THE MOREHOUSE
Journal of Science

MOREHOUSE COLLEGE
ATLANTA, GEORGIA

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THE MOREHOUSE
JOURNAL OF SCIENCE

Vol. VI. September, 1940 No. 1

I. To bring to the teachers of Science in Negro Schools articles on methods of instruction, objectives, and curriculum organizations in both secondary schools and colleges.

II. To publish articles by the profession, giving publicity to individual ideas, methods, et cetera of interest and mutual helpfulness.

III. To act as a clearing house in an attempt to standardize courses in science in the different denominational and public secondary schools, as to aims, content and evaluation, in order to facilitate transfers, and entrance upon the standard college courses.

IV. To point out and emphasize the practical application of the theories of science.

V. To record the achievements of Negroes in the field of Science as historical data for the purpose of inspiration.

VI. To publish unbiased and critical book reviews.

VII. To abstract articles of interest appearing in the periodicals for the benefits of our readers.

VIII. To adhere more or less closely to this general outline but gradually making such improvements and additions as may recommend themselves from time to time.

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THE MOREHOUSE JOURNAL OF SCIENCE

The Official Organ of the Alabama Association of Science Teachers, the Georgia Association of Teachers of Science in Negro Schools.

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OUR VIEWPOINT

Renaissance—In April, 1926, Vol. 1, No. 1 of The Morehouse Journal of Science was printed largely through the encouragement and sanction of the late President John Hope. Through April, 1931, Vol. 5 of the publication was continued. Its reputation as a source of information and scientific data was established. Since publication was suspended, there have been many inquiries as to when publication would be resumed. It would seem that its worth was only realized when it was no longer available.

The organization of the Alabama and Georgia Associations of Science Teachers aroused renewed interest in a periodical devoted to science, especially the physical and biological sciences. With the sanction and encouragement of Acting President C. D. Hubert, Chairman Kendall Weisiger and Chairman of the Executive Committee Trevor Arnett, of the Board of Trustees, Secretary Otis Caldwell, National Association for the Advancement of Science, cooperation of the Science Associations of Alabama and Georgia, with hopeful hands, we break the moorings and start this barge to you, laden we hope with something of interest, inspiration and help to teachers and students alike. Do not hesitate to inform us of its arrival at your port. After you have gone carefully over the Cargo, write us concerning the consignment. Do not forget to send us any packages of ideas, methods, inspirational news items, or other material you wish to share with fellow workers and followers of the mystic sign of science, the eternal "?".

We extend a cordial invitation to the American Technical Association, the Va. Science Association and all other Science groups to join with us and make the Journal of Science their official organ. Subscription to members of cooperating organizations is 50 cents per year. Also we call your attention to reprint service on articles submitted. All cooperating organizations shall elect one member of the editorial board. May we hear from you?

NEED OF A JOURNAL OF SCIENCE: We quote our editorial in Vol. 1, No. 1.

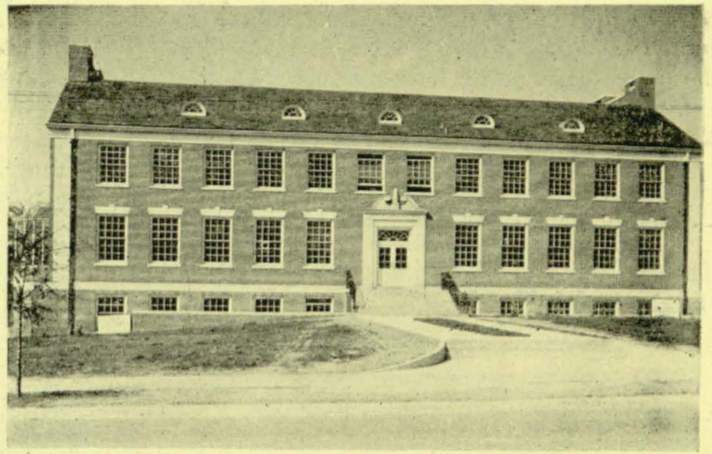
"Negro schools are peculiarly significant. Negroes are served by them more definitely and exclusively than is any other single group of our population by any one set of schools. It is of great importance not only to the Negroes but to the Nation as well that these schools should render a broad and effective service. Through the schools largely must Negroes be trained for the duties required of them by their country. The requirements are steadily broadening and advancing." . . . W. T. B. Williams, Field Director of the John F. Slater Fund.

We feel that the above quotation applies especially to the scientific knowledge and inspiration of the Negro youth of America. Heretofore the problem of education along all lines in our schools has been attacked from afar. We have used courses, methods of instruction, adjustment, values and types of evaluation, arrived at for the other groups after years of experimentation and study of all the environmental and individual characteristics and successful responses. The educational formulas acquired in either vastly different places or handed on by diction of the spoken or written word have been tried on Negro youth. If the youth failed to give the said result he was considered a failure. Yet, sometimes only a slight adjustment in accord with individual or environmental characteristics, would have accompuished a result far in excess of the fondest expectations.

What we are trying to say is that there is need for study of the scientific education of the Negro, using the Negro, his individual and environmental characteristics, his peculiar economic position in America, his cultural background, and his responses as data for the final judgment as to final result to be obtained and the methods of attainment.

The Morehouse Journal of Science's eight articles of preamble state in a general way some of the things necessary to bring these things to pass. The columns of this periodical will be open at all times for the free expression of those interested in the field of science among our group. Here we shall present all sides, thereby hoping to arrive at some conclusions which shall help us to meet the steadily broadening and advancing requirement of the Negro youth in his studies in the field of Science.

FRONTPIECE: We have not considered it as inappropriate to carry a reprint of the eight aims of this periodical as first stated in prenatal notices. We reaffirm our desire that the Journal of Science shall live up to its aims. We want every reader to feel himself responsible for this Journal, give it the best you have of work, support, and output, then expect of it in return the best. Feel free to criticize and make suggestions. Is the Journal of use to you personally, professionally? If not, how can we make it so?



JOHN BEVERLY HALL AT THE STATE TEACHERS COLLEGE

John Beverly Hall, named after the second President of the State Teachers College at Montgomery, Alabama, has been released for class work since September of 1939. The building was made possible with the aid of P.W.A. funds, and represents one of the many additions for teaching facilities to the campus during the present administration of President H. Councill Trenholm.

The building is used for the science and health teaching program and consists of two chemistry laboratories, two biology laboratories, one physics laboratory, a suite for photographic services, a suite for health services, including an examination room, and private hospitalization rooms; two raised floor lecture rooms, two class rooms, three stock rooms, one balance room, four offices in addition to the health office, a research laboratory, and a laboratory for science service to the campus which is maintained by Mr. E. James, a graduate of this institution.

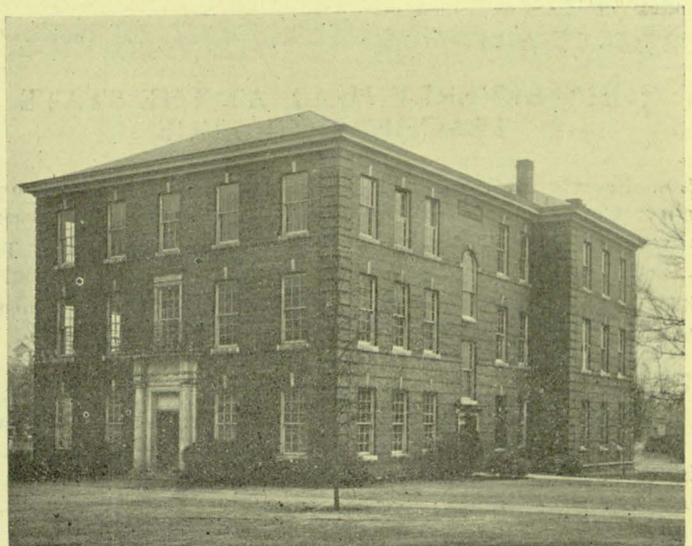
The contracts for new furniture and equipment have been placed to round out the laboratories already in use through furniture and equipment formerly used in Paterson Hall.

The laboratories are provided with hot and cold water, steam, direct and alternating electricity and gas. In addition there is space for showers for men and women to be used in the proposed swimming pool to be placed in the rear. There is an unfinished floor in the attic and one half of the basement unfinished which will provide for future expansion.

The science teachers now handling the program include Mr. H. L. Vandyke in the physical sciences who serves as the department chairman; Mr. C. T. Simpson in the physical sciences and chairman of the department of visual education (at present on leave of absence at the U. of Iowa); and Mr. B. F. Smith and Mr. J. M. Robinson who are in charge of the program for biological sciences. The prints show the building facing South Jackson Street, and two of the laboratories within the building.

The architect was Mr. Louis E. Fry of Tuskegee Institute, who was also one of the architects for the gymnasium which is next to Beverly Hall.

The public is invited to visit and inspect the new building between 8:00 A.M. and 5:00 P.M.



MOREHOUSE MEN AND THEIR CONTRIBUTION TO SCIENCE

LEON CLARK

With the dedication of Science Hall in 1921, Morehouse College assumed the role of pioneer for Negro Colleges in science. This new building, so planned and so equipped as to accommodate demonstration and experimentation, was destined to awaken an abundant array of scientific scholars. Where previously, Morehouse, along with other colleges of its kind, had offered courses in science only in so far as they were a part of a premedical curriculum, she was not able to present a thorough, well balanced curriculum, leading to the degree of bachelor of science. Now, instead of a cursory introduction to anatomy, botany, chemistry, geology, and physics, the student has the privilege of selecting and pursuing courses wherein his major interest lies. Departments were established. Interest was awakened and scholars

began to exert themselves. They were not content merely to meet the requirements for the B.S. degree; they organized the Science and Mathematics Club and conducted forums and discussions on scientific topics. Theirs was a spirit which led them to excel. That they carried this spirit with them into the world beyond is attested by their achievements after leaving Morehouse. The impressive records made by these graduates at the nation's outstanding institutions of higher learning furnish a glowing tribute to the strength of faculty, soundness of curriculum and scholarliness of students of Morehouse at that early date.

A man of science can aspire to no recognition greater than having his work accepted for presentation before the American Association for the Advancement of Science. He can ask no stamp of approval on his work more authentic than its publication by a standard journal of science. Recognition, gained through either of these agencies, signifies that a body of the greatest scientists of the age believe that the contribution offered is one vital enough to deserve their attention. The distinction of presenting papers before the American Association for the Advancement of Science and of having articles published in official journals has been experienced by a number of graduates of Morehouse. In a survey, made by Dr. S. M. Nabrit, in 1938, it was brought out that six graduates of Morehouse, in the field of Biology, had contributed seventeen articles to twelve standard journals. These articles were distributed as follows:

NAME OF PUBLICATION	NO. OF ARTICLES
American Journal of Anatomy	1
American Microscopical Society	3
American Journal of Roentgenology and Radium Therapy	1
Anatomical Record	1
Biological Bulletin	3
Ecology	1
Journal of Bacteriology	2
Journal of Cellular and Comparative Physiology	1
Journal of Experimental Zoology	1
Journal of Infectious Diseases	1
Physiological Zoology	1
Science	1

THE CONTRIBUTORS WERE:	NO. OF ARTICLES
J. H. Birnie	3
J. C. Bridges	1
C. W. Buggs	3
H. E. Finley	4
J. W. Lawlah	3
S. M. Nabrit	3

Since 1938, this list has been substantially enlarged. For example, Dr. Nabrit has published four abstracts of recent works, and in July, 1939, Mr. Finley had a report on the vorticella, a unicellular animal, published in the *Journal of Experimental Zoology*. In addition, both presented papers at the meeting of the American Association for the Advancement of Science.

Meanwhile, at New York University, Mr. C. C. Hawkins established himself as an outstanding scholar. Though his degree, Doctor of Philosophy, was in Physical Education, his problem was a physiological one. Too, his major, at Morehouse, was biology.

In the field of theoretical chemistry, Dr. K. A. Huggins is undoubtedly the outstanding representative. After graduating from Morehouse in 1923, he pursued work leading to the degree of Master of Science at the University of Chicago, and later returned to that institution to receive, in 1937, the degree of Doctor of Philosophy. He has done, and is still doing, extensive research, dealing with conjugated systems in organic chemistry, investigating, in particular, compounds of the butadiene series. In collaboration with Dr. Muskat, of the University of Chicago, he has published several articles in the Journal of the American Chemical Society.

Graduates of Morehouse, in the field of chemistry, have, for the most part, used their training to achieve success in applied science—particularly in medicine. Some have pursued advanced work at the nation's larger universities and, there, have acquitted themselves nobly.

No account of outstanding men of science who are Morehouse graduates would be complete without the inclusion of at least two men in the field of mathematics. One is in the field of pure mathematics; the other is in applied mathematics—engineering. The former is none other than Prof. C. B. Dansby, of the Mathematics faculty. If he has contributed nothing else, he must be given credit for bringing to the field a method of presentation of mathematics which is so dynamic and so effective that the cold and barren mathematical concepts are given vivid color and magnetic appeal. The student looks on in admiration, marveling at the thorough mastery of subject matter and facility of presentation so characteristic of Prof. Dansby. Yet, one must not conclude that his ability is great only because it is enhanced by the none-too-critical judgment of the students; for, while a student at the University of Chicago, Mr. Dansby so distinguished himself that Dr. Bartky, of that institution, made the statement, at a university convocation in Sisters Chapel, that Mr. Dansby was one of the best mathematics scholars that he, Dr. Bartky, had ever taught.

The second representative of the mathematics department is Mr. Edward Swain Hope. After completing his work at Morehouse, Mr. Hope entered Massachusetts Institute of Technology where he won his degree in engineering. Contrary to the general belief that there is no place in engineering for a Negro, he gained employment in the field which was to embrace work from the icy shores of Newfoundland to the jungles of South America. Too, he was proficient enough in his work to maintain employment for a long time after financial straits had caused his employers to reduce their staff.

This same type of proficiency has been an integral part of the make-up of each man mentioned herein; and, if MOREHOUSE men of the future are to equal, or excel, the contributions of these men, they must of necessity, possess a large infusion of that spirit which will not permit them to be satisfied with being the "second best" scientists of their field. That the inclusion of a degree in science has been beneficial to Morehouse and to science alike is quite apparent. May the students of the present and the future strive to preserve the mutuality of the benefits of his inclusion by living up to the standards set by these trail blazers who have gone before.

—Morehouse College

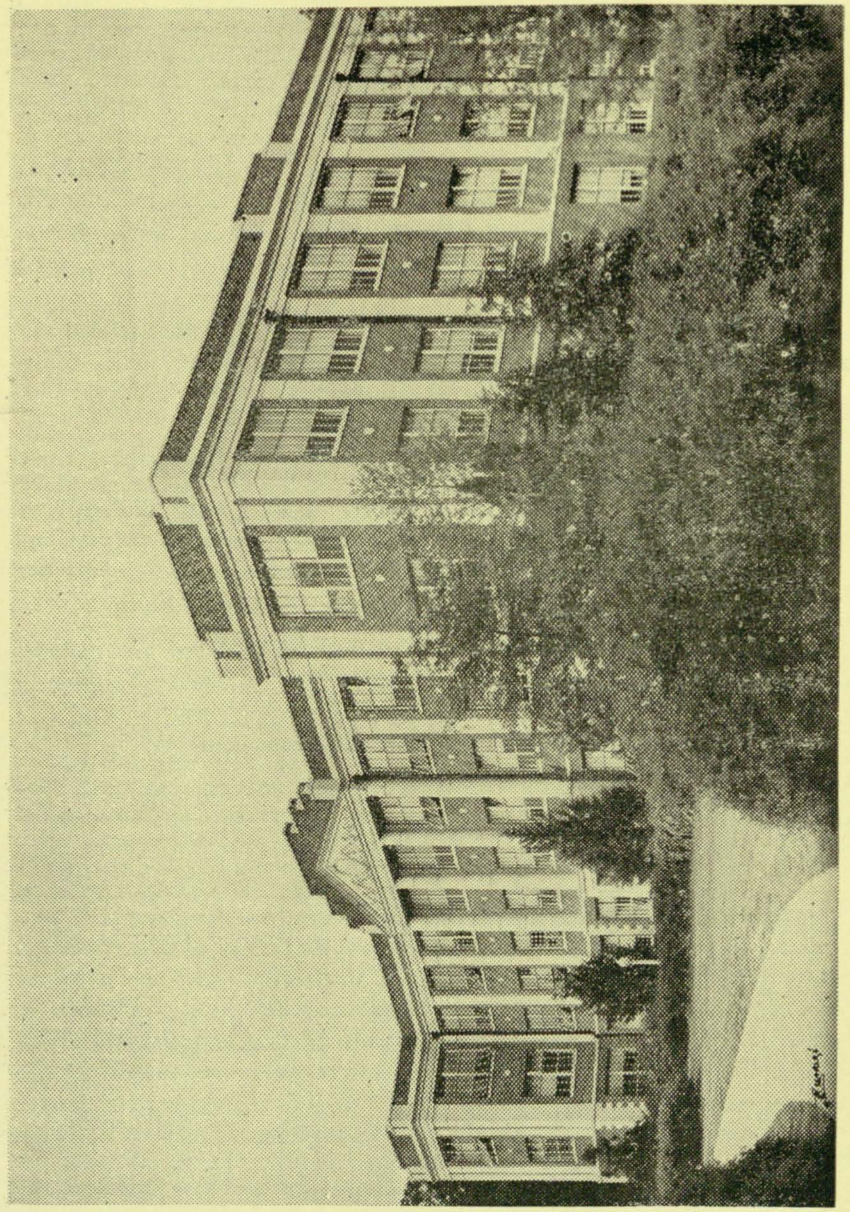
SCIENCE AT TUSKEGEE

Science constitutes a considerable part of the educational work carried on at Tuskegee Institute. By science here, of course, is to be understood the various branches of natural science, pure and applied. While psychology as a science closely related to biology may be included in this account, the mathematical and the social sciences are not included. They should be given separate consideration.

Tuskegee Institute does not regard itself as a liberal arts college. Its work is professional or vocational. It does, however, assiduously recognize the value of liberal education to good citizenship, and this relationship is kept in mind in the Institute's work generally.

The idea of a layman with a balanced education was early conceived of in the Tuskegee plan of training. Dr. Washington stressed a broadening development conjointly with the acquisition of specific skills and abilities. He visualized an education making for an intelligent, useful citizen, respected and active in his community's welfare. In such a program the trades and industries were fundamental, providing the means of meeting the need simultaneously of the individual and the community, but these needs were interpreted in terms of demands made upon the type of citizen desirable in a civilization of high and advancing standards. Thus with the practical training of the applied arts a curriculum was provided to broaden, and enrich the life of the student. Today, this same motive inspires the work at Tuskegee. Due note is taken of the factors of a liberalizing education, ensuring that along with the many other activities of the school's program the student at all stages is provided a chance to become familiar with the matter, and spirit of science.

With the organization for work in the collegiate field of instruction, science assumed wider scope and new importance. What was formerly known as the science division has since 1927 developed into



the respective departments of Chemistry, Physics, Biology, and Bacteriology. Aspects of these main branches of natural science are presented as fundamental or supporting courses in the various curricula of the School on the principle of their value for general or technical education. Psychology is catalogued among the group of education courses, but the courses are presented on a scientific basis and they function also for students enrolled in curricula other than those of the School of Education. Four quarter courses are offered in the field of Psychology. The developmental or genetic point of view is the guiding principle here.

The current announcement lists twelve quarter courses in the field of biology. Among these are courses in botany, zoology, entomology, embriology, personal, community and social hygiene, plant physiology, etc. Seven quarter courses in bacteriology are offered. These include fundamental courses in general and pathogenic bacteriology, and applied courses relating to soil, dairying and household.

In the field of chemistry, eleven quarter courses are currently offered in fundamental courses in general, organic, analytical, biochemical courses, and applied courses for nurse training, commercial dietetics, agriculture and technical arts.

The division of applied science and physics conjointly offer fifteen quarter courses including survey of physical science, general physics, applied mechanics, physical measurements, general applied science, etc.

The special sciences are housed in the Samuel Chapman Armstrong Hall, which was constructed in 1932. The physics laboratories, offices, storerooms, and class rooms are on the first floor, those of biology on the second and those of chemistry on the third. Bacteriology is at present located in the Veterinary Science Building. Before college instruction had advanced three years, the need for a science building was already felt. The rapid progress of this work is over-taxing available housing capacity and new facilities are now being planned. The present laboratory equipment is of the modern type and adequate supplies are provided for effective work.

The conduct of the work of the departments is entrusted to members of the staff as follows: H. J. Romm, Biology; Dr. Russell Brown, Bacteriology; Thomas H. McCormick, Physics; John T. Williamson, Chemistry.

In organization, Tuskegee Institute consists of the following schools: The School of Agriculture, The School of Education, The School of Home Economics and Commercial Dietetics, The School of Nurse Training, The Department of Physical Education, The Summer School, and The School of Mechanical Industries.

Degrees and diplomas are offered in Agriculture, Commercial Dietetics, Commercial Industries, Education, Home Economics, Industrial Arts, Physical Education and Nurse Training.

Even cursory contemplation of what it involved in the various curricula will impress one as to the extent to which science is called upon to contribute its share in the training of candidates for degrees in these areas of specialization. It would prove not only interesting, but probably surprising as well, to give a complete list of the various branches of pure and applied science functioning in the various curricula offered at the institution. It must suffice, however, for the scope of this article merely to add a few supplementals to those already given. Scientific studies are the basis of training in agriculture, home economics, and dietetics, nurse training and physical education. Training in science also inherently plays an important role in preparation for teaching. Some of the sciences integrated in one or the other of these curricula are poultry science, veterinary science, soils, geography, survey of physical science, general science, hygiene — mental and physical—health, kinesiology and applied physiology, food, nutrition and dietetics, electricity, refrigeration, the medical sciences in the nurses curriculum including such as anatomy, pathology, orthopedics, gynecology, phychiatry, materia medical.

It is logical to think that in institutions such as Tuskegee Institute which have played a conspicuous part in educational history and in social progress, scientific study should occupy an important place in their programs. The role of the natural sciences cannot be overlooked as a factor in the type of education Tuskegee fosters. Indispensable from the point of view of the trades, industries and professions, serving thus to integrate the practical and cultural objectives.

THE HISTORY OF SCIENCE AS A MEANS OF INTEGRATING SCIENCE INTO THE CURRICULUM

CLARENCE T. MASON

In the last several years many prominent educators have felt that the Colleges and Universities of this country were not doing quite right by the droves of graduates which they annually turned out. Probably these educators had noticed that many chemistry majors spent their post-college days selling bonds, while others who had majored in economics became service station operators or waiters. They must at least have been aware that many people, after graduation, turned to fields in which they were totally unprepared.

As a consequence of the dissatisfaction with the curriculum which brought about such a state of affairs came "generalized education." New types of schools came into being, while the curricula of many older colleges were radically revised. A great deal of attention was paid to a program which would be endowed with the essence of a vague substance called "general culture." Thus there grew a need for new courses. Naturally much attention was given to the general topic of correlation as well. The program was to weld the material of the generalized course into a unified knowledge, and at the same time work out the relationships of the new courses with the rest of the subjects taught. Let us restrict our study to the integration of general science courses in high schools and colleges. I believe that

most of the problems are common to both college and secondary education, and hence the same approach may be made to each.

More attention, however, has been paid to the integration of science material on the college level. Hard and Jean[1] found that about 38% of the colleges of this country are giving, or planning on giving such general science survey, or orientation courses, while 78% of the courses given then had been started in the years 1932-37. This is significant data on the trend towards generalized education. Further, Hard and Jean found that almost twice as many teachers colleges were giving survey courses as liberal arts colleges. This, I think, might be construed to predict that an increasingly greater number of high school teachers will be trained along the path to generalized knowledge. This will probably affect the curriculum in the high schools in the same way, and we can look for the high school graduate of the future to have a broader training than the one of the past. One must not think, however, that courses in the special fields of biology and chemistry will ever disappear from the high schools and colleges, but rather that expanded new courses touching on these and related fields will be added to enhance the effect of the specialized offerings. These new courses in general science will probably differ from those now given in that their material will be more selected and better integrated and, in general, follow the lines of present freshmen survey or orientation offerings of the college level. Probably an idea of the content of such broad courses can be obtained from a careful study of the college freshmen placement examinations in science distributed by the American Council on Education. These examinations are prepared by groups of experts. They cover generalized material of most of the physical sciences as well as the scientific method. This may be a valid criteria for judging what a high school graduate can know. Such a deduction is open to question, but it can be mentioned in passing.

Let us first look at some of the questions inherent in changing curricula to accommodate such broad courses:

1. The first problem concerns the year in which such a course shall be given. Shall it be presented only to freshmen, or in one of the last three years of high school? This is a question which can only be answered after the next two problems covering content of the sources are solved.
2. Will any of the subject matter of the general science course overlap the material to be given in the specific science courses? Will general science be a series of short studies on the material of physics, chemistry, and biology, or will it contain subject matter not found in these courses? Shall it, as one author puts it "skim the cream of interest" from other courses?
3. Will the science survey supply the student with a foundation for future more specialized courses, or will it glean over backwards in emphasizing the cultural aspect and ignore entirely the future science of the student?

[1]H. O. Hard and F. C. Jean, Science Education, 22, 6, 294-299, 1938.

4. Shall these courses under consideration be related to other high school subjects? Shall there be a definite attempt to connect their subject matter to art, to government, to history, to religion, to health or hygiene? Shall it be integrated *into* the curriculum, or merely a part *of* the curriculum? Now we have the most difficult problem.
5. How will this large amount of generalized knowledge covering several sciences be organized? Will there be a string running through each section which will serve to tie the material together, to make it a whole? If there is to be such a string, just what will be its nature? We will all recognize that such an integrate is necessary, but upon what shall it be based? To integrate any particular subject we must find a common characteristic common to all the sciences. This is the more important problem and we will confine our attention to this.

It is proposed that the *one* feature common to all sciences is their history. Let us see how. Not only are certain advances in the different sciences occurring at the same time, but also there are cases where one person may be making contribution in more than one science—Galileo worked on astronomy and physics, Newton on astronomy, physics, and mathematics, Leonardo de Vinci on geology and anatomy, Descartes on mathematics and the methods of science, Roemer on physics and astronomy, and Davy on physics and chemistry. Still the list is by no means exhausted. Here historical method is admirably adapted. Further, there are instances in the different sciences where, as a group, they are influenced in the same way by the prevailing thought of the period. In the Medieval Period, for example, when the people were dependent upon past authority for their knowledge, men of earlier times in various fields of learning exerted a like effect. Avicenna and Galen in medicine, Aristotle and Ptolemy in astronomy, and Archimedes in mechanics. This certainly is a strong reason for uniting history with science. Moreover, in the development of the sciences, there were certain definite and similar stages through which each passed before becoming established. First a base of empirical thinking and superstition, next a period of disproving false ideas, third a period of collecting and registering data, fourth an interpretation and classification of that data, and finally the technical application of the resulting laws. Thus you see there are various historical features which interlock the various sciences. It is proposed, then, that the historical approach *can* be used to integrated sciences, and thus the problem of integration can be solved by this same historical approach. Let us at the present think of the history of science as being devoted to the study of science in a chronological manner, tracing the development of knowledge from an early beginning almost to the present time, with emphasis on the most important developments of the particular sciences.

In looking over the reasons why such an approach has not been popular in the past we might list first the fact that adequate texts are not available. On the other hand, such texts will be written only after the courses themselves have started. Second, the colleges, for the most part, do not emphasize the history of science to any great extent, and

the graduate who becomes a teacher is hesitant to wade into a course with which he is not familiar. Thus we have a vicious circle.

It might be said also at this point that when the University of Chicago was changing its curriculum to fit the needs of a cultural education, Doctor Herman Schlessinger considered the historical view very valuable, suggesting that it "emphasized the real function which hypotheses and theory play in science." [2]He said, however, that there were two reasons why the historical approach was not used there. The first, that it could not be given without asking the student to read original papers and these original papers, for the most part, are not extremely technical, and I am sure that some of them could be read and enjoyed by many high school science students. Further, Sedgwick and Tyler in the appendix of their SHORT HISTORY OF SCIENCE, also give a few of the more simple and important papers. Such papers do not cover all the fields of science, but they can give the student an idea of the method and form of scientific articles.

The second reason given by Schlessinger was that to study the history of it was necessary first to be familiar with science. Probably here he was referring to a detailed study rather than the use of an historical approach for purposes of integration.

Before we attempt to show how the historical approach can solve the problems of the survey courses, let us first look at some of the objectives of such a course. A. W. Hurd,[3] sent a questioneer to a number of prominent high school educators.

The questioneer contained a large number of possible objectives of a general science course, and the educators were asked to assign to each objective a number telling its relative importance. The first six, and hence the most popular are listed below.

The objectives of the high school general science course.

1. To explain scientific attitude and to explain how they affect one's thinking.
2. To explain the methods of science.
3. To make an appeal to the students.
4. To encourage belief in and practice of the desirable ideals involving science.
5. To give information which will be of the most direct use to the student in everyday life.
6. To explain the local environment.

Now let us see how these ideals of the science course can be satisfied by an historical approach.

1. The historical method can be used to explain to the student the scientific attitude and how it can affect one's thinking. All through the history of knowledge we have situation where the lack of scientific attitudes have hindered the acquisition of new knowledge—interesting little situations of story-like simplicity which can be used to illustrate how the application of a little of the scientific attitude might have saved the people of the world a lot of trouble.

[2]Recent Trends in American College Education—Vol. III, edited by W. S. Gray, University of Chicago Press, 1931.
[3]*Science Education* XVIII, 106-111, 1934.

Probably the most classical of these is the story of Galileo being accused of sorcery when he experimentally disproved the theory of falling bodies held by Aristotle. As you remember, Aristotle had reasoned that bodies would fall with a speed which would depend on their weight, and this was believed by most of the learned people of the sixteenth century, for learning in those days was measured by one's ability to quote from the works of long-dead authorities. Galileo was not satisfied with this type of knowledge, so he dropped two shots of unequal weight from the tower of Pisa. Released at the same time, the shots hit the ground simultaneously before the very eyes of Galileo's colleagues, who knowing their Aristotle, believed that Galileo had cast a spell on their eyes to make them see something that could not have possibly happened. The moral of this true story would be quite obvious even to the most perverse student. On the more positive side, one can study the development of the scientific attitudes in the concepts of Aristotle, Roger, Bacon, Descartes, and Newton, although this would be recommended only to the most conscientious student.

Our second objective was to explain the methods of science. Here again the historical method can be used to point out the mistakes of the past, and to show the terrible effects that are produced in its absence. As one goes back in the history of science one can see the three centuries or more of blind groping men experienced in this effort to find a method of breaking the seals of nature. One can see how his views of the world were false because they were tinged with his overbeliefs which he could not eliminate, for his reasoning was not objective. For instance, the people of medieval times were receptive to any theory of astronomy postulating the earth as the center of the universe not because such a theory agreed with the data they possessed, but because they knew that God made man in his own image, and this favored individual could only occupy the central position of the universe. To them man was not a bundle of life on a speck of dirt which was wandering around a second-rate star lost in an immensity of space, but man was instead the favored creature of a God who had put him in the center of a universe, and created especially for him a sun, moon and stars which went around the earth so that he might have light and warmth. Thus the medieval idea of astronomy was colored by what the individual *wanted* to believe true, and thus his universe was changed by his desires to have himself become all-important. Here is an excellent opportunity for the teacher to show that use of the impersonal methods of science would have eliminated such a misconception. After all, what better way is there of teaching the scientific method than by showing how false ideas can be dominant in its absence? What better illustrations of the scientific method can be found than how Harvey discovered the circulation of the blood by the use of observation, experiment, and mathematics; how Darwin, in twenty years built, piece by piece, evidence for his theory of evolution; how the work of Lavoisier, Avogardro, Dalton, Brookes, Thomson, Madame Curie, Soddy and Rutherford was carefully pieced together to give an idea of the structure of matter. Is this not better than listing the points of the methods of science and asking the student to learn the list?

The third objective, to make an appeal to the students; is not particularly difficult to attain because most students are curious enough to want to know something of the world. However, the historical approach lends itself well here in presenting science not as a closed, static set of truths, but rather as a living, ever-changing knowledge, and content of which is always open to question and revision when new facts play their part in the general science course just as well in the historical approach as in any others.

The fourth objective, to encourage belief in and practice of the desirable ideals involving science can best be attained by showing how, in the past, civilization was hampered and shackled by the ignoring of these ideals, and at the same time pointing out how a different attitude would have led to much different results. It seems that in this objective more than any of the others, the human equation must enter, for it is here that the teacher is most important. A good teacher can inspire the student so that he does not divorce his classroom learning from his life, and hence attain this objective, while a poor teacher would have trouble keeping the attention of the student even in class.

The fifth objective, to give the student information which would be of the most use in everyday life depends primarily on the subject matter present in the course, and the amount of stress or the amount of time given to each section, as here the problem is one of selection of material. Probably it is in this objective that criticism can be best made of the historical approach. Many of the subjects which are important in our everyday life have been developed piece by piece, by a number of individuals, each of whom made only a small but very significant contribution to the final product. Here the historical method cannot be as easily applied. An illustration of this point comes in the development of the radio. The ground work for the radio was laid by three men who made large contributions; James Clerk Maxwell mathematically predicted the radio waves, Hertz confirmed this prediction by transmitting electrical energy across a room, and Marconi perfected the transmission and its reception so that it could span oceans. After these three came a host of men who each made small contributions, and who ultimately brought radio to its present state of perfection. In an historical account, we have to ignore the work of the later men and leave radio in the crude state. This is a decided weakness in the development of some subjects, but this weakness can be minimized. Further, the historical method, in its most rigorous definition, is inapplicable to such studies like, for instance, the weather. It is possible, however, to use the story of science as an approach to subjects falling in these two groups. After the historical account of Torricelli and his barometer and Boyle's work with air pressure, it is but a step further, as far as subject matter is concerned to an account of the weather and its relation to barometric pressure. Historically however, this is quite a long step. Here, you see, the historical method has broken down. This is not a serious disadvantage, though, for connection with historical data are easy to find. The problem of getting the student to apply the principles of the scientific method to his daily life is a part of objective five. Here again we have a situation where the teacher is all important, and inspiration on his part will go far in achieving this section of the objective.

Finally, to explain the local environment, or at least to make an attempt at explaining it, is probably the easiest objective to achieve, for the primary problem is one of content, which can well be expressed in the historical manner, as it is possible to develop historically most of the fundamental concepts of science. In cases as that of the radio given above, connections may be found. Thus the historical approach may be used to introduce or lead up to the subject, while contemporary knowledge may be taught after this point. One advocates, then, not the use of history alone in teaching general science, but history as a means of connecting the subject matter of the course. The modern telescopes and their accessories may be studies after a brief glance at the earlier telescopes of Galileo and Newton, and the modifications of Herschel. After the student learns of the Ptolemaic system, it is only natural that he would be interested in finding out the true nature of the universe, so modern astronomy, through Kepler, Copernicus, Newton, and Moulton, may be introduced in this way.

In recapitulation, we have tried to show the problems inherent in the development of generalized science courses aimed at what we might call "general culture". We have taken the greater problem, the integration of the subject matter of such a course, and postulated that the historical approach could be used as a means of integration, and have tried to point out how such an approach can best satisfy the objectives of a general science course.

AN ANALYSIS OF SCIENCE TEACHING ON THE JUNIOR HIGH SCHOOL LEVEL

W. W. E. BLANCHETT

The junior high school had its beginning in Berkley, California in 1909 just about the time when the emphasis on faculty psychology, subject matter content, and preparing for entrance into college was waning. With the increase in wealth, resulting in many more people being able to send their children to school, than was formerly the case, there was an influx of students into the schools. It was later found, however, that many of the pupils in grades seven and eight, withdrew, that only about one-half to one-third of those who finished the eighth grade entered high school and that only about thirty-five percent to forty percent remained longer than two years. Further it was soon recognized that at the ages of twelve through fifteen years in boys and girls there were exhibited peculiar emotional characteristics which required that the school make certain adjustments in its program in order to obtain best results and in order that the institutions might prove to be of more lasting value. In order to economize time many of the high school subjects were introduced into the upper years of elementary schools. In addition considerable emphasis was placed on

Address by Dr. Clarence T. Mason of Dillard University to The Alabama Association of Science Teachers, Montgomery, labama, Friday, Nov. 3, 1939.

the democratic concept of education to the end that equal opportunities should be provided for all irrespective of birth or circumstances. These factors cited by Davis[1] and possibly others contributed largely to the establishment of the junior high school. It was not until 1920 that the general science course was endorsed as a high school subject, when the Committee on the Sciences of the Commission on the Reorganization of Secondary Education included it as a definite part of the suggested curriculum of schools of different types. Since that time general science has come to be associated with the first year of high school or the last year of the junior high school. In recent years, however, educators have begun to recommend a three-year sequence in general science for the seventh, eighth, and ninth grades. This point of view has been endorsed by the committee on the teaching of science of the National Society for the Study of Education.

Objectives of Science Teaching. Many studies have been made to determine what the objectives of general science should be to meet the peculiar needs of students at the junior high school level. It is important that these objectives be considered because they give direction to this type of work. Weckel[1] in her study to determine the aims and basic scientific principles and fundamental concepts which occur most frequently in text-books in general science finds that the aims of general science are to insure that the pupils acquire:

A. An appreciation of the application of science in industrial and social life;
B. A fund of valuable information about nature and sciences;
C. An understanding, an appreciation, and a control of the everyday environment.

Crecelius[1] in determining the objectives of general science summarizes his results in the following broadly stated objectives:

First—The health of the individual and the community.
Second—Citizenship through an understanding and an appreciation of natural laws and their scientific applications.
Third—Scientific methods for problem solving.
Fourth—Educational and vocational guidance.
Fifth—General interest and information.

Watkins[2] finds that the chief current aims for the teaching of general science are:

To insure that the pupil acquires
A. An understanding and control of environment;
B. A fund of information cencerning nature and science;
C. A preparation for later science courses.

To insure that the pupil acquires
A. A training in the scientific method;
B. A development of power of interpretation and appreciation;
C. A development of interest in science;
D. Culture.

The aims as stated in representative courses of study of five cities and seven states were found by Pruitt to be:

[1]Calvin O. Davis, Junior High School Education, pp. 52-65. Yonkers-on-Hudson, New ork; World Book Company, 1924.

[1]Ada L. Weckel, "Are any Principles of Organization of General Science Evidenced by the Present Text-books in the Subject?" *School Science and Mathematics*, XXII (January, 1922) pp. 44-51.

To develop powers and habits of diversified observation.

To give interesting information.

To develop scientific attitudes of mind.

To train pupils in accuracy of thought and expression in matters of science.

To lead pupils to interpret their environment.

To develop the ability to appreciate and to apply the principles of personal and community hygiene.

To train pupils in problem solving.

To dispel belief in common superstitions.

To develop the ability to read intelligently popular science literature.

To give educational and vocational guidance.

To develop an appreciation of the great contributions of science to modern life.

To stimulate to further and more science study.

To develop in pupils the proper attitude toward science-civic problems and their solutions.

To help pupils to understand better the common natural science phenomena and their applications.[1]

Cureton[2] in commenting on the basic aims of junior high school science classified it as an appreciation subject, a formal subject, a content subject, and a try-out subject.

Wolford[3] in his study to determine the objectives of education in general, and of courses of general science in particular feels that there is no general agreement among teachers as to the objectives of junior high school science, but that most of the authorities emphasizes the ideas of exploration, stimulation, guidance, and adjustment to the environment.

In determining the aims of general science Howe[4] finds that they are to give each child

Understanding, appreciation and control of his everyday *environment.*

Appreciation of the *applications* of science in industrial and social life.

A fund of valuable *information* about nature and science.

Training in use of the *scientific method* in solving problems.

Preparation and foundation for later study of special sciences.

Interest and motivation in school work to prevent his elimination.

A *vocational* survey of science to guide and inspire life.

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[1]Clarence Martin Pruitt, "Status of General Science as Revealed Through State and City Courses of Study," *General Science Quarterly,* XL January 1928, pp. 367-381.

[2]Edward E. Cureton, "Junior High School Science" *The School Review* XXXV (December 1927) pp. 767-775.

[3]Feaster Wolford, "Methods of Determining Types of Content for a Course of Study for Eighth-Grade Science in the High Schools of the Southern Appalachian Region," *Third Digest of Investigations in the Teaching of Science,* F. D. Curtis,, Philadelphia: P. Blakiston's Son and Co. 1939, pp. 47-53.

[4]C. M. Howe, "Can and Should General Science be Standardized?," *School Science and Mathematics,* XIX (March, 1919), pp. 248-255.

Appreciation of the unity and beauty of science and of its master minds.

Training in cold, scientific thinking involving self-elimination.

Hunter[1] made a study to determine the "real objectives" of the teaching of science in the secondary school. Teachers in the junior high school rank the objectives of junior high school science in the following order:

To understand environment
To explore the field of science
To arouse interest in science
Knowledge of environment
To give information
To master scientific method
To explore pupils' interests
Appreciation of environment
To develop appreciation of value of health
Propaedeutic functions
To arouse interest in environment
Development of powers of observation, etc.
Worthy use of leisure time
To establish scientific thinking habits
To develop scientific attitude toward all problems
To develop skill in doing useful tasks
To give basic experience
To develop appreciation of the work of scientists

He concludes that "In so far as aims are a criteria of actual work being done . . . teachers of junior high school science are doing their work better and with more understanding than teachers of the senior high school. Teachers of neither level show much evidence of humanizing science through the development of an appreciation of the work of scientists. Teachers of the upper level seem to be held more closely by convention and college requirements, there appearing to be little relationship between the major aims of the two levels."

If we consider the lists of objectives of science teaching and general science we find that there is little agreement as to what the objectives are supposed to be. We find, however, that certain objectives appear more frequently than others. For instance those objectives dealing with appreciation and application of science to industry and social life; knowledge or information concerning the environment; understanding, appreciation, and control of the environment; exploratory function; method; attitudes and interests; all are mentioned most often.

The Committee on the Function of Science in General Education has this to say about the objectives of science teaching; "An examination of even the state objectives of science teaching revealed little or no general agreement about what this instruction is supposed to accomplish."[1]

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[1]*Science in General Education,* New York: D, Appleton-Century Co., Inc., pp. 14, 1938.

Beauchamp[2] has analyzed the objectives of science and has arranged them into six groups:

1. Knowledge
2. Exploration
3. Abilities
4. Ideals and habits
5. Attitudes
6. Interests

He feels, however, that at the present time there is no conclusive method of evaluating the objectives set forth.[3]

Probably the most valid method of evaluating the objectives of science teaching is to consider the pronouncement of recognized national committees. One of these, the Committee on the Teaching of Science of the National Society for the Study of Education is the most recent and no doubt reveals the best thought on the subject.

This committee, then, recognizes the aim of science teaching to be contributory to the aim of education; viz., life enrichment. It recognizes the objectives of science teaching to be the functional understanding of the major generalizations of science and the development of associated scientific attitudes.[4]

This committee discussing the units of work for the elementary school expresses its opinion as to what the objectives of science teaching on the junior high school level should be. From the calibre of the men who constituted this committee, I would consider the statement that follows as indicative of the best thought on the objectives of science on this level.

> As in the elementary school, these units will be integrated through dynamic experiences resulting in a functional comprehension of principles, major generalizations, and associated attitudes that function in human thought and behavior. A further objective of junior high school instruction is to reveal the fields in which there is opportunity for more intensive and specialized study of science.[1]

Content of Courses. As we consider the content of the course in general science, we find that the early courses were nothing more than miniature courses in the specific fields of science, taking elementary parts of the special sciences offered in the high school and organizing them in a logical order. Later there developed the type of course that took most of its subject matter from physiography; this course tended to link together the different special sciences, but most often contained discussions of unrelated materials and failed to orient the student into the different fields of the sciences and failed to show the relationship between science and life. Another type of course consisted in two parts, the first made up of basic, facts fundamental concepts, and definitions; and the second part, topics that tended to have a more direct relation to life. There then developed the "creator-made units" and environmental topics inherently interesting to pupils;" the units

[2]Wilbur L. Beauchamp, Instruction in Science, Bulletin of the U. S, Bureau of Education, 1932, No. 17, National Survey of Secondary Education, Monograph No. 22, pp. 11-12.

[3]Ibid., p. 13.

[4]Ibid., pp. 6-7.

or topics had such titles as water, air, clothing, heat, germs and disease and so forth. There still remained however, the tendency to emphasize specific subject matter areas; for instance under air there were topics like, physics of the air, the chemistry of the air, hygiene of the air and so on. Other types, the "home and community" type of organization. In each, however, there was the point of view of the special sciences.

The most significant factor that produced a change in the type of courses offered was the report of the Commission on the Reorganization of Science in Secondary Schools, which emphasized the fact that the subject matter of general science should be selected largely from the environment and that material should be drawn from any of the special sciences if they proved to be important in the interpretation of problems that were considered worth while. The topics selected should be large units and the material should be organized as to relate the many different types of materials.

Since that time many different types of studies have been made in order to determine content for courses in general science. Pollock[1] and Curtis[2] have made studies dealing with pupils' interests; Palmer,[3] Finley,[4] and Nettles[5] have made similar studies. These studies have proved to be interesting and valuable, but cannot be relied upon to determine the basic content of a course in science for the seventh, eighth, and ninth grades, if it is to meet the general objectives as indicated.

Analyses of textbooks have furnished considerable information for course content in general science. Webb,[1] Weckel,[2] Leker,[3] Klapp,[4] Downing,[5] Cureton,[6] and Heiss,[7] have contributed to such studies.

It is interesting that in spite of the relative newness of the subject itself the findings of each study revealed a striking similarity in the important topics discussed in the different sources.

[4]*A Program for Teaching Science,* National Society for the Study of Education, Thirty-first Yearbook, Part 1, Bloomington: Public School Publishing Company, p. 57.

[1]C. A. Pollock, "Children's Interest as a Basis of What to Teach in General Science," *Ohio State University Educational Research Bulletin,* 111 (January 9, 1924), pp. 3-6.

[2]Francis Day Curtis, "An Investigation of Adults' and Children's Scientific Interests," *Investigations in the Teaching of Science,* pp. 326-333, Philadelphia: P. Blakiston's Son and Co., 1926.

[3]E. Lawrence Palmer, "How to Meet Some of Children's Nature Interests," *The Nature Study Review,* XVIII (January-February, 1922), pp. 23-30.

[4]Charles W. Finley, "Some Studies of Children's Interests in Science Materials," *School Science and Mathematics,* XXI (January, 1921), pp. 23-30.

[5]Charles H. Nettles, "Science Interests of Junior High School Pupils," *Science Education,* XV (May, 1931), pp. 219-225.

[1]Hanor A. Webb, "A Quantitative Analysis of General Science Texts," *Investigations in the Teaching of Science,* pp. 170-171; Philadelphia: P. Blakiston's Son and Company, 1926.

[2]Ada L. Weckel, "Are any Principles of Organization of General Science Evidenced by the Present Text-books in the Subject," *School Science and Mathematics,* XXII (January, 1922), pp. 44-51.

[3]W. R. Leker, "The Articulation of General Science with Special Sciences," *School Science and Mathematics,* XXV (October, 1925), pp. 724-737.

[4]W. J. Klapp, "A Study of the Offerings of General Science Texts," *General Science Quarterly,* XI (May, 1927), pp. 236-246.

Curtis[8] made a study to determine what sorts of scientific knowledge are demanded for an intelligent reading of the public press. Studies of a similar nature have been made by many other investigators in a further effort to arrive at Curriculum content of a functional nature for the courses in science.

Herriott[2] studied life activities that involved a knowledge of Scientific principles in order to arrive at another basis for determining curriculum content.

Vinal[3] and Caldwell and Lundeen[4] studied common mistakes in natural history and unfounded beliefs or superstitions to determine what knowledge of scientific principles is needed in order to make individuals more intelligent about these so called mistaken notions.

Probably the best available and the most recent check list of items for topics and principles that have been included in text-books and courses of study in science is furnished by Curtis[5] and Downing[6]. These reports give the best perspective for course content in general science.

In keeping with the philosophy that subject matter is but a means to education, that the child and not the subject is of paramount importance, that education means individual growth in the direction of developing certain habits and ideals and attitudes, that are worth while that the social values of education shall receive emphasis, and that there should be considerable self-activity in our schools and in view of the different studies of students' interests, analyses of text-books, analyses of the scientific principles needed for an intelligent interpretation of current literature, an analysis of life activities, and of mistaken notions, the Committee on the Teaching of Science of the National Society for the Study of Education has outlined the following principles to guide teachers in the selection of content material for courses in general science for the seventh, eighth, and ninth grades.

1. The content shall be chosen on the basis of its possible contribution to the objectives set forth by the Committee.

[6]Elliott R. Downing, "An Analysis of Textbooks in General Science," *General Science Quarterly,* XI (May, 1928), pp, 509-516.

[6]Edward E. Cureton, "Junior High School Science," *The School Review,* XXXV (December, 1927), pp. 767-775.

[7]Elwood D. Heiss, "An Investigation of Content and Mastery of High School General Science Courses," *Third Digest of Investigations in the Teaching of Science,* Francis D. Curtis, pp. 54-57, Philadelphia: P. Blakiston's Son and Company, 1939.

[8]Francis Day Curtis, "An Investigation of the Scientific Knowledge Demanded for an Intelligent Reading of the Public Press," *Investigations in the Teaching of Science,* pp. 318-325, Philadelphia: P. Blakiston's Son and Company, 1926.

[2]M. E. Herriott, "Life Activities and the Physics Curriculum," *School Science and Mathematics,* XXIV (June, 1924), pp. 631-634.

[3]William Gould Vinal, "Common Mistakes in Natural History," *The Nature Study Review,* XVIII (November and December, 1922), pp. 329-342 and 371-385.

[4]Otis W. Caldwell and Gerhard E. Lundeen, "Investigation of Unfounded Beliefs," *Third Digest of Investigations in the Teaching of Science,* Francis Day Curits, pp. 280-291, Philadelphia: P. Blakiston's Son and Company, 1939.

[5]Francis Day Curtis, *A Synthesis and Evaluation of Subject Matter Topics* in General Science. Boston: Ginn and Company, 1929, pp. 77.

2. Subject matter shall be considered primarily as a means to an end and not merely as something to be remembered.
3. The course shall consist of a variety of physical and mental activities that shall lead to those knowledges, skills, interests, and attitudes essential to desirable mental and practical adjustments to the environment.
4. The content of the course shall bear direct significance to life's problems and activities.
5. The order of difficulty of the learning activities shall be such that pupils through reasonable effort may gain the satisfaction of accomplishment.
6. The learning activities shall call for experiences with the materials and forces of everyday life.
7. The learning activities shall be of such nature, that pupils may be interested in undertaking them and in carrying them to completion under the motivation and helpful guidance of a well-trained teacher.
8. The activities shall be such that they lead to the comprehension of the elementary generalizations of science that have important implications.
9. The activities shall include abundant opportunities to apply acquired knowledges, skills, and attitudes in life situations.
10. The activities, by their nature and order of difficulty, shall afford opportunity for the exercise of the creative abilities of youth and for the joy, romance, and adventure that discovery, invention, and self-production in science afford.
11. The activities shall be objective enough to be attainable and to make possible the determination or measurement of the attainment desired.
12. There shall be some activities that afford pupils means of judging and measuring their progress in the more specific learning activities.
13. Some activities shall call for direct, concrete experiences so far as possible, but vicarious experiences that are educative should not be neglected.[1]
14. Some activities, at least, shall be of such a nature that they may be organized into problems identical with the problems of life.

The Committee recommends the unit plans of organization of subject matter progressing from the simple to the complex and telling a sequential story of man's understanding of, and adjustment to, his whole science environment; the laboratory shall be an integral part of instruction and wherever needed to help the student in his understanding of his environment historical and biographical content should be included; and above all the work should be organized on a problem basis.

What are some of these major generalizations of science, the scientific attitudes, and scientific methods that should serve as guides in the

[1]*A Program for Teaching Science,* National Society for the Study of Education, Thirty-first Yearbook, Part 1, Bloomington: Public School Publishing Company, pp. 208-209.

organization of course content for the science that is to be taught on the junior high school level? A partial list of these follows:

Generalization of Science.

1. The sun is the chief source of energy for the earth.
2. Through independence of species and the struggle for existence a balance tends to be maintained among the many forms of life.
3. The earth's position in relation to the sun and moon is a determining factor of life on earth.
4. All life comes from life and produces its own kind of living organism.
5. Matter and energy cannot be created or destroyed, but may be changed from one to another.
6. Species have survived because of adaptations and adjustments which have fitted them to the conditions under which they live.
7. The energy of solar radiation is continually working changes in the surface of the earth.
8. There have been profound changes in the climate, not only of certain regions, but also of the earth as a whole.
9. The evolution of the earth has come as a result of natural forces.
10. Units of time are defined by the earth's movements in relation to the sun.
11. All life has evolved from simple forms.
12. The earth seems very old when its age is measured in the ordinary units of time.
13. Distances in space seem extremely vast when compared with distances on earth.
14. The physical environment has great influence on the structural forms of life and on plant and animal habitats.
15. Man can modify the nature of plant and animal forms through application of his knowledge of the laws of heredity.
16. There is a great variety in the size, structure, and the habits of living things.
17. There are processes that go on within an organism that are vital to its continued existence.
18. Chemical and physical changes are manifestations of energy changes.
19. There are fewer than one hundred chemical elements.
20. Every substance is one of the following: (a) Chemical element, (b) a chemical compound, (c) a mechanical mixture.
21. Certain material substances and certain physical conditions are limiting factors to life.
22. Light is a limiting factor to life.
23. Sound is caused by waves which are produced by a vibrating body and which can affect the auditory nerves of the ear.
24. Gravitation is the attractive force that influences or governs the movements of astronomical bodies.
25. Machines are devices for accomplishing useful transformations of energy.
26. Any machine, no matter how complicated, may be analyzed into a few simple types.

27. The properties of the different elements depend on the number and arrangements of the electrons and protons contained in their atoms.
28. All matter is probably electrical in structure.
29. The applications of electricity and magnetism in the home and in industry have revolutionized the methods of living of many people.
30. Heredity determines the difference between parents and offspring as well as the resemblances.
31. The kinetic energy of the molecules determines the physical states of matter.
32. The gravitational attraction between the earth and a mass of unconfined gas or liquid causes the pressure of the liquid or gas on the surface of the earth.
33. Liquid or gas pressure is exerted equally in all directions.
34. Chemical changes are accompanied by energy changes.
35. A change in rate or direction of motion of an object requires the application of an external force.
36. Radiant energy travels in a straight line through a uniform medium.
37. Electricity is a form of energy that results from disturbing the position or the regular paths of electrons.
38. In a chemical change a quantitative relationship exists between the amounts of substances reacting and the amounts of the substances that are the products of the reaction.[1]

Scientific Attitudes.

I. Conviction of universal basic cause and effect relations, rendering untenable
   1. Superstitious beliefs in general, as "signs" of "good or bad luck", and charms;
   2. "Unexplainable mysteries";
   3. "Beat all" attitude, commonly revealed by
      (a) Too ready for credulity
      (b) Tendency to magnify the importance of coincidence.

II. Sensitive curiosity concerning reasons for happenings, coupled with ideals
   1. Of careful and accurate observation, or equally careful and accurate use of pertinent data previously collected by others;
   2. Of patient collecting of data;
   3. Of persistence in the search for adequate explanations.

III. Habit of delayed response, holding views tentatively for suitable reflections varying with the matter in hand,
   1. To permit adequate consideration of possible options;
   2. To permit a conscious plan of attack, clearly looking forward to a prediction of the probable outcome or solution.

IV. Habit of weighing evidence with respect to its
   1. Pertinence;
   2. Soundness;
   3. Adequacy.

[1] *Ibid.*, pp. 53-55.

V. Respect for another's point of view, and Open-mindedness, and willingness to be convinced by evidence.[1]

Scientific Methods.

1. Locating problems.
2. Making hypotheses, or generalizations, from given facts or from observations.
3. Recognizing errors and defects in conditions or experiments described.
4. Evaluating data or procedures.
5. Evaluating conclusions in the light of the facts or observations upon which they are based.
6. Planning and making new observations to find out whether certain conclusions are sound.
7. Making inferences from facts and observations.
8. Inventing check experiments.
9. Using controls.
10. Isolating the experimental factor.[2]

These generalizations, attitudes, and scientific methods indicate the most recent trends in the teaching of science on the junior high schoo level. It is clearly seen that each item is a directive force in the control of present and future actions.

Instructional techniques. In order to appreciate the techniques of instruction it is necessary to know just how people actually learn. In considering the learning process we find that a stimulus is presented to an individual and his whole organism according to his original nature is modified in such a way that he develops a mindset, this mindset comes to consciousness as a desire to want to do. This desire leads an individual to vision a situation in the future, immediate or far distant, that would seem to satisfy this desire. If it seems likely that he will achieve what he desires than he purposes, plans, and acts in order to achieve what he has previously visioned; constantly, however, while he is engaging in the processes of purposing, planning, and acting, he is critically appraising each step in the process. His appraisal of his activities causes him to modify each step as it seems wise to do so. In the course of time he will effect an achievement. There is then the opportunity to compare this bit of achievement with what he visioned it to be in the beginning. Success or failure results. Achievement is never perfect so that the individual searches for imperfections and tries to discover the reasons for them. This diagnosis of the whole process is enriched by the interpretations that he makes; by drawing on his fund of experiences and the experiences of others he gains an insight into the total situation. From all of the data and material that he can muster up he now generalizes how he will act in the control

[1]*Ibid.*, pp. 53-55.

[1]Francis D. Curtis, *Third Digest of Investigations in the Teaching of Science*, pp. 268-269, Philadelphia: P. Blakiston's Son and Company, Inc., 1939.

[2]Francis D. Curtis, "Teaching Scientific Method," *School Science and Mathematics*, XXXIV (November, 1934), p. 817.

of future behavior. The last step is by far the most important because modification of behavior in so far as it affects social life is the end of education without which the individual can hardly be said to have profited from his experiences. Skills, knowledges and understanding, methods, relationships, feelings or attitudes, purposes or goals, and relationship, and standards of conduct or value may result from experience. We have helped to develop an individual who can think independently, but interdependently together when we have developed one who makes a conscious effort to control his experiences in order to grow in the direction of the standards and values that he has chosen or to discover better standards and values.

In order that students of science on the junior high school level shall develop a functional understanding of the major generalizations of science these must be directly related to the situation of life that challenge his interests. It is the object of science teachers to provide such experiences from which functional learning may result, and to make certain that the student profits thereby. In other words the student himself must see how a particular generalization functions directly in his life, and he must so identify that generalization.

A functional understanding of the major generalizations of science, developing scientific attitudes, and developing the ability to use the scientific methods are, to be sure the ultimate objectives of science, but I do not wish to convey the idea that such may be learned by themselves. No, they are inextricably bound up with subject matter, but what I do mean is that such constitute a mode of intelligent behavior, method, and a disposition of mind, attitude. Only in so far as students actively engage in the making of knowledge by transferring conjecture and opinion into belief supported by inquiry does a student get a functional understanding of these scientific methods of inquiry, or methods of knowing, or methods of arriving at knowledge. According to temporal order, science considered as method always precedes science considered as subject matter, for it is only as we proceed to inquire that we are likely to discover.

Science teaching must be inductive for science itself is inductive. Often teachers who emphasize the acquisition of subject matter consider that the laboratory affords the opportunity for concrete learning experiences. The fallacy there is that, if not properly conducted, the laboratory may be compared with the printed textbook when the printed page is used for the purpose of merely getting subject matter, for we obtain certain isolated and final stuff.

In a study by Cureton, two of the problems investigated were: "to determine, the basic functions of the science laboratory in the junior high school," and "to determine the best methods of teaching junior high school science." Check lists were sent to forty persons including authors of textbooks on the teaching of secondary school science or of courses of study in junior high school science, college professors of science, authors of textbooks on the junior high school movement and college professors of secondary education, and pupils from the ninth grade including the most capable, the least capable, and average pupils. The following table represents the results relative to the functions of the science laboratory in the junior high school.

The Function of the Science Laboratory in the Junior High School in the Order of Relative Importance as Indicated by Weighted Totals.

To give concrete illustrations of important facts and principles	397
To train the pupils in the methods of scientific research	515
To develop in the pupil specific skills useful to him either at present or in the future in real life	546

Cureton finds that "the principal function of a science laboratory in the junior high school is to give concrete illustrations of important facts and principles."[1]

Curtis[1] in investigating the teaching of science in secondary schools of the North Central Association found that "with biology and general science the nodal number of teachers used a combination of individual pupil experimentation with teacher-pupil demonstration," and that "while individual pupil experimentation was used exclusively by relatively few (8.1 per cent) of the teachers of general science, 42.2 per cent used the individual plan more or less frequently, while 85.7 per cent of these teachers used some form or other of the demonstration plan."

Beauchamp recognized certain practices which may be considered as innovating as regards the teaching of science; two of these practices follow:

(h) Teachers or pupil demonstration has replaced individual experimentation to a marked degree in the junior high school. A great increase in the use of demonstration is also observable in the specialized science courses.

(i) The laboratory work in the specialized sciences has in the past, often been divorced from the work in the textbooks. The organization of courses in terms of problems requiring a synthesis of the laboratory results and data from the textbooks has unified these two aspects of instruction. The solution of problems has been elevated to the focus of attention. The data obtained from the laboratory and the textbook are those used as sources of data. This has resulted in some schools in a decreased emphasis upon the formal record of laboratory experiments. This shift in emphasis has been accelerated by the use of the demonstration method.[2]

It is the view of the Committee on the Teaching of Science of the National Society for the Study of Education that the demonstration and the laboratory experiment should be considered primarily as the source of experiences that provide the bases for reflective thinking in problem situations and not as ends in themselves and disapproves of the point of view that laboratory work, individual or group, finds its value in confirming or fixing learning gained from other activities.[1]

While I have not found any specific studies dealing with the effect that the laboratory has in facilitating problem solving as regards general science, the study by Horton may prove to indicate the possibility. He demonstrated that "situations may be set in such a way that the ideas which the pupils get from experiences (in the laboratory) with chemistry may be used in problem solving."[2]

[1]Edward E. Cureton, "Junior High School Science," *The School Review*, XXXV (December, 1927), pp. 767-775,

[1]Francis D. Curtis, "The Teaching of Science in Secondary Schools of the North Central Association," *Science Education*, XVII (February, 1933), pp. 1-11.

Cureton[3] as a result of his study of general science in the junior high school lists the following methods of instruction in the order of relative importance:

Demonstration by the teacher or by pupil or a group of pupils.
General class discussion.
Extensive reading of books, magazines, and special papers.
Class projects.
Individual projects.
Field trips and visits to points of interest in the community.
Individual laboratory work.
Intensive reading in a text-book.
Recitation of facts learned from a text, in the laboratory or otherwise.
Lecture by the teacher.

The important thing is to realize that science is an experimental study of phenomena and materials and requires activities that are designed primarily to solve problems relating to concrete and objective materials. It is the teacher's duty after she has properly organized the work in terms of the principles and criteria as indicated to begin the class room work. In order to develop a desire in the student for the work and in order to help the student to will to do and to purpose to do she must provide emotional experiences, determine the individual differences among her students, direct, motivate and supervise the learning activities, measure the products of learning and must inspire the student to continue his learning. The emphasis shall not be on the acquisition of factual information, but on individual adjustment to social life. Once the student is stimulated to activity, the student should be allowed to engage in many varied activities so arranged that he will acquire the objectives that have been set up for the course. These activities should be designed to help the students to acquire new attitudes, new knowledge, new interests, skills and abilities; they should be so organized as to give practice in the use of those abilities previously acquired; and should be so formulated as to provide the student with the means of measuring his acquisition of the learning products that were sought.

The Thirty-first Yearbook lists some forty-four different activities and exercises that may be used in the development of a unit of work. The significant point is that the laboratory work, whether individual or demonstration, should be a source of facts and information pertinent to the problems at hand and should be the bases for the formulation of the major generalizations of science; it should not be for the purpose of confirming what has already been learned nor should it be for the purpose of fixing in mind learning products acquired through other activities. While the work on the junior high school level should be individualized as much as possible developing independence of thinking, group demontrations, class discussions, debates, and the student will develop the ability to work cooperatively with others. After the student has engaged in individual study and in working cooperatively

[1]*A Program for Teaching Science*, National Society for the Study of Education, Thirty-first Yearbook, Part 1, Bloomington: Public School Pub. Co., p. 216.

[2]Ibid., p. 75.

[3]Edward E. Cureton, "Junior High School Science," *The School Review*, XXXV (December, 1927), 767-775.

with the group, opportunity should be given for the organization of the facts and different ideas acquired from each project undertaken. Not only must opportunity be given for the organization of the facts and ideas discovered, but opportunity should be given for the students to apply these major generalizations in concrete, specific life situation. In effect the student receives a stimulus, reflects on laboratory work and activities carried on, catches the idea, uses the generalization in explaining known situations to which he knows the generalization, develops desirable attitudes, uses the scientific methods, applies these generalizations, attitudes, and methods to new situations, and on the basis of the whole learning process it is hoped that he will make a conscious effort to control his experiences in order to grow in the direction of the standards and values that he has developed.

Outcomes of Science Instruction on the Junior High School Level.

Carpenter in a study to determine whether pupils who had received five or six semesters of instruction in general science in grades VII, VIII, and IX made higher examination scores subsequently in physics and chemistry than other pupils who had studied general science fewer than five semesters; and whether on the whole pupils who had studied general science made higher examination scores in physics and chemistry, subsequently, than those pupils who had substituted a year's study of elementary biology for work in general science, found that pupils who had studied general science for five or six terms made consistently higher median scores in the final examinations in physics and chemistry than did those who had studied general science for less than five terms; that the pupils who had studied general science made consistently higher median scores in the final examinations in physics and chemistry than did those who had studied elementary biology. From further investigation he concludes that "While the data presented do not warrant final conclusions, they do present strong evidence in favor of three continuous years of science training in the junior high school grades, as compared with one year of either general science or elementary biology, or with less than five semesters of general science."[1]

Science, then, on a junior high school level should be an orientation to life; it should be functional involving concrete learning experiences from which students may formulate certain generalizations as mode of life; it should instill in the mind of the student an appreciation and a respect for the scientific method and the general spirit of science, which is the search for truth; it should stimulate the intellectual interests of the students so that they will develop that habit of inquiry that is so very necessary in the development of individuals; it should represent the field of knowledge as an integrated whole so that the student may interpret his relation to the physical universe and to the broad concepts of modern science; it should afford a certain amount of relaxation and entertainment, but the student should not expect something for nothing. Certainly a student should get a functional understanding of the major generalization of science, should develop the scientific attitudes, and should use the scientific methods in gathering data, setting up problems, and in solving them. Modification of behavior should be the ultimate outcome of such a course, not so many formulas or facts or principles, but a way of living and the abiltiy to make wholesome adaptations. Ft. Valley State College.

[1]Harry A. Carpenter, "Results of a Three-year Science Sequence in Junior High School Grades," *Science Education,* XVII (October, 1933), pp. 183-192.

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A SIMPLE ARRANGEMENT FOR DEMONSTRATING OR PHOTOGRAPHING DIFFRACTION EFFECTS

HALSON V. EAGLESON

Diffraction is a much neglected part of the study of light. This neglect is often the result of the difficulty encountered in attempting to arrange apparatus which is suitable for demonstration purposes. Too much emphasis can not be placed upon the value of a knowledge of the various effects as an aid to understanding image formation, spectra and other phenomena in which diffraction is important.

The purpose of this article is to explain how a simple bit of apparatus may be assembled and used for demonstrating or for photographing various diffraction effects. Apparatus of this sort was constructed at Morehouse College and used by the students of a class in advanced light.

Two large cardboard tubes were obtained. These tubes are often discarded by stores where linoleum and rugs are sold. These particular ones were each about six feet long and had an inside diameter of about three inches. A cigar box was then selected and circles having the diameter of the tubes were cut in the top and bottom of the box. A side of the box was removed and hinged to provide easy access to the inside. The top was nailed down and the tubes were then lined up with the holes and fastened by nails and glue, one to the top and the other to the bottom. This made a continuous, light-proof tube approximately twelve feet in length. The diagram below shows all details of construction.

When completed, the tube was mounted horizontally on stands and placed to enable convenient use of an intense beam of sunlight.

A few examples will be given to illustrate the methods used. The theory is not new and can be found in any standard physics text.

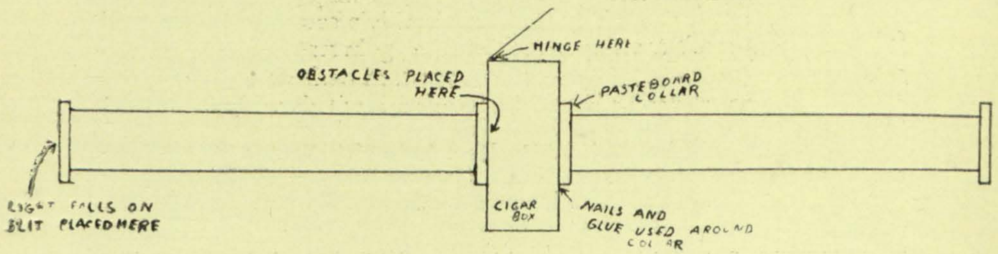

DIAGRAM OF TUBE USED TO DEMONSTRATE DIFFRACTION EFFECTS

The Arago white spot was produced in the following manner. A small circular slit of about a millimeter in diameter was placed at one end of the tube. This slit was made, as were the others, in a stiff piece of cardboard which completely covered one end of the tube. A steel ball of about fifteen millimeters diameter was then glued to a clean piece of glass. The glass was placed inside the cigar box and fastened across the hole so that the ball and slit were in line. A lens was placed at the far end of the long tube. When the slit was illuminated, the effect could be seen by placing a piece of ground glass at the principal focus of the lens. A camera could also be used to photograph the result.

Interesting effects were produced by pasting several pennies around a central penny so that they would all touch as closely as possible. The pennies were glued to a piece of glass which was placed in the cigar box to be illuminated by the circular slit.

Diffraction fringes were produced by placing an adjustable slit in the box. This was illuminated by light from a similar slit which was substituted for the circular slit. These adjustable slits were made by cutting a rectangular opening in a piece of cardboard. Strips of cardboard were pasted at the top and bottom of this opening to serve as slots in which two thin pieces of metal, such as single edge razor blades, could slide. By regulating the position of these blades, a slit of any desired width could be made.

The photograph below will show some of the fringes which were obtained by the method just outlined. The object slit was triangular in shape and was widest where the bands are narrowest.

DIFFRACTION FRINGES PRODUCED BY A SLIT OF VARIABLE WIDTH.

Interesting effects may be obtained by using several slits or by the use of wires across the slits. The chief difficulty is in keeping a constant source of illumination. In this case sunlight was reflected upon the slits from an arrangement of mirrors. If an arc light or heliostat is available, either may be used to great advantage. Although it is best to work in a room where the lighting can be controlled, it is possible to get good results in a room which can not be darkened.

THE CONTRIBUTIONS OF NEGRO SCIENTISTS TO PROGRESS AND CULTURE

LEWIS K. DOWNING

Iron and steel together form the largest manufactured product common to civilized nations. Their use is basic to all industrial enterprises. Every day all of us come into contact with some one or more of its various forms, fashioned to serve our general or specific needs. Schweenfurth, Von Leuschan and P. A. Tolbert are among the archaeologists who hold to the belief that Africans discovered the art of iron working. Among others, there are those like Gowdland, who believe that iron working was invented by people of Western Asia. The oldest piece of wrought iron known in the world was found in Buhon in Northern Ethiopia, 1908, by Dr. Randall MacIver, Director of the Eckley B. Coxe Expedition, and is said to date from about 2000 B. C. According to Dr. Leo Hansberry, a young historian at Howard University and one of the foremost authorities on African History, the question still is inconclusive; the weight of evidence, however, would seem to point to Africa.

It is a fact that there are very few native people in Africa, even in its present day disordered state, who do not know how to smelt and manufacture iron and many of them, steel.

Iron was not a common product in Egypt until Egypt was conquered by the Ethiopians in 723 B. C.

At Lasta, Northern Abyssinia, there are to be found ten great churches hewn out of solid rock in the reign of Lalabela, King of Ethiopia, about the middle of the Thirteen Century, A. D. The floor plan of one of these churches is not much different from that of some of our modern structures. Sir Wallace Budge, of the British Museum, has said that these are the most remarkable churches ever built in Christendom.

Part of a temple hewn out of living rock with tools of steel and iron, in the reign of Taharka, King of Ethiopia, 688-663 B. C. still stands and is representative of highest scientific design and craftsmanship. Credit must be given to the Italians who, despite their ruthless conquest of Ethiopia, left preserved fully these ancient structures for the benefit of future civilizations.

It may be interesting to note that at present there are more pyramids in Ethiopia than in Egypt.

Down through the ages we find Negro scientists, engineers, architects and technicians contributing their bit to the progress of the time.

Benjamin Banneker, 1731-1806, mathematician and astronomer, is classed among the great scientists of the Eighteenth Century. Banneker constructed the first of all clocks made in America. This clock struck the hours of the day. It is said that he wrote a dissertation on bees and calculated the locust plague as recurrent in seventeen-year cycles. From 1791-1802 he published a series of almanacs which were recognized to be of highest precision. Banneker's work on the almanac was commended by Thomas Jefferson, and he was invited to assist the Commission sent to lay out the lines of the District of Columbia. The plan of our Capital City, built on a development of the basic plans of that Commission, has been placed in the top ranks of best planned cities on any continent.

Ernest E. Just, head of the Department of Zoology, Howard University, long has been accorded international recognition as an outstanding embryologist. Dr. Just's experimentations have yielded invaluable information on the normality of the fertilization process, which information is used widely as a basis for similar studies in all laboratories where work of this nature is done. He is a distinguished cytologist and microscopist and has made many contributions to the field of cellular biology. The researches of Dr. Just are published widely in textbooks and scientific journals in America, Europe and Japan. In addition to his membership in principal scientific founder societies, Dr. Just is a member of the Editorial Board of Physiological Zoology, Biological Bulletin and Journal of Morphology.

Hyman Y. Chase, Assistant Professor of Zoology at Howard University, started as a student of Dr. Just. Dr. Chase's work in the field of the Effect of Radiant Energy upon Animal Cells is regarded as a contribution of some significance and is a part of a large amount of experimentation which is being sponsored by the Rockefeller Foundation at present.

Thomas Wyatt Turner, botanist, head of the Department of Biology, Hampton Institute, was selected by the United States Department of Agriculture, 1918-1919 to investigate certain plant phenomena at Presque Isle, Maine. His works on the effect of mineral nutrients upon seed plants, the physiological effects of nitrogen and of phosphorous upon plants, experiments in cotton breeding and other studies are to be found in most of the latest texts published, along the special line of plant nutrition, in Europe and America. Dr. Turner's efforts have ben put forth mostly with the hope of bringing to Negro youth the Methods of science and popularizing them. He is a member of the Virginia Conference of College Science Teachers, the Virginia Academy of Science, a Fellow of the American Association for the Advancement of Science and at present is Assistant Chairman of one of its local committees.

Charles Stewart Parker, botanist, head of the Department of Botany, Howard University, described a new sub-genus and section of the genus carex; he has discovered and described 39 species of plants, and is author of 60 papers. Dr. Parker worked out the life-history and control of a blight of stone fruits which, according to record, had cost the growers of the State of Washington $250,000 in loss of cherries alone, the year prior to the completion of Dr. Parker's work. In 1923-1924 he served as plant pathologist for the Western District of North Carolina as a "dollar-a-year man" under appointment of the United States Bureau of Plant Industry. A recent book, "The Flora of Southeastern Washington and Adjacent Idaho," by Dr. Harold St. John, describes thirty new plants collected by C. S. Parker, and in the same book a new species of sweet pea, "Lathyrus Parkeri," and a new variety of Rosa Spaldingii, "Var. Parkeri," are named for him. Dr. Parker was the only colored Regimental Adjutant in the A. E. F., serving as such with the 366th Infantry.

George Washington Carver, Spingarn medalist, Fellow of the Royal Society of Arts of Great Britain, honorary member of the National Technical Association, was the first Director of Agricultural Research at Tuskegee Institute. With limited facilities, Dr. Carver has produced over three hundred products from the peanut, including woodstains, insulating boards, paper, plastics, meat substitutes, milk, buttermilk, hair oil, cheese, dyes, breakfast foods and ink. From the sweet potato he has produced one hundred eighteen products, including flour, syrup, fuel alcohol, starch and glue. From cotton, Dr. Carver has produced rugs, paper, cordage, insulating boards and asphalt paving blocks. At present he is attracting worldwide attention with his experiments for rehabilitating infantile paralysis victims.

Dudley W. Woodard, Professor of Mathematics, Howard University, is author of "Practical Arithmetic", a text published by Tuskegee Institute. Dr. Woodard now is devoting himself exclusively to one of the unsolved problems of topology; namely, the characterization of the n-dimensional manifold. Four of his papers, published in the transactions of the American Mathematical Society, are steps in the solution of the main problem. Other of his papers have appeared in "Fundamenta Mathematicae", Warsaw, Poland, and in "School Science and Mathematics", 1911.

Elmer Samuel Imes, physicist, Fisk University, Fellow, 1916-1918, University of Michigan, has served for many years in the capacity of Consulting Physicist and research engineer to leading industrial corporations of New York and elsewhere. Dr. Imes' studies in Infra-Red Absorption Bands have been quoted in authoritative works in the field of Atomic Structure and Spectral Lines.

Lloyd A. Hall, Consulting Chemist, is Director of Research for the Griffith Laboratories, the largest organization of its kind in the world which serves the meat-packing industry with curing salts, condiments, spices and flavors, as well as other tenderizing ingredients. Before Dr. Hall went to the Griffith Laboratories curing salts were a matter of chance; someone mixed together some sodium chloride with sodium nitrate and sodium nitrite. Dr. Hall prepared a successful combination of complex chemical salt which has proved to be the most satisfactory curing salt marketed in this country. It is so interesting that an X-ray taken of its crystal construction has been studied carefully for the past two or three years by such outstanding X-ray specialists as Dr. George Clark, Professor of X-ray and of Analytical Chemistry, University of Illinois. According to Dr. Clark, Dr. Hall's curing salt is one of the greatest single contributions to the chemical industry. Dr. Hall found that spices marketed into homes took with them millions of bacteria, having in them a million times the bacteria contained in other foodstuffs. He worked out and patented a method for preparing sterilized spices. The method consists of treating spices in certain special conditions with ethylene oxide. Introduction of sterilized spices to the meat-packing industry bids fair to revolutionize it. Dr. Hall has made the Griffith Laboratories a service laboratory to the food industry of the highest rank. These discoveries have not meant simply honor to the Griffith Laboratories, but have made this concern one of the most prosperous of its kind in the world. During the World War Dr. Hall served as Assistant Chief Inspector of Explosives and Research Chemist, Ordnance Department, United States Army. He has some twenty-five United States and Canadian patents granted, either as patentee or co-patentee, with some fifteen applications pending.

James A. Parsons, Jr., metallurgist, in charge of research and production in metallurgy, The Duriron Company, is an authority on corrosion-resisting alloys.

Mr. Parsons, winner of the Harmon Award in Science in 1927, is a past President of the National Technical Association. He holds patents on methods for the determination of the silicon content of iron alloys by electrical resistance, the strengthening of alloys of iron and silicon by the uses of alloys such as nickel, cobalt, vanadium, etc., and heat-treatment methods for iron-silicon alloys containing molybdenum. These alloys are resistant to hydrochloric acid. Mr. Parsons also holds patents on Austenitic alloy steels for corrosion resistance to sulphuric acid, nitric acid, sulphites, alkalies, and so forth. These materials now are being produced as casting in the case of iron-silicon alloys, and wrought articles, as well as castings in the Austenitic steels. Other works of Mr. Parsons include the development of melting technique for corrosion-resisting steels in the coreless high-frequency electric furnace with special reference to slag-making and deoxidation. Associated with Mr. Parsons on some of the work referred to is another brilliant young chemist, *Earl T. Ryder.* Mr. Ryder, a graduate of the University of Illinois, from 1922 to 1926, was chief chemist of the Champion Chemical Company, of Springfield, Ohio, and since 1926 has served as Research Chemist at the Duriron Company.

Percy L. Julian, Director of Research with the Glidden Company, Chicago, Illinois, former staff member of several leading American universities, has been placed in the top rank of the younger organic chemists of this country. His early work in corydalis has proved to be of great interest to phytochemists, but his recent work on the structure and synthesis of physostigmine is considered by his fellows to be one of the greatest pieces of work done in that field yet. Recent patents applied for by the Glidden Company in Dr. Julian's name deal with the isolation of pure protein from oleagenous seeds, with the preparation of plastic materials, with the preparation of cold water paints, and with the isolation from soy-bean oil, of sterole from which the sex harmones are prepared readily. The researches of Dr. Julian, published 1931 to 1938, in the Journal of the American Chemical Society, Berichte, and Proceedings of the Indiana Academy of Science, have brought forth highest commendation from critics, officials, and members of these organizations.

Robert Percy Barnes, Assistant Professor of Chemistry, Howard University, is engaged in research in synthetic organic chemistry. Dr. Barnes has published numerous studies on the behavior of Alpha-diketones and the relation of derived ene-diols of Vitamin C.

In 1935 *William G. Holly,* now chemist and plant superintendent of the Gypsy Paint & Varnish Company, Incorporated, was successful in the formulation of a complete series of interior paints, using calcium titanium pigment for the entire portion of these paints. Until that time, even the manufacture of this particular pigment had found its use applicable only to flat finishes, and recommended it only for that purpose. The formulation was marketed under the label "Gypsy Titanium Gloss" and its acceptance by the painter public was immediate and remarkable. A recent survey by the Sherwin-Williams Company on all paints sold in the Metropolitan market (omitting theirs) rated the Gypsy products as the finest in their class of all brands sold within the Metropolitan New York area. Other firms have followed this lead in the production of titanium pigmented paints and today their sale is common universally.

William G. Haynes, Assistant Chief Chemist, Union Pacific Railroad, Omaha, Nebraska, has developed several pieces of apparatus for laboratory analysis of materials used by that company. He has developed a new liquid for the preservation of railway ties and a treatment for the inside of redwood water tanks. Mr. Haynes recently has directed his attention to the development of a durable finish for streamline trains, which will withstand abrasion of air particles and dust resulting from the high speed of these trains.

Dennis A. Forbes, an American Man of Science, now Professor of Physical Science at A. and I. State College, Nashville, Tennessee, for a period of over twenty-five years has been interpreting the mysteries of science and making them understandable to thousands of young men and women throughout the South. In 1934 Professor Forbes received a design for patent on the shape of the card used in his chemistry game and now is perfecting a chemistry game which should serve greatly in attracting and developing scientific interest in young potential minds.

For more than thirty years *Paul E. Johnson Company,* Chicago, Illinois, has manufactured therapeutical lamps and other scientific instruments of precision. The products of this company may be found in practically all leading hospitals, many medical schools and a large number of laboratories and professional offices in this country.

William W. Jason has been the leading spirit in the experimental development of the steel piston now used in the Ford motor cars. This piston compares favorably in weight and all other respects with the aluminum piston which it replaced and is much stronger.

Eugene J. Collins, also of the Ford Motor Company, developed the method of die casting now used by them in the making of valve cages and other small motor parts.

Claude Harvard, Ford Motor Company, developed a machine for the inspection of wrist pins for size, weight, finish and roundness. The machine, with one operator, does the work of ten or twelve hand inspectors and with a greatly increased degree of accuracy. Those who visited the Century of Progress will recall the demonstrations performed by Mr. Harvard.

In the social sciences we find scholarly works and publications dealing with the American Negro by such well-known writers as *Dr. Alain Locke, Dr. Abram Harris, Dr. Charles H. Wesley* and *Dr. E. Franklin Frazier,* of Howard University; *Dr. Charles S. Johnson,* of Fisk University, and others. After several years of field work and study in East and West Africa, there recently returned to Howard University *Ralph J. Bunche.* Dr. Bunche proposes an international approach to the problems of the American Negro. It is his view that these problems are merely a part of a universal pattern which applies to minority groups and to non-European peoples throughout the entire world, rather than one peculiar to our own country. Dr. Bunche's studies in Africa related to (1) An analysis of the effect of colonial policy upon the life of native people; (2) the reaction of native people to the incidents of colonial policy, and (3) the parallels which may be drawn between problems of native peoples in Africa and the Dutch East Indies and the American Negro population.

The discoveries of the scientist would contribute little progress and culture were there no engineers and technicians capable of converting scientific discoveries into useful service for men. *Archibald A. Alexander,* engineering contractor of Des Moines, Iowa, is known for his work in the construction of bridges, buildings and public utilities. The million-dollar sewage-treatment plant for the City of Grand Rapids, Michigan, built by Alexander, has operated continuously at a higher rate of efficiency than was anticipated by its designers.

Frederick Massiah, engineering contractor, Philadelphia, a Harmon prize winner in science, erected the concrete framework of a large apartment building of that city in record time. The Camden City Post Office is another of the many projects erected under the supervision of Mr. Massiah.

Samuel Plato, one of the earlier engineering contractors, has built structures of high merit in many sections of this country. Much of the work has been in connection with Federal Construction projects.

Charles S. Duke, structural engineer, now with the United States Housing Authority, while project engineer under the United States Resettlement Administration, organized the engineering staff which built some two hundred homes, community buildings, and utilities at Newport News, Virginia. This staff, composed entirely of young trained Negro engineers and technicians, with C. V. Smith as Resident Engineer, upon bringing the project to completion, were commended highly on their splendid service by Secretary of Agriculture Henry Wallace.

Erskine G. Roberts, Assistant Engineer, Power Division, U. S. Rural Electrification Administration, at present on leave of absence from the faculty of the School of Engineering and Architecture, Howard University, has made numerous firing studies in connection with institutional power plan operation. His papers have appeared in such journals as "Power Plant Engineering" and "Combustion."

It has been said that the progress and culture of a nation are reflected in its architecture. Considered by authorities to be one of the best designed libraries in this country is Founder's Library, Howard University, *Albert I. Cassell,* Architect. Mr. Cassell is known widely for his educational structures, as well as other institutional buildings. It has developed into a Hollywood fad to have a home designed by

Paul R. Williams, Architect, Los Angeles, California. Langston Terrace, Washington, D. C., one of the first low-rent housing projects built for Negroes, was designed under the direction of three associated architects, among them *Hilyard R. Robinson* and *Paul R. Williams.* Mr. Robinson is a housing consultant. Other prominent names in low-cost multiple dwelling projects, residential or church architecture, are the architectural firm of *McKissack and McKissack,* Nashville, Tennessee, and *Julius M. Gardner,* Charleston, West Virginia; *Vertner M. Tandy,* New York City; *Louis A. Bellinger,* Pittsburgh, Pa.; *Miller F. Whittaker,* now President of South Carolina State College; *R. R. Taylor,* Tuskegee Institute; *Howard H. Mackey,* Head of the Department of Architecture, Howard University, and *John A. Lankford,* Washington, D. C.

George Maceo Jones, Associate Professor of Architecture, Howard University, earned the degree Doctor of Philosophy in Civil Engineering, University of Michigan, 1934. Dr. Jones' studies in indeterminate structures, with special regard to wind stresses in tall buildings, have been of real merit.

David N. Crosthwait, Jr., consulting engineer, member of several engineering founder societies, organized and directed a research organization which developed the method of sub-atmospheric steam heating now used to heat the thirty- and forty-story towers of Radio City. The principle developed now is in use in some of the recent important buildings of Canada, England, Japan and Poland, as well as in this country. Much of the information which originated in that organization now has been embodied in the current Heating and Ventilating texts or Reference Books. Mr. Crosthwait has about 20 United States patents to his credit, most of which are in industrial use.

The most complete factual information on Negro Inventors the writer has had the privilege of reviewing is found in the library of John A. Lankford, Architect, Washington, D. C. Many of the records compiled by *Henry E. Baker,* during a period of nearly a half century's service as Assistant United States Patent Examiner, are represented in this collection. These inventions represent contributions to practically every field of activity. Perhaps best known of these inventors is *Grantville T. Woods,* who for many years was associated with Thomas Edison. Mr. Woods has more than 50 patents to his credit. Whenever you use a telephone you make use of improvements designed and patented by him.

When a street car motorman electrically throws a switch, there is Woods. The transmission of messages from moving trains by static conduction; magnetic brake apparatus; improvements in relay instruments used in telegraphy and many other useful devices have been contributed by Woods. In 1872 *Elijah McCoy,* of Detroit, Michigan, invented the original automatic steam lubricator, which made possible the building of high-pressure steam engines. At one time these were in general use on locomotives of leading railway companies of the Northwest, steamers on the Great Lakes and in manufacturing plants throughout the country.

Jan E. Matzeliger gave to the world a machine for lasting shoes which inaugurated a new era in the shoe industry. Within twenty years following the formation of the United Shoe Machinery Company, purchases of Matzeliger's patent, American shoe manufacture increased from 220,000,000 to over 400,000,000, while export of American shoes increased from 1,000,000 to 11,000,000, traced principally to the new American machines founded on the Metzeliger type.

Norbert Rillieux in 1846 invented and patented a vacuum pan, which revolutionized the method of refining sugar. He also developed a practical sewer system for the City of New Orleans.

The simple golf tee (now preferred by most golf enthusiasts) which obviates the use of conical mounds of sand or similar material formed by the fingers, was invented and patented by *George F. Grant,* of Boston, Massachusetts, in 1899. The simple mopholder found in every American home and which can be purchased today at any five-and-ten-cent store in this country was invented and patented in 1893 by *Thomas W. Stewart.* Over 2,000 patents on inventions have been obtained by Negroes in the field of invention. Because of trade secrets; insufficient finance to promote their activities; lack of adequate legal counsel; by law, as was the case during slavery, or for other reasons, many contributions by Negroes to progress and culture will remain lost to history.

In concluding this paper, the writer realizes that he has touched but briefly here and there bits from chapters which might be written on the subject of "Contributions of Negro Scientists to Progress and Culture." With the increasing grants of municipal, state and Federal aid to education; with the increasing truly scientific attitude on the part of national founder societies toward membership qualifications, and the examination and recognition by industry of all values which may contribute to its economic growth, the progress and culture of future generations will attain far greater heights than today's spotlight might seem to reveal as one trains it on the past, surveys the present or pierces the years which are to come.

HOWARD UNIVERSITY.

FACTORS CONTRIBUTING TO THE ECONOMIC SUCCESS OF THE NEGRO

J. T. WILLIAMSON

AGRICULTURAL EDUCATION

Students expecting to be teachers of Vocational Agriculture pursue the complete course in Agricultural education.

Over 800 Negroes are employed as teachers of Vocational Agriculture in the United States. Many of these workers are graduates of Tuskegee Institute.

TECHNICAL AGRICULTURE

Students not interested in teaching Vocational Agriculture, but are primarily interested in Agricultural Production, may enroll in the Technical Agricultural course with the privilege of intensive study in one or more of the following major branches:

Animal Husbandry
Poultry Husbandry
Dairy Husbandry
Farm Crops and Soils
Landscape Gardening

Students completing work in this type of course have readily found employment in the Extension Service, in which over 500 Negroes are employed.

With the increased participation of the Federal Government in programs designed for betterment of farming conditions, many new frontiers have been opened to men scientifically trained in agricultural pursuits. Many college graduates find jobs with annual salaries ranging from $1,400 to $2,300 in the following types of service:

1. Civilian Conservation Crops
   (a) Agricultural Advisors
2. Agricultural Adjustment Administration
   (a) Farm Journalists
   (b) Economic Advisors
3. Farm Security Administration
   (a) Farm Supervisors
   (b) Store Managers
   (c) Community Organizers
4. Soil Conservation Service
   (a) Agronomists
   (b) Conservationists
   (c) Foresters
   (d) Farm Engineers
   (e) Nurserymen
   (f) Wild Life Preservers

Many graduates of the course in Technical Agriculture are successful operators of their own farms, and some find profitable employment as managers and operators of farms owned by other people.

OPPORTUNITIES AND FACILITIES FOR INSTRUCTION

1. The campus, with its many acres of spacious grounds appropriately beautified with ample lawns and shrubbery and well-stocked greenhouse constitute adequate laboratory facilities for the teaching of landscape gardening.

2. A garden which produces an abundant supply of fresh vegetables for the boarding department throughout the year provides a place for practical work and experimentation by those students pursuing courses in Horticulture.

3. The Poultry Plant is equipped with a mammoth incubator, electrical and other types of brooders, and approximately 3,000 birds of various breeds.

4. The Horse Barn is a large brick structure housing 39 head of horses and mules, and so forth, most of which are of pedigreed stock.

5. Other equipment includes:
   (1) A well-equipped Farm Shop.
   (2) A Veterinary Hospital which treats from six to seven thousand patients annually.
   (3) A Dairy Barn which houses 91 head of dairy animals: pure-bred Jerseys, Guernseys, and Holsteins. There are also Hereford and Angus cattle.

6. The Agricultural Administrative Building houses:
   (a) A Creamery where milk and milk products are sanitarily and scientifically handled. There is necessary equipment for pasteurization, refrigeration and for butter-making and ice cream manufacture.
   (b) A well-equipped Farm Crop and Soil Laboratory.
   (c) The Administrative Offices and some class rooms.
   (d) Extension Offices.
7. An apiary with 34 colonies of German and Italian bees.
8. A new Goat Dairy with 34 pure-bred goats.
9. A herd of 170 hogs. The Swine Herd supplies 25,000 to 30,000 pounds of pork annually, facilities for cold storage and curing of meats.
10. A field of 75 acres of kudzu for forage, and so forth.
11. The Institute Farm adjoining the campus consists of 780 acres and 12 miles southeast of Tuskegee, a plantation of 1,700 acres devoted to extensive beef and timber production. A herd of 125 animals is maintained. In all, the Institute has available 2,480 acres of land for agricultural teaching.

WHAT GRADUATES OF 1939 ARE DOING

In 1939, twenty-six students graduated from the School of Agriculture. Twenty-three of this number are gainfully employed as Vocational Teachers, County Agents, Farm Security Workers, or otherwise.

Tuskegee Institute aims to serve you and the nation by fostering:
Improved farming
Increased production
Intense, but conservative land use
Industrial and Social Efficiency
Interest in everything making for:
(1) Wholesome and adequate living
(2) Profitable and progressive citzenship
(3) Prosperous and more Democratic State
(4) A nation ever increasing in true greatness

TUSKEGEE INSTITUTE.

THE AMATEUR IN SCIENCE

C. L. E. MONROE

Officers and members of the Science and Mathematics Club of Morehouse College, it is with great pleasure and, at the same time, with great humility, that I design to address what Sir William Osler characterized the most critical audience — a group of young sincere, aspiring men, united in the cause of science. Yet I have absolutely no misgivings whatsoever, for we talk the same language, in a field dedicated to truth-seeking, tolerance, service and extension of knowledge.

I am here today in the interest of the amateur in science. I hold no especial brief for this specimen, only in so far as he embodies the spirit and disciplines of science. Webster's Standard Dictionary defines the amateur as: "One who cultivates a particular pursuit, study of science, from taste, without pursuing it professionally." However, in disparagement, it gives as synonyms, dilettante and dabbler. It is in this latter sense that the term is connotated too frequently today. Such a meaning and use is not praiseworthy and absolutely unfair to those to whom I am referring today. The amateur in science directs his sparetime energy to the satisfaction of one of man's innate longings—the production or collection of toys, thinga-ma-bobs and other trivia, whose value to him is not measured in dollars and cents. It is not that such articles, findings or technics developed by these amateurs do not have monetary or other economic value, but that the pure amateur sees fit to be satisfied with the pleasurable and intangible assets derived therefrom.

The immediate gain of the worker in pure science is the selfish satisfaction of the climber struggling to the summit, of the poet rounding his rhyme or, if you will, of the successful cross-word puzzler. Pure science is concerned with understanding, not using; it might be denounced as valueless, never as harmful.

There is the story of the three hod carriers. On being asked, "What are you doing?" the first replied, "Carrying bricks", the second, "Earning a dollar an hour"; the third, "Building a cathedral." The last represents pure science, a seeker of knowledge and not merely a collector of do-dads, usual or unusual. Yet the larger the collection becomes, the greater the tendency for the amateur even to compare and classify the items into major and minor groups and subgroups. This, in the final analysis, is organizing knowledge of a sort and, in all probability, true knowledge if the person pursues his chosen interest with the same energy and sincerity with which he plays. Professor Conklin in his address as retiring president of the American Association for the Advancement of Science in 1937 defined science as organized knowledge and maintained that knowledge itself is neither good or bad but only true or false.

The very small additions to the world's knowledge that an obscure and unknown amateur might make, compare favorably with those similarly small additions made by the technically trained professionals, especially when later on, some mental giant comes along and synthesizes a great fundamental and maybe revolutionary finding, using those rather insignificant accretions. To Sir Ronald Ross belongs the honor of tracing the various stages of the existence of the malarial parasite in the body of the mosquito until it was ripe for injection into a human being by the bite of the insect. This was shortly after Dr. Laveran, a French army surgeon, had discovered that the blood of a person suffering from malaria always contained the peculiar parasite. The suggestion, with some evidence, had been made fourteen centuries before that mosquitoes were carriers of disease and that malaria was transmitted by them or flies. These works, however, were never brought to light until after the above workers had practically solved the question.

One may have gathered that much is to be said for the so-called "rank" to the world's knowledge. Then all that is necessary is to get him to divulge his findings, if experimental or investigative. To attain this latter end should not be difficult, considering man's natural inclination to talk about the things he has spent much time and energy on. In reporting his results, the amateur is not very likely to appear pedantic or to speak very fluently the technical talk of his chosen avocation. This fact may, however, redound to a facility of imparting his accomplishments to his fellow man. For what layman or scientist does not maintain that technical talk is sheer gibberish to most folks? Yet, whether they realize it or not, everyone—the hoi-po-loi, the aristocrat, or just plain neighbor—belongs to some exclusive group with a language all its own. Naturally, the language of science does not adapt itself readily to ordinary conversation or inspire hostesses or poets. Albert Einstein expressed his opinion regarding the use of technical language thus, "It should never be used to cover up meaning, but rather to make it more clear." Yet an abstract of his address before the American Association for the Advancement of Science was given to newspaper reporters who were to report other things than comical and social events. The abstract read thus: "It is well known that the equivalence between energy and inertial mass is one of the most important consequences of the special theory of relativity. The theoretical derivation of this principle is the subject of my lecture. From the Lorentz transformation and the assumption of the impulse and energy principle for material particles the form of the impulse and energy of the moving particles, as well as the equality of mass and rest-energy is derived. The proof is based on the consideration of an elastic and an inelastic collision betwen two identically constituted material particles."

Scientific language is not new at all; it has been developing for centuries. The beginning came when Aristotle's curiosity laid foundation stones in six main divisions of science, and he was followed by researchers who for generations after the Dark Ages preserved their discoveries for posterity and saved themselves from persecution by talking a language they alone could understand. Had Galileo had a similar grandstand to play to or had he been a bit more technical in his backing of the Copernican Theory that planets revolve around the sun, he might not have spent so many unpleasant months in dungeons. Likewise, Bruno, had he so willed to hedge and compromise thus, might readily have escaped burning at the stake.

Included among the non-professionals in science are the amateur naturalist, the amateur physicist or gadgeteer, the amateur chemist, the numerologist, the cryptogram solvers and others. It is my confirmed opinion generally, that it is not much more likely that the science major with minimal technical training will increase the world's knowledge than the aforementioned amateur. I say that advisedly, since training of our science majors and minors is so purposive; i. e., the motive behind getting this training is preparation for a profession, in which too often there is so little opportunity for investigation in pure science. The utilization of such scientific technics and disciplines for the purpose of gaining a living is too often not productive of significant fact-finding. In this modern day with its stresses and strains concentrated on a man's welfare and happiness, scientific research is best and most freely done when subsidized by non-profit organizations, in which endeavor, the worker is assured of his maintenance, and is practically as unhampered by worldly cares and vicissitudes as the amateur who indulges in this field as a hobby.

I must hasten to say that I do not maintain or believe that all or even most amateurs in scientific fields accomplish much beyond personal diversion and satisfaction. The more intense the pursuit of personal diversion the more selfish and self-centered the individual becomes. If it is true, and I feel it is, that the wholly extraverted folk of this earth are never either pure scientists or poets, then it augurs well for the sincere and diligent amateur in science.

I also must highly appreciate the motives, the freedom to develop and ingeniously devise means to an end, unhampered or unlimited by anything but personal ability and capability. On the other hand, technical research is most often organized and its expense weighed in the balance of utility. The standard of value in the former case of the pure scientist is that of knowledge only, while in the other it is that of profit or use. The best kind of scientific research cannot be carried on in an atmosphere of commercialism, or where personal profit is the end in view.

The scientific mind, whether professionally employed or used avocationally, seeks continually for natural revelations whether they can be applied to arts and industries or not. The delight is in the chase, and it ceases with the capture. The question of utility or practical applicability of their discovery is anathema to most men of pure science. The clinician, the engineer and the industrial chemist have made phenomenal applications of the apparently insignificant findings of these investigators and they accordingly have received the acclaim of the people. Surely George W. Carver has the scientific mind. Again, this mind seeks to understand Nature; the engineering mind to control her for material purposes.

The periodical, Popular Mechanics, made a poll of its readers to find out what inventions they considered the "seven wonders of the modern world." A list was submitted and the readers chose the following seven: Wireless telegraphy, telephone, the aeroplane, radium, anaesthetics and antitoxins, spectrum analysis and X-Rays. Each one of these things had its foundations in purely scientific work and was not the result of deliberate intention to make something of service to humanity.

Three chemists in a large Dublin brewery became interested in statistics on the side and, after certain adjustments had been made with their employer, they were permitted to publish their work. However, they had to use pseudonyms to avoid difficulties with the rest of the staff. W. S. Gosset was the first of the three to enter this field as a hobby and assumed the pseudonym "Student" and published very significant papers in Biometrika in 1908 and 1912. The younger two chemists followed, taking pseudonyms "Sophister" and "Mathetes."

Of bygone years, Leibniz, one of the inventors of the calculus, was a lawyer who applied himself with great diligence to every branch of

knowledge.

One eminent surgeon, wishing to further the spread of elementary surgical instruction, admonished his class thus: "The higher mathematics will not help you bind up a broken leg." This is definitely so but no more so than surgery will not help one to add up accounts or to think logically, or to accomplish the closely related feat of understanding a clever joke.

Among the naturalists must be mentioned probably the first herbalist Theophrastus, who pursued knowledge of plants for its own sake. Later Swammerdam in the 17th century threw health and honor to the winds and eventually discovered half of the secrets of the bee's hive. Buffon, of the 18th century, was a gentleman naturalist, although lacking in some respects the high ideals I suggested obtained in pure scientific work, yet was guided by the spirit of science. He began his great encyclopedia with the admonition: "One should begin by seeing much and coming back often for a second look." Charles Darwin's training and background were to make him anything but a naturalist for he knew no chemistry, physics, essentials of zoological anatomy of physiology of plants; in fact, his education in science was so scanty that the modern mind would dismiss it as a smattering which would probably best be unlearned. He wavered as to choice in profession, not being helped at all by his expectation of a sizeable inheritance. The invitation to take the trip on the Beagle as a naturalist without pay, settled his mind. We know the rest.

The great names of the past are too numerous to mention—men and women who were fired with the passion for knowledge for knowledge's sake, without incurring the taint of Sophistry. These people and others like them whose names are legion and obscure may be said to have lived and lived completely a life closely approaching, in a sense, the altruistic.

Scientific and humanistic studies are supposed to be antipathetic, and to represent opposing qualities; so that it has become common to associate science with all that is cold and mechanistic in our being, and to believe that the development of the more spiritual parts of man's nature belongs essentially to other departments of intellectual activity. These are indeed very popular misconceptions but none the less misconceptions, in the light of my previous discourse.

Should we not agree with Moulton, who is 1938 in Richmond suggested that "Perhaps the way forward lies in a great extension of the scientific spirit"? This spirit consists merely of deriving conclusions from facts.

This spirit, I maintain, motivates the amateur in science more often than not, and here, for that reason, I plead more serious consideration for this "promising child in scientific study."

Morris Brown College.

The Periscope

TWO QUALIFY AS WATCHMAKERS

The two proudest men in Harlem are Peter Huffstead and James Buchannan. They are justified in being proud. By qualifying as Certified Watchmakers through a rigid examination conducted by the Horological Institute of America, they have achieved the watchmaker's highest rating.

In the science and art of watchmaking, this rating is equivalent to the degree of "Doctor of Philosophy" in the field of education. And similarly, this certificate is obtained only by the most assidious application to the finer side and technique of watchmaking.

Inspired with an ambition to become the best watchmakers in the city, these two workmen filed to take the examination; one because of an inordinate pride in his work, the other on a sheer bet that he could pass the tests. Meeting every preliminary requirement of the institute, which in itself is a rigid test, these two Harlemites determined to do their best in acquiring the rights to the certificate. The work experience necessary before the candidate can qualify; the business ethics demanded; the professional attitude called for; the shop, the tools, all are investigated thoroughly before permission to take the test is given.

These tests include written and manual work of a nature sorely trying to an experienced man, embracing as they do the most difficult and scientific phases of watchmaking. And they are conducted under the supervision of a monitor appointed by the institute from their Washington headquarters in the United States Bureau of Standards.

Records of the Horological Institute show that there are only about 20 certified watchmakers in the entire country, with the largest number being found in the Middle West, where compulsory laws demand this rating before a man can hang out his shingle.

Peter Huffstead is in business for himself; James Buchannan is a valued employee of the Longines Wittnauer company, one of the world's greatest houses.

LEWIS HOWARD LATIMER, EDISON PIONEER

Mr. Latimer was born at Chelsea, Mass., September 4, 1844. At ten years of age, after a few years of rudimentary education, Mr. Latimer seeming to sense the heavy load carried by his parents to support their family of four children, decided to subdue his thirst for knowledge as a school attendant and assist his father to the best of his ability, meanwhile devoting every spare opportunity, and utilizing every available source to acquire the education for which he yearned. At the age of 16 he enlisted in the Naval service of the Federal Government, serving as a "landsman" on the U. S. S. Massasoit from which he was honorably discharged in 1885, when he returned to Boston and secured employment as an office boy in the office of Messrs. Grosby and Gould, patent solicitors. In this office he became interested in draughting and gradually perfected himself to such a degree as to become their chief draughtsman, remaining with this firm for about eleven years. It was Mr. Latimer who executed the drawings and assisted in preparing the applications for the telephone patents of Alexander Graham Bell. In 1880 he entered the employ of Hiram S. Maxim, Electrician of the United States Electric Lighting Co., then located at Bridgeport, Connecticut. It was while in this employ that Mr. Latimer successfully produced a method making carbon filaments for the Maxim electric incandescent lamp, which he patented. His keen perception of the possibilities of the electric light and kindred industries resulted in his being the author of several other inventions. He assisted in installing and placing in operation some of the first "Maxim" incandescent electric light plants in New York City, Philadelphia and Canada for the United States Electric Company, and supervised the production of the carbon filaments employed therein, such as the Equitable Building, Fiske & Hatch, Caswell & Massey's and the Union League Club of New York City, as the offices of Philadelphia "Ledger" in Philadelphia. In the autumn of 1881 Mr. Latimer was sent to London, England, to establish an incandescent lamp department for the Maxim-Weston Electric Light Company of Brooklyn, New York, and then by the Acme Electric Light Company of New York City. In 1884 he became associated with the Engineering Department of the Edison Electric Light Company at 65 Fifth Avenue, New York City, but in 1890 was transferred to the Legal Department where he remained until the formation of the Board of Patent Control in 1896 by the General Electric and Westinghouse Companies, becoming its chief draughtsman, a position he held until the abolition of this Board in 1911, when he became associated with Edwin W. Harmer, Patent Solicitor, and Engineer of New York City, and later with the firm of Hammer and Schwarz. Mr. Latimer's activities were brought to an unfortunate conclusion in the early part of 1924 by infirmities that finally caused his demise.

He was of the colored race, the only one in our organization and was one of those to respond to the initial call that led to the formation of the Edison Pioneers, January 24th, 1918.

Broad-mindedness, versatility in the accomplishment of things intellectual and cultural, a linguist, a devoted husband and father, all were characteristic of him, and his genial presence will be missed from our gathering.

Mr. Latimer was a member of George Huntsman Post, G. A. R., of Flushing, Long Island, and for several years the adjutant of that organization. The funeral services at his late home in Flushing, his casket covered with the flag he loved, was attended by many of his former comrades in arms, and his remains sent to Fall River, Mass., where at his request they were cremated and placed in the same grave with those of his beloved wife.

He is survived by his sister, Mrs. Margaret Hawley, of Bridgeport, Conn., and two daughters, Mrs. Gerald Norman and Miss Louise R. Latimer, of Flushing, Long Island, N. Y.

Mr. Latimer was a full member, and an esteemed one, of the Edison pioneers.

40 West 40 Street
New York City.

PERRY WATKINS, SCENIC DESIGNER

The story of Perry Watkins, Negro Artist, who in three years rose from the bottom of the theatrical profession to become Broadway's first Negro scenic designer, appeared in Opportunity by Edward Lawson.

There had never been a Negro scenic designer on Broadway stage until Perry Watkins was assigned by Producer Guthrie McClintic to prepare the sets for "Mamba's Daughter," which is starring Ethel Waters.

Today the tremendous success of that play presages a brilliant future for the young Negro artist and draftsman who only a few weeks ago was a comparatively unknown cog in the Federal Theatre Project's backstage machinery. A close student of the theatre, although it dates back only three years, Perry Watkins has proved once for all that Negro artists are capable in this field where a high degree of technical knowledge, coupled with a keen imagination are the primary requisites.

Watkins has pioneered in the most important task of providing a new color synthesis of background, costume, and light for the Negro on the stage—a problem which has been given scant attention in the past. He has tried to eliminate on the one hand the pastiness of facial color that has always plagued the olive skinned Negro wearing grease paint, and on the other hand the lack of definition of the features of the dark skinned members of the cast who usually must work without makeup. Emphasizing rather than minimizing, the wide variations of pigmentation of Negro actors has been his special problem, and in its solution he has had to utilize nearly every trick of a very tricky trade.

His success in tackling this problem, achieved already to an extent in the drama that has established Ethel Waters as one of America's most capable actresses, is certain to increase the efficiency of the Negro actor and make his productions more eloquent and effective. It may even bring about a renaissance of Negro drama on the Broadway stage.

During his first year with the Federal Theatre he was assigned to work from time to time in nearly every department. He helped to construct, cover, and paint scenery for the highly successful production of "Macbeth," he dyed material for costumes, he painted drops, he spent long evenings learning to operate the electrical switchboard. It was while laboring with this highly complicated mechanism that he first came up against the myriad problems presented to the light expert by a Negro cast.

Two productions for which he designed sets and costumes were abandoned by the Project because of script difficulties, but undiscouraged he saw the third—an adaptation of George Kelly's "The Show-Off"—go on the boards on March 8, 1937.

It was on the strength of his three year record of achievement that late in 1938 he was engaged to design the entire production of "Mamba's Daughter."

Today, with this production a box-office success, he already has made a point that Broadway producers cannot easily overlook—he has proved beyond the shadow of a doubt that Negro artists lack neither the knowledge nor the imagination so necessary for success in the work of theatrical designing.

COLLEGE HEALTH WORKERS FROM THE NATIONAL STUDENT HEALTH ASSOCIATION

The Second Regional Conference of College Health Workers in Negro Colleges held in Nashville, Tennessee, on April 5th and 6th, under the auspices of the Meharry Medical School, was successful and of historical significance. It was successful because approximately 60 individuals from 15 states, representing 26 colleges, attended the Conference and participated in the discussions. Delegates came from Texas in the Southwest, Ohio in the North, Washington, D. C., and Florida in the Southeast. It was of historical significance because a new organization, the National Student Health Association was formed.

Plans for the National Student Health Association were laid during the Morning Session, Friday, April 5th, when Mr. H. C. Trenholm, President of the Alabama State Teachers College, read the report of the Constitution Committee.

It is our hope that every Negro institution in the United States will become an active part of this organization, and that the Presidents, college physicians, health teachers, nurses, and all other individuals, interested in health of college students will work toward the development and improvement of health programs in our schools and colleges.

THE CARNEGIE-MYRDAL STUDY

109 Chemistry Building
Howard University
Washington, D. C.

Dear Fellow-Scientist:

A notable feature of the writings about the Negro is the scarcity of the material on his work as a scientist. I am certain that you will be happy to know that in its national survey of the Negro as a member of American society the Carnegie-Myrdal Survey is interested in the matter of the Negro's contribution to science.

As a part of the survey and in cooperation with Professor Sterling Brown, I am preparing a memorandum on the Negro in Science. This work will be possible only through your cooperation, hence I am requesting that you help in the following manner:

1. Please answer the questions on the enclosed questionnaire using extra sheets of paper if needed.
2. Please supply us with a brief sketch of your life and work as brief as possible and of the format used in Who's Who.
3. Please return the above material in the enclosed self addressed and stamped envelope as soon as possible.

Thanking you in advance for your cooperation, I remain

Very truly yours,

J. W. HUGULEY, JR.
Inorganic Chemistry
Howard University.

SCIENTISTS

1. General Field.................................. Special Interest..................................
2. Name.................................. Address..................................
3. Institution and rank..................................
4. Education:
5. If teaching other subjects, please state.
6. Reasons for choice of specialty..................................
7. Contributions (With page references to published articles)

.... 2

8. Learned societies to which you belong..................................
9. Do you attend meetings of these societies? Annually ( ) Occasionally ( ) Never ( ).
10. Check the following to which you belong: NAACP ( ) The Urban League ( ) Assn. for the Study of Negro History ( ) National Negro Congress ( ) The American Civil Liberties Union ( ) If any other of social purpose please state

....

11. What purposes do you intend to achieve in your teaching?

....

12. Of the students who have selected a major in your institution, what percentage selected your field?
13. Before becoming interested in your present field, what profession had you planned to follow?

Please answer the following questions as fully as possible. Any statement marked with a (C) will be considered strictly confidential.

14. What advantages and/or disadvantages does the Negro scientist meet with because of "race"?
15. What specific advantages and/or disadvantages have you met with in your chosen field because of "race"?
16. What do you think of the future of the Negro scientist in your field and related fields?
17. Do you believe the Negro has any special aptitude arising from race in (a) science, in general (b) your field, (c) any other field?
18. Do you believe the Negro has any special lack of ability arising from race in (a) your field, (b) science in general, (c) any other field?
19. Please name living Negroes whom you consider eminent in Science, with a brief statement of their contributions.
20. What do you consider the service that Negro Scientists as a group can contribute (a) to American life, (b) to the advancement of the American Negro?

NOTE: Append sheets of paper if more space is needed for answers.

MUSIC IN THE NEGRO COLLEGE

KEMPER HARRELD

The old type of American school and college in, a large measure, emphasized a systematic study of only one art, literature. The only musical organization in the college was a glee club that could sing a few rollicking tunes, and a group gotten together for some formal occasion, such as baccalaureate and commencement. There was still greater neglect of the study of such arts as painting, sculpture, architecture and dancing.

The unfortunate results of this type of training can easily be seen in the present American home where one finds choice literature in the bookcase, but cheap music on the piano, and mediocre paintings on the wall. If taste is shown in interior decoration, it is because it is copied from a magazine, and not because it is the evidence of a solid knowledge and appreciation of the best in art. Add to this—looking at the matter from the particular viewpoint of this article—the fact that the piano is usually out of tune and in poor playing condition. Phonograph records are cheap, commercial, popular airs. We almost always find a radio, but the family turns a new station when the program brings on a symphony, opera, chamber music, or an artist's recital.

It is interesting to contrast the American attitude towards art with that of Europe, where the evidence of familiarity with music and the visual art abounds in the homes, streets, and parks, and even in the factory sites and on farms. The best in music is a part of the citizen's general knowledge. Italians know their operas as they know the alphabet. Germans sit in the cafes and listen all the evening to a program that is nine-tenths classic and one-tenth popular.

The Negro college was established by missionaries and religious leaders, who found Negroes singing religious folk music. These teachers decided that the sacred vein was sufficient and neglected even the other interesting folk music, such as sorrow songs, work songs, lullabies, dances, and the blues. Moreover, many of them considered these songs all that was necessary in the Negro's musical equipment and took no pains to cultivate that appreciation of the music of the ages that is a means of culture, or to acquaint him with the wide field of the art beyond the restricted area of the spiritual.

The public school methods employed a little later in the elementary and high schools have brought about conditions that are disastrous in the main. The teachers themselves have been given a smattering of a wide range of subjects, and are saturated with an unchangeable idea of the importance of some inflexible method; hence, they are not prepared to impart a knowledge that is either deep or intensive, lacking it themselves.

The Negro student that now enters college offers a serious problem to the music department. He is filled with an overwhelming love of jazz. He thinks a saxophone is the greatest of instruments; and has no idea that the violin, the violoncello, the flute, and the oboe are more satisfying even in the purely sensual aspect.

Recently, on a visit to a Negro high school during music week, I found large photographs in the main entrance, not of Beethoven, Brahms, or Wagner, nor of Roland Hayes, Marian Anderson or Coleridge-Taylor, but of three jazz kings.

In passing, I might say that Negro newspapers have had a large part in glorifying the jazz king and his band. "Bill Jones and his Gang", "Jim Smith and his Chocolate Hotshots". Their coming is a big event in the life of the city. Society turns out en masse to hear them and we hear heated discussions over the bridge tables of the relative merits of these jazz groups. Girls of twelve and fourteen years of age begin taking music lessons so that they may play like the leader of the jazz band heard over the radio.

In reading the daily papers, we turn to the amusement column for such news, but how often do we see the announcement of the coming of a jazz band on the front page of the Negro paper. We know the fact that a jazz king has recently composed a new blue and melancholy air; but how much interest have we in the news that the creations of the young Negro composers, William Grant Still or William L. Dawson, are being played by the great symphony orchestras of the country, the New York Philharmonic or the Philadelphia Symphony? It is not common knowledge among the readers of Negro newspapers that the British Broadcasting Company, the largest in the world, is using this music.

Roland Hayes and Marian Anderson appear repeatedly in our most famous concert halls and are classified by the critics as among the world's very great artists; but when we bring them to our communities, where we should expect large audiences, promoters are too often turned away with the expression, "Oh, I have seen him or her."

We find that Negro students are not sensitive to a proper classification of the musicians in widely divergent fields. Other people seem better able to relegate popular music to its legitimate place as amusement "behind the palms". They enjoy it, dance to it, but leave it where it belongs.

Most of our churches have joined in this debauchery of art. The paper-back gospel hymn book, with its unsavory hymns and expressing sentiments no different from the commercial love-ballad and jazz tunes, is placed in the hands of our young people. To give one example; it has been recently found that thousands of children were most familiar with one religious song, namely, "He Walks With Me and He Talks With Me". One seldom hears such standard hymns as "A Mighty Fortress Is Our God" or "Come, Thou Almighty King". Many churches have laid aside the regular hymn-book entirely and substituted the gospel hymn-book.

The student that has lived under these influences through his childhood now comes to college at the age of seventeen and presents to us the problem of building up in him an appreciation of the art that is healthful and invigorating. It is now too late for him to gain mastery over the finer orchestral instruments. His voice has often been ruined by improper singing. His cooperation is lukewarm because of ignorance. And even when the student has had some training in piano and violin —it is seldom any other instrument except the saxophone—even with promising talent, his ground work is not thorough enough for him to have hope of becoming skillful during the college years.

The college cannot possibly reach its highest ideal in developing general music appreciation and rendering its best service to the aspiring young artist until it can have entering its walls young people that have had proper training in the elementary and high schools.

To obtain the results of a broad general culture and specialized training, it will be necessary to revolutionize the music curriculum of most of our colleges, instituting two distinct courses; one of music minor—some required course in appreciation for all students. The purpose of this course would be the dissemination of knowledge necessary for the completely rounded individual and as a means of general culture. The other course should be a major that would require intensive preparation in a restricted field according to the bent of the student. Those planning to become music teachers should be given a comprehensive survey of the field and then special training in their chosen line.

All students in a college should be exposed to the best and highest expressions of musical ideas, since music contributes so largely to every activity, whether at work or play, in which mankind engages from infancy to death. Since they cannot be depended upon to realize this fact for themselves, some means should be devised for bringing about this exposure until they reach the stage of proper appreciation for themselves. With broader and specialized training, the elementary and high school music teacher will be able to accomplish certain definite and highly desired results.

First of all there should be an increased dissemination of the means of culture to people in all walks of life. Popular taste will improve and popular demand will evoke a higher tone in popular offerings. The increased power of discrimination would bring to the masses keener enjoyment, even of light music, and a satisfying appreciation of the more serious types, thus increasing their happiness in general.

Those specially talented would be detected and given special attention while young, so that the technique that must be obtained in youth, or not at all, will be gained. Thus, there would be brought into our colleges, students whose groundwork would be sufficient for specialized training.

There are young artists in embryo that could reach the top with proper development and encouragement. They must have the advantage of the best instruction between the ages of six and sixteen.

One more point is necessary for the consideration of teachers of Negro youth. The Negro's peculiar talent and capabilities should be studied and instruction adapted to his particular needs. A shifting emphasis may be, and probably will be, necessary from that employed by texts now in use. The wise teacher will recognize this and govern himself accordingly.

Further study should be given to a wider scope of Negro folk music. The secular field offers interesting material. And we would suggest giving more encouragement to the Negro composer and artist by using more of the former's compositions and taking more vital interest in booking concerts for the latter in the yearly schedule.

We are in dire need of an awakening among our people to the importance of a greater interest in the means of culture, and to the need of a close study of our heritage in the world of music. The college should cultivate an insuperable desire to develop that heritage and the artistry of our people to the highest possible degree.

—Morehouse College.

News From Here And There

By far the largest number of American students are in the U. S., elementary schools, the U. S. Office of Education reported. There are 22,750,000 children in elementary schools. Out of every 100 students, 75 are in elementary school, 21 in high school, and 4 in college. About 70 per cent of the nation's elementary school children live in the country or in small towns.

Dr. Crawford W. Long, the first to use ether in an operation, was honored by the State of Georgia, March 30, when a heroic relief of him will be unveiled over the entrance of the State Department of Public Health at the New State Office Building. In charge of the exercises will be the Crawford W. Long chapter of the Daughters of the Confederacy.

Dr. George W. Carver, aged scientist of Tuskegee Institute, made available to a foundation established in his name, $33,000 in cash and government bonds. The purpose of the foundation is to perpetuate research in creative chemistry, to which Dr. Carver has devoted a lifetime.

Dr. Carver has been willing to give his whole life's savings to the perpetuating of this work because he believes that experimentation along the line of soil building and the utilization of waste as well as the finding of new uses for native products represent an important approach to the solution of the economic ills of the South and the nation. It will be the foundation's responsibility also to preserve the Carver museum. This museum constitutes an extensive expedition of the uses of native materials in the construction of useful articles. Infinitive in variety, this museum will also house about 100 paintings representing Dr. Carver's handiwork.

Dr. Carver has expressed the hope that this museum will serve as an inspiration to the youth of all races. Revealing to them the dormant possibilities in their native environments. The unselfish gesture is a crowning achievement to a long useful and distinguished service to mankind.

Ground has been broken at Tuskegee Institute for the erection of a hospital for cases of infantile paralysis for Negroes. A gift of $161,350 was made available by the National Infantile Paralysis Foundation of New York. The center will be operated in connection with the John A. Andrew Memorial Hospital at Tuskegee Institute.

First steamboat to cross Atlantic—sailed from Savannah, May 24, 1819. First long distance telephone established in 1880 between Trion and Rome. First machine for manufacturing ice was made in Columbus—1844. First motion picture to which admission was charged, Atlanta—1895.

For his distinguished career in surgery and his fight for high standards in medical training, Dr. Louis T. Wright of this city will be awarded the 25th Spingarn medal at the 31st annual conference of the NAACP in Philadelphia, June 18-23.

The presentation will be made Wednesday night, June 19, Dr. Russell L. Cecil, professor of Clinical medicine in the Cornell university medical school. Dr. Cecil's address will be upon the topic, "Public Health and Medical Service."

FURTHER OBSERVATIONS UPON SEXUAL DIFFERENTIATION IN VORTICELLA MICROSTOMA

HAROLD E. FINLEY

The author previously reported evidence of sexual differentiation in this pertrichous ciliate. The previously reported investigation was confined to vorticellae descended from a West Virginia stock; therefore, a study was made in order to determine: (1) whether non-conjugating stocks could be discovered in populations of Vorticella microstoma from diverse localities; (2) whether West Virginia stocks could be induced to conjugate with stocks from other localities.

Collections were made in different places in the area of Atlanta, Georgia. Two Georgia stocks (CL and LP) were subsequently established from wild populations and many strains were isolated from these stocks. The same evidences of sexual differentiation previously reported from West Virginia stocks were found in the Georgia stocks. Interstock conjugation was induced by cynchronizing epidemics of conjugation in the three stocks. That is to say, conjugation occurred when microconjugants from the West Virginia stock were placed in a small volume of culture medium which contained microcojugants from either the Georgia CL stock or the Georgia LP stock. The reciprocal experiments yielded similar results; inter-stock conjugation occurred when macro-conjugants were taken from the West Virginia stock and exposed to microconjugants from either of the Georgia stocks.

These observations do not preclude the possibility of discovering non-conjugating stocks in this species but they seem to strongly suggest the other point of view. The significance in the problem of sexual differentiation in Vorticella microstoma was discussed.

—Morehouse College.

CARVER CHEMICAL SOCIETY

An organization without a goal is hopelessly lost in the maze of passing events. Any organization's aims and objectives are but the steps by which it climbs. The heights reached by any organization and the degree to which an organization accomplishes its purpose depends upon the wisdom with which its aims and objectives are selected.

The Carver Chemical Society stands among those organizations with aims and objectives worthy of attainment:

1. The organization of a National Chapter of the Carver Chemical Society which will become a living monument to the life and work of Dr. George Washington Carver.
2. To stimulate and give recognition to research in creative chemistry through projects and experiments by undergraduates.
3. To publish quarterly the *Journal of the Carver Chemical Society,* though simple at first, it is hoped that it will become increasingly impregnated with scientific data.
4. To organize, in cooperation with the Carver Research Laboratories, a course in practical Chemistry at Tuskegee Institute and other Colleges.

May the aims and objectives of this organization be so well accomplished that Dr. George Washington Carver will always live in the minds of men.

HENRY P. HUTCHINSON.

PROGRAM OF MOREHOUSE COLLEGE SCIENCE AND MATHEMATICS CLUB

LEON CLARK

The Science and Mathematics Club of Morehouse College exists for the duofold purpose of serving as a medium of expression for those students whose major field is science or mathematics, and as a means of acquainting those whose major lies outside the realms of science with the scientific bases underlying familiar phenomena. Toward the accomplishment of these ends, the club sponsors forums, discussions, demonstrations, and projects of a scientific nature.

The business of the school year, 1939-1940, was ushered in by the addition of twenty-six new members to the club's roster. Shortly thereafter, Mr. Harold E. Finley of the Biology department of Morehouse College was presented in the club's initial forum of the season. Mr. Finley, a graduate of Morehouse. and of the University of Wisconsin, delivered an interesting and informing lecture on the subject: *Organic Evolution, A Survey of the Theory.* In his discussion, he gave a corrected picture of this important theory which has been so often misinterpreted. "The Theory of Organic Evolution," he stated, "is the most important concept in biology." Proceeding from this, he explained the ingenious procedure of reasoning by which this theorem was derived and the evidence which was introduced to substantiate its validity.

In its second forum, the club presented Dr. K. A. Huggins of the Department of Chemistry of Atlanta University. His subject was: *Uses of Low-Boiling-Point Hydrocarbons from the Petroleum Industry.* In the course of his discussion, Dr. Huggins cited many ways in which the residues from the refining of gasoline could be converted into usable products. In some cases, the higher-boiling point compounds can be "cracked" and used as gasoline, he said. In other cases the residue may be a solid from which paraffin, petroleum jelly, or napthalene may be derived.

Dr. H. V. Eagleson, of the Department of Physics, of Morehouse College was the third forum speaker, discussing the subject: *Some Fallacies in Popular Belief Corrected by Science.* In many cases, he used laws of physics to calculate, mathematically, the conditions necessary to enable the realization of certain phenomena which are believed possible by many people who are not acquainted with the facts. The wide divergence between the popular assumption and the scientific calculation emphasized the absurdity of the assumption.

For its fourth speaker of the current season, the club secured Mr. C. B. Dansby, of the Department of Mathematics of Morehouse. Mr. Dansby's subject was: *Methods of Integration,* and in a very concise way, he showed that only three fundamental forms are necessary in integral calculus. Although most textbooks give many more forms, they are simply derivtaions of these three.

The fifth event on the calendar was a showing of three talking pictures on scientific topics. *The Solar Family, Butterflies,* and *The Heart and Circulation.* This event proved to be of more general interest than any previous endeavor, and a sizeable gathering witnessed the presentation. That the audience was not disappointed was shown by the hearty applause which the pictures received.

In the future, in addition to forums, the club is anticipating its annual chapel program, on April 26, at which time certificates will be awarded to those students who have earned them. Then, in May, the club intends to present its greatest annual exhibition. The affair is intended as an educational display with a view toward enlightening the general public along the lines of science in industry and in everyday life.

—Morehouse College.

EXCHANGES:

COLLEGE HEALTH REVIEW

VOL. IV. Issued Monthly by the Division of Hygiene and Public Health, School of Medicine, Howard University, Washington, D. C., under a joint grant from the National Tuberculosis and American Social Hygiene Associations.

NEGRO WORLD DIGEST

A union of Negro Life, Thought and Achievement
1 West 125th Street (at Fifth Ave.) New York City

GEORGIA'S HEALTH

Published monthly for Free distribution by Georgia Department of Public Health, Hapeville, Ga.

PHYLON, VOL. I, No. 1

Atlanta University Review of Race and Culture, Atlanta, Ga., Published Quarterly.

THE JOURNAL OF THE CARVER CHEMICAL SOCIETY

VOL. I. Published quarterly by the Carver Chemical Society, Tuskegee Institute, Alabama.

PROCEEDINGS OF THE SPRING MEETING
OF THE
ALABAMA ASSOCIATION OF SCIENCE TEACHERS
IN CONJUNCTION WITH
ALABAMA STATE TEACHERS ASSOCIATION
MARCH 14, 15, and 16, 1940

NEWLY ELECTED OFFICERS

President .... Mr. T. H. McCormick
Tuskegee Institute, Tuskegee, Ala.

Recording Secretary .... Mr. George A. Reed
Tuskegee Institute, Tuskegee, Ala.

Financial Secretary .... Mr. J. M. Robinson
State Teachers College, Montgomery, Ala.

Treasurer .... Mr. J. A. Sanford
Westfield High School, Birmingham, Ala.

Editor .... Mr. H. L. Van Dyke
State Teachers College, Montgomery, Ala.

The six vice-presidents, three directors at large, and the program chairman along with the membership chairman will be appointed by the President.

Other business transacted in addition to the above included the confirmation of the board's action of February this year in which the Alabama Association of Science Teachers agreed to be co-sponsors of the Morehouse Journal of Science.

The association authorized the awarding of three prizes in the form of books to the best science exhibits displayed by Junior Chapters (science clubs of the various schools under the supervision of members of the Association working the various schools). First prize was won by Ullman High School of Birmingham, Ala. Second prize was won by Interurban Heights High School of Fairfield, Ala. Third prize was won by Westfield High School of Birmingham, Ala. The Science Teacher at Ullman was Mr. C. Haygood, Miss M. L. Biggs is at Interurban Heights, while Mr. J. A. Sanford is at Westfield.

The meetings were divided into a panel discussion on Thursday afternoon March 14 with the theme, "The Functional Aspects of Science in a Democracy". Discussion leaders were Miss Dorothy Stephens of Montgomery, Mr. Spurgeon Q. Bryant of Lanett, Ala., Mr.

T. A. Love, and Mr. B. F. Smith both of Montgomery. Mathematics as well as science was included in the program. On Friday, March 15, a public meeting was held presenting Dr. I. A. Derbigny of Tuskegee Institute as the main speaker. Business sessions were held on Friday morning, March 15th, at 9:30 and on Saturday morning, March 16th at 8:30. A committee was appointed to formulate the recommendations resulting from the panel discussion and will make its report in the near future.

The next meeting of the Association has been set tentatively for November 18th, 1940 at Stillman Institute, Tuscaloosa, Alabama. This meeting is known as the Fall Meeting of the Association.

VA. TEACHERS OF SCIENCE ELECT DREW PRESIDENT

Hampton Institute, Va.—William Drew of Virginia Union was elected president for the 1940 session of the Virginia Conference of College Science teachers which closed its ninth annual two-day meeting here recently.

The organization, attended by thirty-two teachers of the natural sciences and mathematics, representing St. Paul Normal and Industrial School, Virginia Union, Virginia State, Hampton, Bennett, and Shaw, will meet at Virginia Union next year.

OTHER OFFICERS

Other officers chosen are:

Mr. Taylor, St. Paul, vice-president; Armanda E. Peele, Hampton, secretary-treasurer; Dr. Thomas W. Turner, J. M. Hunter, Mr. Taylor, Lucy J. Bullock, members of the executive committee.

The new executive committee was instructed to formulate plans to admit Shaw University and Bennett College to membership. These schools, through their representatives at the recent meeting, expressed a desire to affiliate.

The principal address was delivered by Dr. J. R. Houchins, specialist in colored statistics of the United States Bureau of Census, on "Science, Increased Production and Some Current Problems." He made a plea for colored schools to prepare colored scientists of high caliber to enter industry.

BROADCAST DELIVERED

The conference opened with a dinner in the cafeteria. Among the guests were President Howe and Director Aery of Hampton, as well as the wives of the local conference members.

During the dinner, Nobel Payton of Hampton, broadcast over Station WGH. On the final day, time was given to eight papers devoted to technical subjects and teaching methods.

CONSTITUTION AND BY-LAWS OF THE ALABAMA ASSOCIATION OF SCIENCE TEACHERS

CONSTITUTION

ARTICLE...I.

Name

The name of this organization shall be *Alabama Association of Science Teachers.*

ARTICLE II.

Aims or Purposes

Section 1. To promote with in the organization the highest type of professional ethics.

Section 2. To arouse allegiance to a genuine spirit of professional ethics.

Section 3. To encourage higher qualifications for entrance into the teaching profession.

Section 4. To improve conditions that will enable teachers to function as vital factors in educational progress, particularly along scientific lines.

Section 5. To promote cooperation among members of the organization.

Section 6. To interpret to the public the progress made along scientific lines.

Section 7. To encourage science teachers to exercise the right and privilege to accept leadership in scientific affairs.

ARTICLE III.

Membership

Section 1. Teachers of the science and Mathematics classes, upon payment of dues, as provided by the organization.

ARTICLE IV.

Officers and Board

I. President
   Regional Vice-Presidents
   Financial Secretary
   Recording Secretary
   Treasurer
   Editor

II. Board of Directors.
   1. Three members elected at large
   2. The officers
   3. Chairman of standing committees

III. Executive committee with executive powers only
   1. Officers of organization, and chairman of standing committee.

ARTICLE V.

Affiliation

The organization shall (1) affiliate with the State Association (2) it may be independent of.

ARTICLE VI.

Rules for Amending

An amendment to this constitution may be introduced in any meeting of the directors and acted upon at subsequent meetings.

A copy of the proposed amendment should be sent to each member of the organization.

Three-fourths majority of those voting is required to adopt an amendment.

BY-LAWS

ARTICLE I.

Rules of Order

ARTICLE II.

Duties and Terms of Officers

Section 1. All officers shall take office on *April 1st* and shall serve for *one year*. In case of vacancy, the office is filled by "Board of Directors".

Section 2. The President shall preside at all meetings, he shall with the secretary, sign all vouchers, authorized by the directors.

Section 3. The Vice-President assumes duties of President in case of absence or resignation.

Section 4. The regional Vice-Presidents shall be responsible for the program in their region.

Section 5. The financial secretary shall keep an accounting of all monies received and spent and sign vouchers for monies spent.

Section 6. The secretary shall keep a record of all meetings of the organization, keep on file a list of the names and addresses of members of the board of directors. With the President, he shall sign all vouchers. In case that any member of board forfeits membership, the secretary notifies the President, and asks a substitute to be appointed.

Section 7. The financial secretary shall collect all dues and deposit the same with the treasurer.

Section 8. The treasurer shall have charge of all funds of the organization, shall deposit funds in bank in the name of the organization, shall disburse them as he is authorized, and shall present the records to an auditing committee appointed by a board of directors and make his countersigned report.

ARTICLE II.

Board of Directors

Section 1. Directors are responsible for the conduct of the organization in all matters not stated in the constitution and by-laws.

Section 2. Meeting of directors called by Presidents, or by a majority of the board.

Section 3. The director may by a 2/3 vote authorize the spending of money received from dues or contribution.

ARTICLE IV.

Executive Committee

Section 1. This committee expedites the business of the directors along legislative and executive lines.

Section 2. This committee shall also present a budget, giving an estimate of income and expenditures.

ARTICLE V.

Standing Committee (*Concentrate on place of meeting*)
Membership—Program—Social—etc.

ARTICLE VI.

Nomination and Election

Section 1. A committee on election shall conduct the election of officers by ballot. Nominations may be brought in by a nominating committee.

Section 2. Candidate receiving highest number votes shall serve in specific capacity.

ARTICLE VII.

Meeting (*Fall-Spring*)

We shall always meet with The State Teachers Association in the Spring and have one Fall meeting separate.

Section 1. Meetings of the organization shall be held
Time: *to be decided each year.* Place: *to be decided each year.*

Section 2. Order of Business

1. Opening remarks by the President
2. Report of the secretary, adoption of minutes
3. Treasurer's report
4. Report of various committees
5. Unfinished business
6. New business.

ARTICLE VII.

Dues

The annual dues shall be $1.00.

ARTICLE IX.

Publication: The organization shall sponsor a publication.

GEORGIA ASSOCIATION OF TEACHERS OF SCIENCE IN NEGRO SCHOOLS

CONSTITUTION

ARTICLE I.

Name. This organization shall be known as the Georgia Association of Teachers of Science in Negro Schools.

ARTICLE II.

Purposes: The purposes of this organization are:

1. To secure and distribute information pertaining to the improvement of science teaching.
2. To present to administrators: (a) the place of science in modern education; (b) the needs of science teaching; and (c) ways of meeting those needs.
3. To encourage in all possible ways studies relating to science teaching in Georgia schools. This shall include such topics as vocational, professional, artistic and economic relations of science and people, or any other topic pertinent to science teaching.
4. To encourage dissemination of public knowledge of Negroes in the field of science as historical data for vocational guidance and inspiration.
5. To secure adequate means of information about science, by publication and otherwise, to those interested. This shall include library and reference research service.
6. To improve the professional training and outlook and the personal welfare of those who teach science.
7. To foster science clubs among students in secondary schools.

ARTICLE III.

Section 1. Membership in this organization shall be open to:
- a. Those persons engaged in teaching science.
- b. Prospective science teachers.
- c. Other citizens interested in science and education.

Section 2. Those who join the organization during its first year shall be known as charter members.

Section 3. Following the first year those who desire to join shall be voted upon, following recommendations made by the executive committee. Favorable vote of two-thirds of the members present and voting shall constitute election of new members.

ARTICLE IV.

Method of Work. The association, when practicable, shall function through Divisions, such as General Science, Biology, Chemistry, Physics, Mathematics, and others as may be established from time to time. The chairmen of these divisions shall be members of the executive committee.

ARTICLE V.

Meetings. There shall be an annual convention of this association, at such time and place as the executive committee may determine.

ARTICLE VI.

Amendments. This constitution may be amended at any annual convention by a two-thirds vote of the members present and voting; provided that the proposed amendment shall have been submitted in writing to the secretary-treasurer of the association at least three weeks before the convention meets; and further provided that a copy of the proposed amendment shall have been duly sent to all members of the association prior to the annual meeting.

BY-LAWS

ARTICLE I.

Officers. The officers of this association shall consist of a President Vice-President and Secretary-Treasurer. These shall be elected at the second session of each annual meeting. A nominating committee shall be appointed by the President at least one month before the date of the annual convention (at the organization meeting, election of officers shall be made as agreed upon by those present). The President (after the first year) shall be elected one year prior to the beginning of his year of service as president.

ARTICLE II.

Duties of Officers. The duties of the various officers and committees shall be those usually devolving upon such officers and committees. The funds of the association shall be kept by the secretary-treasurer, who shall pay all bills on order of the executive committee, and who shall render a full account for information and audit at each annual meeting.

ARTICLE III.

Government. The government and general direction of the affairs of the association shall be committed to the executive committee. The executive committee shall consist of the present officers, the past president, the president-elect and the chairmen of the Divisions.

ARTICLE IV.

Annual Dues. The annual dues of each member shall be .... per year, payable to the secretary-treasurer at the beginning of each calendar year.

ARTICLE V.

Amendments. These by-laws may be amended by a majority vote of the members present and voting at any annual convention of this association; provided that the proposed amendments shall have been submitted in writing to the secretary-treasurer of the association at least three weeks before the convention meets; and further provided that a copy of the proposed amendment shall have been duly sent to all members of the association prior to the time of meeting.

GEORGIA ASSOCIATION OF TEACHERS OF SCIENCE IN NEGRO SCHOOLS

OFFICERS: 1940-1941

President.......................B. T. Harvey, Morehouse College, Atlanta, Ga.
Vice-President..............C. V. Clay, Georgia State College, Savannah, Ga.
Sec.-Treas.......................B. T. Barrow, Ballard Normal School, Macon, Ga.

DIVISION CHAIRMAN:

Chemistry: K. A. Huggins, Atlanta University, Atlanta, Ga.

General Science: W. W. Blanchett, Ft. Valley, State School, Ft. Valley, Ga.

Biology: E. L. Maxwell, Ga. State College, Savannah, Ga.

Mathematics: C. B. Dansby, Morehouse College, Atlanta, Ga.
Agriculture: P. H. Stone, Ga. State College, Savannah, Ga.
Home Economics: Mrs. Ester Tate Holley, G. N. & A. College, Albany, Ga.

ALABAMA ASSOCIATION OF SCIENCE TEACHERS

OFFICERS: 1940-1941

PRESIDENT—Thomas H. McCormick, Tuskegee Institute, Ala.
VICE PRESIDENTS:

- T. B. Hannibal, Dothan, Ala.
- I. N. Wright, Stillman Institute, Tuscaloosa, Ala.
- A. C. Henry, Beatrice, Ala.
- Elisha James, State Teachers College, Montgomery, Ala.
- Marshall Robinson, Baldwin County Training School, Daffney, Ala.
- Lister Franklin, Chambers County Training School, Lafayette, Ala.

EDITOR—H. L. Van Dyke, State Teachers College, Montgomery, Ala.
TREASURER—J. A. Sanford, Birmingham, Ala.
FINANCIAL SECRETARY—J. M. Robinson, State Teachers College, Montgomery, Ala.
RECORDING SECRETARY—George A. Reed, Tuskegee Institute, Alabama.
PROGRAM SECRETARY—Robert Lawson, Eufaula, Ala.
MEMBERSHIP CHAIRMAN—Dr. Russell Brown, Tuskegee Institute, Ala.

DIRECTORS:

- V. M. Chambers, Normal, Ala.
- E. C. Caldwell, Auburn, Ala.
- O. H. Johnson, Mobile, Ala.

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