THE MOREHOUSE

JOURNAL OF SCIENCE

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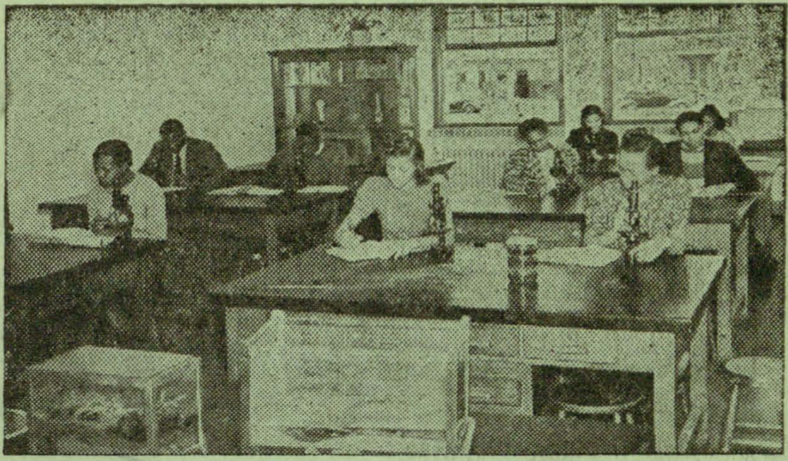

Corner of a Biology Laboratory
The Alabama State Teachers College

Vol. 7, No. 2 April, 1945

THE MOREHOUSE
JOURNAL OF SCIENCE

Vol. VII — April, 1945 — No. 2

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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OUR VIEWPOINT

With Our Readers

The Journal of Science—Vol. 7—No. 1—is a real achievement. I predict that the February issue and those to follow will have an upgrading effect on the teaching of science on all levels in Georgia. Our teachers of science have long sought such stimulating material. The State Department of Education in Georgia will consider it a privilege to cooperate in this splendid undertaking.

I hope so much that the College teachers of science in the five centers of Higher Education for Negroes in Georgia; namely, Atlanta, Augusta, Savannah, Fort Valley and Albany, will take the initiative in their respective areas in organizing and stimulating science Teachers.

ROBERT L. COUSINS,

Director Division of Negro Education,

Atlanta, Georgia.

I am glad that you are continuing the Morehouse Journal of Science. It is a good number, and I trust is merely a prophesy of the quality of articles you will regularly publish in the Journal. I note that you have secured the cooperation of other groups and such cooperation ought to help you greatly in keeping the Journal active and useful. I am enclosing my check for $5.00 made out to the Journal of Science. Maybe that will help a little over some of the difficulties.

OTIS W. CALDWELL,

General Secretary, A. A. for A. of S.

Boyce Thompson Institute for Plant Research, Yonkers 3, New York.

Congratulations on your being able to revive the Journal. I am very much interested in "The Morehouse Journal of Science" and am hoping that you can establish it on a firm foundation.

WILLIAM J. L. WALLACE,

West Virginia State College

Institute, West Virginia.

I was delighted to know that the Morehouse Journal of Science was being published again. I thought the edition of the Journal was very good and I am highly appreciative to you for sending me a copy. Please place my name on your mailing list and I shall foryard you a check for a year's subscription.

CLARENCE W. WRIGHT

Livingston College

Salisbury, North Carolina.

I have examined your "Journal" and I think it is a fine publication. It should receive more publicity.

L. L. WOODS

Saint Augustine's College

Raleigh, N. C.

We appreciate these expressions along with many others. We are hoping for wholehearted and continuous cooperation by all science Teachers in Negro Colleges and High Schools. We want you to consider this your Journal. Tell us what you want in the Journal. Send us your articles for publications. Write your suggestions and criticisms.

WHAT'S IN A NAME

It has been suggested the Journal would receive more support from more schools if it had a different name. Give us the support and name it what you will. A rose by any other name smells as sweet. The printing, postage, proof-reading, etc., must be paid. Is the Journal worth while? Is it needed? Will it help the science teachers and pupils in the hundreds of Negro High Schools where it is the only source of scientific inspiration and stimulation? Do you know that we sent out over 2,000 copies of the February issue, without at that time a single paid subscription? It is our intention to send to the Library and Science Teachers of every Negro Senior and Junior High School copies of each issue of the Journal. Copies will be sent to every College Library in this Country. Public Libraries of Urban Cities and exchange copies to other science publications. Individual subscriptions are solicited from Teachers of Science. We hope that any teacher who receives a copy of the Journal will see that it is placed in the School Library when through reading, if by any chance the School Library does not receive a copy. Again, I say, give the Journal the support and name it what you will!!!

SECOND ANNUAL MEETING OF THE N. A. OF S. T. IN NORTH CAROLINA

Executive Secretary Dr. H. B. Crouch, Tennessee State College, Nashville, Tenn., announces the Second Annual Meeting of the National Association of Science Teachers in Negro Colleges, May 4 and 5, 1945, at Livingstone College, Salisbury, North Carolina.

Friday: Morning—Science Research.

Afternoon—Science Education.

Night—Presidential Address and Guest Speaker.

Saturday: Group Planning and Business.

Unfortunately the editor did not attend the first meeting held last year at the Fort Valley State College, Fort Valley, Georgia. We understand, however, this meeting was concerned largely with organization, constitution and appointment of Committees on function and policies of the association who will report at this meeting. We hope there will be a representative gathering from the various sections of the country to justify the name "National," and that plans will be formulated for stimulating research and improving the deficiencies in the teaching of science. We hope to carry a full report in the October issue.

SOME DESIRABLE OBJECTIVES IN THE TEACHING OF THE NATURAL SCIENCES

By CLARENCE W. WRIGHT

Livingstone College, Salisbury, North Carolina

Probably no other topic has received more attention from educators, both ancient and modern, than that of aims or objectives in education. They have freguently a direct relationship to the national ideals of a people. They also reflect in a measure the acknowledged weaknesses of a people. Educational leaders have attempted to formulate aims or objectives to correct these weaknesses.

As far back as the Greek civilization one can trace definite aims or objectives in education. The Athenians wanted an education that would teach people to live "beautifully and happily." Plato set for the Greeks as their great educational aim the development of the knowledge of "the good life." Plato's educational philosophy was never attained, but this aim has influenced education down to the present. It will be recalled that Aristotle believed that the aim of education should be to make a person "happy." Among the Romans the aim of education was largely vocational. There was for instance an attempt to produce "the perfect orator." The philosophy and aims of education during the middle ages was a preparation for one life in a future world. In other words, education was dominated by the clergy and tended to emphasize things heavenly instead of things pertaining to the world. With the development of humanistic education following the Renaissance, the aims in education changed with the changing character of society but found their sanction largely in the writings of the Greek and Roman philosophers or church fathers. Later, as realistic education developed, a gradual change in attitude on the part of educators resulted. Educational aims were stated in terms of life's activities and situations rather than in terms of abstract virtues. It was around this time that Thomas Acquinas, Roger Bacon and others advocated that the aim of education was to study nature and they formulated a method whereby this might be done. The educational philosophy of using nature as a model had a tremendous influence upon the universities and colleges established during this period. The teachers and students of these institutions produced significant inventions and discoveries which had a great influence upon that period and even affect us in our present-day living. Jean Jacques Rousseau was also influenced by this natural philosophy because he developed the modern viewpoint that the aim or objective of education of the child was to train him according to nature.

One can see from the above discussion that from the earliest periods in the history of education there have been educational aims or objectives. It is important that any organization or institution have definite objectives. The aims or objectives of an organization give it a course of direction and an end toward which to work. They also serve as guides and criteria for measuring subject-matter content and philosophy acquired by individuals. Just as an organization as a whole needs aims and objectives so does each division within that organization need underlying aims and objectives. Therefore, it is the purpose of the writer to present some objectives of the natural sciences which may serve as guides and bases of direction. The following are desirable objectives in the teaching of the natural sciences:

First Objective: The scientific education aims to teach one to know and use the scientific method. This method is a simple one. It is the process of observation, experimentation and gathering of

facts and data of nature. For example, Sir Isaac Newton, the English mathematician and physicist, when hit on the head by a falling apple while asleep beneath the apple tree, wondered why the apply had fallen. This led him to a study of the behavior and external forces of falling bodies, and finally after observing falling bodies which existed in nature, he was able to formulate a law of universal gravitation in that he proved that the earth exerted a full on every object or particle in the universe that was proportional to the mass of the object or particle. Today, as a result of Newton's observation of these natural physical forces, we have Newtonian physics and calculus, which are studied in our colleges and universities. For example, Newton's contributions aided Albert Einstein in the formulation of the theory of relativity.

It was Joseph Priestley, a theologian and chemist, who discovered oxygen by taking mercuric oxide and heating it. He found that upon heating this substance a gas was liberated which we know as oxygen today. Lavoisier thought that animals took in oxygen and that it burned or oxidized the foods which they ate. This was merely a speculation at first, but Lavoisier later took lime water chemically known as calcium hydroxide, and allowed animals, including man, to pass exhaled air through this clear solution. When the exhaled air was passed through the lime water, the latter turned white and a heavy thick residue settled at the bottom of the receptable. This thick whitish residue, upon chemical analysis, was proved to be calcium carbonate which contained the element or substance: carbon, found in all of our food material. This experiment proved conclusively that lower animals as well as higher animals inhaled air that oxidized the foods and carbon dioxide was exhaled, which proved that oxygen did oxidize the carbon which is found in three principal foods: carbohydrates, proteins and fats. This simple experiment also linked chemistry with biology for the first time. These two discoveries illustrate clearly the scientific method and how it may be used. In recent years scientists have noted the failure of man to use the scientific method in other fields. However, it may be used very effectively in other fields, such as the social sciences, education, the humanities and religion.

Second Objective: A study of the natural sciences allows man to acquire a fundamental knowledge of the potentialities of the physical world. He obtains a familiarity with the vital forces of his environment and develops the ability to harness them and use them at will. The Greeks speculated concerning heavenly bodies and the constitution of the world. For example, Leucippus and Democritus, his student, contended that all matter was made up of small particles called atoms and that the physical world was also made up of atoms. This Grecian concept of atoms was merely a speculation, but science has proved "experimentally" that matter is made up of atoms. Further, scientists have also proved that these atoms are made up of electrons, protons and neutrons and that these electrons permeate the air and serve as media to transmit spoken words and music throughout the civilized world.

It will also be remembered that Michaelson actually measured the speed of light and eclipse. The time of the occurrence of earthquakes and storms may be determined with considerable accuracy. Robert Andrews Millikan has proved experimentally that out in the interstellar spaces are rays known as cosmic rays. One might go on and on, but it appears that these are concrete examples of how the study of the natural sciences allows man to acquire a fundamental knowledge of the potentialities of the physical world.

Third Objective: A study of the natural sciences aids greatly in the development of mental discipline evidenced through the individual's life behavior pattern. The student that studies chemistry, physics, mathematics and biology performs certain experiments which require him to follow very exacting rules. The slightest deviation from these rules will alter the desired results. For example, in chemistry, if one wishes to produce sodium chloride or cooking salt, one must react together a definite proportion of sodium hydroxide and hydrochloric acid. The proportions or amounts of these substances, if altered, will not produce sodium chloride; furthermore, certain laws, principles and techniques must be employed, and if they are not followed precisely, in some instances, the chemist may endanger his own life and that of others. The average student and chemist knows this, and thus learns to follow directions to the letter. By so doing, he forms habits of mental behavior which condition and discipline his mind.

Fourth Objective: Science education develops the genius of the natural sciences to block off limited areas of the world of science with which man maintains functional relations and to address himself critically to a study of those areas for the purpose of discovering scientific data and principles concerning them for the advancement of knowledge. One cannot study adequately, nor effectively the total heterogeneous mass of universal knowledge, but one can isolate certain segments or areas of knowledge and study them very effectively. This fact is illustrated by our specialized professions. For example, there are individuals who study nothing but the blood; there are those who study light rays and those who study the stars and the moon, observing how they move through space and time. These examples will serve to show how the scientist blocks off limited areas of knowledge and studies them critically for the purpose of advancing knowledge.

Fifth Objective: Another purpose of the study of the sciences is to educate the student to be informed and conversant with the culture which the world of science provides.

Many students fail to recognize the underlying principles of the sciences. When they enter the world and launch out in their professions, they do not realize the bases of the scientific principles over which they have gone. For example, it is possible for a student to pass through science courses and not know the scientific method; it is possible also, for a student to study mathematics, physics, chemistry and biology without knowing their interrelationship and utilitarian value. One of the basic principles of biology medicine and dentistry is the cell doctrine. The fundamental principle of physics and chemistry is a thoroughly knowledge of the Law of Conservation of Matter and Energy, and the three states of matter, namely, liquids, solids and gases.

Sixth Objective: A study of the natural sciences serves to introduce one to the great ideas and abiding values of science. These values outweigh the commonly known and accepted utilitarian values. Prior to the time of Louis Pasteur, it was believed that certain micro-organisms gave rise to certain diseases. However, Pasteur conceived the idea and proved experimentally, that bacteria was the causative agent producing these diseases. In similar manner, chemists had the idea that certain chemical compounds containing sulphur might destroy the disease-producing powers of bacteria; consequently, today, growing out of this great idea concerning the curative effect of sulphur, sulphur-thiazole, sulphuranilimide and pencillium—three of the most powerful drugs used in biology and medicine to eradicate infectious diseases—have been produced. Aside from the great ideas advanced, the lives of many persons dedicated to science present to the world abiding values. For example, Mandombi, an African scientist, submitted his body willingly in the interest of aiding science to perfect a cure for sleeping sickness caused by protoza (trypanosoma Rhodesia and trypanosoma-Gambiasis). Other illustrations of lives sacrificed to the cause of humanity due to a deepened interpretation of the lasting values of science were: Paul Ehrlich, Madame Curie, Hydeyeo Noguchi and many others. And we could not close this discussion of abiding values without due mention of the highest example of this category, a man of the race who sacrificed his entire life and spurned offers of fame and fortune, a man who sought no publicity, but, rather, devoted all of his time and energy in his laboratory, creating for the sheer joy of creating for humanity: George Washington Carver.

In conclusion, then, for the sake of clarity, let us summarize some desirable objectives in the teaching of the natural sciences:

1. The scientific education aims to teach one to know and use the scientific method.

2. A study of the natural sciences allows man to acquire a fundamental knowledge of the potentialities of the physical world.

3. A study of the natural sciences aids greatly in the development of mental discipline evidenced through the individual's life behavior pattern.

4. Science education develops the genius of blocking off limited areas of the world of science with which man maintains functional relations in order that he may address himself critically to a study of those areas for the purpose of discovering scientific data and principles concerning them for the advancement of knowledge.

5. Another purpose of the study of the sciences is to educate the student to be informed and conversant with the culture which the world of science provides.

6. A study of the natural sciences serves to introduce one to the great ideas and abiding values of science.

LIST OF READING MATERIALS IN SCIENCE

(Intermediate and High School Classes)

TOOLS FOR TEACHERS

Bibliography of Books for Young Children. Washington: Association for Childhood Education (1201 Sixteenth Street, N. W.), 1942.

The Booklist (semi-monthly), American Library Association, 520 N. Michigan Avenue, Chicago, Ill.

Children's Catalog. New York: H. W. Wilson Co. (950 University Ave), Supplements annually.

Elementary English Review (monthly), 211 W. 68th Street, Chicago, Ill.

The English Journal (monthly), 211 W. 68th St., Chicago. (High School.)

Graded List of Books for Children. Chicago: Amer. Library Association, 1943.

The Horn Book Review (bi-monthly), 264 Boylston St., Boston, Mass.

Reading for Fun. Chicago: National Council of Teachers of English (211 W. 68th.)

Rue, Eloise. *Subject Index to Books for Intermediate Grades.* Chicago: Amer. Library Assn.

READINGS

Air-Age Education Series. Macmillan Co., 1943.

Beauchamp, W. L., and Mayfield, N. C. *Basic Electricity.* Scott, 1943. $1.80.

Botley, C. M. *Air and Its Mysteries.* Appleton, 1940. $3.00.

Bullock, B. F. *Practical Farming for the South.* 1944. $2.50. (U. of N. C. Press.)

Buswell, G. T., Brownell, W. A., and John, L. *Review Arithmetic.* Ginn, 1943. 60c.

Bryran, E. W. *Progress of Invention.*

Clark, J. A., and Others. *Fundamentals of Machines.* Scribner, 1943. 93c.

Cooke and Davidson's *Model Plane Annual*: 1943. New York: Robert M. McBride Co., 1944. $2.75.

Darrow, F. L. *Masters of Science and Invention.*

De Kruif, P. *Microbe Hunters.*

Men Against Death.

Dyke, A. L. *Dyke's Automobile and Gasoline Engine Encyclopedia.* Goodheart-Willcox, 1941. (19th edition.)

Eifert, V. S. *Birds in Your Backyard.* Popular Science Series, Vol. 11. Springfield, Ill.: Ill. State Museum. 1941. 60c.

Floherty, J. J. *Aviation from Shop to Sky.* Lippincott, 1941. $2.00.
Foote, Kay S. *Walkabout Down Under.* New York: C. Scribner's Sons, 1944.

Freeman, Mae and Ira. *Fun with Chemistry.* New York: Random House, 1944. $1.25.

Freeman,M., and Freeman. I. *Fun with Science.* Random, 1943. $1.00.

Gamow, G. *Mr. Tompkins in Wonderland.* Macmillan, 1940. $2.00.

Gatti, Attilio. *Mediterranean Spotlights.* New York: C. Scribner's, 1944.

Gilmore's *Model Planes for Beginners.*

Gilson, C. R. *Heroes of the Scientific World.*

Great Biographies Series. Julian Messner, Inc., 8 W. 40th St., N. Y. 18. $2.50 each.

(1) *Raymond Ditmars* (career with reptiles, animals and insects).

(2) *Luther Burbank, Plant Magician.*

(3) *Walter Reed: Doctor in Uniform.*

(4) *Marconi: Pioneer in Radio.*

(5) *Rubber's Goodyear.*

Harkins, Philip. *Bomber Pilot.* Harcourt, Bro. A. story that gives the details of training and combat flight. $2.00.

Hammond, Mrs. D. B. *Stories of Scientific Discovery.*

Holt, R. *George Washington Carver.* Doubleday, 1943.

Kane, H. B. *Tale of the Promethea Moth.* Knopf, 1942. $1.25.

Lent, H. B. *Air Patrol.* Macmillan, 1942. $1.00.

McMahon, J. R. *The Wright Brothers, Fathers of Flight.*

Meadow, Stephens W. *The Long Trains Roll.* New York: Harcourt, Brace and Co., 1944. Vocational story of railroads.

Montgomery, Elizabeth. *The Story Behind Great Inventions.* N. Y. Robert M. McBride (116 E. 16th St.), 1944.

Morgan, A. P. *First Radio Book for Boys.* Appleton, 1941. $2.00.

Namer, E. Galileo, *Searcher of the Heavens.*

The New Wonder Book of Knowledge. Philadelphia: J. C. Winston Co., 1944. $2.50.
Osborn, H. F. *Impressions of Great Naturalists.*

Parker, B. M. *Toads and Frogs.* Row, Peterson, 1942. 32c.

Perry, Josephine. *The Chemical Industry.* New York: Longmans, Green and Co., 1944. $1.75.

The Coal Industry. New York: Longmans, Green and Co., 1944. $1.75.

Sedgwick, W. T., and Tyler, H. W. *Short History of Science.*

Singer, C. *A Short History of Medicine.*

Sutherland, D. *Do You Want to Become a Nurse?* Doubleday, 1942.

Talbot, F. A. *All About Inventions.*

Tyler, K. S. *Modern Radio.* N. Y.: Harcourt, Brace and Co., 1944. $2.50.

Vallery—Radot, R. *Life of Pasteur.*

Waugh, D. *Warm Earth.* Oxford, 1943. $1.00.

Yates, R. F. *Young Men and Machines.* New York: Dodd, Mead and Co., 1944: $2.00.

For additional information, see Heaps' *Book Selection.*

FACTS ABOUT GEORGIA WHICH HAVE IMPLICATIONS FOR SCIENCE PROGRAMS

By S. M. NABRIT

Atlanta University, Atlanta, Ga.

Introduction

This paper concerns itself with objectives and materials for secondary school science curricula rather than with courses or equipment. The opinion is held that biology, chemistry, general science or physics may emphasize the satisfaction of needs of boys and girls while in school and thereafter, provided the teacher has discovered the needs and has the competence to meet them.

Ninety-three and four-tenths per cent of Georgia's children of age ten were in school in 1940. Seventy-three per cent of the white and 64.1 per cent of the Negro children of age fifteen were in school. Twenty-nine and six-tenths per cent of the white and 16 per cent of the Negro youths of eighteen years were in school. Eight and six-tenths per cent of the white and 5.2 per cent of Negro youths of twenty years of age were in school in 1940. Less than half the youths completed high school and less than 10 per cent prepared for and entered college. Only 20 per cent of those entering college were science majors.

In a study by Edgerton, Britt and Davis, in the October, 1944, issue of *Science Education,* it was revealed that every southern state was below the expectancy in the annual search for science talent among high school students.

The rating associations have been more lax in their standards for accreditment in regard to science and salaries than in any other area. Science objectives, teacher preparation, equipment and achievement in science have been lowest in this section of the country.

Larger high schools could arrange special courses designed for college preparatory or prespecialist courses, when and if we can determine what should be included in such courses. Today, college teachers do not assume that freshmen have had any previous science training. Any branch of college science may be entered for the first time in college. Therefore, high school science courses that simply prepare for college first courses are not only failing to meet the needs of 85% of Georgia's students but are great wastes of time.

The smaller high schools should plan their curriculum primarily for general education values to be derived from sciences. By allowing differentiation of work done in the library and the laboratory, provisions could be made to include the materials, yet to be discovered, that the prespecialist should have.

The subject coverage approach which was presumed to have been college preparatory was largely training in verbalism that was easily mistaken for mastery of "fundamentals." Actually, if the needs of students are adequately met in science areas, the student may be best prepared for college.

What should schools accomplish through science teaching for all students in Georgia?

1. Good health and physical fitness.

How fares Georgia in regard to this need?

Malaria is 30% higher among Negroes than whites; 2,503 cases and 89 deaths were reported in 1940 for the entire state. There were 680 syphilis cases per 100,000 population. The Negro rate is five times that of whites. There were 89.8 tuberculosis cases per 100,000. The Negro tubercular rate is twice that of whites. Hookworm is also quite common in the state. Dietary deficiencies, such as pellagra, are also common. All these diseases are preventable. Knowledge of the functions of the body and mode of transmission and causes for diseases such as these should be one of the goals of a science program.

2. Work experience for everyone.

Work in or out of school, in school shops or in industry, should be a part of the training of everyone. Knowledge of special processes, whether they are chemical, physical or biological, associated with the vocational opportunities of the community, should be understood in theory and practice. Skills involving use and repair of appliances used in a home should be acquired.

3. Each student should have a knowledge of the natural and physical resources of our state, some knowledge of production and consumption of goods and services and of their interplay in our economy: engineering methods, food production, fuels, metals, energy; housing, textiles, plastics, etc.

Georgia is primarily an agricultural state. The color, chemistry and physical structure of Georgia soil profiles are due to early geologic formation, temperature, precipitation, leaching, erosion and organic cover. Soils from granites and gneisses are high in potash and low in calcium. The soil from dark rocks is high in calcium and low in potash. The various oxides of iron produce the red, yellow and black soil colors.

Soil used for clean-tilled crops such as cotton, corn and tobaccc without rotation is deprived of its nitrates and gradually requires fertilizer costing Georgia farmers 17% of the farm income. In earlier times, depleted lands were abandoned to weeds while new lands were cultivated. This practice of clean-tilled agriculture and land abandonment mined the soil and produced severe soil erosion. Tennessee Valley experiments proved that soil could be rebuilt if the scientific knowledge necessary is applied.

About 1,000,000 of the 23,000,000 forest acres of Georgia are in virgin timber. This virgin forest indicates that the natural forest climax was hardwoods with pine. The cutover forest is predominantly pine, long leaf in the Coastal Plain and short leaf in the uplands. The length of the leaves is an adaptation to the water available for transpiration. Several hundred pounds of water must pass through a plant for each pound of dry substance produced in the plant. There are 165 species of trees in Georgia.

Climatic conditions that make Georgia capable of producing cotton are not found in continental Europe; 48.3 inches of rain annually, mean annual temperature of 58 2/3° F. and 233 frost-free days. Open sunny to no more than half cloudy weather is necessary. Though cotton acreage is now about 2,000,000 and corn acreage above 4,000,000, we still use cotton as a chief cash crop. But corn, cotton and tobacco are all clean-tilled soil mining crops that require rotation with nitrogen formers like kudza, peas or hay.

4. Knowledge of technological improvement in production methods.

Are our students acquainted with these facts and processes?

Increase of corn yield by using hybrids could make one acre produce what four acres in Georgia now produce .Georgia averages 14 bushels per acre as compared to 55 bushels per acre in the midwest. A South Carolina acre has yielded as much as 110 bushels for one acre.

The mechanical cotton picker, one of which is now in operation in Georgia, would save labor if the hills and gullies can be handled. The small tractor with short turning radius will make possible mechanization of the small farm, though cotton farming can be done more profitably in Texas, and on flat lands.

Egg production and pedigreed flocks of chickens can make poultry raising profitable if all the basic science findings are observed.

Copper, cobalt and iron must be added to pastured cattle if nutritional deficiencies are not to be developed on Georgia lands.

Enrichment of the soil and production of high protein hay will eliminate the necessity of high acreage of corn for silage and feeds.

Saturation of inedible oils into edible fats through hydrogenation will give wider uses for vegetable oils.

Effective utilization of coal and water power resources would provide electric power for industrialization to balance our economy.

Increase in number of paper mills operating in the state should be encouraged. Increased use of slash pine and Georgia clay in kraft paper production would bring us added value from manufacture. Do we teach Herty's contributions to the paper industry in our schools?

Uses of Manganese in steel alloys and the effect of the shift to lighter metals, Aluminum and Magnesium, on Georgia's Manganese production should be examined. Could the low-grade bauxite ores be utilized in competition with South American ores?

Wider uses for Fuller's earth in automobile and aviation oil filters should be sought.

Wider uses of Georgia's naval stores in paints and varnishes as well as in pharmaceuticals should be investigated.

Artificial insemination of cattle and swine with sperm shipped 1,000 miles will increase milk production, and will improve the quality of beef and ability to withstand heat and mosquitoes, without necessity of ownership of pedigreed stock and with much lower breeding costs.

Prefabricated houses, plastics, rayons, drainage and sewage treatment and disposal are other areas of improved living made possible through improved technological methods.

Aviation, transportation and communication are excellent examples of science at work for better living.

6. Concern for human beings.

An understanding should be gained by the two chief race groups of Georgia of the exact nature of race. The lack of relationship of skull capacity to intelligence, the absence of blood type as a racial characteristic which would interfere with blood transfusions, and the relationship of nurture to culture should be understood.

Twenty-four per cent of the Negroes who registered for the draft in Georgia marked their cards with an X. One hundred and fortv out of every 1,000 Georgians were rejected in the 1940-43 draft because of illiteracy. The national average was 28 per 1,000. The state inadequately educates its youth. The education of the Negro is less than that of the white; in 1940 the state spent $73.19 for each white pupil and only $16.55 for each Negro pupil.

Teachers should learn that sex responsiveness is a desirable trait and should be considered a part of personality development. Every boy or girl desires to be socially accepted. Full knowledge of mating and reproduction should be gained to insure selection and good parenthood. In 1938, there were 183.9 illegitimate births among Negroes in Atlanta. Among whites there were 18.1 illegitimate births. I have previously indicated that we have a very high rate of venereal diseases.

The kind of mental health reflects itself in the degree of self-reliance of people in regard to their needs.

6. The public should be educated to select and use intelligently the materials that science has made available to them—good consumership. This demands a knowledge of products and a sense of values. There is a big difference in the price of 1¾ fluid ounces of Carbona and the same quantity of carbon tetrachloride. Dollar for dollar (according to *Consumer Research*) a Stein suit of clothes is a better buy than the $100.00 ones. A suit was brought against a well-known patent medicine because the nostrum was sold as quinine-containing and a malarial cure, when quinine was not available. Do we learn about these things in science?

7. Finally, are we preparing youth to live in a world in which the ways of life are based more and more on interpretation of nature?

Do we avoid black cats or ladders, carry luck charms, carry nails in our pockets for headaches, associate height of forehead with intelligence? Do we believe that disease is associated with evil spirits, do we seek supernatural explanations for natural phenomena? Science has done a great service in rationalizing our thinking and describing our environmental changes in terms of natural causation. The high school graduate of today should have a better understanding of the exact nature of cause and effect than scientists had a few generations ago.

Teaching the disclosures of science concerning man, and the interrelationships of men and the living and non-living environment to the future citizens of our democracy is a necessary function of the secondary school, which without loss of the scientific method may correct some of the anti-democratic and wasteful practices of our society.

THE PERISCOPE

IDEA WINNER GETS $100

H. E. CANTEY

In a ceremony at Warehouse 34 in Newport News attended by Lt. Col. E. S. Smith, GSC; Lt. Col. Louis D. Hubbard, Post Engineer, and Capt. James H. Echelberger, CE, H. E. Cantey heard the cheers of 250 fellow workers as he received a belated Christmas gift.

This was a $100 check from the Suggestion Committee, of which Colonel Smith is chairman, for an Idea for Victory passed on favorably by the Committee at its holiday meeting.

Cantey earned the cheers of the crowd of ship's carpenters as he had earned the award, which takes rank with the three greatest ever approved at HRPE, only one of which was larger.

While meeting the specialized requirements of the War Dept.'s Ideas for Victory program, Cantey's suggestion incidentally fits in with the broad, general rules for successful inventions. His is quickly, easily made of common material so cheap it can be discarded after serving its purpose.

Cantey's invention saves time and money, and besides getting ships loaded more quickly, prevents damage to ships' fittings. He suggested prefabricated shoring for vehicles and cases comprising deck cargo. The pieces are cut out in the carpenter shop instead of on the job and the operation takes less than 30 minutes for all five hatches of a ship.

Besides introducing Colonel Smith, Colonel Hubbard thanked the assembly for the fine spirit showed by the carpenters in working over Christmas. Colonel Smith outlined the workings of the suggestion program at the port, where ideas of personnel have saved $27,000 in a year. He explained how the savings are rewarded, by cash for civilians and non-monetary awards to military personnel. Capt. Echelberger, Assistant Post Engineer, made the actual presentation.

—*The Newport News.*

EDGAR GASTON

Wins Certificate of Individual Production Merit

A Detroit Janitor in a tank factory whose ingenuity has already saved 12,000 gallons of oil, worth $10,000, became the second Negro war worker to win a Certificate of Individual Production Merit.

The award winner is Edgar Gaston, who is handicapped by having only three fingers on his right hand. He is a janitor in the Cadillac plant of General Motors in Detroit, where Army tanks are made. One of his responsibilities is the disposal of chips and shavings from metal-working machines. He realized that quite a large amount of good oil was being thrown away when the chips were cleaned from the machines and dumped into small carts for disposal. There was no oil slinger for salvaging this oil from the chips, so Gaston, on his own initiative, proceeded to build a cart with a false bottom. He filled this cart with the chips and let it stand for a while. The oil drained off very easily and could be replaced in the machine from whence it came.

The production soldier responsible for this idea was born in Atlanta, Ga., 31 years ago. He graduated from high school and that was the end of his formal education. Because he believes so thoroughly in the advantages of education, his ambition is for his children to become school teachers.

Charles H. Fletcher, a welder in the Moore Dry Dock Company Shipyards at Oakland, California, was the first of his race to win the Certificate of Individual Production Merit. His contribution was a device to use in welding insulation pins to deckheads which increased production in tack welding operation 400 per cent.

The Individual Awards Plan provides for several types of recognition for workers whose suggestions increase the quantity or improve the quality of war production. Plant Labor-Management Committees confer local Awards of Individual Production Merit for suggestions deemed meritorious in their own plants. They then submit to Headquarters suggestions which may be used on an industry-wide basis.

These suggestions are processed and evaluated in the Awards Branch of the War Production Drive Headquarters before coming before the Board for Individual Awards. This Board, composed of technical experts, recommends letters of Honorable Mention, Certificates of Individual Production Merit, or Citations of Individual Production Merit.

DR. CHARLES DREW AWARDED SPINGARN MEDAL

Dr. Charles Richard Drew's contribution to medical science in plasma research is saving thousands of lives these days.

His receipt of the Spingarn medal by the National Association of Colored People for the "highest and noblest achievement by an American Negro" climaxed a long list of honors which he has accumulated ever since he was a youngster.

At eighteen upon graduation from Dunbar High School in Washington, D. C., he received the James A. Walker Memorial Medal as the best all-round athlete and scholar in his class and a scholarship to Amherst. When he was graduated he was awarded the Moss trophy for having brought the greatest honor to the college.

"During his second year as an intern a big fire broke out in the hospital and, in the course of treating the victims, he was confronted by patient after patient suffering from shock as a result of burns," relates Barbara Gair in an article called "Plasma Pioneer" in the May issue of This Month magazine out April 21st.

"He started studying the way shock worked, how it was caused and in particular the fluid losses in the body that set it in motion. It was generally conceded by that time that sufficient quantities of whole blood pumped into the veins was an antidote to shock. But blood would not keep indefinitely. If there was to be a medical weapon to deal with war shock cases, it would have to be a part of blood itself."

If whole blood stands long enough it will separate, the cells grouping in a thick red mass and the plasma, liquid and yellow, rising to the surface. When stored blood deteriorated, it was usually discarded, plasma and all. Drew worked on the situation and before war broke out in Europe, it was conclusively proved that plasma was stable. Leaping from limited scale production to mass business then because of war exigencies, those working on the problem, including Drew, had 17,000 donors listed, typed and tested by January of 1941.

America helped Britain until they were able to put their own blood-collecting centers on their feet. Drew summarized the results of the whole project for the Blood Transfusion Association and on the basis of his report, the American Red Cross decided to set up the first blood-collecting center for the armed forces of the United States.

When Pearl Harbor was attacked the doctors at this Hawaiian base were not unprepared because of the bold vision of men like Drew. They were armed with a large enough supply of dried plasma to carry through until local blood transfusions could get under way.

DID YOU KNOW

By MARY L. REDDICK

Morehouse College, Atlanta, Georgia

In keeping with the suggestion made in an article by Dr. Finley in the February issue of the Morehouse Journal of Science, a few facts concerning some of the worm parasites common in the South are given. With these facts in mind, a well-planned health program in connection with science teaching can easily indicate means of preventing worm infections. Such a program should also develop in the student and community habits that will serve to prevent many common diseases which result from inadequate personal and community practices.

INTRODUCTION—Man does not live alone. Within his body there are many living organisms which are beneficial to him. However, at times, the body is invaded by organisms which live at the expense of tissues, fluids and digested food of man. Such an organism is appropriately called a parasite, and the individual is just as appropriately called the host. Some of these parasites even require two hosts in order to complete their life cycle. Among the parasitic worms, however, there are many that require only one host, and spend part of their life cycle as free living larvae. Worms may enter the body by way of the mouth, or by penetrating the skin. Since most of them favor one or another part of the digestive tract, their sexual products leave the body along with the faeces. If an individual becomes infected with worms that require no secondary dost; and if the parasite must enter the body through the mouth; only one conclusion can be drawn—in some way contaminated faecal material has been swallowed.

If these worm parasites were content to remain in one place within the body there would be less discomfort due to their presence, but many of them take a 7-10 day tour over the body before settling down. Part of this tour involves burrowing from one organ or blood vessel to another. Such burrowings lead to a loss of blood, ulcerations, aches, pains and the blockage of certain important ducts and canals. Above all, it leaves the body generally weakened so that the individual's whole resistance is lowered, making him more susceptible to many different ailments such as pneumonia, ulcers, peritonitis and anemia.

The three parasitic worms that are discussed below are in the phylum Nemathelminthes, which means thread worm.

ASCARIS LUMBRICOIDES. This worm has been described by Chandler as one of man's most faithful and constant companions from time immemorial. The adult worms may be from 8-18 inches long. The male is smaller than the female with a curled posterior end. The female is longer and wider with a more blunt tail. The mouth is guarded by three lips, one dorsal and two latero-ventral. In addition to living in man there is a variety that lives in the pig and dog, both of which may play a role in the distribution of its eggs.

The adult worms live in the small intestine where after copulation the eggs are shed, and pass out with the faeces. It has been estimated that a single female may contain as many as 27,000,000 eggs, indicating a daily production of 200,000 eggs. The eggs require a temperature lower than that of the body, a trace of moisture and oxygen in order to develop into active embryos. When these embryonated eggs are swallowed along with contaminated soil, the larvae hatch out in the intestine. They burrow through the mucous membranes, and enter the blood stream. Along with the circulating blood they are carried to the liver, the right side of the heart and finally to the lungs. From the lungs they make their way up the respiratory tract to the throat. Upon reaching the throat they may either be swallowed, or removed by expectoration. By way of the digestive tract they finally reach the intestine again. Full maturity is reached within 2½ months. A common result of the "bodily tour" is pneumonia. The adults tend to become closely entangled, blocking the intestine, which leads to fatality unless surgically removed. Individually, the worm may be prevented from infecting the body by being sure that the hands are cleaned thoroughly before eating. With children around, an adequate disposal of faecal material should be provided for throughout the community.

NECATOR AMERICANUS, commonly known as the hookworm, is widely known for the devastating effects it has on whole communities. The adult worms live in the small intestine, and with their chitinous teeth attach themselves to the mumous membranes, drawing blood and tissue juices into the buccal cavities.

The adults may live in the small intestine for five or more years during which time the female will lay from 5,000 to 10,000 eggs per day. The adults are seldom seen under natural conditions, and only the eggs pass out with the faeces. The eggs require moisture, warmth and oxygen before they hatch. Soil containing contaminated faecal material harbor these larvae for about 5 days, during which time they undergo two moults. These moults are necessary before the larvae become infective. The larvae of Necator take the same route as described in Ascaris except that they enter the blood stream by penetrating the skin. Within the villi of the intestine they undergo two additional moults before reaching maturity. At the end of 6 weeks they begin to lay eggs. Children from 14-16 years old are especially susceptible to hookworm infection. Children, especially in rural areas, like to go barefooted during the spring and summer months. These months are especially conducive to larval development, and the soft skin between the toes offers a fine place for their penetration. Here again the proper disposal of faecal material is important.

ENTEROBIUS VERMICULARIS, commonly called the seat or pin worm, is a parasite found in many children. The adult worm lives in the coecum, appendix and neighboring parts of the intestine. At night the female will migrate to the peri-anal region of the body where she will lay her eggs. These eggs require air before they will develop, and many times the air will stimulate the female to explode at which time more than the usual number of eggs will be released. The embryo, commonly called the "tadpole," will remain in its shell until swallowed by a susceptible victim. The migration of the female will cause an irritation around the anal region which will lead to scratching. Eggs will lodge underneath the finger-nails, and unless the latter are thoroughly cleaned, the eggs will eventually reach the intestine. The eggs are also air borne and may find their way to the pharynx by way of the nasal passageways. Since many times the females are destroyed as a result of their nightly trips, it is important that a victim of the pin worm should avoid reinfection by swallowing the eggs.

FINIS. From the above facts, it has been indicated that simple habits as to personal cleanliness will prevent infection of these worm parasites.

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MAY FIRST—CHILD-HEALTH DAY IS BIRTH REGISTRATION DAY

Children First on May First

May Day is traditionally children's day. Time was when its significance was measured only in the beauty of maypoles and graceful dancing on the green. But with the passage of years, growing concern for the health of the children who danced—and the children who weren't able to—brought about the celebration of May Day as Child Health Day.

This year, the Child Health Day spotlight swings to infants and babies again. It highlights the importance of . . .
A Birth Certificate for Every Baby in the U. S. A.

A birth certificate is a mighty important scrap of paper. It makes known who you are, and where and when you were born. It signifies the country's desire to protect the rights of every single human being born within her boundaries. Its presentation is the most satisfactory and convenient way of proving the right to work, to go to school, to travel in foreign lands, to marry, to hold office, to claim social security benefits or servicemen's dependents' allowances.

A birth certificate is a "first citizenship paper," possession of which is a fundamental right of every child born in the United States. It entitles him to all the privileges and protections of citizenship.

IS YOUR BABY REGISTERED???

After the issuance of a Presidential proclamation designating May 1, 1945, as Child Health Day, Negro parents throughout the country were urged this week to join all other parents in cooperating with State health departments and bureaus of vital statistics in intensive birth-registration campaigns.

Cooperation of all groups of the population in the birth-registration campaign was asked by Katharine F. Lenroot, chief of the Children's Bureau, Department of Labor; and J. C. Capt, director of the Bureau of the Census, Department of Commerce. These two agencies are joint sponsors of this year's observance of Child Health Day.

"One out of every 13 babies born each year is not registered," Mr. Capt said. "A birth certificate is the best evidence of citizenship, age, and place of birth it is possible to have in claiming many of the privileges and protections of citizenship."

Miss Lenroot said:

"Complete birth registration is of enormous assistance to State and local health departments in planning adequate health programs for children. Under the Social Security Act, Federal funds have been made available to State health departments to promote programs of maternal and child health and welfare. Unless all births are registered in a State the amount of money received by that State is less than the proportion to which it is entitled, and so fewer children get the care they might have."

A 1940 study on "Completeness of Birth Registration" by the Bureau of the Census shows that registration is generally poorest in rural areas, and among the nonwhite population in both rural and urban areas. Many rural areas showed 100 per cent completeness of registration, however, and in some areas the nonwhite population had better registration than the white population. Delaware, for example, showed a 100 per cent nonwhite rgistration for urban areas as compared with a 99.1 per cent registration for whites, and a 97.7 per cent nonwhite rural registration as compared with 94.2 per cent for whites.

In most States where large segments of the Negro population reside, the percentage of nonwhite registration is generally below that of the whole community. In Arkansas, for example, only 63.2 per cent of the nonwhite births were registered in 1940; in Oklahoma, 66.9; in Texas, 68.7 per cent.

Other percentages of complete birth registrations for nonwhites included: New York, 96.3; New Jersey, 98.7; Pennsylvania, 92.9; Ohio, 93.7; Indiana, 94.0; Illinois, 90.6; Michigan, 94.0; Wisconsin, 93.2; Minnesota, 97.2; Missouri, 82.7; Kansas, 92.9; Maryland, 94.1; District of Columbia, 96.6; Virginia, 90.2; West Virginia, 81.3; North Carolina, 81.0; South Carolina, 71.8; Georgia, 77.6; Florida, 86.4; Kentucky, 87.6; Tennessee, 75.1; Alabama, 82.4; Mississippi, 86.2; Louisiana, 83.7; and California, 96.5 per cent.

Stressing the advantages of complete birth registration in his proclamation of April 9, President Roosevelt declared:

"WHEREAS the health and vigor of the nation's citizens are not only essentials in the achievement of peace but also goals for the fullest enjoyment and perpetuation of peace; and

"WHEREAS it has been demonstrated that many physical defects which handicap large numbers of adult citizens are evident during childhood, and could be prevented or corrected with proper care at that time;

"WHEREAS good community planning for the health and care of our children starts with the registration at birth of all babies; and

"WHEREAS each year the births of tens of thousands of our babies are not officially registered; and

"WHEREAS the Congress by joint resolution of May 18, 1928 (45 Stat. 617), authorized and requested the President of the United States to issue annually a proclamation setting apart May 1 as Child Health Day:

"NOW, THEREFORE, I, FRANKLIN D. ROOSEVELT, President of the United States of America, do hereby designate the first day of May of this year as Child Health Day.

"And I call upon the people in each community to use that day as an occasion to impress upon parents the importance of registering the birth of every baby born in the United States; and I further urge our citizens to mobilize community resources for the better care of our children so that the growing generation will be strong to mold the peace.

"IN WITNESS WHEREOF I have hereunto set my hand and caused the seal of the United States of America to be affixed."

"MAGIC PILLS"

Ponce de Leon's vain search for the fountain of everlasting youth has its modern counterpart in today's search for health and increased vitality through the swallowing of "magic" vitamin pills. This search, spurred on by high-pressure advertising campaigns, costs $500,000 a day—$180,000,000 a year; yet physicians and nutrition experts say that the number of persons actually needing vitamin therapy is small by comparison to the number of persons daily dosing themselves with vitamin preparations.

A recent article in Hygeia, magazine of the American Medical Association, says, "The truth of the matter is that most of the vitamin pills which are trustingly swallowed in the search for a magic short-cut to health are not needed by the swallower and will not perform the wonders he has been led to expect of them. Unless he lives in poverty—and people who can buy expensive vitamins are not likely to be living in poverty—or unless he is a food faddist or has a poorly planned, lopsided diet, he is getting most, if not all, of the vitamins he needs in his daily meals. If he isn't, he should seek to make up the deficiency through dietary correction rather than by taking pills; vitamins obtained from natural food sources cannot be replaced by artificial, manufactured vitamins. *There is no substitute for an adequate diet!"*

The average well-balanced diet includes all necessary vitamins and *only a careful medical examination will reveal the need for extra vitamins.* Vitamins are prescribed by physicians as a temporary measure to correct a vitamin deficiency. When a specific condition is corrected, a well-balanced diet is all that is necessary. Buying and taking expensive vitamin preparations by people who have an average well-balanced diet is a terrific waste of money.

There is no magic short-cut to health.

—*Georgia Health.*

CONGRESSIONALLY SPONSORED SURVEY OF HIGHER EDUCATION AMONG NEGROES

Restricted opportunities for education among Negroes, the economic and social factors responsible, the resultant loss in manpower, particularly for the armed forces and industry in wartime, and recommendations for action, are covered in a four-volume report of a Congressionally sponsored survey of higher education among Negroes recently published by the U. S. Office of Education of the Federal Security Agency, Commissioner John W. Studebaker announced today.

The report includes Socio-Economic Approach to Educational Problems (Volume I), General Studies of Selected Colleges for Negroes (Volume II), Intensive Study of Colleges for Negroes (Volume III), and a summary (Volume IV).

Volume IV, written by Dr. Ambrose Caliver, associate director of the survey, is a summary of findings reported in the first three volumes, and offers recommendations for action by Negroes and their institutions of higher education, white persons and their institutions of higher education, and Federal and State Governmental agencies.

"This survey has emphasized the interrelationship existing between education and the other social factors in the life of the community, the State, and the nation," Dr. Caliver writes. "It has shown how the mobility of the population ties together the interests of the different regions of the country, and has further indicated the extent to which the goals and activities of Negroes are common with those of the majority group in America. Finally, it has pointed out the necessity of providing equality of educational opportunity to Negroes in the interest of the national welfare; for it has well been said that as a people half-slave and half-free was a threat to the Union, so also it may be said that a people half-ignorant and half-educated is a threat to democracy."

On the timely and crucial problem of race relations, recommendations are made to both Negro and white institutions.

Recommendations to Negro institutions:

1. That they collect as much information as possible about Negroes and techniques of race adjustment experiments and activities, and disseminate this information to both Negroes and white persons.
2. That they cooperate with other colleges to develop union library lists on the Negro and race relations and arrange interlibrary loans.
3. That those which have not already done so inaugurate the scientific study of the Negro and other races and their contributions to American and world culture as a part of the regular curriculum offering.
4. That they recognize their special responsibility to this minority group and cooperate with other community agencies to develop minority group strategies in attacking interracial problems, to encourage civic responsibility and participation and to remove the stigma of inferiority.

Recommendations to white persons and their institutions of higher learning in the South:

1. That they join with similar Negro institutions to develop a constructive program for better race relations in line with the suggestions made to Negroes.

2. That, to develop qualified leaders, they work out ways and means of making their facilities available to Negro scholars, and assist in providing opportunities, facilities, and leadership for the development of research among Negroes.

3. That they assume increasingly the responsibility of pointing out to the majority the economic significance and social implications of providing equality of educational and occupational opportunities for Negroes.

4. That they examine, continually, critically, and fairly the relation between democratic ideals and their practices with respect to the consideration and treatment of Negroes.

The following recommendations are among those made to Negroes and their institutions of learning regarding their educational programs:

1. That they study the socio-economic factors in the life of their regions, States, and communities and apply the findings and conclusions to their programs.

2. That they begin an aggressive attack on the problem of defining their purposes in the light of the needs of the students they enroll.

3. That they assume leadership in improving the health status of Negroes.

4. That they provide comprehensive programs of vocational guidance for their students.

5. That they attempt to fill the cultural gaps in their students' backgrounds caused by the low economic status of the families of a majority of Negro college students.

6. That they cooperate with high schools, white institutions, and community agencies to coordinate and expand educational facilities, and improve conditions for Negroes.

Recommendations to State and Federal Governments:

1. That State authorities take steps to assure that equalization funds of their State reach the source for which they are intended.

2. That States take steps to provide equality of educational opportunity for Negroes.

3. That the Federal Government participate in developing high-grade university education for either the Negro or white race or both wherever in the country it cannot be done from other public or private sources.

4. That competent Negroes be utilized to an increasing extent in formulating educational policies and administering educational programs on a local, State and national basis.

In commenting on the survey, Commissioner Studebaker said that "the anticipated increase in college enrollment among Negroes after the war, and the demand for Negro leaders and professional workers, makes this survey especially timely."

The National Survey of the Higher Education of Negroes was undertaken in 1939 with funds granted by Congress in answer to a request by the Association of Colleges and Secondary Schools for Negroes and many other educational leaders. The directional staff for the survey included Mr. Studebaker; Bess Goodykoontz, Assistant U. S. Commissioner of Education; Fred J. Kelly, chief of the Division of Higher Education of the U. S. Office of Education, who was director of the survey, and Dr. Ambrose Caliver, senior specialist in the education of Negroes, of the Office of Education.

Copies of each of the volumes of the report may be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., for the following prices:

Volume I, "Social-Economic Approach to Educational Problems," Misc. No. 60. 40 cents.

Volume II, "General Studies of Selected Colleges for Negroes." Misc. No. 6. 30 cents.

Volume III, "Intensive Study of Colleges for Negroes." Misc. No. 6. 30 cents.

Volume IV, "Summary." Misc. No. 6. 15 cents.

CAN THIS HAPPEN TO HIGH SCHOOL CHEMISTRY?

By W. H. BROWN

Associate Director, Secondary School Study, Atlanta, Ga.

In 1945, just ten years ago, who would have thought that chemistry courses would now be practically extinct in southern Negro high schools? Physics, of course, was dropped by most high schools just before World War II largely because few teachers were able to make physics teaching effective. It was dull and uninteresting to high school pupils. In fact, not many pupils could understand what the teacher was trying to do aside from making physics as difficult as possible. Truthfully, the teacher of physics usually had taken only one course in physics himself and he taught it because he was asked to do so. Not many teachers could put their fingers on any definite values which physics should promote.

The war revived physics temporarily because somebody said a knowledge of physics would help win the war and schools wanted to be patriotic. Teachers didn't know exactly what it was in physics that would contribute to the war effort and when they asked about this received only vague answers. So they tried the same dull books again. Much of the apparatus suggested in the books was entirely too expensive and physics was taught largely as a reading course. About this time the use of direct current for ordinary purposes was discontinued but when teachers looked through physics books for help in making or repairing A. C. motors, they found meager help.

Then most of the older boys were called to the army. Since physics had never been a subject for girls, particularly, there was then no apparent reason for teaching it. Authors of science books salvaged some of the materials from physics books and tactfully dispersed them in the new general science books. That was just about the last of physics. Nobody misses it now.

But chemistry went out like a light. The reasons for its disappearance, as a course, are well understood now. First, not many teachers knew how to adapt the study of chemistry to important situations which children and grown-ups faced every day. Chemistry, quite unrealistic, was designed for classroom use only. However, people wanted to know more about the new plastics which were replacing materials which they had used formerly—"That's organic chemistry," teachers said, "and you will have to wait until you get in college." Soap and water had long since lost its monopoly as a detergent. There were quicker and more effective household cleaning agents. "Universal solvent" was just another trite expression. Dry cleaning methods had changed as new fabrics and new dyes came into use. High school pupils and their parents felt strongly that school work should very definitely place the pupil in position to make a substantial contribution to his own and his family's success in living.

Most chemistry teachers were never quite able to fit such things into their work in more than an incidental way. They were afraid that inclusion of such ideas would mean a sacrifice of something which they vaguely referred to as "fundamentals." Strangely enough, teachers seldom indicated what these "fundamentals" were fundamental to, and few people went to the trouble to find out whether knowledge of "fundamentals" operated to change the learner's thinking and behavior in chemistry situations. Although pupils seemed to acquire a huge body of facts and pass rigid examinations, a year or so later, an overwhelming number of them would say, "All I remember about chemistry is H_2O." Generally, pupils were not skillful in making predictions regarding the course of chemical reactions in new situations; seldom did they turn to

chemistry for the key to science situations which they faced; seldom did they see anything which they could do with chemistry outside of the classroom; and they knew few places other than the highly condensed sections in textbooks to which they could turn for pertinent information on a problem. Teachers were too busy to help with such things. Some teachers declared that children were getting dumber and that anybody who couldn't get chemistry just didn't belong in high school. To these teachers, thinking meant solving the problems at the end of a chapter. They never suspected that thinking might be a process consisting of combinations of many skills—one of which might block the whole process—rather than a unitary skill. They flunked pupils right and left and drove them away from chemistry. Strangely enough, some pupils began or continued the study of chemistry in college but the loss of chemistry students at the freshman level was usually close to 80%. Nevertheless, two universities in the South were able each year to turn out about half a dozen students holding advanced degrees in chemistry.

In the second place, colleges and universities closed their ears to requests for help in improving the chemistry teaching being done in the schools from which their pupils came. It was frequently said that a student who had studied chemistry in high school with teachers who were products of colleges generally did no better in college chemistry than those who had studied no chemistry in high school. At this point high school chemistry teachers became hopelessly confused because they had assumed that preparation for college was their clearest objective. The root of this confusion was the fact that colleges were attempting mainly to serve those chemistry students who hoped to study medicine or become research specialists in chemistry.

Colleges made so little effort to train teachers for chemistry that high school curriculum makers recommended that high schools concentrate on the development of general science and biology programs. Most Negro senior high schools had enrollments of about 100 pupils and could not afford to employ a teacher who could work only in chemistry. Schools wanted teachers who could plan and direct school-wide science programs which would not only permit pupils to acquire facts in many phases of science but which would contribute toward increased reading efficiency, writing skill, ability to plan and carry out important science investigations and ability to use number concepts to get meaning from science situations.

Curriculum makers were determined that high school pupils be able to "do something" as a result of their high school work. There was a terrific clash of values and when there seemed to be no way to include any new ideas in the framework of chemistry teaching, curriculum makers, monied interests and to some extent the Federal Government developed our present plan having a general education emphasis in science.

Now, science education begins in the first grade and extends throughout the high school. In the primary grades science is largely directed observation in fields, streams, at home and during simple teacher-demonstrations in classrooms. Gradually, as pupils develop more interest, reading skills and planning abilities, groups or individuals undertake investigations involving an increasingly wide range of facts, principles, manipulative skills and science situations. In all of these investigations materials are used concurrently from one or several of the various fields of science depending on the nature of the investigation. Pupils write interesting accounts of their investigations and many of these are published as guides for other pupils.

Classes dramatize the experiences of scientists and this is usually a more satisfying experience than reciting sections from encyclopedias or other reference books.

The teacher is responsible for the maintenance of continuity in the growth of a class. She, better than the pupils, knows how this might be done, she directs class discussions leading to clear plans for some type of study. Frequently, the discussion leads to a clear understanding of some science concept which all pupils need in order to proceed with some task at hand, or to a summary of the progress which the class had made up to a certain point. Through such discussions pupils come to understand the relationship between the different investigations going forward in the room. The teacher assists each pupil as he develops a plan for his growth in science. Such plans usually include activities designed to enable a pupil to get full meaning from chemical symbols, to accurately predict the course of important types of chemical reactions based on an understanding of such things as solubility, heat of formation, electro chemical series, ions and periodic functions.

The teacher is fully aware of the pitfalls which await those who fail to provide for a systematic and comprehensive account of the growth of individual pupils. He works out with the whole class and frequently with individual pupils a cooperative system by which evidences of pupil growth in science can be kept. Usually included in these evidences are consecutive samples of plans which pupils develop, consecutive samples of his reports and other writing along with notes explaining why a given sample represents an improvement over previous samples, a record of all investigations which the pupil has made or contributed to, a list of the sources of information which the pupil has used and the purpose for which each was used, and lists of manipulative and thinking skills which the pupil is able to use with certainty.

We lost our courses in chemistry as a result of a general failure to clearly identify the values which chemistry could promote and through lack of agreement on a process by which teachers and pupils could determine what kinds of growth had actually resulted from the study of chemistry. However, this apparent loss led to important and substantial gains. We are fairly clear now on how to give advice to high school pupils before, during, and after their work in science concerning their after-high-school endeavors. This advice is based on a knowledge of their growth during high school.

Practically all of these pupils can succeed in college science, even in those classes where college teachers still persist in spraying students with a succession of facts from books which pupils themselves could locate and read, if they had a good reason for doing so.

High school science teachers are well paid because their contributions to life in schools and communities are considered indispensable. In many states, federal funds have made it possible to provide consultative services to teachers. These consultants are highly skilled and experienced teachers who can assist other science teachers who wish to increase their effectiveness.

Everybody is happy over the present arrangement. The more skillful science pupils begin special studies of important chemical industries as early as 10th grade and they go directly into these industries upon leaving high school. The colleges concentrate on the preparation of students for medical schools and the universities prepare the research workers.

SOME RECENT SCIENTIFIC ARTICLES BY NEGROES

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BIOLOGY LABORATORY EQUIPMENT

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There is a wide divergence of opinion as to the purpose of goal of the general biology course, especially general biology at the secondary school level of instruction. Some teachers consider the human welfare side of the subject more important, others still hold to the procedures which emphasize facts and principles without too much concern about their application. It is not the purpose of this article to debate the very controversial subject of purposes, however, the author agrees with those teachers who believe the purpose of general biology stem from the principle that " all education is concerned with the needs of the learners." Among the needs of a learner in a general biology course one would certainly wish to include *fundamental concepts in life science* and *appreciation for the attitude and method of life sciences.* Nevertheless, it may be difficult to get a large number of biology teachers to agree upon a common plan for meeting the needs of learners. Perhaps it shall ever be thus, in view of the fact that local resources and needs exert great influence upon teachers and teaching.

Likewise, the general biology laboratories of schools will be different. The laboratories will differ according to the purpose of the course, according to the skill and industry of the teacher, and according to the resources of the school.

With the above facts in mind it should be obvious that there can be no such thing as THE list of MINIMUM or ESSENTIAL materials and equipment for a general biology course, regardless of the level on which the course is taught. Accordingly, these remarks are intended to offer suggestions as to how first steps, very modest first steps, may be taken in the direction of equipping a biology laboratory. The conscientious alert teacher will never be satisfied with his laboratory materials and equipment because he will continualy revise and expand it; not entirely through his own efforts but in cooperation with his students and his colleagues.

It seems advisable to begin by deciding what purpose the course in the particular school is intended to serve. If this can be done, a list of materials and equipment can be selected by consulting resource catalogs and bulletins. Many such publications are available to teachers, three which come to mind are the following: Turtox Biology Catalog and Teacher's Manual: General Biological Supply House, 761 East 69th Place, Chicago 37, Illinois. 415 pp. Free. Biological Material: Carolina Biological Supply Co., Elon College, N. C., 215 pp. Free. Bulletin George Peabody College for Teachers, Free and Inexpensive Learning Materials, Field Study No. 9: George Peabody College for Teachers, Nashville 4, Tenn., 125 pp. 25 cents.

By consulting the above publications, or others like them, it will be a simple matter to choose materials and equipment to meet the needs of the course. One example may suffice. Suppose one unit or phase of a course is intended to provide opportunities for students to learn about "studying, collecting, and caring for living animals or plants." One could refer to the catalogs and choose, from the sections on Living Materials, animals or plants to represent almost any combination of living things. Schools in cities where field trips cannot be made easily or economically, laboratory projects may be planned and carried through without much cost by making use of the materials available in the above sources. Any school located in a town or village will have ready access to a variety of living organisms which students will enjoy establishing in the laboratory aquaria or terraria; these may be supplemented by purchasing the rare or out-of-season organisms. The above-named Peabody Bulletin gives sources of materials on the study, the collection, and the care of numerous plants and animals. A great number of projects are suggested in the service leaflets published and distributed free of charge by many biological supply companies; with the aid of these, many variations of projects on living organisms can be planned within the limits of a very modest budget. Experiments on the nutrition, the reproduction, and the effects of hormones upon plants or animals have been successfully planned and prosecuted with the aid of resources suggested above.

What has been said about a unit on living animals or plants may also be applied to preserved materials, demonstration preparations, fossil collections, charts, models, biological apparatus, and the commonly used chemicals and reagents for the biological sciences.

In spite of the difference concerning the purpose of the general biology course and even though laboratories will differ according to the purpose of the course, many biologists insist that every student should be introduced to the world of microscopic organisms. This indicates the need for microscopic equipment. It may be that some teachers are not acquainted with an instrument which will supplement the microscope, namely, the micro-projector. This instrument projects temporary or permanent prepared microscope slides of subjects or images of specimens in liquids; the image may be projected upon the wall of a room or on a screen, or upon a sheet of paper on a table. It is about the size and weight of a compound microscope. With the aid of this instrument an entire class may simultaneously study a microscopic image. Two popular models are made and sold by the Spencer Lens Company, Buffalo, N. Y., and the Bausch and Lomb Company, Rochester, N. Y. One of the models may be adapted to any student type compound microscope and can be purchased for less than $25.00; the other model costs approximately $50.00.

SUGGESTED LIST OF MINIMUM EQUIPMENT FOR GENERAL SCIENCE COURSE FOR 8TH OR 9TH YEAR

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In the last two years I have attended several meetings in Georgia and Alabama where much discussion has gone on concerning functional teaching of High School Science. I listened to generalized directions and largely vague information as to use of community resources. When teachers asked for definite information, concrete illustrations and help in the selection of equipment, they were told these questions could only be answered as the situation developed. We feel that whatever the unit, objective or functional result hoped for there are certain fundamental scientific relations and principles which must be implemented by controlled laboratory experiments. To these experiments this list turns its attention.

Because we have found that a majority of High School General Science Teachers in Georgia contacted apparently use "Every-day Problems in Science," Pieper and Beauchamp, we have used this text as a basis for this list, although over 70% of the experiments are found in all the General Science Texts examined. This list is published to assist Principals and Teachers in making out plans for purchases for the fall. This list has been derived from a study of the 1940 edition. In the Teacher's Guidebook for Everyday Problems, there is a list given on pages 403-414. For this reason we are not giving the list of "Other Apparatus and Materials from Local Stores or Home" or "Material to Be Obtained When Needed." Reference to these community resources in the guidebook is recommended and where not given or loaned by students, parents or local stores the entire cost should not exceed $25.00. We regret that space forbids our printing these lists, as some of our functional friends may feel the appended list is too theoretical. To them we suggest reading these omitted lists before passing judgment on these suggested minimum purchases. We have not attempted either to suggest charts, visual aids or excursions. This list is confined to those manufactured and commercial articles which we think ought to be purchased and be a part of the permanent equipment of the General Science room. Where the teacher has available the necessary shop and tools and the dexterity of manipulation this list can be further reduced.

Here in this Laboratory we shall set up all the 111 experiments as a permanent display, including certain substituted personally prepared apparatus and auxiliary experiments from other General

Science texts which we consider useful. We will welcome science Teachers and students to visit this display whenever it is convenient. We will be glad to render any further assistance desired by individual teachers or principals.

The minimum list will not allow all the experiments to be set up at one time. The number in parenthesis behind each article gives the number of pieces of apparatus necessary for all experiments being assembled at the same time.

The catalogue numbers are from the catalogue of W. M. Welch Mfg. Co., 1515 Sedgwick Street, Chicago, Illinois, one of the Companies which from the very beginning of the High School Science movement has specialized in such equipment, and even now contributes to the ability to bring this information to you by advertising in this Journal.

From the appended list we feel that any school by an investment of $300.00 in apparatus and material, together with a proper use of community resources, can offer two years of High School Science of quality and with due regard to functional value.

LIST OF LABORATORY APPARATUS, MATERIAL

CHEMICALS AND TOOLS

Quant.	*Cat. No.*	*Description*	*Cost*
2	4080	Balance spring graduated in ounces and grams (4)	1.30
4	4516	Beakers, Pyrex, 250 cc (15)	.80
1	4752A	Burner, Bunsen (if gas is available; or) (10)	.55
1	5330P	Alcohol lamps	.55
2	4900	Clamps, burette, single, adjustable (4)	.70
1	4913	Clamp, pinch	.20
2	4908	Clamps, right-angle (4)	.50
1	1881	Compass, magnetic, 25mm	.25
1 set	4952	Cork bores	1.35
144	4948	Corks, assorted, some ordinary shapes, some flat	.65
1	4972e	Crucible, porcelain	.33
1	5256	Cylinder, graduated, glass, 100 cc	.85
2	5004e	Evaporating dishes, porcelain, 3 in. (75mm) dia. or larger	.48
1 box	5053	Filter paper (100 circles), 12 cm dia	.20
4	5160P	Flasks, Pyrex, Erlenmeyer, 250 cc or larger (8)	.80
1	5140	Funnel, glass, 3 in. (65mm) dia. (3)	.28
1		Galvanometer (3)	12.50
2 lb.	5235	Glass tubing, 3-4 mm outside dia	.60
2 lb.	5235	Glass tubing, 6 mm outsdie dia	1.00
36 in.	5235	Glass tubing, 18 mm outside dia	.40

Quan.	*Cat. No.*	*Description*	*Cost*
1	1166A	Jar, battery, 6 in. dia. x 8 in. high	.80
2	1813	Magnets, bar (maywell be rod-shaped cobalt chrome)	.90
2	1829	Magnets, horseshoe, large (or 6-magnets)	1.30
1	7969	Microscope, compound	72.80
½ oz.		Microscope cover glasses	1.75
½ gross		Microscope slides, glass	.63
6	8386P	Petri dishes, Pyrex, 100 mm dia	2.28
1		Prism, glass, 60° angles	.60
1	2450	St. Louis motor	3.75
1	5407	Mortar and pestle, 80 mm	.47
2	153	Meter sticks	.60
1	756	Pulley, single	.35
2		Pulleys, double	.90
2		Reading glasses, or other large convex lenses	2.00
2	5572	Ring stands, with small, medium, and large rings (10)	2.30
12	5505	Rubber stoppers, No. 2, 1-hole	.25
12	5505	Rubber stoppers, No. 6, 1-hole	.70
12	5505	Rubber stoppers, 2-hole, to fit wide-mouth bottles	.80
6 ft.	5510	Rubber tubing, 4/16 in. inside dia. (for connecting burner	.72
20 ft.	5110	Rubber tubing, 3/16 in. inside dia	2.00
1	2616A	Sending key, telegraph	2.25
1	2622	Sounder, telegraph	2.25
2	5227	Stirring rods, glass, 6 in. x 3/16 in. dia	.20
24	5620	Test tubes, ordinary glass, 6 x ¾ in.	.66
2	5629	Test tubes, Pyrex, 6 x ¾ in.	.12
1	4675A	Test tube brush	.10
3	4918	Test tube holders (6)	.30
1	5606	Test tube rack (3)	.60
2	1260	Thermometers, chemical, 10-110° C. (double scale graduated also in Fahrenheit) (6)	2.50
1	5711	Triangle, pipestem A	.12
1	5720	Tripod	.40
1	4050	Trip scales	12.00
1	1424	Vacuum pump	4.75
1 doz.		Vials, glass, homeopathic	.15
12	5750	Watch glasses, 3 in. in 1 dia	.60
1		Wing top	.10
2 lb.		Wire, copper, double cotton-covered, No. 18 or 22	1.80
¼ lb.		Wire, iron or copper, bare, No. 22 or 24	.50
1 spool		Wire, iron or copper, No. 30	.30
2	5207	Wire gauze, iron, 5 x 5 in., asbestos center	.24
1	1426	Air pump plate	6.75
1	3616	Concave mirror convex mirror	.50
1	5212	Glass cutter	1.00
1	818	Hall's carriage	1.25
1	8052	Magnifier, tripod	.75
12	5505	Rubber stoppers, 1-hole, to fit wide-mouth bottles	.75
3		Tuning forks, two with same frequency, one with different frequency	3.75
			165.78

CHEMICALS

Quan.	*Cat. No.*	*Description*	*Cost*
¼ lb.		Acid, citric, crystals	.25
1 lb.		Acid, hydrochloric, concentrated	.60
1 lb.		Acid, nitric, concentrated	.70
1 lb.		Acid, sulphuric, concentrated	.60
1 pt.		Alcohol, denatured	.30
1 pt.		Alum (aluminum potassium sulphate)	.21
1 lb.		Ammonium chloride	.25
1 lb.		Ammonium hydroxide	.51
1 lb.		Calcium oxide (for making limewater)	.30
1 lb.		Calcium sulphate (plaster of paris) or magnesium sulphate (Epsom salts)	.20
1 lb.		Carbon tetrachloride (or "Carbona" cleaner)	.40
1 lb.		Copper (cupric sulphate)	.30
1 lb.		Ether	.74
4 oz.		Fehling's solution A	.25
4 oz.		Fehling's solution B	.30
4 oz.		Glycerine	.20
1 cube		Gum Camphor	.30
4 oz.		Iodine, Lugol's solution (to be diluted)	.40
1 lb.		Iron filings	.30
1 lb.		Iron powder	.30
1 oz.		Magnesium powder	.30
¼ lb.		Magnesium ribbon, 1-oz. rolls	1.40
1 lb.		Manganese dioxide	.25
1 oz.		Mercuric chloride	.20
¼ lb.		Mercuric Oxide	.57
5 lb.		Mercury	10.20
4 oz.		Potassium bromide, crystals	.21
1 lb.		Potassium chlorate	.33
1 lb.		Potassium nitrate (saltpeter)	.30
1 oz.		Silver nitrate, crystals	.60
4 oz.		Sodium hyposulphite	.22
1 lb.		Sulphur, powdered	.25
1 sheet		Touch paper	.10
1728			
1 lb.		Zinc, mossy	.40
		Total	23.69

TOOLS

1 set		Auger bits, 1 each, ¼, ½, 1 in.	1.60
1		Brace	1.50
1		File, triangular, 4 in. or 6 in.	.12
1		File, round, small (4 in.)	.15
1		Forceps, steel or brass	.24
1–5130		Hammer, clam type	.25
1		Knife, paring, or large pocket size	.35
2		Needles, dissecting	.10
1		Pliers, 6 in., wire cutting	.30
1		Saw	1.00
1		Scalpel	.35
1		Scissors, small, slender	.45

Quan.	*Cat. No.*	*Description*	*Cost*
1		Screw driver, 4-in. blade	.25
1		Shears, strong	1.00
1		Tweezers	.15
1		Trowel or spade	.30
		Total	8.11

REFERENCES: EVERYDAY PROBLEMS IN SCIENCE

References Everyday Problems in Science

Study-Book for Everyday Problems in Science, Pupil Edition
Study-Book for Every Day Problems in Science, Teachers Edition
Objective Unit Tests for Everyday Problems in Science. Teacher Guidebook for Everyday Problems in Science.

Beauchamp-Mayfield-West Scott, Foresman and Company,

Atlanta, Georgia

Catalogues: W. M. Welch Manufacturing Company
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