's "Vulgar Errors," or the "Religio Medici" is struck more forcibly by his manner of saying a thing than by what he actually says. Critics usually classify him as a stylist, a latinist. It is the purpose of the writer to show that he was exceedingly learned in the science of his time, that he was really in a position to make contributions to the scientific thought of his age, and that he actually did so.

After discussing Browne's debts to Bacon and Descartes for his general ideas as to the method of discovering truth, and showing that, although he wrote in a perfectly orthodox manner, he approached his problems in a thoroughly sceptical frame of mind; the writer endeavors to work out Browne's method of attacking a problem, to reduce it to a formula and to note how he used it in a specific set of his errors. It will be found that he relies upon three weapons to combat error and arrive at truth: Authority, Reason, and Experience or Experiment.

Critics have always maintained that Browne was one of the last great adherents to the Ptolemaic Hypothesis. Bearing in mind his general attitude and his formula for arriving at truth, the writer attempts to show Browne's correct attitude, which is in line with his whole position on scientific matters and may be summed up in one word, open-minded. It was this trait which carried the "Vulgar Errors" through many editions. The book did much to clear the ground of a mass of errors and superstitions making possible the acceptance of the work of the later seventeenth century scientists.

The following theses for the Master's degree in English were approved by the Department in 1922-1923:

WADE H. ATKINSON, JR. Satire in the Recent American Novel.

In this study, the development of the use of satire in the American novel of the past ten years is traced. It is shown that during this period a change from the sentimental to the realistic school of fiction has been effected, largely brought about by the World War and its results. Coinciding with the effects of the War on our national life, the range of satire

has been extended from that of society life, youth, and business to include every possible feature of our existence. Because of the broad scope of this satire, it has been treated under the general heads of social customs and institutions, sex, business and politics, youth, and the revolt against the small town.

While the greater amount of the satire produced during this period comes from the pens of a few authors, there are a large number of writers who satirize certain objects and make satire a minor but brilliant feature of their work. Instead of being characterized by didacticism and personal embitterment, there is a certain aloofness in the works of these authors. Thus, in a manner pleasing to the public, they have portrayed the follies and abuses of our life.

SYBIL BARRINGTON. Spenser's Letter to Sir Walter Raleigh.

The Letter to Raleigh was annexed to the publication of the *Faerie Queene*, I-III, in 1590. Its importance lies in the fact that it explains the allegorical intention of the *Faerie Queene*; outlines the plan as a whole; and portrays Spenser's idea of poetry, epic poetry especially.

The thesis, an edition of the *Letter* with Introduction and Notes, discusses three topics. It is shown that the *Letter* is quite similar to other prefactory works, especially those of Dante and Tasso. In the study of the critical views of Spenser, based on what is known of his lost critical work, the *Shephearde's Calender* and the *Letter to Raleigh*, it is pointed out that he is the poet of his time both in his conception of poetry in general, and epic in particular. This conclusion is reached only after his relation to Sidney, the Italian writers, and the ancients is found. The moral purpose of the *Faerie Queene* is shown by relating it to the courtesy books of the sixteenth century, by pointing out its author's indebtedness to the "antique poets historicall," and by an interpretation of the use of the allegory used throughout.

CHARLES BOWIE MILLICAN. Antiquarianism in Edmund Spenser.

The purpose of the essay was to show that Spenser as an antiquary was but following the vogue of the age and that with his antiquarian interests the poet revealed especially the two Elizabethan traits of romanticism and nationalism. A brief survey was given of the antiquarian movement in general in England during the Tudor period; and it was shown that the movement was not odd and accidental, but just as expressive of the temper of the age as exploration, discovery, or literary production. A natural sequence then followed of the influence of antiquarianism on Elizabethan life and literature: in the former special attention was given to the progresses of Elizabeth; in the latter special attention was given to the revival of medievalism as exemplified in tournaments and chivalric settings in general in such works as Shakespeare's *Richard II* and *King Lear*, Sidney's *Arcadia*, Lodge's *Rosalynde*, Gascoigne's *Steele Glas*, and Nash's *Jack*.

Wilton. Spenser was then linked with the movement (1) through association either with antiquaries or friends of antiquaries and (2) through the peculiar psychology of his own mind.

The main study of Spenser's antiquarian interests was divided into four heads: (1) interest in chronicle history and ancient national customs; (2) interest in topography and geography; (3) interest in versification, philology, and etymology; and (4) interest in the revival of chivalry.

HENRY BASCOM MOCK. The Influence of Ovid on Spenser.

In the introductory section of this paper the evidence of Ovid's popularity in Renaissance England is discussed. The reasons for this popularity are pointed out as follows: (1) Ovid was considered an allegorical writer in the *Metamorphoses* especially; (2) he was the most convenient and complete source of classical mythology; (3) he is ornate and sensational; (4) he has dramatic intensity in narration and character study; (5) his style is graceful and charming; (6) his material is easily readapted.

These qualifications of Ovid are seen to be significant as the main body of the study proceeds. The first chapter of this deals with the Ovidian influence on Spenser's narrative and descriptive style. First, it is shown that Spenser has material resemblances to Ovid in a number of narratives. Where these material resemblances cease those of style and spirit still hold. Thus the many scenes of pursuit as well as the general air of intensity in Spenser's narratives are shown to be the partial result at least of Ovidian influence. Second, the great number of personifications in the *Faerie Queene*, while in no case bearing a close material resemblance to Ovid, are shown to be creations of the same literary impulse. And finally it is pointed out that, since Ovid was understood allegorically, and since personifications would be the most obvious feature of his work considered allegorically, the influence of Ovid is responsible for Spenser's liking for personification. Third, the dramatic element in the *Faerie Queene* is pointed out and compared with the like element in the stories from the *Metamorphoses*. Spenser, like the men of his day, delights in the color and vigorous movement of the pageant. It is shown that for his pageantry scenes he has borrowed material from Ovid who is rich in dramatic situations.

The second chapter deals with the moral and philosophical ideas borrowed from Ovid. In F.Q.III,ix Spenser expressed the thought that evil is not removed by restraint since it is a condition not due to circumstance. It is explained that this thought, as well as its setting, is derived from various places in Ovid. Second, it is shown that Spenser in working out his conception of the origin of life, his philosophy of change, etc., makes use of Ovid as well as Lucretius, in that he borrows specific details from pagan philosophy as explained in the fifteenth book of the *Metamorphoses* and from other places in Ovid.

The last chapter deals with Spenser's elegy. It is recognized in the beginning that Spenser is not always Petrarchan in the love poetry. A

differentiation of the sonnets into two groups is made, and by a comparison with certain elements in Ovid's elegy it is shown that one of these groups is Ovidian in spirit.

VIVIAN MONK. Narrative Types in the *Tatler* and *Spectator*.

It was the purpose of the essay to study the narrative art in the *Tatler* and *Spectator* with a view to: (1) classification into types, (2) sources of these types whenever the problem was practical, (3) Steele's and Addison's development of these types. By this study the vital part narration plays in the two periodicals was more firmly established.

The specimens of narration considered were divided into two kinds: realistic and imaginative—the realistic types being character-sketches and anecdotes, and the imaginative being allegories, fables, and oriental tales. So far as sources are concerned we know that Steele and Addison were following the fashion of the day when they wrote character-sketches since the "character" was the most prolific form of literature during the seventeenth century. Steele and Addison had little to imitate in the way of domestic anecdotes since the majority of the few journals that existed before 1709 were either political or ecclesiastical. Similarities may be seen, however, in the "Scandalous Column" of Defoe's "Review" and in some three or four insignificant periodicals that were published for a few months only, for example: "The British Apollo," "The Newes." As for the sources of the imaginative types, Steele and Addison were familiar with Ambrose Philip's translation of the "Persian Tales," Galland's translation of "Arabian Nights," and L'Estrange's "Fables of Aesop;" but the problem was not one of sources here since in a majority of cases Steele and Addison were merely translating and adapting and they acknowledge their sources frankly.

In the realistic types—character-sketches and anecdotes—our authors are important forerunners of the modern novel. Though the "characters" culminate in Sir Roger of the *Spectator*, the same methods used to vitalize Sir Roger are begun in the *Tatler*: (1) There are five instances of the serial idea—re-appearing characters—in the *Tatler*. (2) Anecdotes, biography, the personal touch are used to make the Upholsterer and Jenny Distaff more real.

Furthermore, the differences discovered between narration in the two periodicals show a gradual development toward more skillful narrative art. (1) Narratives in the *Spectator* are longer and more unified. Though short narratives are still used as mere illustrations for moral essays, the tendency is toward longer narratives that fill the whole of one paper. (2) The type *Court Sessions* is abandoned in the *Spectator* because it is too mechanical; whereas the imaginative type, Oriental Tales, which is not utilized at all in the *Tatler*, is used an increasing number of times as the *Spectator* continued to be published.

GARLAND B. PORTER. Benedetto Croce as a Literary Critic.

The literary theory of Croce is given an exposition, the aim being to set forth the foundation of the expressionistic school, with emphasis placed on how Croce arrived at his position. This is done by following his movements in both his studies and personal life. He began life as a student of esthetics, going later into the field of logic and metaphysic. Instead of abandoning his work in esthetics, however, he supplemented it with his other philosophical studies. In his logic he arrived at the conclusion that the concept is connected with the intuition in the relation of double degree, the intuition preceding the concept; thus the latter is dependent on the former but the converse not so. He adduces that a work of art is the expression of an intuition and that it can be judged only as to the perfection, or success, of the expression.

The thesis also takes up certain internal considerations and seeks to show that the literary theory and the logic are fundamentally one. To demonstrate further the theory of Croce, his actual literary criticism, especially that of Shakespeare, is studied and results are given. These bear out his theory; that is, his theory and practice do not disagree. Finally, a short criticism of Masters' *Spoon River Anthology* is given in the manner of Croce.

FRANK T. THOMPSON. The Influence of Wordsworth upon Emerson.

Writers such as Frothingham and Goddard have partly accounted for the influence of Wordsworth upon Emerson in their books on Transcendentalism in New England. But, until the publication of the *Journals* in 1909-14, it was impossible to make a complete study. The fact that Emerson, in his youth, was devoted to the Classics and to the writers of the Renaissance, while he cared little for Wordsworth, makes the study an interesting problem. For Emerson came to think highly of Wordsworth and as late as 1868 said that Wordsworth was the greatest poet in England since Milton.

The problem, then, is to account for Emerson's change from an all but complete adherence to Classicism to a partial acceptance of Romanticism. The part that Wordsworth played in this change is found, upon a study of the *Journals*, to be greater than is generally supposed. The three years intervening between Emerson's trip to Europe in 1833 and the publication of *Nature* in 1836 appear to be the years of greatest change in Emerson's thought and style. So far as Wordsworth is concerned, these are the years in which Emerson learned to read him aright and to turn to him for courage and inspiration and, to some extent, for doctrine. It is this aspect of the influence of Wordsworth upon Emerson that is essentially different from that of previous studies of the same nature. However, the thesis attempts to link together every phase of Emerson's attitude toward Wordsworth and, further, to suggest the direction this influence took in Emerson's work.

The following doctoral dissertation was approved by the Department of English, 1922-1923:

EDWIN S. LINDSEY. *The Music of the Songs in the Elizabethan Drama.*

The texts of the many songs found in the Elizabethan drama have been carefully studied and edited; but the original music for these songs has not been systematically investigated, except for Shakespeare. This dissertation is a study of the Elizabethan settings which are now extant. The field of the investigation includes the main works of the representative playwrights for the public and private theaters and for the court performances from 1552 to 1642, excluding Shakespeare. Examination of 259 plays by 61 dramatists showed that 140 plays (41%) contain songs. There are 471 songs. For 70 of the songs (about 15%) we have the original music. The British Museum preserves the MSS of 17 of the settings dating from 1600 to 1642. Extant publications from 1609 to 1660 contain 25 pieces. Most important of these publications is Dr. John Wilson's *Cheerful Ayres or Ballads*, Oxford, 1660, which contains about a dozen Fletcher songs. Publications of Ravenscroft, 1611 ff, and of the Playfords, 1650 ff, are also valuable. Nineteenth century reprints of sixteenth and seventeenth century MSS and publications give us 28 more settings. Most important of these reprints are J. Stafford Smith's *Musica Antiqua*, 1812, and Chappell's *Popular Music of the Olden Time*, about 1855. The latter work is our chief source for early ballad tunes.

The 70 pieces of music include 26 popular ballad tunes, 14 simple airs, 24 elaborate airs, 6 contrapuntal pieces. All the pieces except the ballad tunes were composed by highly trained musicians, usually men connected with the court.

Analysis of specimens of ballad tunes shows that they have usually the form of a Double-period (4 musical phrases), corresponding to the "ballad metre stanza;" occasionally the form of a Phrase-group (6 musical phrases), corresponding to a six-line stanza. The melodies are simple, shifting in tonality, plaintive in atmosphere as a rule. The rhythms and accents correspond closely to the metre of the verse; thus the music helps to emphasize the important words in each line and bring out the meaning of the ballad.

The simple airs were composed mainly in the style of ballad tunes, the contrapuntal pieces largely in the style of the Elizabethan madrigals. The elaborate airs were in the *aria parlante*, that is they attempted to reproduce in music the normal accent and shading of spoken verse, with all the important words stressed, whether they fell on metrical accents or not. Therefore they sacrificed regularity of form and rhythm, the outstanding feature of most music. Sense was preferred to sound—in theory. In actual practice the elaborate airs are hard to understand and appreciate.

The bulk of the dissertation is concerned with treatment of each of the 70 songs. The following points are discussed for each song: connection

with action of the play, metrical form, literary type, musical analysis, relation between words and music, composer, date, proof of use in the play. For the last point, which is very important, there is marshalled all the available evidence, external and internal, historical, biographical, dramatic, and musical. For a few of the songs we have contemporary documentary evidence as to their use in plays; for most of them the evidence is elaborately circumstantial. The 70 songs are from the following plays:

Barclay, *The Lost Lady*.

Beaumont, *The Knight of the Burning Pestle*.

Beaumont and Fletcher, *Cupid's Revenge*.

Brome, *The Jovial Crew*.

Cartwright, *The Ordinary, The Royal Slave*.

Dekker, *The Shoemakers' Holiday*.

Fletcher, *The Faithful Shepherdess, Love's Cure, Monsieur Thomas, The Captain, The Nice Valor, The Woman's Prize, Beggars' Bush, The Chances, Valentinian, The Bloody Brother, The Loyal Subject, Women Pleased, The Pilgrim*.

Fletcher and Massinger, *The Little French Lawyer, The Spanish Curate, The Lover's Progress*.

Ford, *The Lover's Melancholy, The Ladies Trial*.

Glapthorne, *Argalus and Parthenia*.

Heywood, *The Rape of Lucrece*.

Jonson, *The Poetaster, Volpone, Bartholemew Fair, The Devil is an Ass*.

Jonson, Marston, Chapman, *Eastward Hoe*.

Jonson, Fletcher, Middleton, *The Widow*.

Lyly, *The Maid's Metamorphosis*.

Marston, *The Dutch Courtesan*.

Middleton, *A Chaste Maid in Cheapside, More Dissemblers Besides Women, The Witch*.

Nash, *Summer's Last Will and Testament*.

Peele, *Edward the First, The Old Wives Tale*.

Mr. S. of Art, *Gammer Gurton's Needle*.

Sampson, *The Vow Breaker*.

Shirley, *Love Tricks, The Bird in a Cage, The Constant Maid, The Cardinal*.

Suckling, *Aglaura*.

Webster, *The Dutchess of Malfi*.

Wilkins, *The Miseries of Enforced Marriage*.

DEPARTMENT OF GEOLOGY

WILLIAM F. PROUTY was field geologist and paleontologist for the W. Virginia Geological Survey during the summer of 1922. The results of the field work and later study will be published in two reports of the West Virginia Geological Survey. The first

volume dealing with Mineral and Grant Counties is nearing completion and the other volume dealing with Mercer, Monroe and Summers Counties will be ready in a few months.

The revision of the geological map of the State of North Carolina by Dr. Prouty will be completed in the early fall. A special study of the Triassic of North Carolina is being undertaken. Detailed sections are to be made across the field at numerous places and data assembled for critical study of subdivisions and age.

During the past year Dr. Prouty was author of:

Geology and Mineral Resources of Clay County, Alabama, with geological map. Published by the Alabama Geological Survey, April, 1923.

Clay County is located in the Piedmont and Blue Ridge Physiographic Provincees of the State. Its thousand square miles of area is geologically highly complex. The metamorphosed igneous and sedimentary rocks are folded, faulted and injected by later igneous rocks of both acid and basic type. The Ocoee phyllites, formerly supposed to be of pre-Cambrian age is shown to be largely of Mississippian and Pennsylvanian age. Infolded areas of these Paleozoic rocks recur in a highly metamorphosed condition in east portion of county.

Clay County is the leading flake graphite producing centre in the United States. The county contains also extensive deposits of Mica, Pyrite, Limonite and manganese ores. These deposits are fully described. The graphite industry, because of its importance is treated in great detail.

Dr. Prouty was also collaborator in *The Silurian System of Maryland*, published May, 1923, by the Md. Geological Survey. This volume of 800 pages, 68 full page plates and over 2000 figures of Silurian life, is the result of the collaboration of four scientists: Dr. C. K. Swartz of Johns Hopkins University, Dr. W. F. Prouty, Dr. E. O. Ulrich of the U. S. Geological Survey and Dr. R. S. Bassler of the U. S. National Museum. In this volume Dr. Prouty is responsible for the study and description of the larger percentage of the nonostracod species of life. This study includes the description of 46 new species and varieties.

Messrs. H. C. Amick, C. H. Walker, Gerald R. MacCarthy and E. J. Alexander completed the topographic mapping of the Booker Creek Quadrangle and Messrs. H. C. Amick and G. R. MacCarthy mapped the area geologically.

Mr. T. E. Powell has completed a topographic and geological map of a quadrangle to the south of Elon College.

Clarence E. Miller has carried on extensive research in specific gravity methods for mineral determination.

The following theses were submitted for masters' degrees:

HAROLD CLYDE AMICK. The Geology of Booker Creek Quadrangle.

The geology of Booker Creek Quadrangle is, in keeping with the greater part of the geology around Chapel Hill, very complicated. It consists of both igneous and sedimentary rocks.

The topography of this area is in early maturity, being that of an etched peneplain. The streams are still cutting back into the hills, with the exception of Booker Creek, which is entrenching itself in a broad, flat flood plain.

The soil is poor, and the results of the attempts to carry on agriculture are small productions. Most of this soil is suitable only for native forest, and pasture.

There are three kinds of igneous rocks in this area; coarse-grained crystalline granite, fine-grained intrusive aplite, and a dense, heavy, basic intrusive rock.

The coarse-grained granite is by far the oldest rock in this area, being of late Proterozoic era in age. It is very resistant to the forces of erosion, therefore it forms the highest hills of this area.

The fine-grained aplite is much younger than the coarse-grained granite. It occurs as an intrusive rock in dikes of various sizes, and carried numbers of inclusions from the coarse-grained granite, which it cuts in all directions. These dikes are numerous and do not appear to be associated with the joints of the older rock in any way.

The basic rock is a true diabase, and is the youngest rock in the area; it cuts the old plutonic granite, the intrusive aplite, and the sedimentary rocks, carrying inclusions from all three of them. It is late Triassic or Post-Triassic in age, and was most probably introduced during the time of diastrophic movements which brought the Triassic period to a close in this country. It is unlike the aplite dike material in that it seems to conform to the jointing of both igneous and sedimentary rocks.

The sedimentary rocks of this area are Triassic in age. They are composed of a coarse shore conglomerate, and a very arkosic sandstone. The sandstone composes the greater part of the sedimentary rocks of this area. It rests upon both coarse and fine-grained granite, and appears to have been formed from material carried by torrential currents from the nearby granite land mass, under semi-arid conditions, and deposited in the Triassic trough-like sea. Beach pebbles which lie in thick beds on this area, show that the shore-line has moved back and forth over this area many times.

In places on this area and in the neighboring vicinities, large quantities of petrified wood of the conifer family lie thick on the surface of the Triassic deposits, associated with the water-worn beach pebbles. Not any of this wood has been found with the roots in place in the clay. This leads to the conclusion that it grew on the slopes of the semi-arid hills and mountains, and was transported by torrential currents to the shallow, muddy Triassic sea, where it became soaked with water and settled to the

bottom. It was soon covered by the Triassic sediments, and by means of molecular replacement was transformed to almost pure silica, the structure of the wood being very well preserved.

CARL HAMPTON WALKER. Comparative Study of the Newark of North Carolina and New England.

This comparative study was made in order to determine the conditions under which the Newark sediments in Eastern North America were deposited; and, to see if they were later subjected to the same deformation. To do this it was necessary to choose widely separated areas. A second reason for selecting the extreme regions within the United States is the fact, that of all the areas, these are the only ones in which the strata dip to the southeast. This suggests that the deformation following sedimentation was similar in the two regions.

The general topography in all the areas is about the same. The slight undulations are due to the underlying crystallines, dikes, sill, etc.

Due to the absence of the Paleozoic sediments in these regions, and to careful studies made by several leading geologists it has been determined that the region had undergone much erosion, and was probably an extensive peneplain. Lateral pressure from the east caused folding and faulting which resulted in the formation of basins. At this time deposition began.

A careful study of the deposits brought out many illuminating facts as to the conditions under which deposition took place.

A rather extensive search for faults resulted in one being found on the east side of the Deep River area. Here it was found that the sediments had been derived from the immediate crystallines lying to the east. Similar conditions, according to Davis, are found in the New England areas.

The dikes and sills were studied because of their importance in determining the sequence of strata in the northern region. They were found to be of little importance in the North Carolina areas. Near all the intrusives the surrounding sediment is very much baked.

The Deep River coal basin was examined in order to bring out the chief difference between the northern and southern areas.

The Newark soils were found to be rather poor. Their quick response to fertilizers, and the fact that truck crops can be raised much earlier on the sandy soil more than makes up for the poorness of the soil.

In the New England and North Carolina areas much hydro-electric power is developed. In the New England regions it has been used for manufacturing for a long time. In North Carolina it is being used more each year. Ultimately it will cause the most backward part of the State to become the most progressive.

The coal in the Deep River basin, although not the best of coal, is being used by the railroads, and for domestic purposes.

The conclusions arrived at in this work are as follows :

1. That, in the areas under discussion, the old land-surface had been reduced to a peneplain.

2. That the force from the east caused the deformation of this peneplain; the deformation caused deposition to begin.
3. That deposition probably did not begin at the same time in all the Newark areas.
4. That the climate was at least semiarid during a greater part of the period of deposition.
5. That the deposits were put down in shallow water; and the transporting agents were wind and water.
6. That the base of the Triassic is not seen near Chapel Hill, but is seen in the New England areas.
7. That the color of the sediments in the New England areas is deeper red than in the North Carolina areas suggests more leaching in the southern areas, and a difference in character of the original rock from which the sediments were derived.
8. That the intrusion of the dikes and sills came at, or near the end of deposition.
9. That the Deep River coal basin was formed before deposition began in the New England areas.
10. That a careful study of this coal basin, with a close correlation, would probably result in its being placed in the Permian period.
11. That, in order to place these formations in the periods to which they belong, it will be necessary to study all of the Newark areas in a comparative way.

DEPARTMENT OF GERMANIC LANGUAGE AND LITERATURE

E. C. METZENTHIN has contributed to the *Journal of English and Germanic Philology* (April and June, 1922) two articles on the *Heliand*, the only work of literature in the Old-Saxon vernacular, dated about 830 A.D., the special topic being *Home of the Addressees*.

The first chapter examines the so-called "Praefatio," a veritable riddle for the Germanists, having withstood all attempts at its satisfactory explanation, and repudiates it as a source of information concerning the author's personality and intentions.

In the second chapter the writer searches the epic poem itself for indications as to the home of its supposed readers, gathering all the references to the products, landscape, occupations (predominantly seafaring and fishing besides farming) in the country of the addressees. In addition, a survey of place names with "burg" and "holm," as appearing on medieval maps, is given.

The third chapter investigates the four extant manuscripts of the "Heliand"—two complete ones: Cottonianus, in the British Museum in London, and Monacensis in Munchen, and two short fragments: one in

Rome and one in Prague. An attempt is made to locate the original home of these four MSS and to prove that all can be traced to, or connected with, the missionary field of the Archbispopric of *Mainz*, situated along the coast of the North Sea and including Bremen, Magdeburg and Hamburg.

The "Heliand," therefore, appears to be destined for assistance in this missionary work, undertaken by the Carolingian Church, under the auspices of the Emperor Louis the Pious, in the northeastern part of the empire, including possibly Denmark.

MR. METZENTHIN read a paper on *Some Problems of the Heliand* before the Philological Club on December 5, 1922. It endeavors to show new ways of approaching these problems, particularly that of the personality of its unknown author. Mr. Metzenthin is working on some other problems of the *Heliand*, the next to be approached being "The Influence on the Author of Political Conditions and Considerations," and expects to publish a part of the results in *Studies in Philology*.

DEPARTMENT OF HISTORY

The following Master's theses were approved in 1922-1923 :
C. B. ALEXANDER. Woodrow Wilson's Political Ideas.

The purpose has been to examine Woodrow Wilson's most important political ideas and to inquire how far they are in agreement with the teachings of political science and especially to emphasize that part of his thought which seems most constructive.

Some of the conclusions Mr. Wilson reached are that there has been no responsible government at Washington and that it should be reformed so that the President may take leadership in Congress and in co-ordinating the departments. Congress has lost its opportunity of leading the nation by giving up the sovereign power of criticism. The fifty-seven standing committees work on a vast amount of legislation, but each is confined to one narrow field and there is little coöperation either with each other or with the executive branch.

The President is the proper leader of the nation because he is in more direct touch with public opinion. He should initiate legislation by delivering frequent messages to Congress in person, and he should steer important measures through Congress by controlling the party organization, as he is the only nominee of the whole party. Cabinet members should sit in Congress and represent the administration policies and coördinate the Executive and Legislative departments.

American democracy is based on national character and long training in self-government. Our serious blunders in government of late do not prove that democracy has failed but only show that we have failed to apply

the principle of democracy to our modern conditions which are so different from those of the early days of the Republic that new methods have to be adopted to restore the government to the people. Control of the government should be restored to the people through direct primaries, the short ballot, popular election of Senators, the adoption of the initiative, referendum and recall in places where the people do not have truly representative governments in their legislatures. The recall should be restricted to administrative officers, but the judges should be independent of all perverting influences. The popular selection of judges is more effective as a method of controlling them than the recall. After all, public opinion must restrain the judiciary as it does the other parts of government.

As to the proper function of government the socialistic school makes the mistake of raising our large corporations out of the realm of individual morality and personal responsibility. Our newly established commissions for regulating monopolies are tending to draw the government more and more into ownership and operation of industries. The older method of courts is preferred to commissions for guaranteeing that all interests are safeguarded. The laissez-faire theory should be revised to secure freedom for the individual under modern conditions. Under our complex business and social relations, law must come to the assistance of the individual to see that he gets fair play, and to abolish all unfair competition. No limit must be theoretically on the State interference with the activities of the individual. Human freedom consists in perfect adjustment of these activities. Free enterprise must be preserved to make sure of equality of opportunity and individual initiative.

VICTOR VARD ADERHOLDT. The Political Theories of Elisha Mulford.

About the middle of the nineteenth century American political thinkers began to attack political problems in a scientific manner. Prior to this time there had been little, if any effort to make a systematic and careful study of political science. The forerunner of this new school of thought was Francis Lieber, who had come to this country in 1827 to escape the reaction in his native land that followed the Congress of Vienna. Lieber must be given credit for blazing the trail for Elisha Mulford and those who came later.

Mulford was obviously under the influence of the German political philosophy. In his book, *The Nation*, the influence of Hebel and Stahl is evident. Speaking of this influence Professor Merriam remarked that "following Lieber came studies of the type of Mulford's *Nation* (1870), a striking illustration of the intoxicating efforts of undiluted Hegelianic philosophy on the American mind." Professor Dunning discussed this same influence as follows: "Elisha Mulford, in *The Nation*, gave to the American people, after the Civil War, a version of German political theory, in a manner and with much of the substance of Stahl."

Mulford came out strongly in defense of the organic theory of the state. This theory, he contended, is the most logical and reasonable explanation of the nature of the state. He not only held that the state is an organism, but that it is also a conscious and moral organism, whose laws act "with unvarying certainty."

In addition to his theory of the nature of the state he treated its origin, holding that it originated through the instrumentality of God. He further held that the representatives of the government are "responsible to God and accountable to the people."

The theory of natural rights, as set forth by seventeenth and eighteenth century thinkers, he rejected. He held that man possesses no absolute or inalienable rights which the state may not disregard in time of extreme danger.

His conception of the nature of the American Union was not wholly unlike that of Abraham Lincoln, although he perhaps had less regard for the States of our Union than did Lincoln. In fact he held that the Federal Government is supreme and that the States are mere administrative districts and nothing more.

Sovereignty he held to be indivisible, inalienable, and indefeasible. He located sovereignty in the organic people and denounced vigorously the Hurd-Brownson view that it rests in the States united.

It is fair to say that he was the outstanding exponent of German political philosophy in this country. While many political thinkers in America since his time have shown a decided tendency toward the Germanic view; it is not so easy to say how much they were influenced by Mulford's views.

JOHN W. COKER. The Political Theory of John C. Hurd.

This paper has attempted a critical analysis of the political theory of John C. Hurd, as contained in his published works. An analysis was made of each of his three works, *The Law of Freedom and Bondage in the United States* (1858-1862), *The Theory of Our National Existence as Shown by the Action of the Government of the United States since 1861* (1881), and *The Union State, A Letter to Our States-Rights Friend* (1890). It was found that Hurd's main interest was in evolving a correct conception of the nature of the union and of the nature and location of sovereignty therein. His views on these subjects enable one to place him in the Post-Civil War Nationalist School of political thinkers, though it was found that of that group only O. A. Brownson had similar views.

Hurd's view of sovereignty is that its location must be determined by the facts back of the constitution rather than from that instrument. Sovereignty, according to Hurd's view, is "will and force directed to a certain political end." He held that the political peoples of the several states united are the possessors of sovereignty in the American union. It seems that since the Civil War the Supreme Court of the United States has adopted this same view of the nature of the union.

CORA J. MOSS. The Origin and Development of the General Assembly in Colonial North Carolina.

The purpose of this investigation is to study the authorities for legislative beginnings in the Carolina Colony, and to trace the gradual development and evolution of the general assembly into an organization representative of the people's interests.

With reference to the plan and purpose of the Lords Proprietors in planting the colony, two facts are certain: first, it is evident, from the charters, concessions, fundamental constitutions, and various instructions to colonial governors, that the proprietors themselves did not know just what form of government they wanted enforced in the colony; second, that whatever form this government took, the colony must be first of all a successful financial venture.

Throughout the entire colonial period there were present in the colony two incompatible ideals. On the part of English authorities was the desire for monetary gain, and for the strengthening of English colonial possessions: on the part of the colonists, through the activity of the Assembly, was the determination to have a voice in their government, and not to be subjected by English interests.

Most of the materials used in preparation of this paper were, *The Colonial Records of North Carolina* in two volumes, edited by W. L. Saunders, and *The State Records of North Carolina*, volume 23 of which is a compilation of the laws in North Carolina from 1715 to 1776. Reference has also been made to available histories covering the period.

JULIA CHERRY SPRUILL. The Political Ideas of Orestes A. Brownson.

Orestes A. Brownson became, after many changes in church loyalty, a Catholic publicist. From 1844 to 1876 he owned and edited *Brownson's Quarterly Review*, through the medium of which he set forth his ideas of religion and polities. His *American Republic*, published in 1866, was an attempt to present his political philosophy in a scientific, systematic way. In this book Brownson discussed the origin of government and its justification, the constitution of the state and of the government, the constitution of the United States and the nature of the Union.

The basis of all of Brownson's political theory was his belief in the divine origin of government. The right to govern, he said, came from God through the people. The people were thus sovereign not in their own native right, but possessed merely a delegated sovereignty. Since the origin of all government was divine, every existing government was sacred and inviolable, and resistance to any constituted authority was not only disloyalty to the State but also a sin against God.

Government he regarded not as a necessary evil but as a beneficent agent. He held that the end of government was not merely to redress wrongs and punish transgressors, but that its two chief functions were:

(1) to maintain justice between man and man; and (2) to direct the activity of society to the common good of all of its members. In the early part of his life he was attracted to the conditions of the laboring men and sought to ameliorate their sufferings by political action, but later he became less interested in social reform and emphasized the rights of individuals as opposed to the rights of society. He cannot be identified with either the individualistic or the socialistic school of writers, for he held what has been called the "compromise view" of the functions of government. He attempted to draw no fixed line between the legitimate and the illegitimate functions of government, but considered each question separately and judged whether it came within the sphere of state action.

Brownson drew a distinction between the written and the unwritten constitution. The former, he declared, was the constitution of the government, that which the people give themselves. All it did was to provide for a wise and just administration under it, and it was no more than waste paper unless it was in accord with the unwritten, providential constitution of the people. The unwritten constitution he described as the constitution which is born with the state, the organic constitution, or the way in which the elements of society are organized.

Until 1861 Brownson held the theory of state sovereignty, but when he saw his theory practically expressed in the actual secession of the southern states, he set out to find a new philosophy. He based his inquiry not upon the evidence of the written instrument, but looked beyond the written constitution to the power which created it, and came to the following conclusions: (1) the United States are and have always been a single sovereign nation; (2) sovereignty resides neither in the general government nor in the several state governments, but in the people of the United States or the states united; and (3) the organization of the people into states united was not the work of the written constitution but was anterior to the written constitution. He came to these conclusions, it would seem, by employing the ideas and logic of Calhoun, although he changed or abandoned Calhoun's premises.

D. J. WHITENER. The Rise of the Standing Committee System in Congress.

Congress has developed a parliamentary institution which today virtually controls legislation. This is the system of standing committees. The purpose of this paper is to trace the beginning of this system, to discuss its development, and to see the extent to which Congress is controlled by it.

The custom of appointing committees in legislative bodies originated in England as early as the fourteenth century. Practically all the colonies used committees; the colonial assembly of Pennsylvania had developed the custom further than any other by the time of the revolutionary war. Thus England, the colonies, and the Continental congresses used committees which served as precedents and a background for Congress.

Two types of committees were used in the formative period of the government—select and standing. The select committee reigned practically supreme for the First and Second Congresses, as there were only two standing committees during this time. With the Third Congress, the select committee reached its zenith and from then on gradually declined in number and importance. The evolution of the standing committees began in the First Congress. By the opening of the century there were six standing committees, consisting generally of seven members each. The committees of Elections, Claims, Commerce and Manufacturing, and Ways and Means are the basic committees because in later years they were subdivided into about twenty-three separate standing committees. This increase of committees signifies an increased division of labor. The Speaker was given the power to appoint all standing committees, regardless of size, after the Second Congress.

Three fairly definite lines of procedure were observed in appointing members to the committees: First, with but few exceptions, no state had two members serving together on the same committee. Second, practically all the members were chosen because of ability. Third, committeemen were chosen along political party lines as early as the Fourth Congress. During the Fifth and Sixth Congresses, as a rule, all the committees were controlled by the Federalists, but the Seventh Congress shows the Republicans in the majority on all the committees. It is well to note that members and chairmen were not appointed on account of seniority during the first twenty-five years of the new government. Although there were re-appointments which served as precedents for another carefully guarded custom in later years, the re-appointments were not according to any conscious or pre-arranged plan.

The House of Representatives was the real business department during the early years of Congress. In later years the Senate generally copied the organization of the House, so far as such organization was necessary. The great Committee of the Whole House on the State of the Union in the House did much of the work before standing committees usurped its importance. The standing committees in the House, excepting the two appointed in the First Congress, all went through a process of select committee evolution. Their development was gradual because of two reasons, first due to the nature of the committee and secondly due to extra-committee influence.

The outward relations of the committees to public and private interests and to the coördinate branches of the government began at a relatively early date. The private interests were sacrificed for the general interest during the Federalist period. The executive department also during this period exerted a great deal of influence on the committees, though this was changed by the coming of Jefferson. Between the two Houses a conflict is easily seen. However, the House generally dictated its policy to the Senate.

THE LIBRARY

L. R. WILSON made a special study of reading in North Carolina, and published the results in the following paper: "The Use of Books and Libraries in North Carolina," *Journal of Social Forces*, I, 2, pages 78-86.

1. A study of public libraries in North Carolina, with statistics of library income, relation of income and books to the population served, and other data.
 2. A similar study of other classes of libraries, such as college and high-school libraries.
 3. Statistics of newspaper and periodical circulation, book-stores and news-stands, and books for negroes.
 4. Recommendations for further development.
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DEPARTMENT OF PHARMACOLOGY

Research in Progress by WILLIAM DEB. MACNIDER.

Studies concerning the influence of a disturbance in the Acid-Base Equilibrium of the Blood of Renal Function and Pathology.

Study I. The Effect of Acid and Alkaline Solutions on Renal Function and Pathology in Normal Dogs.

Accepted for publication by *The Journal of Metabolic Research*.

In normal dogs in which there has developed from the use of an alkaline solution or a N/2 solution of hydrochloric acid an inability to effect a readjustment in the acid-base equilibrium of the blood, the type of renal injury is in general the same. This injury is primarily one of cloudy swelling of the renal epithelium which is most marked in the cells of the convoluted tubules. The more advanced changes of degeneration consist in edema, vacuolation and more rarely an early necrosis of the tubular epithelium.

Study II. The Effect of Acid and Alkaline Solutions on Renal Function and Pathology in Naturally Nephropathic Dogs.

The pathological response of the naturally nephropathic kidney to alkaline solutions of different molecular concentration has been of the same type as has occurred from the use of N/2 acid solution, with the exception that the amount of stainable lipid material that can be demonstrated in the renal epithelium is marked when an acid solution is employed and usually absent when an alkaline solution is used.

Such changes have been very largely localized in the convoluted tubule epithelium and consist of an edema with vacuolation and necrosis of these

cells. The degree to which these changes develop depends upon the duration and severity of the disturbance in the blood chemical environment of the kidney.

Study III. The Ability of an Alkaline Solution to Protect the Kidney of Normal and Naturally Nephropathic Dogs Against an Acid Solution.

The naturally nephropathic kidney is more susceptible to the toxic effect of a N/2 solution of hydrochloric acid than is the normal kidney. Such a solution in naturally nephropathic animals induces a more marked disturbance in the acid-base equilibrium of the blood. The naturally nephropathic animal is unable to readjust this disturbance and establish a normal physico-chemical state of the blood. As a result of the persistence of such a disturbed environment renal function is rapidly reduced, albumin and casts increased in the urine, the elimination of phenolsulphonephthalein is delayed and decreased in its output to a trace. The animals become anuric. Such changes develop to a less extent in normal dogs than in naturally nephropathic dogs. The use of a solution of sodium carbonate equimolecular with a 1.5 per cent solution of sodium chloride in such normal animals protects the kidney against the toxic effect of a N/2 solution of hydrochloric acid.

The intravenous injection of such a solution of sodium carbonate into naturally nephropathic animals before the use of a N/2 solution of hydrochloric acid confers a partial protection to the kidney of such animals. This protection is shown by the naturally nephropathic animals being able to more nearly maintain a normal acid-base equilibrium of the blood. With this physico-chemical state of the blood more nearly approaching the normal, the naturally nephropathic animals that have received the alkaline solution continue to form urine until the termination of the experiments. The urine from such protected animals has contained only a trace of albumin and no casts. The elimination of phenolsulphonephthalein is in excess of that obtained from the animals without the protection. The histological evidence of injury to the kidney is less marked than is the case in naturally nephropathic animals that have not been protected by the use of an alkaline solution.

Kidney Function from the Standpoint of the Organism as a Whole. *Southern Medicine and Surgery.* Vol. 85, No. 7, 350, 1923.

There are known to be three fundamental conditions in the animal organism which must be maintained at the normal in order for the organism to function properly. These are body temperature, osmotic pressure and a normal acid-base equilibrium of the blood.

So long as physiological life exists, the acid-base equilibrium of the blood is maintained at a point of neutrality. This is very largely accom-

plished through the activity of the kidney. Through this activity all of the cells of the organism are furnished a blood with a normal physico-chemical environment in so far as its acid-base balance is concerned. When renal function is disturbed the blood chemical environment of cells is disturbed and unless a readjustment of the environment can be accomplished disease and death result.

The inside environment of the organism must receive the same consideration as its outside environment if we are to understand adaptations and survivals.

DEPARTMENT OF PHYSICS

OTTO STUHLMAN, JR. The Extension of the X-Ray into the Ultra-violet Spectrum. Preliminary announcement, *Science*, Vol. LVI, September, 1922.

It was found that when thermions liberated from a tungsten filament were accelerated and allowed to impinge on a metal grid maintained at a variable positive potential, secondary electrons were emitted from the grid. The number of such secondary electrons emitted was measured by means of a galvanometer in series with the grid and a plate maintained at a constant positive saturation potential.

On plotting the secondary current as a function of the accelerating voltage acting on the primary electrons, sudden changes in the slope of the curves occurring at critical potentials were interpreted in the usual way. The energy—quantum relation V (volts) L (A)=12320 was used to compute the equivalent wave-lengths.

The following table gives the preliminary results thus far discovered. The quantities bracketed are still doubtful. At present it appears as if the convergence wave-length for tungsten ended at 91.2A and is followed by an absorption band extending probably down to 14A. This is then followed by the Maline, here extrapolated from the above measurements.

TUNGSTEN

Volts	Wave-length (A)	Remarks
4.4	2800	Hull found 2700 shortest spark spectrum Suspected
(17)	(725)	
35.0	352	
(60)	(205)	Doubtful
135	91.2	
144	85.6	
181	68.0	
295	41.7	
435	28.3	
()	()	
1750	7.04	From X-Ray Extrapolated M=7.007

IRON

Volts	Wave-length	Remarks
3.3	3763	
8.5	1450	Millikan's iron spectrum shows 1430 and 1409
10.4	1184.6	also 1184
24.3	507.0	also 506 and 552.1 Intensity 7 M computed from Sanford's formula gave 484A
25.8	269	Iron shows spectrum 271.6A
200	61.6	

Otto Stuhlman, Jr., and D. A. Wells. The Radiotron as a source of Negative Electric Resistance. Read at the Amer. Phys. Soc. Washington Meeting April 1923. In press.

Otto Stuhlman, Jr. Radiations Lying between the Ultra-violet and X-Ray Spectrum. Elisha Mitchell Sc. Soc. Read April 10, 1923. Abstract in press.

The report comprised a theoretical discussion of the results obtained in the above cited paper and their probable place in completing that part of the spectrum lying between the extreme ultra-violet and very long wave X-Ray Spectrum.

D. A. Wells and Otto Stuhlman, Jr. Secondary Emission Emission from Some Metals when Bombarded by Thermions. (Proposed Master's Thesis).

Otto Stuhlman, Jr. The Distribution of Velocity Amongst the Secondary Electrons Emitted by Metals when Bombarded by Thermions of Given Velocity. (In Progress).

W. Cathey and Otto Stuhlman, Jr. An Evaporation Method for Platinizing Quartz Fibres Used in Electrical Precision Instruments.

The proposed problem has been solved from the point of view of practicability and design. A theoretical consideration has shown that in order to produce uniform deposit of metal on a linear fibre the platinizing wires must be placed two deep, set in echelon.

DEPARTMENT OF PSYCHOLOGY

J. F. DASHIELL has been making studies on the problem of the relation of number of blind alleys to total maze difficulty in animal learning. Results of a preliminary experiment conducted under his direction two years ago tended to show that a simple relation held: that increasing the number of culs-de-sac

served to increase the difficulty in learning the maze in the same ratio. Three repetitions of the experiment have been made with identical technique, with results showing that the increase of difficulty is very irregular but tends to follow a law of decrease by geometrical progression.

Mr. Dashiell is making preliminary studies of habit hierarchies in human reactions.

H. W. CRANE has been working upon the analysis of reaction data previously secured by the method of free chain association. F. H. ALLPORT has been working upon the problem of the measurement of traits of personality. Fifteen copies of a rating scale covering twenty-four significant traits were given to each member of the freshman class at the time of the intelligence examination, for the purpose of obtaining ratings from his acquaintances. Self-ratings by the students were also obtained. One hundred names from the freshman list were selected, for whom the rating scale returns were most adequate. A statistical study is being carried on with these returns, including the following specific problems: (a) Correlations between rankings in the following traits and capacities: intelligence (Otis) and general insight; intelligence and general excellence of personal traits; intelligence and objective-mindedness; insight and objective-mindedness; insight and excellence of personality. (b) Relative reliability of ratings upon different traits. (c) Relative insight, as judged by self-ratings, upon different traits. This includes tendencies to over self-evaluation. (d) A study of the relation of intelligence and character traits to scholarship, carried on by graphing the standing in various traits of students selected from the Dean's records of high and low men.

A finding of interest already obtained is that the trait of extroversion-introversion follows a normal distribution curve rather than a bimodal distribution as implied by psychoanalytic discussions of the two types.

The final aim of this research is the devising of a scale of tests, standardized by ratings, for measuring the fundamental traits (other than intelligence) of individuals. One such test, developed in co-operation with F. M. Dula, is included in the report of the latter's thesis.

For the purpose of analysis of traits by self-study, a systematic questionnaire has been developed, comprising 176 questions and divided into the fields of developmental history, intelligence and abilities, emotion and bodily activity, ambitions and interests, habits of work, recreation, social and moral aspects (character), sex and family life, attitude toward self and reality, and compensation and self-improvement. This questionnaire will be used also in research in problems of vocational guidance.

Mr. Allport has continued with the editing of the Journal of Abnormal Psychology and Social Psychology, a quarterly devoted to research and theoretical contributions in the two fields indicated by its title.

A paper read by Mr. Allport in December, 1922, before the Elisha Mitchell Scientific Society, dealt with research upon the recognition of emotional expressions in the face. This study revealed the following points: (1) There is a rather surprising inaccuracy of persons in judging the facial expressions of the various emotions. (2) The fundamental affective expressions of laughter and pain are more accurately identified than the more complex emotional states, such as fear, scorn, anger, etc. (3) Subjects of low ability in recognizing the expressions improve markedly through a brief study of a chart describing the expressions. (4) It seems likely that the large differences existing between individuals in this ability are due rather to differences in previous observation and study than to innate differences of capacity.

W. D. GLENN, JR., has been in the field starting research upon the inheritance of intelligence in a cacogenic family, working in coöperation with Bureau of Mental Health and Hygiene of the State Board of Charities and Public Welfare. Various evidences of the degree of adjusting capacity have been obtained for over 360 individuals. General intelligence ratings have already been secured through the use of the Stanford Revision of the Binet-Simon Tests for 75 of the 250 living cases being studied.

FREDERICK M. DULA. Methods and Problems in the Measurement of Personality (Master's Thesis).

This Research is an attempt to establish methods of group testing for extroversion-introversion (objective-subjective mindedness), compensation

and other traits. It was found that the Kent-Rosanoff Association test, which measures objective-mindedness, if given as a written test to a group, yields a high correlation with the rankings based upon scores in the test when given to the individuals separately. The test was thus found valuable for group use.

A group method was devised as follows for showing the resistance of subjective-minded individuals to revealing their emotional complexes. Each subject was required immediately after writing his response to a stimulus word in free association, to perform a written arithmetical calculation. The accuracy of such calculations was compared with the subject's accuracy in similar calculations performed independently of the association tests. It was found that the arithmetical work of the subject-minded subjects improved rather than suffered through having the association tests to perform. This improvement is interpreted as an effort to overcome the emotional excitement aroused by the 'tapping' of complexes through strongly toned stimulus words, an effort which showed itself in heightened attention to the performance, with the result of increased accuracy in the arithmetical problems. The test, therefore, has value for measuring the 'resistance' of the introverted type.

It was further found that this resistance-tendency does not increase with degree of subjective-mindedness, but reaches its maximum not far from the middle of the group when ranked from objective to subjective-mindedness. This result tends to establish a 'complex' or psychoneurotic type of person exhibiting one form of subjective-mindedness. This class of subjects seems identical with the 'complex' type found by Jung to be outwardly distractable in association tests, a type also to which the term *extravert* has been applied. At the extreme subjective-minded end of the scale individuals show less resistance to distraction and invasion of complexes. These form the technically defined *introvert* group. Three types, therefore, are differentiated by this test in conjunction with the K. R. test; namely, objective-minded, extravert, and introvert.

The subjects, sophomores and juniors in college, who were 18 in number, were now divided into two groups, roughly the objective-minded and subjective-minded, respectively, according to the K. R. test. A study was made through personal interview of the tendencies, shown in the history and behavior of each subject, to compensate for physical, intellectual, social or other deficiencies by concentrated effort. It was found that the average tendency (ranking) in such compensatory effort for the objective-minded group was considerably higher than for the subjective-minded group. Evidently the resistance shown by the latter in their increased effort in the arithmetic-association test can not be regarded as compensation in the true sense. Since this resistance is an effort for repression, *i.e.*, to avoid facing facts as they are, it may indeed be considered as a reaction opposite in character to overt compensation.

The results of this research throw doubt upon the validity of ratings by associates upon the trait of objective-subjective mindedness. Significant

correlations were found by the use of the rating scales between subjective-mindedness and sensitiveness, intelligence and executive ability, intelligence and good humor, sympathy and humor, tenacity and energy.

H. A. HELMS. The Learning by White Rats of an Inclined Plane as a Cue. (Master's Thesis).

The problem of this study was to see if white rats could learn a maze placed on an inclined plane of thirty degrees, in which the inclination itself was the only cue. The food box was already at the top of the incline, so that the rats' problem was that of learning to take the path leading upward. A simple maze thirty-six inches square, with four alleys, each four inches wide and five inches high, was used. Each alley led to the choice chamber, which was located in the center of the maze.

To eliminate possible cues, due to spatial relations within the maze, it was rotated to the left ninety degrees, and the table on which it was placed was rotated to the left ninety degrees after the first run; after the second run, it was rotated one hundred and eighty degrees, but the table was not moved; after the third run it was rotated ninety degrees, and the table the same again; and a different alley made the proper exit alley, by being placed on the upward slope. This also eliminated cues in terms of absolute directions, or of "landmarks" in the experiment room. To eliminate special visual cues, an electric light was placed directly over the choice chamber, and two feet above it, so that the alleys were equally lighted, and the maze was painted a dead black throughout.

Nine animals were selected for this experiment on January 13, and given ten days of preliminary training, seven days being given to runs in a straightalley, and three days in the maze in which the animals were run during the experiment, before placing it on the inclined plane. The experiment continued for one hundred days, making a total of two hundred runs, two runs being made daily, one in the morning and the other in the evening. A separate record was kept of the time and errors for each run of each rat, and a curve plotted for each, according to the record made. Different criteria were used for judging the degree of learning. One was that one-third of the total runs should be errorless before any degree of learning would be shown, since only three choices were possible; a second was a comparison of the results between the first and the fourth quarters of the entire series; a third was a comparison of the results between the second and third quarter; a fourth was a comparison of the results between the first and the last half; and the fifth was a comparison of the amount of improvement in time and errors, as shown by the graphs.

Some of the animals failed to show any degree of learning by any criterion, while three showed a clear degree of improvement by all the criteria mentioned. From the results of this study, one would infer that kinaesthetic sensations were the main cue by which the animal was guided, since the animal was in a different position each time while running to the choice chamber, one run the fore feet being higher than the rear ones,

the second run the right feet were higher than the left, while in the third there was a reverse, the left feet being higher than the right, which clearly shows that a distinct stimulus was received at each run.

DEPARTMENT OF ROMANCE LANGUAGES

WILLIAM M. DEY expects to have ready for publication in the near future his study of the *Poèmes Philosophiques* of Alfred de Vigny. He is continuing also his work in phonetics, and is preparing a text-book on the subject designed especially for young students.

STURGIS E. LEAVITT. Chilean Literature. A bibliography of literary criticism, biography and literary controversy. (Parts II, III, and IV) *Hispanic American Historical Review*, Vol. V, *Review*, XIII, 151-94.

A bibliography of Bolivian literature. To appear in the 274-97, 516-34, 760-76.

A bibliography of Peruvian literature, 1821-1919. *Romanic Review*.

Argentine Literature. A bibliography of literary criticism, biography and literary controversy.

(In preparation).

Spanish American literature in the United States.

Among other topics this study will discuss the first mention of Spanish American literature in the United States, early translations, the beginning of research in this special field, notable collections of Spanish American books, the introduction of courses in Spanish American literature in American universities, and recent contributions to this subject.

DEPARTMENT OF RURAL SOCIAL ECONOMICS

E. C. BRANSON AND S. H. HOBBS, JR., directed the usual collateral studies of particular North Carolina problems in economic, social and civic fields, some sixty in number in 1922-23 and more than 550 all told during the last nine years. Thirty-six of these were given in brief to the public in the weekly issues of the University News Letter.

They also directed and edited the 1921-22 N. C. Club Year-Book. It is a 207-page book bearing the title *Home and Farm*

Ownership. The twenty-one chapters were contributed by Professors Branson and Hobbs, Hon. J. W. Bailey of Raleigh, and sixteen university students. The Year-Book represents original research work, and is the first of its kind on this important subject. It treats this essential matter of civilization in the state, the nation, and in other countries of the world. It exhibits (1) farm tenancy conditions and the causes producing the landless estate of men, (2) the consequences of landlessness, (3) the remedies applied in California, Denmark, New Zealand, England, Ireland, Scotland, and Canada, and (4) it proposes a remedy for North Carolina. For the first time in America it gives this subject to the public in a single, well-ordered volume. It sets a background for competent discussion of the Giles bill that the General Assembly of North Carolina is now considering. One chapter is based on a field survey made by Mr. J. A. Dickey, a graduate student of the University, covering two whole townships and more than three hundred farm homes in Chatham county. Three months were consumed in gathering the data alone.

What Next in North Carolina is the title of the 1922-23 N. C. Club Year-Book which is now being edited for publication in the fall. This book will present some of the problems yet to be solved by the state. For the best paper on this subject Hon. J. W. Bailey offers a prize of fifty dollars to be awarded at the commencement exercises. The prizes will be awarded again next year.

Johnston County: Economic and Social, by G. Y. Ragsdale and W. M. Sanders, Jr., has been published. Buncombe County: Economic and Social, by A. M. Moser, F. J. Herron, J. C. Cheesborough, P. S. Randolph, and I. E. Monk, is being published, the expense being borne by an Asheville bank. The following county bulletins have been completed, or will be ready for the press in a few weeks: Guilford County; Economic and Social, by R. C. Price, Thomas Turner, and J. R. McClamroch; Alamance County: Economic and Social, by Gus Bradley, L. B. Bradshaw, Wilbur Stout, and Miss Mabel Walker; Henderson County: Economic and Social, by H. S. Capps, E. L. Justus, L. V. Hug-

gins, and Cameron Shipp; Rowan County: Economic and Social, by J. T. Gregory, W. T. Shuford, and W. H. Woodson; Forsyth County: Economic and Social, by C. N. Seiwers.

Among the research studies which deserve especial mention are: Land Resources of the U. S. by J. H. Zollicoffer; The Growth and Outlook of the South as a Textile Center by C. P. Hunt; History of Forsyth County, by C. N. Siewers; History of Chatham County, by A. H. London, Jr.; and History of Guilford County, by J. R. McClamroch.

The church survey conducted by J. M. Arnette has been completed. This survey was conducted to show the relation of farm tenancy to ministerial supply. In February double post cards were sent to all preachers of the four leading denominations in the state, 2,016 cards in all. About 1,100 cards were returned properly filled out. Answers to the following questions have been tabulated: (1) Were you born and reared in the country? (2) Are you the son of a farm owner? (3) Or of a tenant? (4) Are you now serving country churches? (5) How many churches in your care? (6) Do you live in the country? (7) If not, where? (8) How do you travel to your country churches?

A new bulletin entitled *Agricultural Graphics: North Carolina and the United States, 1866 to 1922*, has been prepared by Miss Henrietta R. Smedes, librarian and laboratory assistant in the Department of Rural Social-Economics. This publication, soon to be available, presents the results of several years of painstaking and minute research in government crop and livestock statistics. The bulletin consists of (1) a brief narrative of interpretation, (2) tables in detail, and (3) graphs for each crop and each class of farm animals.

E. C. BRANSON is in Europe for a year, where he is studying at first hand the country-end of civilization in Western Europe—mainly in Denmark, Belgium, South Germany, Italy, Switzerland, France, and Great Britain. He is abroad on the Kenan Traveling Scholarship Fund of the University. Also he goes as a member of the State Commission on Farm Tenancy recently created by the General Assembly of North Carolina. He wants to know, in direct studies, how against heavy odds the Danes

have come to be the richest farm people in Europe and perhaps in the world; why the Belgian farmers who produce enormous per-acre grain crops are cursed with farm tenancy and farm poverty; how the farmers are faring in South Germany, and what part the dorfer or farm hamlets play in German farm life; how the Swiss farmers win prosperity on little pocket-handkerchief farms; whether latifundia, or large estates, are destroying Italy today as in the days of Pliny; how the French farmers manage to have so many millions of government bonds stowed away under the corner brick of the hearth; why England is a paradise for pigs and a purgatory for peasants; and how the farmers in all these countries organize to secure for themselves a maximum share of the consumer's dollar.

DEPARTMENT OF SOCIOLOGY

Four issues of *The Journal of Social Forces* have appeared. Among the Universities represented by contributors of scientific articles in *The Journal*, besides the southern home folk, have been Columbia, Harvard, University of Chicago, University of Wisconsin, University of Minnesota, University of Southern California, University of Kansas, Haverford College, Barnard College, University of California, Cornell University, Brown University, Miami University. The contributions have covered a wide range of important subjects and have been by such men as Franklin H. Giddings, Roscoe Pound, James H. Tufts, Charles E. Merriam and John L. Gillin. *The Journal* has been well received and has set itself to certain very definite tasks of social research and publication. Its September number will tend to emphasize the social basis of education and will have contributions by Professor John Dewey, of Columbia, Professor Wm. H. Kilpatrick, of Teachers' College, President H. W. Chase, of the University of North Carolina, Commissioner John J. Tigert, of the United States Bureau of Education, and many others. The November number will tend to specialize in the field of rural organization. Among the research projects which *The Journal* has undertaken are those relating to the social conditions in

the industrial south, the transfer of leadership in the south, the fortunes of southern periodical literature, and studies in the southern race question, and others.

HOWARD W. ODUM has edited during the year the January Annals of the American Academy of Political and Social Science. The volume was entitled "Public Welfare in the United States." He contributed three articles to this volume:

Newer Ideals of Public Welfare.

Attainable Standards for State Departments of Public Welfare.

Positions for Trained Social Workers in the Field of Public Welfare.

He is continuing the study of this subject under the title "The Public Welfare Movement in the United States."

In addition to editing *The Journal of Sociol Forces* he has published: "Fundamental Principles in Race Relations" and is making special inquiry into "the study of social problems."

JESSE F. STEINER is continuing his studies of the problem of collective behavior in community life. He has published in this series the following articles in *The Journal of Social Forces*:

Community Organization, a Study of its Rise and Tendencies, November, 1922.

Community Organization in Relation to Social Change, January, 1923.

Community Organization and the Crowd Spirit, March, 1923.

The Reading Habits of Social Workers, May, 1923.

He has published in The Annals of the American Academy:

Professional Training for Public Welfare.

HAROLD D. MEYER has published the following studies through the University Extension Division:

The Parent-Teachers Association, February, 1922.

Town Studies, January, 1923.

The Commencement Program, March, 1923.

The Rural Playground, Second Edition Revised.

He is continuing his studies of organized play and recreation.

WILEY B. SANDERS is continuing his study of juvenile courts and prison work in North Carolina.

The following Theses for the Degree of Master of Arts were presented in June, 1923:

MINNIE ETTA HARMON. Child Labor with Special Reference to the Industrial Home Work of Children in Mill Villages.

This study of child labor was made with particular reference to the effect of industrial home work on children in mill villages. An original investigation of 58 individual cases of children in a local mill village was made in order to form a basis of comparison with other forms of child labor. It was disclosed that in the majority of cases retardation and a lowered physical condition were prevalent among the working children.

The chief reason given by both parents and children for the child working was that it was an economic necessity. The study showed that the average wage of the child was too small to justify the sacrifice of his leisure time and at the same time it was at the expense of his education and physical development. In the families of mill workers the average wage of the father was \$20 per week although in many instances he had worked in the same mill since the age of 10 or 12. The wages of the children and wife were necessary to supplement the wage of the father in order to meet the family expense.

The general public opinion concerning the problem was that it was much better for children to work than to starve or break up the family. Child labor was looked upon as a necessity and it was considered charity to secure work for the children. Sometimes it was mentioned as a solution to the problem of dependency. Adequate wages for the father did not seem to be the logical solution.

In order to have a background for the local study there is a general discussion of the child labor question with relation to its effect on the health, mind and morals of the future citizenship of America. Special attention is directed to the various studies of child labor made in the beet fields, cotton fields, rural life, street trades and other phases of home work. A brief discussion is given to each of these forms in which is brought out significant facts very similar to those disclosed in the study.

A chapter is devoted to the various laws on child labor, tracing the history of federal legislation, giving the North Carolina laws and the local enforcement of child labor laws. The proposed constitutional amendment giving Congress the power to prohibit or regulate the employment of children under 18 years of age is discussed.

Minimum standards for age, education, physical examinations, hours of employment, wages and supervision of placement and employment outlined. A standardized compulsory school law is mentioned.

The following conclusions were reached: 1. Local:

In regard to the local solution it was recommended that scholarships equal to the amount the children could earn be paid to them or the family in order to relieve the child of the burden of supplementing the family budget. These scholarships could be paid by some local organization or civic club.

A general investigation conducted by the state of North Carolina on the industrial home work problem with reference to forming a state policy on the question was suggested. A sufficient number of adequately trained local officials to enforce the child labor law was seen to be a big need.

2. General:

The main conclusions to the whole question were: that child labor was detrimental to the health, education and morals of the children: that the economic exploitation of children was as bad in industrial home work as in other forms of child labor: that child labor is one of the serious problems facing the American nation today: that in order to insure a normal, healthy, intelligent and happy citizenship the child labor question must be solved by the nation as a whole and without favor or prejudice to any section of the United States.

ROY RITTER ANDERSON. Development of the Social Sciences in Secondary Education.

The purpose of this study is to trace the development of the social sciences in the secondary schools of the United States. The term social science, as it is used in this study, refers to those studies that are concerned with the problems of social organization and human progress. For purposes of this study history, civics, economics, geography and sociology are included in the term social science.

The study begins with an account of the development of the social sciences in higher institutions of learning in the United States in order that some facts may be available for judging the progress made in the development of the school sciences, and for noting the influence that such development has had on the progress of the social sciences in secondary schools. These introductory portions are followed by a discussion of the growth of secondary education and the entrance of the social sciences into the curriculum of the secondary school. Attention is then given to the work of a number of committees to bring about a better program of civic education for the secondary school by improving courses of instruction in the social studies. The concluding portion of the study is devoted to a consideration of some studies that have been made relative to the actual position of the social sciences in secondary schools.

The principal sources of information were reports of various committees representing the different divisions of the social sciences, and studies that have been made by educators relative to the status of the social sciences in secondary schools. Other sources include materials obtained from certain standard books on education.

This study has made clear the fact that there has been a gradual development of the social sciences in secondary schools, but that this development has come about, not as a conscious and deliberate attempt to construct a program of education for citizenship, but as a desire to place the social studies in the curriculum without a consideration of the ultimate aims of these studies. The study also shows that very little coöperative

effort has been applied to the solution of the problems that have arisen in connection with the extension of the social sciences in secondary schools; and that the activities of the present time to improve courses of instruction are the result of an attempt on the part of educators to state the objectives of education in terms of social efficiency. It would appear, therefore, from the facts brought out in this study that the next step in the development of the social sciences in secondary education demands the association and coöperation of all groups who are directly, or indirectly, interested in obtaining the largest possible results in education for citizenship through the social studies.

DEPARTMENT OF ZOOLOGY

H. V. WILSON. Natural History Notes from Beaufort. Before the Elisha Mitchell Scientific Society, October 10, 1922 (Proc. of the Society, in press).

The general character of the phenomena classed under the head of reduction was discussed on the basis of observations on hydroids and ascidians made at the Beaufort Laboratory of the U. S. Bureau of Fisheries.

H. V. WILSON. Dedifferentiation in hydroids and ascidians. Before the North Carolina Academy of Science, May 5, 1923 (Proc. of the Academy, in press).

Eudendrium carneum, one of the common hydroids at Beaufort, when brought into the laboratory quickly undergoes the retrogressive process known as dedifferentiation or reduction. The hydra-like individuals (hydranths) of the colony absorb their tentacles and become transformed into simple, mouthless sacs which then drop off. If the hydranths while normal are cut off, they undergo a similar series of dedifferentiative changes. Something of the same gradual simplification of structure affects, after amputation, the group of specialized reproductive individuals (gonosome) in the male. This process of retrogressive simplification of structure is conspicuous, as Driesch first showed, in ascidians. Some experiments along this line carried out on *Perophora viridis*, a common Beaufort form, are also here reported on.

H. V. WILSON. An extensive memoir representing many years of work on the "Silicious and Horny Sponges collected by the U. S. Fisheries Steamer Albatross during the Philippine Expedition 1907-10" has been completed for publication by the U. S. Bureau of Fisheries. The sponges on which this report is based will be, in part have been, deposited in the National Museum at Washington. Many new forms are described and the genera are critically examined. Data and ideas on the subject of variation

and classification are presented in detail, some of which have already been outlined in brief papers published from time to time during the past few years.

R. E. COKER. Natural History of the Boring Isopod, *Limnoria*.

A study of the breeding habits, life history and environmental relations of *Limnoria lignorum*, a marine borer destructive of wood. Special attention is given to variations of form and habit in southern and northern waters by the study of material from Beaufort, N. C., and Woods Hole, Mass. A preliminary report is being published in the Journal of the Elisha Mitchell Society.

R. E. COKER. Ecology of Freshwater Animals.

A study of freshwater animals in relation to each other and to the physical conditions of the environments, with special reference to the fauna of streams of the vicinity of Chapel Hill.

C. DALE BEERS. Some Points in the Bud Development of a Simple Ascidian. Before the North Carolina Academy of Science, May 5, 1923 (Journal Elisha Mitchell Scientific Society, in press).

Precise details as to the origin of the stigmata and the peribranchial sacs in *Ecteinascidia turbinata* are here given (see the comprehensive abstract in University of North Carolina Record, Graduate School Series No. 6, p. 69).

THE PHILOLOGICAL CLUB

The Philological Club numbered a total of 59 members during the academic year of 1922-23, an increase of 19 over the previous year. Of the eight meetings held, seven were devoted to papers by members of the University faculty and one was by a visiting scholar. The complete program with abstracts of the papers not appearing elsewhere in this bulletin, is given below.

October 10—Prof. Norman Foerster, "Quantity and Quality in the Aesthetics of Poe."

November 7—Prof. H. D. Learned, "Accentuation of Old French Loanwords in English."

December 5—Prof. E. C. Metzenthin, "Some Problems of the Heliand."

January 16—Dean James F. Royster, "Grammatical Thinking and the Going-to Future."

February 13—Prof. Wm. A. Nitze, "Modern Language Scholarship: An Enquiry." (Published in P.M.L.A., Vol. 38, No. 1).

March 13—Dean Edwin Greenlaw, "Spenser's Goddess of Nature."

April 17—Prof. J. Penrose Harland, “The Helladic Civilization.” (Illustrated with slides of excavation work).

May 8—A. C. Howell, “Sir Thomas Browne and Seventeenth Century Scientific Thought.”

Professor H. D. Learned’s paper on “Accentuation of Old French Loanwords in English”:

Old French loanwords appear in English with first-syllable accent in a majority of cases, antedating the M. E. vowel-shift as in *council*, *season*. The accepted explanation (analogy to Germanic first-syllable stress) is unsatisfactory for the following reasons: (1) the time is too short between the acquisition of the loanwords in the thirteenth century and the vowel-shift beginning in the fourteenth; (2) many Germanic words, as *begin*, *forget*, do not have first-syllable stress; (3) a large number of popular O. F. words do not have first-syllable stress, as *annoy*, *attention*, *attorney*, *entire*, *estate*, *imagine*, *obey*.

A distinction seems established between words beginning with a *consonant*, nearly all of which have first-syllable stress, and words beginning with a vowel, nearly all of which have second-syllable stress. In view of the fact that the English-speaking masses must have acquired these words aurally, being illiterate, and therefore caught only the clearest, most emphatic, detatched words, the explanation is advanced that French emotional or emphasis stress, which falls upon the *first* syllable in a word beginning with a *consonant*, but on the *second* syllable of one beginning with a *vowel*, is the origin of the English system.

Professor James F. Royster’s paper on “Grammatical Thinking and the Going-to Future”:

The *going-to* future has been neglected by English grammarians on account of the tyranny of the terminal inflection conception of language structure. It is generally denied that the verbal combination is a tense. The question then arises: when is a tense not a tense? The *going-to* future is in widespread use in Modern English, in all language levels, though it is sparingly found in impersonal writings and generally excluded from poetry on metrical objections. The *going-to* future is used more frequently with a determination sense than as an immediate future, the lesser and the greater grammarians to the contrary. The *going-to* future apparently extended its use in the eighteenth and nineteenth centuries. In its determination sense it supplies the lack of such meaning in *will* among the mass of English speakers. Its growth as a relation index from the notion sense of movement may be fairly clearly traced. All of these matters are neglected by the hundred and one school-text grammars which pretend to analyze the English language and even by serious students of our tongue.

Professor S. E. Leavitt's paper on "Camclo Pitollet, *Blasco Ibanez. Sus novelas y la novela de su vida*":

As the title indicates, this volume deals in a rather popular way with the life and works of the spectacular author of the "Four Horsemen."

Professor J. Penrose Harland's paper on "The Helladic Civilization," which was illustrated with slides:

Recent excavations on the mainland of Hellas, especially those conducted by the American School at Athens, have shown that the civilization on the mainland (in the Bronze Age) was not identical with that of Krete. Therefore, the Minoan system of classification and terminology cannot be satisfactorily applied to the mainland or Helladic culture. The two cultures pursued parallel, but independent courses until the Late Helladic Period (ca. 1400-1100 B.C.), when the fusion of Minoan and "Minyan" resulted in the so-called Mykenaian Civilization.

At Korakou, excavated by the American School in 1916, a complete pottery sequence was given by the excavations, and several houses of the Middle Helladic Period (ca. 2000-1400 B.C.) were found. Here and at other sites pottery of an earlier date had been found, but scanty traces of the settlements of the earlier age.

It remained for the American School's excavations at Zygouries, a mound in the Korinthia between Korinth and Mykenai, to bring to light the first Early Helladic settlement on the mainland of Hellas, and to determine the plan and type of the Early Helladic house. (Early Helladic Period, ca. 2500-2000 B.C.). The great quantity of pottery from this site corroborates the evidence from Korakou, which indicates a comparatively close cultural relationship between the mainland and the Islands in the Early Helladic Period. The evidence from the traditions and the dialects pointed to this, and made it appear probable that at some early time the Southern part of Hellas had been inhabited by a non-Indo-European race that was akin to the Lykians of Asia Minor. The archaeological evidence both supplements this twofold evidence, and ties it up with the Early Helladic Period.

The evidence from Zygouries, Korakou, etc., shows that the regime of the Early Helladic peoples was brought to a sudden end by invaders from the North. (Slides chiefly of the excavations at Zygouries).

THE GRADUATE CLUB

The club was organized at the first meeting. Officers for the first term were elected as follows: L. J. Phipps, president; J. A. Bender, secretary-treasurer. For the second term the officers were J. A. Bender, president; I. J. Stephenson, vice president; Clayton Edwards, secretary-treasurer. Meetings were held

monthly and each time some member of the faculty who is directly interested in graduate research addressed the club. After the address a round-table discussion followed in which every member was invited to participate.

FIRST MEETING

Dr. H. M. Wagstaff, professor of History, talked informally of his year's study in Europe.

SECOND MEETING

Dean Greenlaw addressed the club at its second meeting on "The Scope of the Master's Thesis."

THIRD MEETING

Dr. R. E. Coker addressed the club at this meeting on "Fields of Research in Relation to Fisheries."

Fields of Research in Relation to Fisheries

The speaker discussed the recent application of methods of scientific control to the breeding of fur seals by the U. S. Department of Commerce through the Bureau of Fisheries. He told how long-standing problems of the life histories of Pacific salmons were now being solved by critical studies of scales of adult fish, upon which the skilled investigator could often find a remarkably definite record of life history. He showed how difficulties encountered in commercial oyster farming and questions concerning the conservation of important marine fishes involved the most intricate studies of temperatures, salinities, currents, and other physical features of the sea. Consideration was given finally to the part played by our Government in advancing the special science of Oceanography and to the further opportunities for research afforded in that field.

FOURTH MEETING

Dr. Royster spoke informally to the club concerning some problems in curricula in the undergraduate courses.

FIFTH MEETING

At this meeting Dr. Archibald Henderson addressed the club on "Science, Art, and the Subliminal Self."

Science, Art, and the Subliminal Self

The speaker attempted to give some general statement of the fundamental meaning and purport of Science, and to show the qualities it possessed in common with Art. He cited Plato's definition of Art, and showed that it might equally well hold for Science. Among moderns he cited the example of Einstein, who has advanced the view that the scientist deals with his materials after the fashion of the artist. In especial he quoted at length the great French mathematician, Henri Poincaré, regarding the activities of the subliminal self in coöperating with conscious scientific rationalization. He stressed Poincaré's conclusion that the subliminal self was artistically critical and selective, thrusting up into the domain of the conscious self the creative, productive factors in completing scientific rationalization.

SIXTH MEETING

Dr. W. deB. MacNider addressed the club at its final meeting. His subject was "Concerning the Selective Action of Drugs on Certain Tissues."

RESEARCH PUBLICATIONS

Contents of the research publications of the University during the period covered by this bulletin are as follows:

JOURNAL OF THE ELISHA MITCHELL SCIENTIFIC SOCIETY, VOL. 38

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Some Phases in the Development of Chrysemys Cinerea. <i>Bert Cunningham</i>	51
Reaction of Methane and Also of Acetylene Upon Zirconium Tetrachloride. <i>F. P. Venable and R. O. Deitz</i>	74
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