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The Morehouse *Journal of Science*

BURWELL T. HARVEY, JR., *Editor*

IS IT TRUE?

Age of Sea, 195, 043,312 Years.

Age of First Organic Cell Formations, 293,013,999 Years

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FEATURES

OUR VIEWPOINT

Our Nomination for the Harmon Award in Science:

We note through the columns of our weekly newspapers the current notices of the Harmon awards to be awarded for 1929. Although we promised our readers to speak in this issue concerning the methods of selection and determination of merit, we have been unable to receive further information than given in press releases. To assure our readers we have attempted to get more definite information, we quote without further comment the following from letters received from Dr. George E. Haynes, Secretary Commission on the Church and Race Relations:

Jan. 28th, 1929.—Your letter of January 16th, asking questions about the Harmon Awards in Science, is of such deep interest that I would like the privilege of making a more careful and extended statement than is possible in a letter composed now in the rush of preparation for the presentation ceremonies in eight cities which takes place February 12th, and arrangements for the Traveling Art Exhibit which started on its tour of six months yesterday. I am writing, therefore, to ask if there is not time, within the next month or two, for me to prepare a careful statement for publication in the next issue of the Journal which can be run either as an editorial statement or over my signature if you care to have it.

March 1, 1929.

I doubt if it will be possible for me to get the Harmon Award article ready for you by March 25th, because of some other work that has preceded it. Please give me the date to deliver material for your next issue.

But the Journal of Science hereby nominates Prof. T. W. Talley, Department of Chemistry, Fisk University, Nashville, Tenn., on the basis of his many years of faithful and efficient teaching and the development of "A New Systematic Chronology of Creation," Part I of which appears in this issue of the Journal of Science. Prof. Talley invites criticism and discussion of this original idea for the compilation of the Chronology of Creation.

The Atlanta Affiliation:

Elsewhere in this issue appears a copy of a news release concerning the affiliation of Morehouse, Spelman and Atlanta University, whereby the present Atlanta University passes out of existence and a new school for graduate work is organized. What does this mean to Negro education in the South?

First, let us take stock of what we have in hand. A plant of over 65 acres, 4 main buildings and limited Carnegie Library; a faculty, with a few Masters' degrees, which to my mind has distinguished itself primarily in the training of teachers, especially for public school teaching and administration, by the aid of Oglethorpe Practice School, and more

lately for high school work with the use of Knowles High for a practice school; a heritage of unselfish devotion to the cause of a broad and cultural college education for its graduates. Very little permanent endowment, and no church affiliations.

What is needed to do graduate work?

A faculty which will command respect scholastically. Also in each department such experience and training in actual contact with the vital problems to be studied as to be able to direct, supervise and evaluate such work.

A library which will give at least reasonable resources for the gathering of data and information along lines of graduate work. This would mean especially the availability of the leading professional, departmental and educational periodicals from at least 1900, as well as monographs, etc.

Permanent Endowment to assure funds for teachers' salaries that will make the desirability of the man, rather than available salary, the question of importance in selection.

Funds for library and science equipment for graduate work.

All these separate needs are multiplied many times when we think of the professional schools, such as medicine, dentistry, etc.

Should these resources become available we feel sure that the new Atlanta University, in the Gate City of the South, will become the shrine of truth seeking pilgrims from far and near, and a worthy newcomer will be accorded a place among the great universities of the world.

In the meantime, with the great interest in the raising of standards for Negro teachers in city and state-supported grade schools and high schools, with the present equipment, a working nucleus is available for a Graduate Teachers' College.

And Another Thing:

Our mind wanders on with day dreams of what we need as a group Surely our greatest problems of the future are economic. Shall we always remain consumers and not producers, repairers and not builders? With the requisite technical knowledge and half the capital, because of different living scales, it ought to be possible for any Negro manufacturer to compete successfully in the open market with prices gotten for any manufactured commodity by any small independent manufacturer. Commodities and prices in the industrial world know no color line. Prejudices are built on inefficiency and unreliability. The South has begun a wonderful era of industrial growth and expansion. The Negro must get in on the ground floor not only as farm hands, and laborers, but as scientific farmers, skilled artisans, manufacturers and producers. We must give our banks, insurance companies and other types of business enterprises the solid financial backing of producing concerns which produce what the people need, want and must continue to need and want. Think this over, young college graduates of 1929. Get in the producing business, become independent. Have something work for you. Do not work for something.

Accrediting High Schools:

With the announcement at the Alabama Teachers' Association meeting in Birmingham some weeks ago of the accrediting by the State Department of Education of a half dozen or more high schools and high school departments of various Negro schools, practically every Southern State accredits or evaluates in some way the Negro high school, public and private. This is marked improvement and the end is not yet. North Carolina has taken the lead again, in that the State department has accredited twenty-two Negro colleges as class "A." Fifteen of the colleges are situated outside the State. We are sure that other State departments will follow North Carolina's lead.

The Summer Migration:

In order to be sure to receive your July issue of the Journal of Science, write a card stating your address, between July 15-30. With our sincere hope that your summer may really be a period of rest and recreation for the future task of the fall term.

A NEW SYSTEMATIC CHRONOLOGY OF CREATION

THOMAS W. TALLEY
Fisk University, Nashville, Tenn.

Why write a Chronology of Creation? First, a knowledge of the time element involved in Creation furnishes the Biologist, the Sociologist and the Psychologist with a partial key to the time element which must necessarily be involved in the development and change of all the matters with which they deal. When one is working to bring about a given change, it is worth while to know whether the change is of a nature that it may be brought about within a generation or whether it is a change which can be brought about only by so long a lapse of time that the reforming individual can only hope to add his small mite to the end that the desired result may come long after his own generation has been forgotten.

It is likewise a sad truth that our accumulation of facts in the world as well as our deduction of the correct conclusions from these facts is at best extremely slow. The only hope, therefore, for a large growth of knowledge in the world is that each one should give to all every new ray of light which it has been his to capture. I herewith present a new ray of light as I hope and this constitutes a second reason for writing this little treatise. I believe also that there are still a large number of cultured men and women in the world who love knowledge for its own sake. Though this might be given to the undiscriminating as my third reason for writing this Chronology, it is my pleasure to present without apology this little morsel to these lovers of culture.

Former Calculations of the Age of the Earth as a Whole.

Certain notable efforts have been made to calculate the age of the earth as a whole. The physical constant which has seemed available practically for that purpose is heat. Knowing, as we do, that the earth was once in a molten condition, the mathematical problem of determining its age simmers down to calculating how long it would require such a molten earth to cool to its present status and temperature.

Assuming that the temperature gradient of the earth is the resultant of simple cooling, Thomson at first calculated the earth's age to lie somewhere between 20,000,000 and 400,000,000 years. The mathematical probabilities indicated about 100,000,000 years to be approximately the true age. Thomson also made a later calculation and, as he thought, with more accurate data. In this calculation he set the age of the earth as somewhere between 20,000,000 and 40,000,000 years.

Using a kindred but different line of mathematical calculation, Clarence King, taking the temperature gradient of the earth and the melting curve of diabase as a basis, has shown that the age of our planet, in consonance with its present known tidal rigidity, could not exceed with the premises 24,000,000 years.

These probable or possible ages thus mathematically obtained, through a consideration of heat units and their resultants, have been largely rejected by men of Science. Such assigned ages do not allot a sufficient space of time for the long lines of evolution which we know to have taken place in the Geological past in both the organic and the mineral worlds. Of course there is still much room for discussion as to how far Evolution may go, but only the ignorant may question the presence of its transforming hand. Thus any age calculated as that of the earth must be, if correct, in general harmony with its manifest products and the time required for their gradual formation.

The failure of these great men of Science to determine the age of the earth through its heat units is due to no fault in their splendidly conceived calculations but to a fault in the premises upon which the whole of the calculation rests. There are quite a few phases of the fault, but perhaps it may be summed up by saying that the earth in its cooling has not obeyed the ordinary laws which govern the cooling of bodies as we are privileged to study them. It has been our privilege to note a given mass at a given temperature and then to note the undisturbed radiation of the calories associated with the mass.

When we come to study the cooling of the earth we have an almost entirely different condition, even though there is everywhere much similar relation. The earth, unlike the cooling bodies which we study, has a surface where chemical reactions evolving heat are constantly taking place. The chemical reactions taking place in the surface layers of rock and in the metabolism and in the decay of both animals and plants are constant sources of addition of heat to our planet while it radiates its heat in cooling. Of course the amounts of heat generated thus may not be large as compared with the whole heat involved, but it is sufficient to make the earth in its cooling depart from the laws of ordinary cooling bodies as we know them. Then the sum total of the organic tenants of the earth varying from age to age and thus varying also their heat contribution lends a complexity to the problem which does not yield to our present known laws of mathematics. In addition to this, it is well known that chemical reactions are continuously taking place within the earth. They have varied in their amounts from age to age and have thus also added new and variable increments of heat to the cooling mass. Thus these things remove the calculation from the sphere of our mathematical formulations for the cooling of heated bodies. Therefore, calculations of the age of the earth as a whole hitherto made, based on laws governing the loss of heat by cooling bodies and mathematically sound, have given results most unsatisfactory.

Chronologies of Gealogic Time

A set of measurements of Geologic Time has of late been made by calculations based on a knowledge of radio activity shown by Uranium and the relative stabilities of the various decomposition products forming its radio-active series. The work done along this line by Rutherford, Strutt, Becker, Arthur Holmes, Richards and others is epoch-making. A chronological table for the Geological Eras made from a knowledge of radio-active elements, based largely on the classical re-

searches of Strutt, is given in Joseph Barrell's excellent paper on "Measurements of Geologic Time," published in the Bulletin of the American Geological Society of December, 1917. The range of time shown by this table begins with about 100,000 years ago for recent Geologic Time and ends with an age for the Lower Precambrian era, estimated at from 715,000,000 and 1,500,000,000 years ago. Though the reckoning of this table holds out much promise, it cannot be accepted as a close approximation to the truth for two reasons: First, the excessively large number of years obtained for the ages of the various Geological Eras, on the whole, are out of harmony with geological facts as we know them; second, if Uranium ratios to Helium are chosen, we get one set of values for the Ages, while if we choose the Lead ratio to Uranium we get an entirely different set of values. Perhaps the weakness of this system of calculation lies in the fact that we practically know nothing of the laws which have governed the accumulation of these radio-active elements as a whole at various points on our planet. We know little or nothing as to the real nature and cause of radio-activity. It is a new field. It seems clear to the writer that one can scarcely hope for success in solving the problem by the method under such handicaps. This method, however, holds out distinct promise for the future when our knowledge of radio-activity shall have reached a larger perfection.

A set of measurements of Geological Times have been gotten also through long, careful and painstaking study of sedimentation and erosion as evinced by the strata of the rocks on the surface of our globe. So many factors enter, however, to influence erosion and sedimentation that one feels, when he is through, painfully aware that the general accuracy of the premises upon which his conclusions are based is little to be trusted. Our knowledge of chemical reactions causes us to know that the rate of the erosion and of sedimentation which have given to us our stratified rocks could not have been at all uniform even limitedly. Erosion is a product of many variable and varying chemical and physical factors. As an example: We all know that the speed of chemical reactions varies directly with the temperature. Thus from this one law alone a cooling earth would carry a constantly varying erosion and deposit. This general method for the calculation of Gealogic Time, however, has probably given to the world the best results thus far obtained.

The general principles, upon which the chronology given in this treatise is based, are not entirely new. They are chemical and biological laws and principles accepted by our scholars in the world of Science. The laws and principles most used are biological and the application of these principles and laws in such a manner as to scientifically weave a Chronology of Creation into a symmetrical whole which seems to reasonably satisfy the claims and expectations of Geologists, Biologists, Chemists and Physicists is new. Only the age of the sea is derived by an already well-known chemical principle, but my viewpoint even here differs somewhat from the majority of others. My general method of procedure will be first to determine the age of the sea by a well-known method, then the number of years the earth has been tenanted by each

of the branches of its inhabitants, and finally the minimum age of the earth itself.

The Age of the Sea

It was Edmund Halley, in 1719, in the Philosophical Transactions of the Royal Society who was the first to point out that the age of the earth might be obtained in determining the ratio between the total salts dissolved in the sea and the total salts transported thither by the fresh water streams of the world. Joly was the first to apply the suggestion to the determination of its age. The method is simply in theory. The accumulation of salts in the sea is due to the transportation thither of these by the fresh water streams of the earth. The water of the sea evaporating has left these salts behind. From known and fairly accurate data we may now easily calculate the salt content of the sea. We may likewise calculate the amount of dissolved salts carried by fresh water streams annually into the sea. It is easily apparent, theoretically, that if the total amount of salts in the sea is divided by the amount of the salts carried into it annually by fresh water streams, the quotient will be the approximate number of years that the sea has been in existence or its age.

I herewith reproduce from Bulletin 695, U. S. Geological Survey, "Data of Geochemistry," by F. W. Clarke, a table giving in column B the total amount of a given ion found in sea water; and in column A, opposite to it, the total amount of that same ion delivered to the sea annually by all the rivers of the world:

	A Annual from river metric tons$\times 10^3$	B In ocean metric tons$\times 10^{12}$
CO_3	961,350	95.6
SO_4	332,030	3,553.0
Cl	155,350	25,538.0
Br	------	86.8
NO_3	24,614	-------
Na	158,357	14,130.0
K	57,982	510.8
Ca	557,670	552.8
Mg	93,264	1,721.0
R_2O_3	75,213	-------
SiO_2	319,170	-------
Sum	2,735,000$\times 10^3$	46,188.0$\times 10^{12}$

Clarke, using the quantity of sodium found in the sea gotten from the foregoing table through Ditmar's analysis of sea water and Karsten's value for the volume of the sea, and dividing this by the sodium carried to the sea annually by the rivers of the world estimated from hundreds of analyses and measurements, obtained a crude age for the sea. Such an age, geologically speaking, might be reasonably correct. His formula and calculation is:

$$\frac{\text{Na in Ocean}}{\text{Annual Na from rivers}} = \text{Age of the Ocean.}$$

$$\frac{14{,}130\times10^{12}}{158{,}357\times10^{3}} = 89{,}222{,}900 \text{ (Crude age of the Ocean).}$$

But a certain modifying factor must be considered and was further considered by Dr. Clarke in his calculation. Of the amount of salts carried to the sea annually, a certain percentage is raised by evaporation and is restored to the land through rainfall. The salts thus restored from the ocean to the land annually have received the name of "cyclic salts." In order, therefore, to get the true annual increment of a given ion added to the sea by the rivers, one must subtract the total ion as "cyclic salt" from the total amount of that ion carried by the rivers annually. Many investigators have made careful estimate of the amount of this "cyclic salt," but the estimate of Becker, mathematical and based upon isochlor evidence, appears to be the best. He has estimated the "cyclic sodium" of the rivers at 6%. Dr. Clarke, using the reduction of 6% for "cyclic sodium," obtained a corrected value for the age of the sea—making it 94,712,000 years.

This age for the sea of 94,712,000 years rather satisfies one until he considers seriously the foregoing table where the annual contribution of the ions by the rivers of the world is compared with their accumulation during the ages in the ocean. The ions involving the silicic oxide and the sesquioxides, although they have been delivered and are being delivered annually to the ocean by the rivers, have practically disappeared from its waters. It is quite evident that, had none of the ions delivered to the ocean been precipitated nor removed as "cyclic salt" nor decomposed into gaseous form after reaching their destination, the accumulation of each ion divided by the amount of the same ion delivered annually through the agency of fresh water ought not only give the age of the sea *but that age given ought be approximately the same whatever ion one might choose.* Looking at the table and considering each of the ions which have not disappeared and dividing in such a manner as to obtain the age of the sea by the formula

$$\frac{\text{Amount of ion in Ocean}}{\text{Amount of ion added annually by rivers}} = \text{Age of Sea.}$$

We find that we get a different age for the sea in each case.

The question now immediately arises: Which ion chosen for the calculation ought give the correct age of the sea? Our splendid men of Science who have worked upon this problem have recognized this very large difficulty. They, in majority, have chosen the sodium ion for the calculation. It will be readily conceded that among a set of ions disappearing from the ocean, the ion used for the calculation of its age ought be either the one which has not disappeared at all or has disappeared least.

One can only righteously judge in what comparative amounts this disappearance of ions by precipitation and sedimentation has taken

place among the various ions of the ocean by a consideration of its sediments and the analytical tables giving their chemical composition. If one will examine the volume on Deep-Sea Deposits by Murray and Renard, published in 1891 as a result of the classic Challenger Expedition, he will find monumental statistical tables of the composition of the sediments of the ocean, gotten through an extremely large number of painstaking analyses.

These tables show that, in the various deep sea deposits, the ions of the solution are found in the sediments in varying amounts. Most of the ions which have disappeared from the solution appear in large amounts in the sediments. Some of the precipitated ions, chemically reckoned as oxides, form more than 80% of some of the deposits, while the others appear in smaller amounts. The nitrate ion, however, presents the anomoly of being delivered in large amounts to the ocean annually but of neither having accumulated in its waters nor in its sediments. But this non-accumulation of nitrates becomes clear, without discussion, the moment that one thinks of the "nitrogen cycle" well known to all and mutually embracing both the organic and inorganic worlds. The very nature of this cycle, an account of which may be read in any elementary treatise on Chemistry or Agriculture, makes its atoms pilgrims that "tarry but a night". The nitrogen atom is the "Wondering Jew" in the great Family of Elements. Another thing is striking and has direct bearing on our purpose in this treatise, namely, that the elements Sodium and Chlorine are found only in small amounts both in the Terrigenous and Pelagic deposits of the ocean; while the same ions are the ones which have accumulated in large amounts in the waters of the sea during the earth's long ages.

In order that those caring to look at data showing the average loss of various ions through precipitation and sedimentation in the ocean may have that privilege, I am herewith giving a table taken from Bulletin 695, U. S. Geological Survey, Data of Geo-chemistry, by F. W. Clarke. The nature of the table may be well understood from the following prefacing words taken from the treatise: "In order to determine the composition of the oceanic clays more minutely, two analyses have been made in the laboratory of the United States Geological Survey upon material kindly furnished by Sir John Murray. The samples analyzed were composites of many individual specimens, brought together from all the great oceans and collected partly by the Challenger and partly by other expeditions. The data are as follows, reduced to uniformity by rejection of sea salts, calcium carbonate, and hygroscopic water, and recalculation of the remainder to 100%.

Analyses of Composite Samples of Marine Clays

A. Composite of fifty-one samples of the "red clay." Analyzed by G. Steiger, with special determinations by W. F. Hillebrand and E. C. Sullivan.

B. Composite of fifty-two samples of "terrigenous clays," namely, four "green muds" and forty-eight "blue muds." Anaylsis by G. Steiger.

	A	B
SiO_2	54.48	57.05
TiO_2	.98	1.27
Al_2O_3	15.94	17.22
Cr_2O_3	.012	.05
Fe_2O_3	8.66	5.07
FeO	.84	2.30
NiO,CoO	.039	.0630
MnO	----	.12
MnO_2	1.21	----
MgO	3.31	2.17
CaO	1.96	2.04
Sro	.056	.03
BaO	.20	.06
K_2O	2.85	2.25
Na_2O	2.05	1.05
V_2O_3	.035	.03
As_2O_3	.001	trace
MoO_3	trace	----
P_2O_5	.30	.21
S	----	.13
CuO	.024	.0160
PbO	.008	.0004
ZnO	.005	.0070
C	----	1.69
H_2O	7.04	7.17
	100.000	99.9964

The preceding table points out that considerable sodium has gone out of solution to enter into combination at the bottom of the sea. So far as this one table goes, it might seem to show that no chlorine at all has disappeared through sedimentation, but we must bear in mind that the sea salts were excluded from the analyses. The amount of chlorine which has disappeared through sedimentation, however, is comparatively small. Chlorine compounds are removed through becoming entangled with solids settling to the bottom. Then, of the oceanic areas which is 143,259,300 sq. mi., there are 100,000 sq. mi. of its bottom covered with a terrigenous red mud which shows by analyses 2.4% of chlorine entering into its composition. Looking at all available data, one can not fail to conclude that the ocean has best kept its chlorine ion in solution delivered to it from various sources through the long ages of the past. I have therefore chosen to reckon the age of the ocean from the chlorine content of its waters.

The Chlorine in the Sea

The Chronology as finally set forth in this treatise is largely based on biological truths. Since, however, the age of the sea furnishes the beginning and the central point of it all, it is incumbent that I should discuss just a little my choice of the chlorine ion content for calculating its age. My predecessors who have used this general method here proposed for the calculation of the age of the sea have not used chlorine because of the enigma of its very large accumulation there as compared with that of the other ions present in its waters.

It must be urged against their objection that we face the stubborn fact that this large content of chlorine has really accumulated in the waters of the sea. It is there. We also face the equally stern fact that we see nothing constantly delivering this chlorine to the sea except the circulating waters of the earth. Of course any hydrochloric acid finding its way into the atmosphere and left undisturbed would go into solution only by the law of solubility for several gases in contact with a liquid according to their partial pressure. But hydrochloris acid in the air is not left undisturbed. Knowing, as we do, the solubility of hydrochloric acid in water, plainly due to a kind of equilibrium reaction as yet little understood, we know that the whole is probably dissolved within a short time in the moisture content of the air, and thus soon reaches the sea through the channel of rainfall and fresh-water drainage. With the facts before us of the chlorine in the sea and the chlorine being delivered annually, we must calculate the age of the sea by its use unless we wish to ignore the facts.

Perhaps it is only right, however, that I should offer the reasons why, as far as possible, that the chlorine has accumulated and is still accumulating in the sea beyond that of other elements. I present reasons as follows:: : :

A. I have already pointed out the very large disappearance of ions from sea water other than chlorine through precipitation. The chlorine remains constantly augmenting in a large way the chlorine content.

B. When limited amounts of chlorine renew their journeyings over the land in "cyclic salts," though its accompanying ions such as sodium, potassium, magnesium, etc., may enter into reactions to form insoluble salts, the simple chloride liberated during the reaction is soluble and pursues its undisturbed journey back to the sea. Thus the "cyclic" chlorine in its inorganic contacts may be retarded, but it does not stop. It is not permanently removed from the mass of its fellows in the sea.

C. Chlorine practically does not enter actively into the metabolism of the terrestial organic world. Where is does enter, as in case, for example, of the gastric juice, it does not accumulate. Experiment shows that the presence of .001% of sodium chloride in soils is very injurious to average terrestial plant life; while soils that contain more than .1% are barren. Thus the chlorine ion little delayed in the terrestial organic world continues its journey in the cycle.

D. The entrance of chlorine ions into the organic life of the sea is necessarily temporary.

E. Volcanoes and fumeroles constantly emit chlorine and its compounds, which finally find their way to the sea. To this thought must be added that Becker, in his paper on the "Age of the Earth" published by the Smithsonian Institution in 1910, has shown mathematically that the supposition of a moderate constant emission of chlorine by our

volcanoes and fumeroles can be made to account for its large accumulation in the sea.

Calculation of the Age of the Sea by Use of Chlorine Ion.

Of the chlorine delivered by fresh water to the sea annually, some of it is "cyclic," some is derived from disseminated salts or former marine deposits and thus ought not be counted a second time, and some has been placed in the annual delivery to the sea above the ordinary natural amount through the commercial and domestic uses of chlorides. All this chlorine must be deducted from the gross annual delivery of chlorine by rivers to the ocean in order to get the net annual increment added by their flow.

Indirectly a careful estimate of this "cyclic" and other added chlorine has been made after long and careful research by some of the best geochemists of our day. This estimate is not the "last word" on the subject but it is the very best that the world's present scientific data will permit. The direct estimate was on that of the sodium ion. Since, however, the cyclic sodium is sodium chloride and since the 5,700,000 metric tons of sodium added to our rivers from commercial use owes its origin to the 14,500,000 metric tons of sodium chloride annually produced; it follows that one may calculate from the sodium, by simple chemical laws of combination the chlorine to be deducted from the gross delivery of chlorine by rivers so as to obtain the net amount of it carried to the sea annually.

F. W. Clarke in his "Data of Geo-Chemistry", fourth edition 1920, places the total correction for sodium at 10%, apportioned as follows: Six per cent for regular "cyclic salt", 3% added through commercial and domestic use, and 1% added through disseminated salt. I am accepting this estimate. In accordance with this estimate the total amount of calculated sodium to be deducted from its delivery to the sea annually, in order to obtain the net delivery, is 15,836,000 metric tons. Since sodium combines with chlorine in a ratio of 23: 35.46, by a simple propotion (23:35.46: :15,836,000:x), we find that the total amount of chlorine which ought to be deducted from its annual delivery to the sea is 24,414,980 metric tons. Deducting this amount of chlorine from the total load of chlorine carried to the sea annually by our rivers (155,350,000-24,414,980) we obtain as a corrected value, for its annual delivery to the sea, of 130,935,020 metric tone. Looking now at our table showing the composition of sea water find that the total amount of chlorine now accumulated in the sea is 25,538,000,000,000,000 metric tons. Dividing this total chlorine in the sea by the net amount of chlorine delivered annually by the rivers of the world we obtain as *the age of the sea* 195,043,312 *years. This age for the sea marks the beginning for the chronology of creation set forth in this treatise.*

All the Geological record is a witness to the fact that the living organisms of the earth originated in the sea. A study of sea-life shows that its abundance and kind varies directly with the temperature and

pressure. The tropical pelagic fauna and flora are more abundant than the polar; and literal more abundant than the deep sea. The Chronology here to be offered rests on a Biological basis. It is therefore quite clear that the initial and early temperatures of the sea are of first concern to us in the present dicussion. All the geological record shows that when the earliest life appeared upon the earth tropical seas bathed its surface from pole to pole. Likewise the igneous and metamorphic condition of all the earliest surface rocks indicate that the sea was a boiling cauldron prior to the time when it became cool enough to permit the existence of life. These statements hold good for the early condition of the sea independent of whether one accepts the Nebular Hypothesis or the Planetesmal Theory of the origin of the earth. Our early geologists conceived that the earth's first atmosphere was very dense and of great pressure. The estimates of some of our scholars have placed its pressure as high as 50 atmospheres with a temperature of nearly 273° C. We must now present a newer knowledge of the sea's earliest temperature resting upon the experimental basis of modern science, because it must be clear, if these pressures and temperatures were true of the atmosphere at its lowest level, the same would also characterize the sea at that time.

The Initial Temperature of the Sea

Ralph M. McKee, a little more than twenty years ago in the February issue of "Science", seems to have tried in vain to awaken the world to a realization of the greatness of the geological meaning of a discovery made by Professor Krafft of Heidelberg University assisted by his students. It is this discovery which enables us here and now to record the initial temperature and pressure prevailing with the sea. I herewith quote a portion of Mr. McKee's article which summarizes in a measure the discovery.

"The geological import of a work carried out at the University of Heidelberg by Professor Krafft and his students seem to have been overlooked.

Krafft has determined for a number of metals the lowest temperatures at which they evaporate in a nearly perfect vacuum. He estimates the vacuum obtained as having a pressure of less than one millionth of an atmosphere. In order to avoid all action of gravity the evaporation temperatures were determined in a tube (1 to 1.5 cm. diameter) placed horizontally.

He has also determined the boiling points in vacuum of metals, i.e., the temperature it is necessary to reach to form a steady 'saturated' stream of vapor upwards from the liquid against the force of gravity.

In boiling under ordinary pressure it is necessary to force the stream of vapor upwards against gravity plus the atmospheric pressure.

Krafft finds that it requires the same number of degress rise, within the limit of error of the experiment, to pass from the temperature at which evaporation in a vacuum occurs as to pass from the latter temperature to the temperature at which boiling at atmospheric pressure (760mm.) occurs.

In other words, that the same rise of temperature is required to overcome the force of gravity at the earth's surface as to overcome the atmospheric pressure and from this the conclusion is drawn that gravity and atmospheric pressure are equivalent.

Krafft's experimental data are given in the following table, also the difference between the temperatures of the beginning of evaporation and boiling in a vacuum (Differences I) and between boiling in a vacuum and boiling at atmospheric pressure (Differences II.)

Element	Evaporation begins in a vacuum (0 mm.)	Differences I	Boiling occurs in a vacuum (0 mm.)	Differences II	Boiling at atmospheric pressure (760 mm.)
Mercury	40°	195°	155°	202°	357°
Cadmium	156	294	450	299	749
Zinc	184	366	550	370	920
Potassium	63	302	365	302	667
Sodium	98	320	418	324	742
Bismuth	270	723	993	707	1700
Silver	680	680	1360	680	2040
		2880		2884	

It will be noted that, whether a metal of low boiling point or one of high boiling point is taken, the two differences for any given element are very nearly the same. The lack of exact agreement is probably largely due to the experimental difficulty of measuring some of the temperatures.

The writer wishes to direct attention to the bearing of the above on the question of the character of the primeval atmosphere and on the theories of world formation.

The atmosphere is held about the earth by the action of gravity and from the above we are forced to the conclusion that the mass of the atmosphere is as great as gravity is able to control. Perhaps this will be made clear by the crude comparison of the interaction of the earth and the atmosphere to that of a rotating bar magnet and its iron filings.

The magnet is capable of exerting attractive force. When the filings are present in full amount, i. e., when the magnet can hold no more filings, the attractive force of the magnet for the filings is exactly equal to the attraction of the filings for the magnet. If a less amount of filings were present the attractive force of the magnet would be greater than the attractive force exerted by the filings. If a large amount were placed in contact with the magnet a certain amount, 'the full amount' mentioned above, would be held and the rest would be thrown off, i.e., the attractive force exerted by the iron filings is never greater than that exerted by the magnet.

In the case of the earth and its atmosphere Krafft has given us our first measurement of the attractive force of the atmosphere for the earth (atmospheric pressure) in the same unit of measurement (degrees of heat). This measurements show that the two are equal and

we must therefore conclude that the present atmosphere of the earth is the largest it is capable of holding. If from any source additions were made to our atmosphere a corresponding amount would be thrown off, i.e., escape from the atmosphere. [Compare the articles on the conditions of the escape of gases from the atmosphere by G. Johnstone Stoney in which he has shown that the molecular velocities of hydrogen and helium are so large that the earth is unable to retain them in its atmosphere. Trans. Royal Dublin Soc., 1892, p. 563; ibid, 1897, p. 305. Astrophys. Jour. VIII (1898), 316; XI (1900), 251 and 357; XII (1900), 201 (Foot Note.)]

As we look at the foregoing we know that with the establishment of the first steaming seas of our earth the amount of gaseous emenations, steam included, could not fail to give to its atmosphere a pressure of 760mm. We also know that the earth's attraction will not retain an atmosphere of larger mass than will exert 760mm. pressure. *Thus we know that the temperature of the sea at the date of its establishment was 100 degrees Centigrade or our regular boiling point of water.*

The Meaning of One Degree of Cooling in the Sea.

We have now shown that the age of the sea is 195,043,312 years. The average temperature of the sea today is 4.44°C. Its temperature at its first formation was 100° C. Since its original temperature was 100° and its present temperature is 4.44°, it follows that it has fallen 95.56° in temperature during the entire period of its existence. Thus a change of one dergee Centigrade in the temperature of the sea corresponds to 195,043,312 divided by 95.56 or 2,041,056 years.

Death Temperatures of Cold-blooded Animals and of Lower Forms of Plant Life and their Initial Terrestial Appearance.

It is a well known fact that cold-blooded animals as a rule have about the same temperature as their surroundings. The few exceptions are such as the Boa where the individual is reckoned among the most highly specialized of his class and not among the average or lower forms. Thus it must be clear that cold-blooded animals, as a class, during the tenure of the life of their successive generations on the earth from the earliest geological eras down to the present, must necessarily have readjusted their body-temperatures as the temperature of their surroundings changed or they could not have survived.

Organic evolution, attested by both Geology and Biology, is here assumed as a premise in all the discussion in this work. *It is also assumed that the ancestral protozoan of a given metazoan began its differentiated existence in the sea at a time when the sea was at the temperature above which the cell structure of the evolved metazoan of today meets death through heat rigor. If we know this highest temperature for the individual cells of any cold-blooded animal, know that the animal is of aquatic origin, know the present temperature of the sea, know that it required 2,041,056 to effect the change of one*

degree of temperature in the sea; we may then calculate when the ancestral protozoan of this given organism came into existence on the earth. Thus to begin with, it is our purpose to calculate when the protozoan ancestors of various animals had a beginning as such, having differentiated through development from others even lower in form. There is a temperature for the cell of each Class of cold-blooded animals—different for each—above which it can not live. Let us see what those temperatures are.

What we need in the way of temperature is the temperature at which the tissues of each Class of cold-blooded animals pass into a fatal heat rigor through heat of contraction. A study of the temperatures of fatal heat rigors of cold-blooded animals has been made by Brodie, Richardson, Morgan, Gotschlich, Schmulewitsch, and others. Though the work of these men was not very wide in scope, the results were congruent and pointed out that generalizations might be made as to such temperatures by extended research.

H. M. Vernon published two articles in the Journal of Physiology —one June 13, 1899; the other November 28, 1899—giving in detail his extended and thorough research on the Death Temperatures of Cold-blooded Animals. The results of his experiments showed that these was a characteristic death temperature for the cell of each Branch of the cold-blooded animals and the temperatures used in this treatise are those through his classic research.

No animal could come into existence in the sea at a temperature above which his muscular organism lost excitability through heat rigor. Vernon's research set the following as the points of death temperatures for the cells of respective branches of cold-blooded animals: Mollusca, 46 degrees; fishes, 39 degrees; amphibians, 38.5 degrees; reptiles, 45 degrees; earthworm, 39.4 degrees; Dytiscus (beetle) 39.5 degrees.

From this data of Vernon and from that of others I shall be able to calculate and to show a considerable range of time through which unicellular organisms were masters of the world. But there are unicellular organisms which have not evolved along the metazoan line and to another Class; but have evolved within their own Class, readjusting their comparatively physically unchanged generations to the new temperatures as the earth has grown older and colder. An examination of the habitats and experiment have proven these to have a much higher death temperature than those cells now evolved from their former estate to the metazoan stage. Thus the appearance on earth of the unicellular ancestors of these persisting and now existing unicellular organisms preceded even in point of time the appearance of the protozoan ancestors who evolved to the metazoan stage. Let us therefore now take a little survey of these.

I first call attention to the experiment of Dr. Dallinger with amoebae. He, having chosen three varieties of amoebae that flourished at 15.55° C. (60°F.), placed them in a suitable apparatus at that temperature. He slowly raised the temperature of their habitat over a period of their successive generations for seven years. At the end of that time he had succeeded in producing a generation of individuals which lived in

the surroundings at a temperature of 70 degrees Centigrade (158 degrees Fahrenheit), though the raising of the temperature originally to 61.1 degrees Centigrade (142 degrees Fahrenheit) immediately killed their ancestors. Thus it has been established that amoebae may live at a temperature of 70 degrees Centigrade.

The obtaining thus of individuals that could live and thrive at the abnormal temperature of 70 degrees Centigrade did not come about through natural selection "weeding out" and killing off those less adapated to the successive changes in temperature. Whenever the subjects of the experiment showed very ill effects from the increasing of the temperature, the increase of heat was stopped by the experimenter until the animalcules had made a cellular readjustment which rendered them unhurt by the change of temperature in their surroundings.

Thus Dr. Dallinger consumed four months in making the first 5.55 degrees C. (12 degrees F.) of increase in the temperature of the habitat. When he had raised the temperature to 6.66 degrees C. (12 degrees F.) the amoebae were affected most adversely and many watery vacuoles made their appearance within the cells. A long pause in the raising of the temperature was required here. The vacuoles induced in their cellular structure finally disappeared and he was free to proceed as before with the raising of the temperature.

Since the temperature of 70 degrees C. was reached by an ordinary unbroken succession of generations, we know that one-celled animals were able to begin their tenure of life in their present form upon the earth when the sea was at that temperature. From this data we shall be able to calculate the date of their initial appearance upon the earth. Furthermore since the original amoebae of Dr. Dallinger's experiment were all killed at once by an immediate raise of the temperature to 61.1 degrees C., this would seem to show that this must have been the highest temperature favorable to the growth of the ancestors of those that are now living. Thus this temperature in the sea (61.1 degrees C.) ought to mark the culmination point of the Geological Era when one one-celled type had reached its height and a new type began. It probably marks the culmination period of one-celled animals, as we know them. But Dallinger and Drysdale found also, that the reproductive granules of cereco-monad survived a dry heat even at 148 degrees C. (300 degrees F.). Since from our biological law we conceive that animal states repeat those of the geological ancestors, we have here an indication that such forms of life began on the earth's surface at 148 degrees C. Accepting the viewpoint of the existence of such animal life we are enabled to explain the existence of apatite and phosphatic granules and the like derived from animal sources and found in the Archaean formation of the rocks—a thing hitherto unexplained. Using the temperature of 148 degrees C. as that at which the very first life of the earth began, we shall obtain a date which will be considered as the beginning of Archaean. It will probably be of interest to mention at this point that geologists have commonly agreed that the

length of this period of the world's history must have been nearly as great as the sum of all the other geological eras.

The first definite tenants of the earth, however, as shown through well formed fossils were Algae, Confervae, and Diatombs. The highest temperature at which these are able to live must also have governed the date of their entry upon the life as such in the sea. Brewer reports Algae living in a California geyser at 93 degrees C. Confervae have been found growing in geysers at a temperature of 92.2 degrees C. (198 degrees F.); and Diatombs and Oscillartoria at 78.8 degrees C.

Bacteria were also numbered among the earliest tenants of the earth. Consulting Sternburg's Bacteriology we find that the highest death temperature for Bacilli is 74 degrees C. and for Bacteria in large numbers about 70 degrees C. This combined data on plant life will enable us to point out the time of the very beginning of Paleozoic (geologically speaking) life upon the earth. Coupled with other data to be given it will enable us to calculate the duration of that long period. By way of data on spores I must add that Globig found that spores of a certain potato Bacillus withstood boiling up to a temperature of 125 degrees C. It is also well known that the spores of most Bacteria resist and survive the action of a dry heat up to 125 degrees C. The spores of anthrax even withstand a dry heat up to 141 degrees. C. It is a fact that no sterilization is sure which is not made at a temperature where albumin coagulates. From the mass of the foregoing data we now tabulate various highest death temperatures of animal and plant life to be used in our calculations.

Table of Death Temperatures

Some amoebic reproductive granules	148 ° C.
Some spores (in presence of compressed moisture)	141 ° C.
Many spores (in dry air)	125 ° C.
Algae	93 ° C.
Confervae	92.2° C.
Diatombs	78.8° C.
Bascilli	74.0° C.
Amoebae (through acclimatization)	70.9° C.
Amoebae (in their present natural state)	61.1° C.
Mammalian muscle (cells)	50 ° C.
Mollusca (cells)	46 ° C.
Reptilia (cells)	45 ° C.
Dytiscus (insect cells)	39.5° C.
Earthworm (cells)	39.4° C.
Fishes (cells)	39.0° C.
Amphibia (cells)	38.5° C.

Since the present temperature of the sea is 4.44° C. and since one degree fall in the temperature of the sea required 2,041,056 years, the time when the Amoebic Ancestral Forms of the foregoing higher forms —(from "Amphibia" to "Mammalian Muscle")—came into existence may be calculated by subtracting 4.44 from the death temperature of

each and multiplying the remainder by 2,041,056. The same process is followed with the others found in the table; but in these cases we get the time when these appeared in their adult form and not in an ancestral form, with the exception of the spores and reproductive granules which also come under the heading of possible ancestral types. The foundation for calculation rests on the Biological Law enunciated by Herbert Spencer in the following words: "Each organism exhibits within a short space of time a series of changes which, when supposed to occupy a period indefinitely great, and to go on in various way instead on one way, give us a tolerably clear conception of organic evolution in general." The reader must also constantly bear in mind that animals and plants in their development repeat the forms of their ancestors of geological times. The calculation follows:

		Years ago that they appeared
**First Organic cell formation	[(148 —4.44)×2,041,056]	=293,013,999
**Spore-like forms	[(141 —4.44)×2,041,056]	=278,726,607
*Algae	[(93 —4.44)×2,041,056]	=180,755,919
*Confervae	[(92.2—4.44)×2,041,056]	=179,123,074
*Diatombs	[(78.8—4.44)×2,041,056]	=151,772,924
Bascilli	[(74.0—4.44)×2,041,056]	=141,975,845
*Amoebae through adaptation	[(70.0—4.44)×2,041,056]	=133,811,631
*Amoebae	[(61.1—4.44)×2,041,056]	=115,646,232
Ancestral Amoebic Cell Formation of		
Mammalia	[(50 —4.44)×2,041,056]	= 92,990,511
Mollusca	[(46 —4.44)×2,041,056]	= 84,826,287
Reptilia	[(45 —4.44)×2,041,056]	= 82,785,231
Dytiscus	[(39.5—4.44)×2,041,056]	= 71,559,423
Earthworm	[(39.4—4.44)×2,041,056]	= 71,355,316
Fish	[(39.0—4.44)×2,041,056]	= 70,538,895
Amphibia	[(38.5—4.44)×2,041,056]	= 69,518,367

In the immediately preceding table we have fixed the dates for Algae, Confervae, Diatombs, and Amoebae, and have starred these. *They mark the beginning of Geological Time known to us as Paleozoic.* The ancestral forms are typified by the reproductive granules listed in the table as "First Organic Cell Formations" and "Spore-like Forms." We have double-starred these as marking the Eozoic of Archaean Time.

We have here some very interesting suggestions concerning the beginning of life upon the earth. (a) It was begun in the dust-saturated clouds and mists about the planet before it was cool enough to have a sea. (b) The spores which withstand a heat of 141 are those of Anthrax and anaerobic bacterium, which lives apart from an atmosphere of oxygen and nitrogen. It suggests that this life of the earth began before it had evolved its present type of atmosphere. (c) It was this earliest spore-like life which furnished the large deposits of graphite found in the Archaean. The graphite of the Archaean of

Canada is on an average equal to the amount found in similar areas of the Carboniferous Era. The date of the reproductive granules answers for the distribution of grains of phosphate through Archaean rocks.

In the calculations which we have made in our table, we have only the dates of the ancestral amoebic forms of these animals aside from those starred. Paleontologists have established the law that animals during their development in embryo repeat on a diminished scale the forms through which their ancestors have passed during the geologic times. All the metazoans under discussion begin in embryo as one cell and gradually develop to the form in which we now know them as adults. Thus having fixed in our table the dates of the beginnings of these amoebic forms from which these metazoans evolved, it must next be ours to calculate the time when each animal under consideration entered initially upon its present metazoan form.

(*To be concluded in the July issue.*)

THE PERISCOPE

HENSON HONORED AS ARCTIC DISCOVERER

NEW YORK—At a celebration of the twentieth anniversary of the discovery of the North Pole here Saturday Matthew A. Henson, aide to the exploror, Commander Peary, who actually planted the American flag at the North Pole, received his first formal recognition for his part in the historical event. Word was also received from Washington that Representative Kelly (Republican) Pa., in a celebration of the discovery at Capitol Hill, announced that he would introduce in the new Congress a bill to grant gold medals to Peary's aids.

In the New York observance the Bronx Chamber of Commerce presented Henson with a silver loving cup inscribed with a tribute to his service.

Henson who never received a reward for his part in the dash to the North Pole, is a clerk in the custom house. He lives with his wife in the Bronx, where many of his neighbors are unaware that he and four Eskimos were the only companions of Peary at the pole.

Matthew Henson is the only surviving member of the only group of men who ever stood at the North Pole. He said two of the Eskimos died on the trip and he heard later of the deaths of the other two. The death of Commander Peary left 62-year-old Henson, the only survivor.

JACOB ADDISON, MOTION PICTURE OPERATOR

Jacob Addison, Los Angeles high school student, has established a record in passing the examination for motion picture operators with an average of 97%, the highest grade so far received by any person taking the test. He received his training at Jefferson High School in Los Angeles where he operate the school motion picture machine.—*Opportunity*, April, 1929.

TWO HUBBARD HOSPITAL GRADUATES RECEIVE ROSENWALD FELLOWSHIPS IN PUBLIC HEALTH NURSING

Miss Eugenia Albritton, a graduate of the Nurse Training School of the George W. Hubbard Hospital of Meharry Medical College, class, 1927, and a nurse in the Public Health Staff of Nashville, Tennessee, and Miss Laura Campbell, class 1928, have been granted fellowships by the Julius Rosewald Fund for further study in Public Health Nursing.

Misses Albritton and Campbell made an observation tour through two Southern states prior to their registration at Columbia University.

While in Alabama they spent one week with the Department of Health at Birmingham and one week with the traveling Health Unit of Tuskegee Institute, Tuskegee, Ala. After which they spent ten days observing classes in midwifery and hygiene with the Mississippi State Department of Health.

From here they spent four weeks in Philadelphia, Pa., visiting Phelps Institute, Mercy Hospital, and the visiting Nursing Association. After they completed their observation tour they registered at Teachers College, Columbia University, New York City, on February 1, 1929, where they will spend four and one-half months in an intensive course in Public Health Nursing. After completing the course at Columbia, they will spend six weeks at the Henry Street Visiting Nursing Service. Upon completing this course they will return to Nashville to resume their work with the City Council of Public Health Nursing.

Dr. E. E. Just, Professor of Zoology at Howard University has sailed for Naples, where he is to conduct a scientific investigation in the Italian Marine Biological Laboratories.

Miss Alethea H. Washington is the first colored woman to win a degree of Doctor of Philosophy from Ohio State University.

Prof. Dudley S. Tanner has been appointed as State Agent for Negro Education in Tenessee. Professor Tanner holds his masters degree from Peabody College at Nashville, Tennessee.

—*The Bulletin.*

MISS MYRA LOGAN WINS NEW SCHOLARSHIP

Miss Myra Logan received an A.B. degree from Atlanta University, an M.A. from Columbia University, 21 years old and was the first to benefit from the income of a $10,000 scholarship recently established at the New York Homeopathic Medical College and Flower Hospital by Walter Gray Crump for the exclusive use of "a deserving Negro desirous of studying medicine." This scholarship is the only known one of its kind granted by a medical college. Miss Logan will begin

the four-year medical course this fall. She lives at 130 W. 120th Street, New York City.

—*The Pittsburgh Courier.*

NEGRO FARM AND HOME OWNERSHIP WEEK

Pres. Benjamin H. Hubert, Executive Secretary, The Association for the Advancement of Negro County Life, Georgia State Industrial College, Ga.

Negro Farm and Home Ownership Week is a movement begun by some of us who are interested in having our people know and appreciate the value and importance of farm life. It is an attempt to bring the attention of farmers, teachers, preachers, social workers, and others interested in the advancement of the Negro race in particular and the progress of our country as a whole to the great underlying influence of home ownership on the permanent happiness and prosperity of races and nations who own the land that they till.

There is a feeling among those who have made a study of the whole question of Negro life that there must be a redirection of the thinking of our people. Thousands of them have left the farms and have sought for themselves a future in urban centers. Much of the land that we, as a race, have purchased at a great sacrifice is being lost for a mere song.

There is no attempt, however, on our part to urge people who have a brighter future in urban districts than in the country to remain on the farms. There is no desire on our part to bring back fom the city people who have left the farms unless they find that on these farms, they have a comparative advantage for themselves and for their children. But there is a compelling reason why Negroes who are already on the farms and have the opportunity to remain there and develop these farms should be encouraged to purchase some of the valuable lands now being offered for sale and build for themselves a satisfying economic and social life.

The Farm and Home Ownership Week, then, attempts to stress the facts about Negro Farm and Home Ownership and the fundamental reasons why men and women should be urged to keep their feet firmly fixed on the soil. It points out the reasons why ownership is more desirable than tenantry. It calls to the attention of the masses the facts of history—that a people who till the soil over a long period of time are eventually the people who own the soil. According to the census estimates, Negroes in Georgia, from a total of sixteen thousand farms have lost, during the last five years, approximately five thousand farms. We as leaders ought to realize our responsibilities in this connection whether we ourselves live on the farm or not. We should also point the way to an independent and progressive life in the open country.

The observance of Negro Farm and Home Ownership Week began in 1927. It was celebrated in practically every state in the South.

All of the Land-Grant Colleges and many of the private institutions of learning carried messages of hope to our people who live in the country. It seems to me that the institutions of the South could do no better thing now than to put the question of the ownship of land at the front of their programs, no matter what these programs may be, because, in the last analysis, the Negro in our urban centers will have the keenest kind of competition.

So far as we are able to see, there is no probable chance of Negroes owning and operating our factories, our mines, our shipping industries, or our railroads. There is left to them the one great primary occupation—the farming business. Negroes have shown ability in this direction. It is a great field for the single entrepreneur.

We ought to become increasly proficient as a race in this one of the primary businesses to the world in which we have already shown that we can succeed. The world will always depend upon the soil for its food and clothing. If the Negro race can get hold of this great business of producing the raw material that men need for life and sustenance and control it and learn to market the products produced, we will soon occupy a most important place in the councils of the nations of the world.

I can do no better than repeat the warning of that great American, the late Henry Wallace when he warned the American people "a people that till the soil will eventually own it, but a people that leave the soil will eventually perish."

The Farm and Home Ownership movement is sponsored by the Association for the Advancement of Negro country life. It is the purpose of this Association to make it possible for Negro boys and girls to serve in a large way in rural America. We urge all right minded, fair thinking people to join this movement with us which we believe will mean so much to our people and will add to the growing power and prestige of our country.

HIS FORMULA FOR SUCCESS

Dr. David C. Bartow
Chancellor of University of Georgia

1. Can you make yourself useful?
2. Can you make people like you?
3. Can you control your temper?
4. Can you control your tongue?
5. Can you keep your money?
6. Can you keep accounts?
7. Can you keep things where they belong?
8. Can you do one thing at a time?
9. Can you do without?
10. Can you plan the use of your money?
11. Can you plan the use of your time?

—*The University News.*

WE WIN A PLACE IN INDUSTRY *

By Claude A. Barnett, Director of Associated Negro Press, Chicago, Ill.

A DECADE has passed since the close of the great war, and the general migratory period which brought colored workers north in large numbers to invade fields of labor that were new to them. How nearly the colored laborer is holding his own in the general industrial realm, whether he has made good, whether there is an increasing demand for his labor, the extent to which he has been able to overcome the prejudice which naturally met him from competing whites, how employers regard him, the manner in which unemployment affects him and what the future seems to hold for him are questions which arise as one ponders the record of adventurers.

Chicago, the haven for the largest proportionate share of the influx of southern laborers, offers the most logical proving ground for such a group of inquiries as is contained in the foregoing paragraph.

The Negro population of Chicago was roughly estimated at 45,000 in 1910. It increased 275 per cent in almost direct response to the opportunities which were opened up for work at better wages than those which prevailed on the farms of the South. The pre-war population presented no noteworthy industrial aspects.

In fifty years the number of colored citizens had gradually increased without any greatly significant disturbance of the social or economic status.

Before the turn of the century, scions of the eastern line of colored caterers had come to this city and made a place for themselves which lasted for nearly a generation. Sixty per cent of the rest of the inhabitants were confined to jobs of the personal service variety. They were waiters, cooks, maids, porters, janitors. Some of the women were hairdressers and chiropodists, plying their trade among the rich white families.

The number of men and women employed in plants and factories before the war was negligible. The stockyards employed a few colored persons, mixed with Irish and Polish. In factories, however, it was exceptional to see a Negro except as a porter, and that was not the rule. There was a definite spirit of hostility exhibited by the lower class of working man, it being unsafe for Negroes to venture alone into their residential districts. This antipathy was almost entirely traceable to their desire to keep the Negro from becoming a competitor for the jobs held by white men.

Most of Chicago's new laborers came from Georgia, Mississippi, and Alabama, off the plantations and cotton farms of states that were notorious for their small wages, the backwardness of their people, and the vicious character of their laws and treatment of colored people. They were eager to come and the industrialists were eager to get these men and women, but it would have been foolish on the part of any one to have expected these newcomers to fit immediately into the

*Reprinted from April, 1929, *Opporunity*.

highly-organized and industrialized life of the north. Social problems immediately presented themselves. The turnover of the new Negro labor was high, but, when it was considered that once these farm hands were in northern cities they found greater opportunities for themselves than the labor agents of special interests had held out to them, their desire to get the best possible advantages explains somewhat the waste from turnover for which they were responsible.

There was an abundance of openings for skilled labors, but these men and women from the fields were not qualified for the specialized tasks. Most of them were only competent to do the heavy, unskilled work. The industries employing large numbers of Negro workers were: Slaughtering, packing of meat, and other food products; iron foundries and iron and steel products; laundries, needle trades; hotels, railroads, pullman and dining car services, tanneries, taxicab upkeep and repair, and mail order houses.

But most important in an appraisal of the Negro in industry in Chicago is his position since it was realized that the best minds and agencies must apply themselves to the working out of an industrial program for the Negro. This program contemplated the retention of all the ground the Negro had gained with the thoroughly American objective of placing him wherever else it was possible. Two of the most affective agencies which undertook to deal with the problem were the Chicago Urban League and the Young Men's Christian Association. the Chicago Urban League and the Young Men's Christian Association. C. A., co-operated directly and continuously with stock yards workers, placing men, discussing problems with the laborers and the company representatives, and suggesting factors that would tend to bring about an agreeable working status. The Illinois Free Employment Bureau under the direction of George W. Griffin, likewise performed creditable service.

The brunt of the task, however, has fallen upon the Urban League, under its two able secretaries, T. Arnold Hill and A. L. Foster. The League's special task has been to contact large employers of labor, seek openings for skilled and unskilled workers, and to help to solve problems that might arise. Through the League's helpful influence the field for the Negro worker has been gradually extended. As a result, Negroes have taken their places in the following industries in larger numbers than previously: First, laundries; of fifteen large laundries employing 937 women there are 790 colored a proportion which represents more than 84 per cent. Second, date, fig, and nut factories: Negro women have a practical monopoly on this work—from six factories the statistics show a total of 635 colored and 48 white employed.

The steel industry has given increased opportunity. The Illinois Steel Works in 1910 has seven colored employers, 35 in 1916; 1,209 in 1919, which fell off to 338 during the after-the-war depression, but has since increased to 1,014 and a present average of 600. Other steel companies have given similar consideration, employing between 12 and 20 per cent colored help. The layoff of colored help has been in the same propotion as that of other employes.

Five years ago the By-Products Coke Company employed 13 per cent Negroes, but today this percentage has been increased to 33 1/3. The Beaver Products Company (roofing manufacturers) during a period of four years increased its Negro force from fifteen per cent common labor to 77 per cent, including skilled and semi-skilled employes.

The Urban League gives the following figures on the distribution of Negro workers in 1928:

Packing Houses	8,000
Steel Works and Foundries	3,800
Building Trades	6,000
Tanneries	1,200
Car Shops	1,000
Laundries (approximately)	75%
Waiters and Cooks	3,200
Pullman Porters	2,800
Government Employes (post offices)	3,400
Red Caps	215
Musicians (organized)	350
Musicians (unorganized)	150
Police Department	124
Firemen	21
Corn Products Industry	1,000
Lamp Shade Factories	4,000
Date, Fig, and Nut Shelling	2,300
Overall and Apron Factories	1,000
Auto Accessories	850
Ladies Dresses and Men's Clothing	900
Commonwealth Edison Company	115
People's Gas Light & Coke Co.	75

Rapid Transit & Surface Lines: A few as janitors and porters.
Bell Telephone Company: A few as janitors and porters.

It will be noted that the second largest group in point of numbers is that employed in the building trades. In spite of advancement in these crafts, determined opposition has been offered by the labor unions. In some trades, such as bricklaying and plastering, the Negro is admitted somewhat freely to the unions, but in others—printers, plumbers, electricians, entrance is made very difficult for him, and some unions have established Jim Crow branches for Negroes.

Another indication of how the Negro is progressing industrially may be seen in the following list of what might be termed "unusual positions" held by Negroes with white concerns:

Name	*Occupation*	*Where Employed*
David Manson,	Traffic Manager	Ohio Iron & Metal Co. (Retired)
Bertram Jamison,	Engineer	Commonwealth Edison Co.
H. R. Lewis,	Electrical Draftsman	Commonwealth Edison Co.
Jas. A. Megahey,	Junior Engineer	Board of Local Improvements
W. H. Sheridan,	Junior Engineer	Board of Local Improvements

William Thornton,	Junior Highway Engineer	State Highway Comm.
Sam Cheevers,	Junior Highway Engineer	State Highway Commission
Oscar Randall,	Civil Engineer	Sanitary District
Thomas Mayo,	Chief Chemist	B. Heller Chemical Co.
Richard Morgan,	Chemist	B. Heller Chemical Co.
W. A. Mollison,	Chief Chemist	Imperial Belting Co.
James Prince,	Chemist	Argo Corn Products Co.
E. M. Aiken,	Chemist	American Maise Products Co.
Howard Shaw,	Head Electrician	The Pullman Company
A. D. Watson,	Electrical Engineer	The Pullman Company
James W. Camp,	Bookkeeper	Johnson Hardware Company
Richard Jones,	Assistant Manager	South Center Department Store
R. Lester Buffins,	Architectural Draftsman	Charles S. Duke
Lemuel McDougal,	Architectural Draftsman	Henry K. Holsman
Clifford Campbell,	Architectural Draftsman	Board of Education
August Jennings,	Meter Reader	Gas Company
Edward A. Jones,	Meter Reader	Gas Company

It is the belief of the writer that while the number of Negroes found in these so-called "unusual positions" is increasing, the number of those engaged in domestic service is decreasing. This conclusion is drawn from analyses made of the classified advertising sections of the local daily papers, which show that while ninety per cent. of the "situations wanted" as domestics is colored, ninety per cent. of the positions offered is for whites. The general belief is that this condition is not due so much to prejudice as it is to the prevailing incompetence of the Negro domestic, as compared with the foreigner, and the unwillingness of colored domestics to accommodate themselves to the hours and habits required.

The Urban League has not only been busy placing Negroes in the larger white industrial establishments, but has conducted a thorough campaign in the colored districts to see that proprietors of white businesses give Negro boys and girls, and men and women, the opportunity to work which the patronage of Negroes deserved. A survey of seven white banks revealed a surprisingly large number of colored depositors but few colored employees. The Bankers State Bank and the Industrial State Bank each reported that more than 90 per cent. of their depositors in the savings department were Negroes and about 25 per cent. in the commercial department. While the Industrial Bank employs one colored woman in its savings department and a colored janitor, the Bankers Bank employs only two Negroes in the capacity of chauffeur and janitor. The Franklin, Drexel State, and Kenwood National Banks each reported a large number of Negro depositors, yet in neither bank was a Negro employed in a position above that of janitor. In one bank a colored policeman was employed, who has since been killed in line of duty. The Lincoln State Bank reported that it had 15,000 colored depositors and the Roosevelt State Bank admitted it had about one million dollars on deposit from Negroes. The former employs one colored woman in its savings department and two policemen. The Roosevelt Bank has a colored receiving clerk and a policeman.

About fifty drug stores were surveyed of whose trade Negroes constitute from fifty to ninety-five per cent. While in almost every place a colored porter was employed, only 35 per cent. of the stores employed full-time colored clerks and a few more than seven per cent. had registered pharmacists who were colored. Walgreen Drug Company has recently opened one of its largest stores in the center of the Negro district with about twenty colored employes. The manager is white.

Twelve shoe stores, seven United Cigar Stores, and seven coal companies were visited. No shoe store had a full-time salesman, but in two cases the porter was allowed to wait on customers in the rush period. Three stores thought favorable of colored help and advised the investigator that consideration would be given at a later date. Colored trade was found to constitute from 75 to 95 per cent. in these stores. The cigar stores had one colored manager. All other employes were white, except seven porters. Negro patronage was said to be eighty per cent. for all the stores. In the seven coal companies the majority of those employed were colored, but these men were used as drivers and common laborers except for one salesman. Office forces were all white. In every case it was announced that the trade among whites was greater than among colored.

Inquiry at fourteen theatres revealed that there were 121 male and 37 female employes, among whom 94 males and 32 females were colored. Six of the theatres, however, had forces entirely colored. Nine houses had colored cashiers. Other Negroes were employed as musicians, doormen, ushers, and operators.

Proprietors of eight groceries, markets, and fruit stores were interviewed. With but few exceptions the Negro patronage amounted to 90 per cent. or more. In nearly 20 per cent. of these stores delivery boys constituted the only colored part of the help; the rest of the proprietor's family. In many other stores Negroes served as both clerks and porters. Fourteen markets employed butchers, all of whom were reported to be giving satisfactory service. There was a general opinion among the proprietors that since there was a considerable Negro trade, colored help should be used, white patrons often objecting to such clerks waiting on them, and this was more evident in the meat markets than in the groceries.

There are employed two hundred clerks and other helps in one hundred of the Greater Atlantic and Pacific Tea Stores. The National Tea Stores employ a manager in one store and several clerks in others. The Loblaw Groceries have indicated their willingness to employ Negroes in their stores in the colored district.

The Standard Oil Company has extended opportunities to the Negro as attendants and greasers in filling stations. This was a departure from custom brought about through H. N. Robinson, of the industrial department of the Urban League, after several months of effort. Six attendants and twenty-five greasers have been given employment.

The South Center Department Store, and the Silver Dollar Store, both established in 1928, have employed more than a forty per cent. sales force of colored men and women. This has helped to destroy the

belief that the two racial groups cannot work harmoniously together. The proprietors have openly expressed their satisfaction with the success of the plan.

As an evidence of the successful efforts of workers engaged in various fields, the following statements from employers are quoted:

Louis Kahn, proprietor of the South Center Department Store, writes: "I am pleased to state that the colored employes at the South Center Department Store are proving very satisfactory in their various capacities. They are steady in their attendance, diligent and anxious to make good. They are meeting all requirements expected."

John Paul, proprietor of Myer-Paul Company: "We have at this time approximately thirty-five colored persons employed, and the majority we acquired through the Urban League. We find them honest and a good percentage very efficient as a whole. We are satisfied with them."

T. B. Clifford, manager of the sales department of the Standard Oil Company: "With reference to your request for information pertaining to the status of colored men employed by this company, please be advised that the attendants and greasers listed are still in our employ and are satisfactorily discharging their duties."

In some places Negroes have lost out because unemployment is widespread and has affected white and black alike. The Boston Department Store and the Stop and Shop Food Shops dismissed their colored employes with the explanation that white people wanted work, too. All the colored employes were given sterling recommendations as to their ability and character, with the added statement that they were being replaced because the policy of the stores was to employ white help.

A survey of the Negro in Industry in Chicago would be incomplete without some space given to the employment of Negroes by Negroes. A tabulation by W. H. Bolton shows the following Negro businesses in Chicago for 1927:

Artists	6	Employment Agencies	16
Bakeries	12	Express and Storage	51
Banks	2	Fish Markets	11
Barber Shops	187	Florists	7
Book Stores	4	Furnace Repairs	3
Bond & Investment Co.'s	5	Furniture Dealers	19
Brokers	5	Garages	22
Cab Companies	9	Groceries	153
Churches	98	Haberdashers	3
Chiropractors	23	Hairdressing Parlors	103
Cigar Stores	17	Hardware and Paint	3
Coal Companies	3	Insurance	11
Decorators	15	Inventors	3
Dentists	97	Jewelers	5
Dressmakers	26	Laboratories	7
Druggists	41	Ladies' Furnishings	8
Dry Goods Stores	6	Laundries	6
Electricians	9	Lawyers	106

Locksmiths	3	Physicians	176
Magazines	4	Plumbers	7
Manufacturers—		Printers	20
Cigars	3	Real Estate Dealers	56
Ice Cream	3	Restaurants	98
Hair Preparations	8	Service Stations	6
Medicinal Lights	1	Shoe Repairs	12
Sausage	2	Shoe Stores	2
Toilet Preparations	6	Sign Painters	5
Mattress Makers	2	Stone Cleaner	1
Milk Distributor	1	Tailors	89
Music Stores	6	Transfer	15
Newspapers	6	Undertakers	28
Optometrists	4	Variety Stores	15
Photographers	4		

The above list is given to indicate the nature and extent of Negro enterprise. Most of these, including physicians, dentists, and so forth, employ one or more persons. It is not in agreement in all respects with some other compilations, differing notably in regard to the number of physicians, which the Negro in Chicago gives as 241, but the figures above are adequate to give a reasonable picture of the Negro at work in his own pursuits in Chicago.

The colored insurance companies employ approximately 425 persons. The two banks have about 25 employes each. The newspapers give employment to sixty. The beauty parlors, drug stores, restaurants, groceries, hotels, real estate offices, physicians' and dentists' offices, and other such places, all employ one or more persons. It has been conservatively estimated that 5,000 Negroes are employed either part time or full time in these different Negro establishments. Some of them, such as the Chicago Defender, the Binga State Bank and the Therapeutic Lamp Company of Paul E. Johnson, employ both white and colored help.

It can thus be seen from this survey that the Negro in Chicago has no cause for great pessimism so far as the immediate future of his industrial outlook is concerned. Since before the war he has been making steady, normal progress. The mal-adjustment of the early post-war period has been straightened out and the industrial field for the Negro worker has been extended and secured in small and large white businesses in such a way as to more than offset any losses he may have suffered. In addition, the feeling between the races has improved, and greater respect and appreciation for the Negro has been the result of his advancement.

Chicago today is on the verge of a big boom. Four years hence the city's leaders plan to hold another great world's fair that is expected to surpass anything the city has ever seen. Its promotion will involve the expenditure of many millions of dollars. Negroes now occupy a district in that section of the city which will benefit most from the fair. Not only are they going to benefit through increased property values, but they are in a position to get a fair share of the work of

preparing for the millions of fair visitors expected. Their place in the building trades will assure them of this. And even before the great fair there are indications that many other public improvements are on the way. Negro representatives in the state legislature, the city council and other powerful political posts will fight to see that the Negro gets his part of this work which his taxes help to pay for.

All the time the Negroes' leaders in Chicago are pushing, pushing, pushing. The Urban League, the Young Men's and Young Women's Christian Associations, The Illinois Free Employment Bureau, and other civic and social agencies have all contributed to help to bring about a partial spirit of fair play in industrial relations. That, it is hoped, is going to be the spirit of the future of the Chicago Negro in industry in relation to his white brothers.

NEWS FROM HERE AND THERE

ATLANTA UNIVERSITY TO BECOME A UNIVERSITY FOR GRADUATE WORK

On April 1, 1929, an arrangement was completed between Atlanta University, Morehouse College and Spelman College for the affiliation of these three institutions in a university plan, the graduate and professional work to be carried on by Atlanta University, the college work to be done by Morehouse College and Spelman College.

The arrangement contemplates an immediate change in the activities of Atlanta University. No freshmen are to be admitted next fall, and as rapidly as the present undergraduate classes can be taken care of, the University is to become an institution for graduate and professional work only. It is expected that certain graduate courses will be offered during the coming academic year 1929-1930, but time will be taken to build up with care and with a definite eye to needs of the graduate faculty and the graduate school.

The Board of Trustees of the Atlanta University has reorganized to include representatives nominated respectively by the Boards of Trustees of Morehouse College and Spelman College, and additional members to be elected at large.

Those who have been selected for positions on the governing body represent the various schools, and they will later select five more members at large to complete the membership of the board of trustees. Dean Sage, of New York, is president of the board and one of Atlanta University's representatives; James Weldon Johnson, of New York, and W. W. Alexander, of Atlanta, being that school's other members. Dr. John Hope, of Atlanta, who will assume the presidency of the new organization this summer; Kendall Weisiger and Dr. James Nabrit, are Morehouse representatives, and Mrs. Alice Coleman, of Boston; William Travers Jerome, Jr., of New York, and Miss Florence M. Read, president of Spelman College, are the latter school representatives. Dr.

Myron W. Adams, present president of Atlanta University, will hold an ex-officio membership on the board until his retirement on June 30.

At the meeting on April 1st, Dr. John Hope was unanimously invited to become president of Atlanta University, with the understanding that for the present he might, in response to the insistence of the Morehouse Board of Trustees, remain as president of Morehouse College to complete the present endowment campaign and the plans for strengthening the college growing out of the campaign. Dr. Hope has the matter under advisement.

Dr. Hope has been connected with Morehouse College for 30 years, 22 years as president. He is a native of Georgia, was graduated from Worcester cademy and Brown University, and holds the honorary degree of LL.D. from Bucknell University, from Howard University and from McMaster University. He has long been prominent in all movements for the betterment of conditions and opportunities for Negroes. He won distinction during the war for his work among colored troops in France. He is officially connected with all branches of the Young Men's Christian Association from the local committee in Atlanta through the county and state and national organizations to membership on the General Board and the World's Committee of Y. M. C. A.'s. He has from its beginning been a member of the Interracial Commission with headquarters in Atlanta, and has done much for the improvement of interracial relations throughout the South. But in spite of his many outside relationships, he remains first and foremost a teacher with a statesman's view of the field and function of education.

MOREHOUSE-SPELMAN SUMMER SCHOOL

The Summer School of Morehouse College was organized in 1921 primarily to enable public school teachers to continue their study and qualify for higher state certificates. Through the courtesy of Spelman College, the women's dormitory and home economics building of that institution were used. Each year there has been an increasing number of registrants for content courses in high school and college subjects leading to diplomas and degrees. In order to meet this demand in 1928 the Summer School was enlarged and reorganized as the Morehouse-Spelman Summer School, conducted jointly by Morehouse College and Spelman College, with the resources and facilities of both institutions at its disposal. Atlanta University became affiliated in 1928. This year the Atlanta School of Social Work will also be affiliated.

The faculty will be composed of experienced members of the regular staffs of the four schools and of outstanding teachers from other institutions. The curriculum will be sufficiently varied to permit a wide choice of subjects. The Summer School has become, in point of study, one of the strongest in the South.

The campuses, only a block apart, occupy beautiful and healthful sites over 1,000 feet above sea-level.

MEETING OF THE ATLANTA ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

By LAURA AUSTIN DICKINSON, *Spelman College*

The Atlanta Association for the Advancement of Science held its monthly meeting in Tapley Hall on February 9. The meeting was an open one, and was much enjoyed by all who attended it.

The speaker was Dr. Charles H. Herty, advisor of the Chemical Foundation. On the subject, "The Outlook for Industrial Expansion," Dr. Herty spoke of the larger per cent. of manufacturing which has in recent years been established in the South rather than in the North. He gave as reasons for this, not only the nearness to raw materials and a wealth of power, but also the efficient, loyal and contented labor. At the close of his lecture he made an appeal to his hearers, as teachers or future teachers, to do all in their power to help in the development of this section of the country by fostering in others an ability to find happiness in work. He said that a good workman should have the qualities of loyalty, thrift and attention to detail. He cited, as an illustration of the need of attention to detail, a certain product that requires thirteen different processes before it is completed. If a worker fails in one process, not only is his work lost, but also the work of twelve other men.

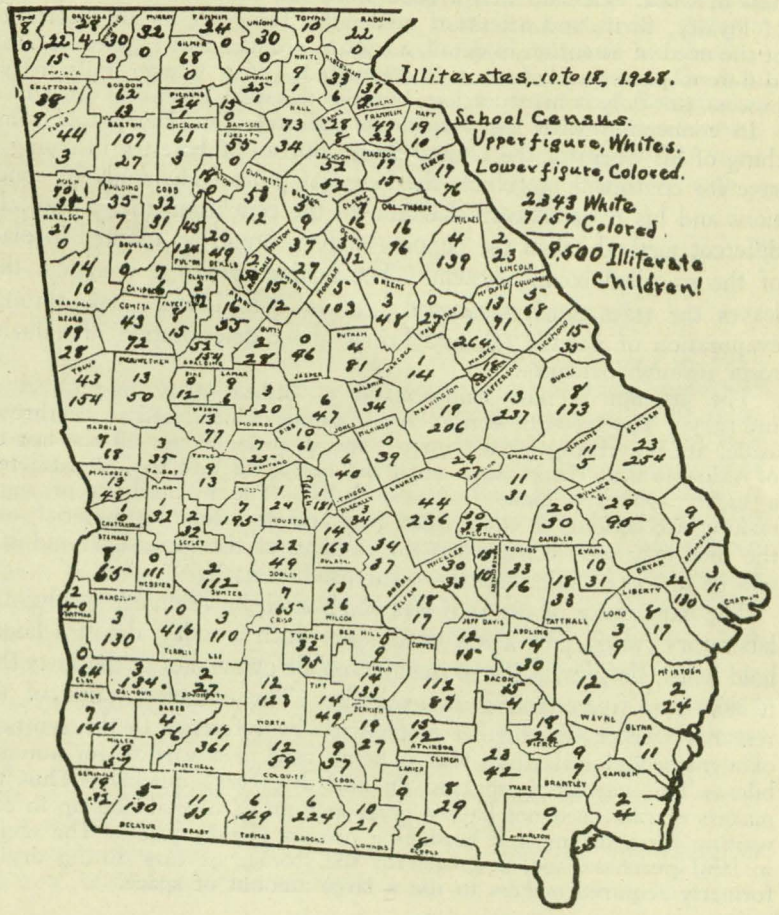
In connection with the turpentine industry, Dr. Herty told something of his work for the United States Bureau of Forestry in trying to save for continued usefulness the long-leaf pines. His study of conditions and his research work led him to the conclusion that a radically different method called the cupping system should be adopted in place of the so-called boxing system. The boxing system is a system that leaves the trees much weakened, causes considerable loss through evaporation of volatile oil, and brings about deterioration of valuable rosin through oxidation.

The attempt is now being made to utilize every by-product in industry. The seeds of cotton, for example, which used to be thrown aside, are now being ginned three times in order to get off the last bit of valuable lint. Moreover, when the lint is off and the oil extracted, a sugar, xylose, is made from the hulls. The by-products of sugar making are serving as compressed fuel and as insulating material, and the time may soon come when the residues of the cane sugar industry will be of more value than the sugar product itself.

The importance of research was emphasized by reference to glycol, a laboratory curiosity of a few years ago, which is today almost a household word. Its great value to the automobile owner lies in the facts that it does not freeze and is non-volatile. The economic value of the research worker was further emphasized by reference to the synthesis of a nitrocellulose lacquer that is being used as a varnish for automobiles. This varnish is sprayed on and dries very quickly. Thus the makers of cars need not have a great amount of capital tied up in cars waiting for a drying and hardening process to take place. The saving in land purchase, too, is great; for the storage of cars during drying formerly required makers to use a large amount of space.

Perhaps of the greatest human interest to us were the remarks about wood-growing as a means by which people in the South who happen to find themselves settled on somewhat unproductive farms can increase their yearly incomes. A little knowledge of good forestry will help the farmer of the South very much. If he cuts down all of his trees, he is doing destructive work, and keeping himself from a continual source of income. Much of the wood that is in great demand in the rayon, paper and wall-board industries is imported from Canada, where the growing season is short, and spruce forests, even when thirty years of age, will grow only 0.9 ton of wood per acre per annum. Our long-leaf pines will produce 1.7 tons of wood per acre per year, and slash pine 2.93 tons. Farmers wishing to supplement their incomes would do well to seize their opportunity and grow trees.

DEPARTMENT ISSUES BULLETIN ON CHILD ILLITERACY IN GEORGIA



In the fall of 1926 the University Items printed a map of Georgia showing the number of children between 10 and 18 in each of the counties that were illiterate, according to the school census of 1923.

The 1928 school census has just been issued by the State Department of Education in a bulletin prepared by Dr. G. C. Singleton. We have made, according to promise, the above map showing the 1928 status of child illiteracy in each county.

There were 3,049 white illiterates in 1923. In five years the state has reduced this number by 706, or 23 per cent. There were 12,383 Negro illiterates in 1923. This has been reduced in five years by 5,226, or 42 per cent. This is making progress by a reduction of one-third in five years, leaving, however, 9,500 children who cannot read.

This map tells its own story. Examine it and see what counties are most vigilant and which seem to let the compulsory attendance law be of little effect.

The 1930 U. S. census is only a year off. Will not all the agencies unite to reduce child illiteracy in their respective counties during 1929? We owe it to these neglected children and to the good name of the state to do our best. One superintendent phoned us today, "Yes, I see we have 16 cases left. We have the names and we will be 100 per cent literate next year. Our campaign starts the first of the new year." That is the right attitude towards wiping out child illiteracy, which will in time reduce adult illiteracy.

Bartow County has the largest white child illiteracy and Terrell County has the largest Negro child illiteracy. Let the papers study the map and print the number of illiterates in their territory so that all the people may know the facts and help the attendance officers and school people clean up the few cases left by the U. S. census. It is now largely a matter of public backing. The names of the illiterate children are in the county superintendent's office.

—*The University News.*

NORTH CAROLINA RATING OF NEGRO COLLEGES

For the year 1928 the entire list of 22 colleges in Class "A" is as follows:

1. A. & I. State Normal, Nashville, Tenn.
2. A. & T. College, '28, Greensboro, N. C.
3. Atlanta University, Atlanta, Ga.
4. Benedict College, '28, Columbia, S. C.
5. Fisk University, Nashville, Tenn.
6. Hampton Institute, Hampton, Va.
7. Howard University, Washington, D. C.
8. Johnson C. Smith University, Charlotte, N. C.
9. Knoxville College, Knoxville, Tenn.
10. Lincoln University, Lincoln University, Pa.
11. Livingstone College, '28, Salisbury, N. C.
12. Morehouse College, Atlanta, Ga.
13. Prairie View State N. & I. College, Prairie View, Texas.

14. Shaw University, Raleigh, N. C.
15. Spelman College, '28, Atlanta, Ga.
16. Talladega College, Talladega, Ala.
17. Virginia N. & I. Institute, Petersburg, Va.
18. Virginia Union University, Richmond, Va.
19. West Virginia Collegiate Inst., Institute, W. Va.
20. Wilberforce University, Wilberforce, Ohio.
21. Wiley College, Marshal, Texas.
22. Winston-Salem Teachers' College, Winston-Salem, N. C.

—*Home Mission Review.*

ABSTRACTS AND REVIEWS

Further studies as to the effect of mineral nutrients upon seed plants. Phosphates.—*Thomas W. Turner.*

ABSTRACT

The beneficial effects of phosphates upon certain root crops when grown under field conditions have been under observation for nearly a century, but little experimental work has been attempted to show in any exact way the mechanism of the effects of these salts in bringing about observed results. The water culture experiments reported here have been carried out with barley, wheat, and cotton, and they show clearly that the ratio of tops to roots in these seedlings decreases as the phosphate concentration in the medium is increased. Nitrates were shown in previous studies to have the opposite results.

Whether the effect of phosphates in bringing about relatively greater root growth as compared with tops resulted from a directly stimulating action upon underground portions was determined by employing Robbin's method of growing root tips under pure culture conditions. While the same solutions were used as in the water cultures above, root tips of corn only were used.

These pure culture experiments are reported in three series and are strikingly constant in showing that increasing the phosphate concentration not only does not have the effect of stimulating directly growth in length or multiplication of lateral roots, but both of these are retarded under such conditions.

A summary of results of the pure culture experiments is shown as follows:

	Solution 1		Solution 2	
	% increase in length	Average No. secondary roots per culture	% increase in length	Average No. secondary roots per culture
Series 1				
19 days -------	133	71.35	57.9	32.3
Series 2				
16 days -------	234	67.3	62.3	29
Series 3				
16 days -------	141.9	65.1	40	46

The experiment shows, for example, that cellular activity which should manifest itself in increased growth in length or multiplication of secondary roots is not increased by direct application of phosphates as is implied in the usual statements. The actual facts noted then, that there is a decreasing ratio of tops to roots as the phosphate concentration is increased, must find explanation in the formation of compounds or simply substances in connection with photosynthetic activity in the tops which are translocated to the roots and manifest themselves there by their stimulating or storage effects.

A BIBLIOGRAPHY OF THE NEGRO IN AFRICA AND AMERICA

By

MONROE N. WORK

Director Records and Research, Tuskegee Normal and Industrial Institute, Tuskegee Institute, Ala.

Few books have been so welcome. The reviews it is receiving are not those usually accorded to bibliographies. But it is not surprising for this Bibliography to receive marked attention. The need has been very great. In the past all research in Negro problems has been retarded because of the scatttered nature of the reference material. Mr. Work's problem was to bring together all known references on the Negro, to select and classify the better ones, and to present these in some clear adequate fashion. His work began more than twenty years ago. In 1912, the first edition of the Negro Year Book, of which Mr. Work is the editor, contained a selection list of 408 references on the Negro in the United States. Subsequent editions included additional references. With the help of Tuskegee Institute and in 1921 of the Carnegie Foundation, Mr. Work carried on his task of collecting and arranging references on the Negro. Meanwhile he was working out a classification that would include all phases of the Negro race and its problems. The Phelp-Stokes Fund enabled him to include in his study the contents of the leading European libraries.

The 17,000 references the book contains, including periodicals, books and pamphlets in several languages, have been selected from more than twice that number. Under two geographical divisions are 74 well classified chapters. There is also an excellent index of authors.

EXCHANGES (Continued)

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The Cuyler Workman, Cuyler School, Savannah, Ga.

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