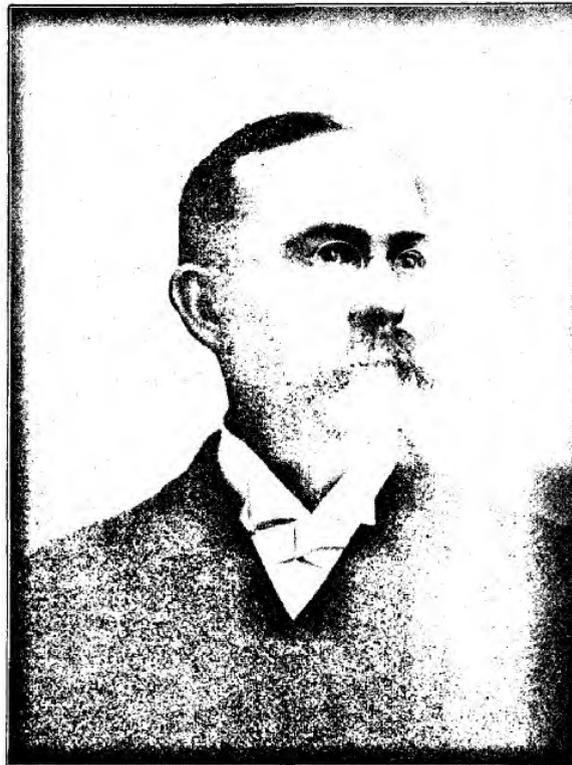


CHRISTIAN EDUCATOR

A SCHOOL AND HOME MAGAZINE

FEBRUARY



DR. ASHLEY S. JOHNSON,
FOUNDER OF THE SCHOOL OF THE EVANGELISTS.

1899

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The Christian Educator

IS DEVOTED TO

The Thorough, Systematic, and Symmetrical Culture
of the Hand, Head, and Heart, in the
Home, School, and Life.

Edited by FRANK WILLIAM HOWE.

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PRINCIPAL CONTENTS.

- Gems for Thought.
- Some Reflections.
- School Courses.
- Knowledge, False and True.
- Scientific Study.—VI.
- The Best Preaching.
- Bible Psychology.—IV.
- What To Do with the Bible.
- The Reading Circle.
- An Afternoon Ramble.
- "Queries for Students."
- Educational Hand-Work.—No. 8.
- The Happy and the Unhappy Way.
- Branches of Beech as Seen in Spring.
- Use and Abuse of Nature.
- Human Physiology.—Respiration—Ventilation.
- Current Interests.—A Good Law—Cleveland's "School Farm"—A Rapid Transit—Annual Negro Conference—The New French President—Some Recent Events.
- Correspondence.—Educational Co-operation.

A FRIENDLY WORD.

THIS month we have some special words for our readers who have allowed their subscriptions to get in arrears. Would it not be a good new-year resolution to pay up your financial debt to the EDUCATOR? We might specify quite a number of reasons to show that a magazine needs the prompt financial support of its readers. The EDUCATOR is not an endowed institution, and it carries practically no advertisements; it is all solid reading, at very low subscription price. There are doubtless other magazines that give more than six pages for one cent,—five cents for the month,—but the EDUCATOR is worth alone more than its cost to our readers.

But we are always glad to extend to our patrons the added advantages of any arrangement we can make with the publishers of other good periodicals. We published a special list of remarkable combination offers last month. We presume that it was very carefully read. Notice that there are upwards of thirty standard weeklies and monthlies that can be had with the EDUCATOR for the one price of the other periodical. In other words, in

these cases our subscribers get the EDUCATOR free by subscribing with us for the other periodical named. (We almost hesitate to point out that in some cases—see list—both the EDUCATOR and the other magazine can be had for less than the regular price of the other magazine.)

How can we do this?—We don't do it: the other magazine does it for the sake of getting new subscribers through the influence of the EDUCATOR. That is the truth in a nutshell. We simply pass the offer along to those who want the EDUCATOR and are willing to get it free by paying the regular price—or less—for a well-known periodical.

With this incentive before our delinquent subscribers, we expect their renewals will be promptly sent in. It is important to state that you are not an "old subscriber" for the other periodical which you order. If you want the EDUCATOR only, send fifty cents at once.

Note our last special offer with the *Teachers' World*. Send to us for sample copies. The regular commission will be given on the EDUCATOR in this combination. Write for particulars.

The "Christian Educator" and "Teachers' World" one year for \$1.00.

THE CHRISTIAN EDUCATOR

A School and Home Magazine

Edited by FRANK WILLIAM HOWE.

VOL. III.

FEBRUARY, 1899.

No. 6.

GEMS FOR THOUGHT.

[From the author of "Christian Education."]

RIGHT thinking lies at the foundation of right action.

GOD must first take hold of you, if you would take hold of others.

ANY effort that exalts intellectual culture above moral training is misdirected.

THE Christian should possess more intelligence and keener discernment than the worldling.

IF morality and religion are to live in a school, it must be through a knowledge of God's word.

HE is a Christian who aims to reach the highest attainments for the purpose of doing others good.

THE exercise of the muscles, as well as the brain, will encourage a taste for the homely duties of life.

THE world is full of one-sided men and women, because one set of faculties is cultivated, while others are dwarfed from inaction.

IN the common walks of life there is many a man patiently treading the round of daily toil, unconscious that he possesses powers which, if called into action, would raise him to an equality with the world's most honored men.

PARKERISMS.

MOST human beings are specimens of suppressed personality.

What is done for me?—Everything. What must I do?—Everything. And if you can reconcile these two, then you can work with God.

There are many ministers trying to preach the unsearchable riches of Christ who could preach far better by pounding the hard iron in a blacksmith shop than by pounding the pulpit.

Whatever your work is, that is yourself.

No one is educated unless he is a perpetual student. If you ever stop studying, you will have no education.

You stop studying when your ideal is stagnant.

SOME REFLECTIONS.

THE teacher must be what he would teach, because he *teaches* what he is. And this is true not only with reference to his manners and externals, but with reference also to his real personality. If he is himself an embodiment of the truth, he is therein a teacher of the truth, though he may never engage in the business of instruction. But if teaching is only his profession, and the thing to be taught is outside his own experience, he is of all men the most miserable. Fancy a writing-master trying to teach harness-making, or a faulty speaker teaching grammar out of a book! The book may teach, but the teacher can not teach the book unless it has been eaten and inwardly digested. Truth must be within before it can come without. We teach what we are.

WHAT is the truth? What is the fact? Truth is the substance out of which facts are made. Facts illustrate the truth; truth explains the facts. We *know* the truth, we *see* the facts. We may see the facts without knowing the truth; we may memorize facts without learning the truth. Facts point to the truth, but we may lose the way; truth is the way by which to reach all the facts. The Great Teacher said, "I am the Way, the Truth, and the Life." Knowing the truth is the way to the life, and life is but a continuous flow of the facts of experience. A fact is a thing done, truth is the thing that does. I am the thing in which truth becomes fact, if I do not pervert its process. And though I be filled with great bookfuls of fact, so that I stagger under their burden, and have not the truth, I am nothing. The fact dies, and the fashion of it passeth away, but the truth abideth forever.

"WISDOM is the principal thing; therefore get wisdom." Wisdom is the possession of truth; knowledge is the possession of facts. The wise man knows, the learned man remembers. Some men get wisdom by experience; it is better to get experience by wisdom. Some expect to get wisdom by knowledge; all may get knowledge by wisdom. Knowledge is the stream, wisdom the fountain. He who owns the fountain controls the proper use of the stream.

PHILOSOPHY is the love of wisdom. It is a condition of the mind rather than the statement of a system. I am a philosopher when I am in love with wisdom. To know the Truth is wisdom, and to know Him is to love Him. The Christian is the only philosopher. "The Christian alone can make the right use of knowledge."

EDUCATION is the application of wisdom to the getting of knowledge. Education is never "finished," but always in process of development. It does not consist in accumulating the largest possible quantity of facts, but in organizing every fact in accordance with great central principles. And these principles are the laws of God normally working in the human constitution. He who by active, personal faith puts himself in obedient touch with the laws of his being, holds the secret of wisdom that leads to all necessary and wholesome knowledge. Faith, conformity, obedience,—is the one condition of true knowledge. "We learn by doing." "He that willeth to do shall know."

EVIL TEACHING.

Not long ago a book was written by Mr. Horace Fletcher, which advocated and argued that each child be given a chance, by right training and education, claiming "that the state should provide adequate care for all young children born into the nation." The *Kindergarten Magazine*, under a department of "Social Quarantine," advocates the same thing. But this teaching is evil. By what means is the state fitted to educate the child in its fulness properly? What is there in the state, in its government, in its morality, in its social life, which fits it to become a great big mother of all the children? To do this work would be simply to create another political bureau, in which all sorts of corruption would run riot as it now does in similar institutions. The state is not fitted for that business. It is no better in a republic than in the average home. And, furthermore, the education of

the child belongs to the parents. They may try to foist the responsibility upon some one else, but God holds them largely and primarily responsible both here and hereafter. To go back to the state as a great foster-mother is to revert to paganism and to make the human being a machine.—*Signs of the Times.*

SCHOOL COURSES.

In a recent address on "Fitting the Curriculum to the Different Ages of Childhood and Youth," Pres. G. Stanley Hall, of Clark University, makes the following suggestions:—

As to the special studies the first period is, above all, the time of a study of Nature. She is the universal mother, and this should be the foundation of all curricula. The culmination of the child's interest is in human subjects, and from this subject it radiates outward to all natural things. Geography is the great bugbear in the way of carrying out this natural order of things. To my mind geography, as now studied, is a miscellaneous jumble of incoherent sciences.

As to mathematics, we have gone arithmetic-mad in this country, and our children study it from infancy through the grammar school. Do very little arithmetic before the age of eight or ten.

These sentiments are in harmony with the thought of many eminent educators who are becoming discontented with the traditional curricula. They all help to prepare the way for a more rational education that the world is longing for. The great desideratum now is a natural, symmetrical course of study fitted to all the educational needs of the child, physical, mental, and spiritual. It must be systematic, properly graded, progressive, and pedagogical. It can not be come at by random experimenting, but only by careful observation of normal child-development. It is encouraging to find influential teachers speaking of fitting the curriculum to the child; the prevailing plan has been to fit the child to the curriculum. Each will fit the other when the best is produced.

The time is going, if not gone, when "the murder of the innocents" by slow destruction of nerve, body, and mind, in the cramming processes of the schools, can go on without protest from intelligent parents. Almost at the outset of life, children of the present system have been called to "take up the white man's burden" in the form of numberless books and exercises, pale cheeks and spectacles, and premature loss of health and spirits. A return to nature is imperatively demanded, and the world is looking for educational leadership in a direction that will insure sound, healthy development of body, mind, and character. Let its coming hasten.

THE SCHOOL OF THE EVANGELISTS.

FRANK WILLIAM HOWE.

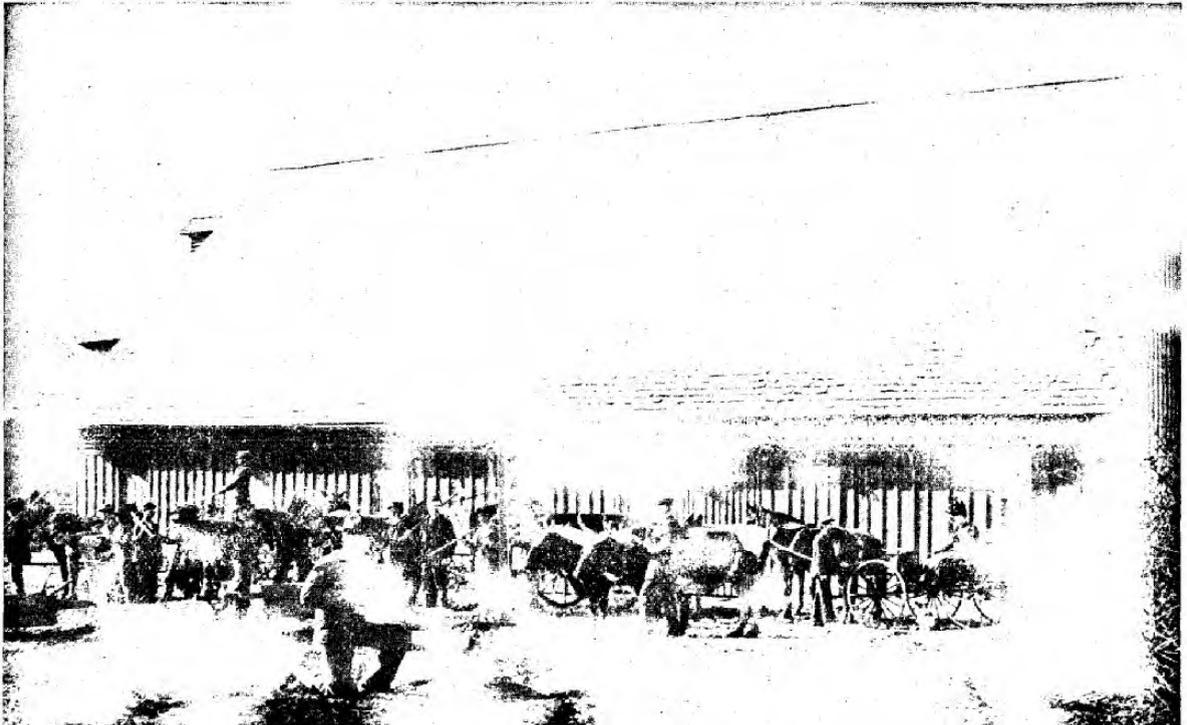
ONE of the most remarkable modern instances of faith is to be seen in the upbuilding and administration of a private school for "poor young preachers" at Kimberlin Heights, Tenn. This school had its birth in the mind and persevering efforts of Dr. Ashley S. Johnson, whose zeal, based on the experience of success, has led him to affirm that he is willing to give his life "to the demonstration that a school can be run on the promises of God." Five years of his life have already gone into the problem, and with such results that the rest are likely to be spent in the same way.

Dr. Johnson's interest in evangelistic educational work began in a system of Bible instruction by correspondence. He enrolled in these studies thousands of students, and believes himself to have been instrumental in leading more young men to become preachers of the gospel than any other man of this generation. His correspondence in this work became so great that he felt obliged to give up preaching altogether in order to devote all his time to teaching. Money for tuition flowed to him from all directions. But he became convinced

that his correspondence course did not meet the wants of many poor boys who needed a more elementary education in English before they could avail themselves of it. He felt that he had an inspiration to start the "School of the Evangelists" for the benefit of this class. He corresponded with friends, and received much encouragement to go forward with the enterprise. Finally one said, "Go ahead, and I will give you a hundred dollars." Another offered to contribute plans for the building. With only this much in sight, Dr. Johnson employed a foreman, contracted for 117,000 feet of lumber, with brick for the foundation, and went to work.

At this juncture several young men, some of them carpenters, wrote for employment in order to pay for tuition in the new school, and these were immediately set to work. From this point onward both the building and eager students were assured.

But a building and students do not make nor support a school. Some source of income was requisite; and to provide this Dr. Johnson consecrated to the new school all the receipts from the sale of his books and pamphlets. Their titles



and circulation are of interest. There have been sold 50,000 copies of his "Great Controversy," 22,000 of the "Tennessee Evangelist," 10,000 of

was a very few cents. Not a cent is ever put in a bank, nor is any provision of funds made for the future.

This dependence upon the bounty that the day may provide is one of the leading characteristics of the instruction in this school. In the course of study it is called "Faith Development," and it runs through every year. It certainly has a tendency to develop faithful preachers. Speaking of his own experience and purposes, President Johnson says:—

I have found that if faith grows, it must have something to do. I give mine the right of way. It is a contradiction to say that a man trusts God to supply his needs when he has laid up enough to last him his whole life.

I started out to educate men to preach, and thus incidentally to glorify God. Now I run the work to glorify God and incidentally to prepare and send out more and better preachers. We run the work on the promises of God in order to test these promises for ourselves, and to demonstrate to the young men that they are true. Sending out a man to preach is a small thing—worse than a failure!—if he does not know "by heart" that God is true and faithful. Men have in a great measure left God out of their calculations and plans; I am trying to bring him back to his throne in the human heart and in common business.

I am endeavoring to provide men who are not afraid to do anything, go anywhere, endure any trial, suffer any privation, simply in the name and on the promises



THE MAIN BUILDING.

the "Letters to a Young Methodist Preacher," 5,000 of "Out of Darkness into Light," 15,000 of the "Condensed Biblical Encyclopedia," 10,000 of "Opening the Book of Seven Seals," 10,000 of "Johnson's Speeches," 10,000 "Evangelistic and Expository Sermons," 2,000 of "Ten Lessons in How to Read, How to Understand, and How to Remember the Bible," and 10,000 of "The Life of Trust," making a grand total of 144,000 copies.

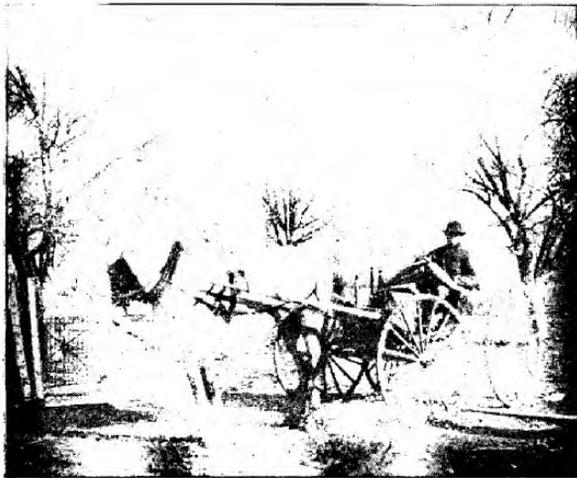
With this endowment of books, buildings, and industrious students, all inspired with enthusiasm for the work of the gospel ministry, the School of the Evangelists began its work. Its treasury is a pasteboard box, many times replaced as it has worn out, in which is deposited the income of sales and donations that are received in the daily mail, and from which the running expenses of the school are provided. When these supplies do not come in sufficient amounts, the students are called together, the situation frankly explained, the classroom study stops, and "all hands" go to work until the flow of funds is resumed. The largest sum ever received in one mail was eighty dollars, and the smallest



CANNERY AND LAUNDRY.

of God. While I sympathize with every effort to preach the gospel to the whole creation, the results that follow present efforts, when compared with what needs to be done, prove that the work needs hastening somewhere. I am not afraid to declare that beyond a doubt there is something radically wrong in an educational system

that does not lift the saving of men above the aspiration of mere place-hunters. A young lawyer or doctor expects to begin at the bottom and work his way up, and I believe a young preacher can do as well. The



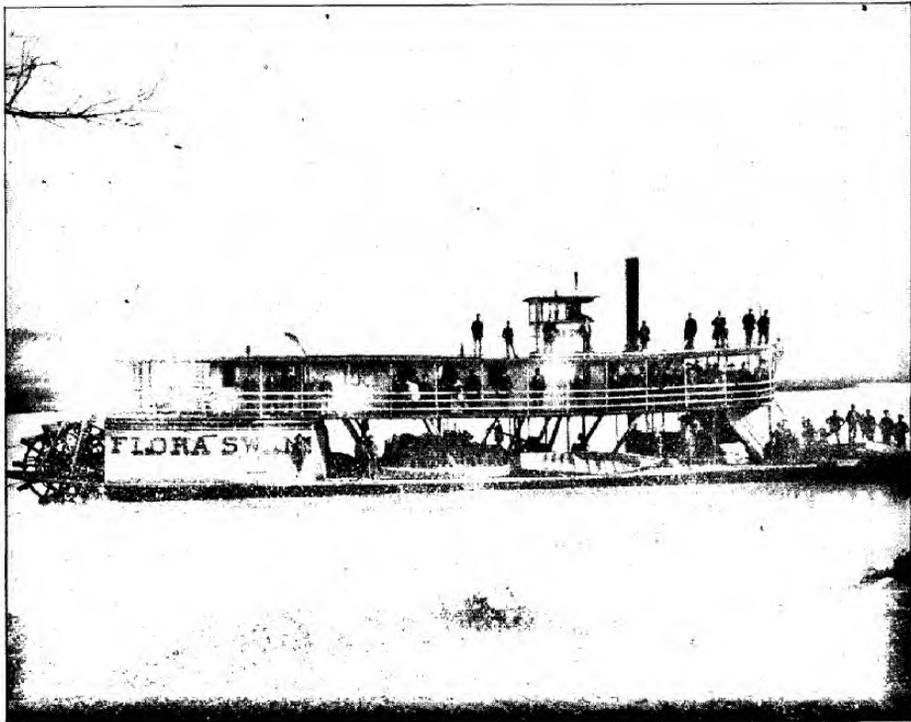
U. S. MAIL.

field is great, and the need is pressing. More laborers are needed everywhere. I am trying to train my boys, and at the same time to generate in their hearts more zeal for world-wide missions. We reduce the matter of evangelization down to one man, and that man is you—you must go, send, or perish!

These sentiments suggest the spirit in which this school is conducted. Self-sacrifice is the key-note. The plan of study does not appear to differ materially from that of other schools of the same grade, except in its courses in "Faith Development" and the Bible. The industrial work on the farm, shop, laundry, and dairy, is incidental to the maintenance of the school work, rather than a definite educational factor in the system. But it is inevitably educational in its influence on the development of character, and constitutes one of the most valuable influences that characterize the work of this school.

A general view of the scope and purpose of the school and the responsibilities of students may be seen in the following statement of the set conditions on which every student is admitted:—

1. He must pay a matriculation fee of \$10 in advance.
2. He must be an earnest and zealous Christian.
3. He must be free from the use of tobacco in every form.
4. He must be fully decided and determined to preach.
5. He must pledge himself in writing to stay at the school during vacations until in the judgment of the managers he can spend them profitably in preaching.
6. He must be seventeen years old, and furnish testimonials proving his purity of character, purposes, and sticking qualities.
7. He must be willing to eat uncomplainingly plain food, such as the school is able to provide.
8. He must furnish his own bedding, clothing, towels, and pay for washing his fine linen.
9. He must pledge himself in writing to assist the president in his determination to keep unworthy boys out of the school, and to help in every way to prevent any improper conduct on the part of students.
10. He must attend strictly to his own business, preserve intact the property of the school, keep himself free from love affairs, and continue in his work [manual and intellectual] until his course is finished.



STEAMER FOR KNOXVILLE.

The foregoing is a condensed statement of the only specific "rules" that govern in the school. Their operation insures the institution against loss or discredit from unworthy recipients of its privi-

leges. The entire plan of work, administration, and support, make this school for preachers a unique development in modern education. With its present facilities, the institution can accommodate only about one hundred students, and its manager and friends are anxiously hoping that it may soon find other benefactors who will enable it to provide for two or three times its present capacity. But it is not altogether a misfortune that it is now obliged to turn away many who might be found wanting in the staying qualities that are essential to success. Sooner or later every young man or woman who would rightly use a good education will find the way to get it.



MRS. A. S. JOHNSON.

A word should be said concerning the location and natural surroundings of the school, factors which have an important, if not vital bearing on the success of any educational institution. The School of the Evangelists is beautiful for situation, in the midst of a charming agricultural region traversed by the French Broad River. Looking eastward, the river embraces a small but fertile island cultivated by the school. Looking westward, one sees a fine herd of Jersey and Holstein cows grazing over the background of hills and meadows. To the south, is Bay's Mountain and its forest-covered foothills. The buildings of the school stand on an eminence, and include the president's cottage, two large recitation halls, a commodious chapel, sleeping rooms, bakery, boiler and pump house, and a large barn for the stock.

The present value of lands and buildings is estimated at \$40,000. The work of the farm and home is carried on exclusively by the students, and exhibits an admirable plan of industrial management.

Considered as a whole, this school is a convincing illustration of the effectiveness of a faith that works by love. However one may differ with the theology and scope of its work, it compels admiration for the enterprise and devotion of those who have made it what it has so far come to be; and its future development may well be watched with great interest by all who are looking for the best type of benevolent, practical, Christian education.

HOW TO BUILD UP A GOOD SCHOOL IN THE SOUTH.

BOOKER T. WASHINGTON, whose Institute in Tuskegee, Ala., was described and illustrated in the September EDUCATOR, receives many requests for advice in the organization of smaller schools for negroes. He has prepared the following circular, which has in it many points of value for the conduct of any school anywhere:—

“The colored schools in the South, especially in the country districts and smaller towns, are not kept open by the State fund, as a rule, longer than three or four months during the year, and the great question with teachers and parents, is how to extend the school term to seven or eight months, so that the school shall really do some good. I want to give a few plain suggestions, which, I think, if carefully followed, will result in placing a good school in almost every community. In this I am not speculating, because more than one Tuskegee graduate has built up a good school on the plan outlined—

“*A Good Teacher.*—In the first place, a good teacher must be secured—one that is not only not working for money, but one that is willing to sacrifice for the good of the race, and one that is willing to remain in one community, and not move from place to place every three months. The teacher must be one who is willing to settle down in one community, and make that his home and life work.

“*A Comfortable Schoolhouse.*—The next thing after securing an educated, honest teacher, is to get a convenient and comfortable schoolhouse. Usually, in the far South, the State is not able to build a schoolhouse. How is it to be secured? A good schoolhouse should be carefully planned. Then let the teacher or some one go among the people in the

community, both colored and white, and get each individual to give something, no matter how small, for purchasing the lumber. If enough money can not be secured in this way, a supper, festival, entertainment, or church collection will help out. After the lumber is secured, parents should be asked to 'club in' with their wagons, and haul it free. Then at least one good carpenter should be secured to lead in building; each member of the community should agree to give so many days' work in helping to build the schoolhouse. In the work of building, the larger pupils can help a great deal. In these ways, by patient effort, a good frame schoolhouse can be secured in almost any community.

How To Extend the School Term.—In cases where it can be done, take a three or four months' public school as a starting-point, and work in co-operation with the school officers, but do not let the school close or the teacher leave at the end of three or four months, because, if that is done, the school will amount to almost nothing.

As soon as a teacher goes into a community, he should organize the people into an educational club or society, and there should be regular meetings once a week or twice during the month, and plans for building a good school should be discussed and decided upon.

There are a number of ways of extending the school term. One is for each parent to pay ten, fifteen, twenty-five, or fifty cents each month during the whole time the school is in session. Often parents who can not pay in cash, can let the teacher have eggs, chickens, butter, pigs, sweet potatoes, corn, etc. Another way is for each farmer to set aside a certain portion of land, and give all that is raised on it to the school. Still another plan, and one that is being successfully carried out in at least one place, and one that I think much of, is for the teacher to secure, either by renting or purchasing, a small tract of land,—say from two to five acres,—and let the children cultivate this land while they are attending school. If in this way, three bales of cotton can be raised, and a variety of vegetables and grain, the produce can be sold, and in this way the school term extended from three months to six or seven months.

How the Teacher Can Help Himself.—In every case where it is possible, the teacher should buy a home in the community, and make his home in every way a model for the community. The teacher should also cultivate his farm, or follow some other industry when not teaching, or in connection with his teaching, and in this way not only help himself, but set a good example for the com-

munity. There are few communities where a woman teacher can not add much to her income by sewing, dressmaking, or poultry raising.

TO BE, NOT TO SEEM.

LIFE is a reality. To perform its duties, something real is needed rather than anything imaginary. The hand, the mind, and the heart must be put to training and to work. Nothing less is adequate to the task.

The world is not in need of careless, thoughtless, slighted labor. Earnest, painstaking, accurate work is wanted. The beginner in music, always out of time or out of tune, is not in demand. His only hope lies in the possibility of correcting the mistakes. Yet too many are content to remain beginners. The farmer not infrequently is dependent upon the carpenter, painter, or other workmen to do other small jobs which, by a little care, he might do himself. Again, it occasionally happens that the housewife is satisfied to leave the cooking, washing, sewing, and in general, the making of the home, to servants, while she gives her attention to the glamour of society.

There are many examples of noble achievements along the line, of every-day, practical experiences. One case will illustrate: A young lady school-teacher upon marriage found herself ignorant of the numerous household duties. She immediately turned from her former work to that of making home. With marvelous rapidity the object was gained. Thus her charm, though not withdrawn from society, was extended to the home. One having a practical disposition will acquire a practical education. The student that does not care whether school keeps or not, lacks much. He does not desire even to make an appearance, much less to be anything. The student that studies simply to recite is lacking but little less. He has his reward: he makes a show. The student that studies for truth, for the love of it, recitation or no recitation, is the one that succeeds. If he finds himself without work assigned by the teacher, he is at no loss to furnish himself with useful employment. In fact, time seems altogether too short for a full survey of fields at hand, to say nothing of the beautiful landscapes spread out toward the distant horizon. And further, raising his eyes to the infinity of space, studded with the gems of eternity, he feels as did Newton that his work is but gathering, childlike, a few pebbles by the sea.—*E. C. Kellogg, in the Practical Educator.*

KNOWLEDGE FALSE AND TRUE.¹

M. C. WILCOX.

AN old maxim of Bacon is, "Knowledge is power." But it depends on the kind of knowledge. Much that is called knowledge, or science, nowadays, and in fact through all the ages, is mere guesswork. The science of to-day *knows* that much of the science of the past was *myth* or *fable*; but it follows in the same old path of vain conjecture. The highest among the world's devotees at the best are but—

"On the lowest benches of truth's great college
To guess at what grown-up angels know."

Much of the knowledge of to-day is the "science falsely so called," which seeks to interest the receptive student as it has intoxicated its devotees, in "profane and vain babbling," "old wives' fables," "endless genealogies," "empty jangling," "foolish questions," "strivings about law," and "commandments of men," which "turn from the truth," and minister to vanity. This conjectural sort of knowledge is true to a great extent of nearly all the various sciences and arts. How much of conjecture and mere hypothesis is found in natural philosophy, psychology, astronomy, geology, medicine, and theology. Certain phenomena are witnessed, certain effects seem to follow certain causes, but apart from a higher revelation, how little man knows of the real origin of these phenomena or manifestations.

Let a practical physician speak for the science of medicine, and in speaking for that, speak for all. I quote from the *Arena* for November, 1896:—

Practical medicine is an old hulk out on the professional sea, without sail, oar, rudder, compass, or north star. It has no head. It has no body, unless we accept as such the conglomerate mass of discordant elements seen in the opposing schools—the Allopaths, Eclectics, Homeopaths, Hydropaths, etc. Its reliance is on its voluminous tail, a prehensile tail, by which it clings tenaciously to old-time theories and dogmas. . . . Practical medicine has not even the impulse-center of the starfish. It looks to its prehensile tail, with its old theories, dogmas, and traditions, for impulse and guidance.

In the pillory of the condemned, medicine does not stand alone. It is a frequent thing to find in our leading periodicals and reviews sweeping con-

demnation by leading men of the whole popular system of education. The theories of astronomy, geology, and theology as sciences, are undergoing constant change, according as the little fires kindled by human investigators set new areas of scientific atmosphere in motion; and the great result is that the minds of thousands are unsettled, but the great world is moved no nearer the stars of God, nor is man more of an ideal character.

And yet this uncertain theorizing on the part of learned, energetic men is not unfruitful of results. It brings bread and butter from the ignorant to the equally ignorant. It gets gold. Its favorites acquire fame. It soothes into self-satisfaction its egotistical and more indolent devotees. It heaps up sunshine friends. It fosters pride.

All purely worldly knowledge is in its getting based on a wrong conception, a false notion. It reverses true processes. It builds the pyramid on its apex in shifting desert sands, and wonders that it is not more stable. This wrong notion is education from the standpoint of the imperfect human. It is heathen in its cradling, and satanic in its origin. It is set forth in a maxim attributed to Solon, and inscribed over the portal of the temple of the old Delphic oracle, "Know thyself." Alexander Pope enlarges the thought thus:—

"Know well thyself, presume not God to scan;
The proper study of mankind is man."

The thought has been enshrined in so-called Christian literature and education. In one of the latest books, "What a Young Man Should Know," by an esteemed Eastern clergyman, I read, "The only proper study of man is man. The only way to arrive at the correct knowledge of human nature is by a study of human nature." It is the repetition of the same old falsehood, continuing the same old system of search and guess; and ignorance, though more refined, is as colossal as ever. As of old, Inspiration may unchallenged make the same statement, and ask the same question: "The heart is deceitful above all things, and desperately wicked; who can know it?" And the true student will find response in the words of the ancient prophet: "O Lord, I know that the way of man is not in himself; it is not in man that walketh to direct his steps."

What is the end of all this worldly knowledge?—Apart from its few days of despairing pleasure,

¹ Extracts from a commencement address before the students of Healdsburg (Cal.) College.

it is death. It leads men to hope, but it disappoints. It blinds where it can not instruct. If we prize knowledge by what it brings, surely we should estimate lightly the knowledge of the world. Like beautiful soap bubbles, its results vanish while we gaze upon them. All knowledge of all worldly languages, sciences, arts, and "ologies" will sometime be locked in the archives of oblivion. Man's earthly tenure of stay at the longest is but a little while, and he enters the tabernacle whose door "never outward swings." His life here is as a shadow which appeareth for a little time and vanisheth away. Like a flower he blooms in the morning, at evening it is withered and fallen. His existence is as the grass, and his glory as its fleeting flower. His fame perishes in eclipse, oftentimes of a meaner body. His riches take to themselves wings and fly away. His great strength of body or of mind enfeebles with fast approaching age. Earthly friends leave him for some newer or more favored child of fortune or of fame. Changing theories crowd his knowledge out of fashion, or stigmatize it "ignorance." Death ends all. Well said the prophet, "Let not the wise man glory in his wisdom, neither let the mighty man glory in his might, let not the rich man glory in his riches."

What is the true knowledge? How may we obtain it? What is its end? its object? its result? It is stated in this text: "And this is eternal life that they might *know thee*, the only true God, and Jesus Christ whom thou hast sent." It is not a new doctrine. It is older than modern systems. Said the old Idumean emir:—

"Acquaint now thyself with him, and be at peace: thereby good shall come unto thee. Receive, I pray thee, the law from his mouth, and lay up his words in thine heart."

That higher knowledge, the only true knowledge, is knowing God,—not knowing *of* God, but knowing God. Knowing him, we know all; for God comprehends all.

How may we know him?—Only through Jesus Christ; for he is the only man who has perfectly revealed God to the children of men. He declared to the worldly educated: "I know him: and if I should say, I know him not, I shall be a liar like unto you: but I know him, and keep his saying." "All things are delivered unto me of my Father; and no man knoweth the Son, but the Father, neither knoweth any man the Father save the Son, and he to whomsoever the Son will reveal him."

In this is knowledge and positive assurance which the conjecture or hypothesis of the world can not give. Knowing him, we shall see and know our-

selves in the clear light of heaven's revealing. Only so can we know ourselves; for God only knows the heart of man. But knowing the Creator, he will reveal to us the creature.

Do not be discouraged, therefore, if you have not obtained all that you have longed for in the way of book culture in the great schools of the world. You may not have so much to unlearn. Moses, after being learned in all the wisdom of the Egyptians, found it necessary to take a forty-years' course in school with God in the deserts of Midian, caring for the sheep of his father-in-law. Paul, after taking a course that was the first among his own countrymen, confessed, "What things were gains to me, those I counted loss for Christ." And he learned more in his three-years' retirement in Arabia, yea, in the few days following his journey to Damascus, when the Lord met him, than he had learned in all the previous years.

Make the knowing of God the basis of all your knowledge. Knowing him, having his Spirit, filled with his Word, you may be able to discern between the good and the evil, you may separate the wheat from the chaff.

And then the possibility of knowing God! What does it mean? Does it mean that you will be cramped and narrow and short-sighted?—Nay, verily. God's commandment is exceeding broad, and its dimension lengthwise is eternity. What a field for investigation, for expansion,—the unfenced realms of God! Only finite capability will limit the opportunity or quantity.

Would you be a painter? What glorious scenes, what vistas of beauty, will there open before you! There will be no need to hasten—tuition will be free, and eternity is yours.

Would you study astronomy? You may have longed to study that and other interesting sciences here, but may have given it all up for Christ's sake. Do not mourn your hope as dead. It waits more glorious birth, with better facilities. In the redeemed land it will not be hypothesis, but fact. The eye will not gaze through an atmosphere hazed by sin; it will be as clear as the azure air of heaven's dome. The vision will not be dimmed with mortality. You will not be confined to the heights of medium mountains, but, gifted with superhuman powers, you may wander from world to world, from sun to sun, and forever bring home to a sinless earth new proofs of God's wonderful works.

Would you study music? There are no such masters of melody on earth as heaven knows. There is music everywhere there, even as discord

here. The rolling of the spheres will be the grand bass to the sweet treble of softest bird-songs and growing flowers, which ears attuned to the harmony of God will hear. But the sweetest music of all will be the grand new song learned only in the school of experience, learned only in knowing God. The minor chords will be absent. It will be only grand major symphonies, sweet, entrancing melodies, and glorious songs of triumph in which all may have a part, with none of the envyings and jealousies which earth now knows.

Knowing God, most wonderful knowledge! How easy will be all the minor lessons; how clear all sciences of inanimate things! Who would not know him and Jesus Christ whom he hath sent?

SCIENTIFIC STUDY.—VI.

OTHO C. GODSMARK, M. D.

ELECTRICITY.

THE two great lines of investigation in the field of electricity have been, first, how to produce electricity, and second, what it will do when produced. What electricity really is, has been largely a matter of speculation. It is commonly accepted, however, that electricity is one of the higher manifestations of vibration, and so far as our present study goes, we shall so consider it. It appears to occupy the field next higher than light, as the following illustrations will show.

In the December number of the CHRISTIAN EDUCATOR it was seen that while heat occupies much of the same field of vibration with light, yet it falls considerably below light in the lower ranges of its manifestation; and while electricity is closely related to, or associated with, light, yet we have to get above light in its highest forms to find that form of vibration which we call electricity. To learn that electricity is closely related to light, we have but to apply one of the electrodes of a battery to the region of the optic nerve, and by its stimulation we receive the impression of light. This is not the case when applied to the auditory nerve; for the reason that the nerves of hearing receive vibrations of a much lower order.

There is but one phase of electricity to which we shall call special attention, that is its quality of being changed in its manifestations. We can not say of electricity as we did of light and sound, that by increasing or decreasing the number of vibrations per second, within its special field, we get a higher or lower form of electricity. This may be true, and may give us galvanism or magnetism for all we can know at present. There is,

however, one very interesting fact concerning electricity,—its power of being slowed down so that it enters the field of light. It is well known that phosphorus has the power, not only of receiving and storing up rays of light, but also of giving them forth again in a much subdued or lower form. For instance, a plate of phosphorus may receive light from the direct rays of the sun, which are bright and penetrating; but when it gives forth these same rays of light the following night, we find them much subdued in power.

By forcing the electrical current through a "Crookes's tube," it meets with a certain amount of resistance which brings much of it near to the field of light. But this same current, though yet in its modified form, retains much of the penetrating qualities characteristic of electricity. These modified rays, or "X-rays," may then be caused to pass through some object or collection of objects, which permit the rays to penetrate them more or less readily. For instance, a coin is placed behind a piece of timber; the rays penetrate the stick of timber so much more readily than they do the coin that could the eye recognize these rays, we would see the shadow of the coin through the timber; but the vibrations of which these modified rays consist are yet too rapid to be recognized by the eye. Here it is that the "fluorescent plate" of the X-ray machine comes in. By causing these modified rays to fall upon the specially prepared plate they are still further reduced in their velocity, and come within the range of light. So we see the shadow of the coin through the intervening stick of timber.

When a slight electric current is caused to pass over a wire of considerable size, we notice no change in the appearance of the wire, especially if it is a good conductor of electricity; but if the electric force is considerable, and the wire is small and composed of a substance that is a poor electrical conductor, we find immediately that the electricity, being thus resisted and slowed down, is converted into heat and light, both of which are lower forms of vibration than electricity. The resistance offered to the electric current as it is forced to pass from one carbon point to another in the arc lamp changes the electricity into light, by slowing down or lowering the number of vibrations per second to a point that brings it within the range of vision. Suppose a thunderbolt hurled from the skies. The friction of the atmosphere, which is a very poor conductor of electricity, causes such a retarding of the vibratory movements of the outermost portions of the electrical ball that they

become slowed down to a point where the eye recognizes them as light, not as electricity.

Now if electricity can be, and constantly is, being changed from its original form to that of light, by meeting with resistance; if light is changed from a perfect white ray to a distorted one of a lower nature—one which shows a preponderance of the yellow and red rays by meeting with resistance, as we have seen in our past studies; if sound is lowered in its pitch by meeting with resistance—its compositeness lost and distorted to a tone of a different and lower nature;—why, then, is there not an underlying principle in all this upon which we can build our structure of scientific truth?—We believe there is.

“But,” says one, “there is nothing new in all this.” And as Dr. Reed says in his “Criticism” published in the January number of the EDUCATOR, “His conclusions are in harmony with the best scientific thought of the day.” I am glad this is recognized as being true, for I had not thought to present any new scientific facts, but merely to call attention to an underlying principle which, I think, is being overlooked by the great majority of public educators to-day. I am glad that so far we are all agreed. In fact I have sought to present these subjects in so simple and plain a manner that all could grasp them, and see the true simplicity of the statements made. If we are all in harmony thus far, then we are ready to go on and draw some conclusions that seem to be just as simple and harmonious as has been the study thus far. If our views so far are true, then we may expect to understand the scientific principles found in the Bible; for just as truly as God is the author of Sacred Writ, and just as truly as his hands formed the mighty worlds that swing in space, obedient to the laws that govern their courses through the heavens, so surely is there harmony existing between nature and revelation.

In the next article I hope to take up some of these subjects for which the past lessons have been preparing the way.

THE BEST PREACHING.

THERE are people who feel it necessary to put enmity between piety and learning, between personal Christianity and the broadest and highest education. There are even preachers of the gospel who deprecate literary training or any special cultivation of the *best* way of saying and doing things that ought to be done, whose ministry is less effective than it ought to be because of their

failure to use the beauties of language as did their Master. The following excerpt from the *North-western Christian Advocate* puts it most happily:—

From the rhetorical point of view there is no more beautiful or artistic book than the Bible; and its loveliness reaches its ripest perfection in the sayings of Jesus. Those who for sensational effect always refer to the apostles as “poor and illiterate” fishermen, and especially those who do so that they may secure Scripture indorsement for a poor and illiterate sermon, are not dealing honestly with the facts.

The pulpit was made for man, not man for the pulpit; and the preacher who fails of making his pulpit a center of attraction will just as surely fail of making it a center of power. It is not simply that he must have something important to say, he must also train himself to say it in the most effective way. Now, so long as man is compounded of reason, emotion, and a sense of beauty, he will not be tolerant of a leader who, in the name of God, argues with him as if he were a logic-chopper, or rants at him as if he were a mass of flabby sensibility. Man requires in a leader that note of authority which comes only of a message known in the fibers of experience to be a divine message and accredited by a delivery which directs itself at the very citadel of his conscience through every avenue—rational, emotional, and esthetic—of his nature. The preacher who imagines this can be done without infinite painstaking in preparation, misjudges terribly the character of his work. He has a message from God; that message must first be clear to himself, but in making it clear to himself, he is dependent upon the words by which he defines it to himself. Then he must make it clear to his people; but his only means of communication is by the symbolism of the Word. To fail at either point—in understanding it himself, or in communicating it—is for the preacher to dishonor his commission and vitiate his message.

But granting an understanding of the message and a measure of clearness in communicating it, does the responsibility of the preacher end here?—By no means. There still remains the responsibility of so preparing it that by the mere beauty of its presentation it will command and keep attention; for beauty has a universal and fadeless quality which will commend truth so linked to all classes of minds and perpetuate it through all ages. It is just the difference between saying a thing any way and saying it the best possible way that makes the difference between a thing speedily forgotten and a thing forever remembered. Sermons would be more welcome as literature, were preachers as anxious about the permanence of their message as poets are about their favorite creations. And, as literature, why might not their influence and power be working long after the hand that wrote them had vanished and the voice that uttered them was still? Surely a minister may honorably desire to perpetuate his ministry and commend his message by a style clear, strong, and beautiful as that of the Book which he expounds and which abides, in no small measure, by virtue of its style.

THE formation of character is the work of a lifetime, and it is for eternity.—*E. G. White.*

BIBLE PSYCHOLOGY.—IV.

BY THE EDITOR.

WHAT is "the spirit of man"?

This question stands as the natural sequel to the others previously considered in these articles. It will be fitting, therefore, to present a brief recapitulation of the foregoing development of the subject of "Bible Psychology."

The importance of the subject finds its basis in right educational thought and practise as a preparation for the highest kind of living. If "education is but a preparation of the physical, intellectual, and moral powers for the best performance of all the duties of life," then it is of the greatest importance to understand the nature, relations, and right development of these three sets of faculties. And if God is both the Creator of man and the Author of Revelation, and His Word contains "all that is needful to guide man in the study of what he needs to study," then we shall expect to find in the Bible a definite recognition of man's triple nature, and also the data for a complete definition of each of its three elements.

We have seen that the Scriptures do describe man "wholly," as "spirit, soul, and body." Likewise the body is shown to be "dust," or the material part of man; and the soul is defined as the "life" that animates the body, and dies in the stoppage or the pouring out of the blood. It is the sentient, intelligent power that sustains and governs all the bodily activities, while it is at the same time largely conditioned by them. Many scriptures might be cited in proof of these statements that would appear more evident in the light of further investigation.¹

It is of course true that the original word for "soul" is used many times in the Scriptures in some secondary, derived, or symbolic sense; but we are here seeking the primary or central meaning which, being understood, furnishes the ultimate key to all its secondary applications. And judging from the evidence already presented, this

ultimate meaning of "soul" is *the feeling, knowing, acting LIFE* that is momentarily existing in the body.

We are now to seek this same central and ultimate meaning of the word "spirit." The logical presumption would be that if the body embraces all that is material in man, including food, drink, and air, while the life or soul is the feeling, thinking, motive force that fills the body, then the spirit must be all that is left of man and not included in his body and momentary life. This spiritual residue must, then, be either a *resultant* of life working in the body, or else a supernatural power that *uses* both the body and its life as an instrument.

This latter view regards the Spirit of God as directing the doings of man. But man can oppose, for a time, his own doings to the leading of the Holy Spirit. Man's own spirit rules himself, at least during his probationary period. But we can not conceive this "spirit of man" as being outside of himself, independent of his body and life; hence, we are led to infer that it is the *product* of the life in the body, the aggregate *expression* of the personality, the individual *influence* and *character* of the whole being.

But does this inference accord with the Scriptures? Does the meaning of the Bible word "spirit" justify such a conclusion?—There are two Hebrew words, *neshamah*, and *ruach*, and one Greek word, *pneuma*, which are found in the Scriptures as the originals of the English word "spirit." There are occasions where these original words may be also translated by any one of the following terms:—

Air	Anger	Thought
Breath	Courage	Touch
Blast	Inspiration	Smell
Wind	Mind	Ghost
Tempest	Understanding	Soul
Power	Word	Life

In so long a list of different possible meanings, how shall we certainly ascertain the crystallized, concrete significance of the word "spirit"?—Manifestly by selecting that term whose meaning includes, underlies, and explains all the others. Such a term when found should be a true synonym of "spirit" in all the various uses of that word in the Scriptures.

¹ The following scriptures are here referred to in evidence:—

The soul "liveth." 2 Kings 2:2; Ps. 22:29; 66:9; Isa. 55:3.

The soul "knoweth." Ps. 139:14.

The soul is "satisfied." Prov. 13:25; 25:25; 27:7; Isa. 29:8; 32:8; Lam. 1:11.

The soul "wearies." Job. 7:15, 16; 10:1.

The soul "sineth." Eze. 18:4, 20.

The soul "loveth." Cant. 1:7; 3:1, 2, 3, 4.

A merely superficial inspection of the list of terms just given, immediately suggests to the mind the idea of energy, force, action, influence,—in a word, *expression*. It is difficult to find just the word that is most satisfactory as an equivalent for each of those in the list, simply because the English has no perfectly satisfactory synonym for *spirit*—though every one seems to get the “spirit” of its meaning by direct intuition. The only difficulty is in making a sharp distinction between the spirit and the soul, or life. The spirit is the essential attribute, product, or expression of life, but not the life itself—except in a figurative sense. Just so the smell or odor of an apple is not the apple itself, nor the life that is wrapped up in its seed, but is a characteristic *emanation* from the apple. We can *think* of the odor apart from the apple, but we find it only as a *product* of the apple.

Speaking broadly, the term “word,” as meaning the *expression* of thought and power, is a fairly satisfactory equivalent for any of the terms in the foregoing list. Thus, a word is a blast or breath of air, carrying like the wind an expression of mind or power, and touching the understanding or soul of another. A thought is a word yet unexpressed, an action is a word written in muscular contractions.

In this large, symbolic sense, the *word* includes every possible expression of thought, utterance, and action, of which man or any other being is capable. Jesus was the Word because he was the complete expression of his Father's thought toward man, the same Word that is now living in the Spirit. And by analogy, it would appear that the “spirit of man” is that totality of thought, word, and act, which is summed up in *character* and *influence*,—the expression of personality. “Character” is its static or passive aspect, “influence” is its dynamic or active exercise; neither is flesh or physical life (body or soul), but *spirit*,—*mind* as distinguished from matter and motion.

God says: “My words are spirit *and* they are life.” John 6:63. In his word is creative, life-giving power; but not in the words of man. Man's word (thought or deed) is spirit only, the outcome of life, but without the inherent power of giving life,—a consequence but not a cause. God gives to man with his life and body the power to feel, think, and develop character. He “formeth the spirit of man within him” (Zech. 12:1), by surrounding man with those opportunities and influences by which he may mount to the highest sphere of life. This “spirit of man is ascending” (Eccl. 3:21) to the daily record books of judgment before the eye of God, who “weigheth the spirits” (Prov.

16:2) in the balance of his word. And so man is held responsible, not only for the care of his body and the promotion of a healthy vitality, but chiefly for the *moral character* which he is able to develop. Bodily health and mental vigor are to be but the means of promoting a noble spirituality. Thought, word, and deed are the building-stones of character,—the *spirit* that constitutes the measure of the man.

It is highly significant that the “spirit” is the only element of man that is spoken of as returning to God at death; the “soul” is never so described. One or two Scriptural references on this fact must close the present article. In the presence of expected death, David says (Ps. 31:5), “Into thy hand I commit my spirit.” And in Eccl. 12:7 it is said, “Then shall the dust return to the earth as it was, and the spirit shall return unto God who gave it.” Jesus at his crucifixion (Luke 23:46), when he had cried with a loud voice, said, “Father, into thy hands I commend my spirit;” and Stephen in his martyrdom (Acts 7:59) calls upon the Master, saying, “Lord Jesus, receive my spirit.”

In each of these typical cases, the life record, the sum total of character and influence, is commended to the judgment of the Most High. There is no intimation that this judgment has already been passed, or that the spirit continues a conscious existence apart from the body. The body wastes to dust, the life goes out, but the life record is indestructible in the hands of God, and serves as the identifying element of personality in that future day of resurrection which is clearly taught in the Scriptures.

It will be the purpose in later articles to consider some of the secondary or derived meanings of the words “soul” and “spirit,” and to determine whether they are consistent with the fundamental meanings that have been already suggested. The study should be of intense interest.

NOTE.—This article and the preceding ones in this series have been presented not as a dogmatic deliverance of opinion, but rather as the statement of conclusions that appear to be naturally drawn from the scriptures considered. It is believed that further investigation on the part of EDUCATOR readers would result in still clearer views upon this subject, which is confessedly difficult to understand. The editor welcomes correction or suggestions on any points thus far presented. They would materially assist in the further development of the subject. Our correspondence department is open to all our readers.

WHAT TO DO WITH THE BIBLE.

THERE is no book in the whole world so unfairly treated as the Bible. Those who have no understanding that this book is above all other books “the Book of books,” who simply regard it as a

The Reading Circle

compilation of very remarkable efforts of men of literary genius, may be excused if they do not devote a very large proportion of their time to the enthusiastic study of the Bible, since they do not regard it as the word of God. But there are other people, not the avowed enemies of the word of God, who are simply indifferent and unconcerned.

The acknowledged foes of the Bible are anxious to find inaccuracies, contradictions, and weaknesses that would tend to invalidate its authority and weaken its power. But those who are most guilty of treating the word of God unfairly are, singularly enough, the men and women who profess to believe that this word is the word of God, the sufficient and authoritative exponent of the divine will, the unerring guide for man throughout the devious ways of time to the shores of immortality. They do not search the Scriptures, though they believe that in them they have eternal life.

When we come to think of it, any book that represents the serious work of a thoughtful man demands at our hands a careful study, if not a prolonged and diligent search. The more important the issues of the questions discussed by the book, the more exact and painstaking should be our treatment of it. But of all books, the Bible demands at our hands the most constant, ceaseless, and devoted study. And yet, who of us can say that we have made a lifelong diligent search of these sacred writings? Is it not wonderful that the Bible has such power over us considering how little we commune with its glowing pages? If we searched more diligently, what gems of light, what pearls of truth, would come into our possession! How rich we might be in the divine love! There are mines of gold, but we do not dig for the glittering treasures. In every realm the law is search, or you will not find. Do we expect to find without search? Do we treat any other book as we treat the Bible? A daily search would always bring a daily benediction.—*Thomas W. Handford.*

THE redemption of the race is not all in the hands of the clergy, nor are church methods the only profitable ones to employ in this greatest work in the world. Every investigation into the hidden processes of Nature having for its subject the betterment of mankind, and every act in the harnessing of Nature's laws and directing them in the work of developing the best there is in the world in the interests of a higher type of manhood, puts man in closer touch with the creative genius, and gives him clearer conceptions concerning the divine plan.—*Chas. W. Garfield.*

[THIS subdepartment is maintained as a guide to independent or reading-circle study for parents and teachers. This year the work is based on Professor Hinsdale's "Jesus as a Teacher" and "Horace Mann and the Common School Revival in the United States." Both books are excellent.]

"HORACE MANN."

CHAPTER VIII. CONTROVERSY WITH BOSTON SCHOOL-MASTERS.

Topics.—The Conflict Unavoidable; Object of School Work; Opposition to Establishment of Board of Education; Mann's Denunciation of Public School Methods; Prestige of Boston School-teachers: Their Self-consciousness and Hostility to Improvements Demanded by Mann; Reference to German Schools; Pronouncement of the Schoolmasters; Some Ardent Supporters of Mann; Unfairness of the Attack upon the Great Reformer; "Captious, Vulgar, and Abusive;" Prussian Mode of Instruction; Use of Text-books; Mann in Favor of Word Method in Teaching Reading; School Discipline; Mann Opposed to Corporal Punishment; Moral Suasion; Infliction of Physical Pain Sometimes Necessary; Mr. Mann's Reply to the "Remarks" of the Schoolmasters; Its Remarkable Force and Vigor; Its Weak Points; Strenuous Opposition to Plans and Policies; Rejoinder of the Masters; Public Sentiment Growing in Favor of Reform; Mr. Mann Promptly Answers Rejoinder; History of Controversy; Summing Up of Mann's Position; Benefits of Debate; Record of Corporal Punishment; "Young Boston;" Emulation in School Work; Mann Disapproves "the Prize System;" The Love Principle in School Government; Lesson of Obedience Important; Cruelty Never Justified.

"JESUS AS A TEACHER."

CHAPTER XIII. HIS METHODS OF TEACHING.

Topics.—Definition of Parable; The Apologue of Jotham; Uses of Parables; Why Unused in early Ministry; Christ's Reason for Using; Canon Farrar's View.

CHAPTER XIV. HIS RECOGNITION OF APPERCEPTION.

Topics.—Definition of Apperceive; Cause for Absence of Apperception; Application to Morals and Religion; Examples of His Recognition; Woman of Samaria; Nicodemus.

CHAPTER XV. HIS USE OF THE DEVELOPING METHOD.

Topics.—Leading Characteristics; His Constant Incentive to Vigorous Action; Recognition of Growth; Influence of Mind on Growth; His Unsurpassed Use of Natural Illustrations; Conversation with Samaritan Woman.

Quotations.—Jesus impressed his personality on every form and mode of teaching that he used. . . . The parable was in familiar use in Judea from the time of the judges to the time of Jesus. . . . A child's mind at birth is not, as some philosophers have supposed, an inert and powerless substance. . . . It is not what we see and hear and feel, but what we inwardly digest or assimilate,— what we *apperceive*,— that really adds to our knowledge. (Harris) . . . No teacher has more clearly seen how potent the state of the mind is in learning than Jesus. . . . A truth that has failed to enter a human heart through a high door sometimes enters through a low one.

THE DAY LINE.

WHERE do the days begin?—Evidently the days began where man began to live on the earth; and as the "star of empire" took its way westward, the day went with it. The local time changes one hour for every fifteen degrees of longitude. When it is six o'clock or sunrise in New York, it is one hour earlier at all points fifteen degrees west of New York, and one hour later at all points the same distance eastward. Between these eastward and westward points there is a difference of two hours in local time.

If two persons should travel from New York at the same rate, the one eastward and the other westward, until they met on the opposite side of the earth, each would have passed over one hundred and eighty degrees of distance. With a difference of one hour for each fifteen degrees, there would be a difference of twelve hours from the starting-point for each person, and a difference of twenty-four hours between them when they met. If the one going westward should start at six o'clock on Wednesday morning, and travel as rapidly as the sun "rises," it would still be six o'clock on Wednesday when he reached a distance of one hundred and eighty degrees west of New York. It would continue to be Wednesday when he got back to New York, and Wednesday still during a second and third circuit of the earth, and so long as he did not allow the sun to set on his journey. The only way he could get to any day beyond Wednesday would be to select some point on the circuit as his "day line," and then add another day every time he crossed this line in going westward. But the person who went eastward must subtract a day every time he crosses the day line.

Custom has fixed the day line about midway across the Pacific Ocean. Vessels crossing this line westward "drop" a day from the calendar. Thus, if the line is crossed at noon on Wednesday, an hour later is called 1 P. M. Thursday. But if the line is crossed going eastward, the calendar "gains" a day. Thus if the crossing occurred at sunset on Wednesday, the next day would also be Wednesday—two days of the same name in one week. Of course the day is neither gained nor lost absolutely. We can not *make* time or annihilate it by changing the direction of our travels. We simply change the *name* of the day.

Some have made the suggestion that the Jews and Mohammedans could easily bring their rest-day practises into conformity with the rest of the world by taking a westward voyage around the world, the Jews going once around and the Mohammedans twice. But such a change could be easily made without going to the trouble of a sea voyage. Let all the Jews unite in *calling* Sunday Saturday, and all the Mohammedans in calling Sunday Friday. This would accomplish all that the voyage would; that it would not alter the absolute facts only shows the absurdity and insincerity of the proposition.

AN AFTERNOON RAMBLE.

CHAS. F. EDGERTON.

ONE pleasant afternoon following a hard half-day's work upon the morning studies, I suggested to the school that we take a ramble through the adjacent fields and woodlands, instead of following the usual school program.

The day was one of those bright, sunshiny days in the latter part of May-time, when all nature is freshly dressed in beautiful shades of green, sparkling with gems of wild flowers and blossoms. From the rugged old orchards, the soft south zephyr bore upon its gentle wings a sweet perfume which dispelled all worldly thoughts and cares, and drew one nearer to his Maker, the divine Creator of all. All seemingly invited us to forsake the school-room, with its text-books, and study from the page of God's great text-book, Nature.

Every pupil, from the chart reader to the most advanced student, was deeply interested in the new plan of study. Our only apparatus were bright eyes and a good microscope. And what a change was wrought in those children by the bright sunshine, the pure atmosphere, and beautiful landscape! The mischievous, the idle, the dull countenances, had vanished. What rare treasures those eager eyes found! Butterflies, bees, spiders, beetles, crawfishes, and turtles were captured, examined, and given their freedom,—for it is our duty to teach the law of love and kindness. Their peculiar forms and distinguishing features were explained, (material for future composition and nature study lessons). Flowers of many varieties were gathered; notes taken of their fragrance, form, color, and locality of growth. Attention was called to

the many birds flitting to and fro in the woodlands; their names given, and stories told of their life and characteristics.

An extended study was also made of a pond, which represented "old ocean's gray and melancholy waste." There were bays, gulfs, peninsulas, and islands. A ditch flowed into the pond: it was our river. The delta and silt deposits were noticed. Imaginary cities and towns were planned in suitable locations, and a lively commerce carried on between distant ports. The entire school passed over the strait which connected the two divisions of the pond. When passing a pile of morainic boulders which a farmer had taken from off his plow land, the older pupils were requested to note the several kinds, and were told of their origin and the glacial story.

In the woodland they were told of how this region was once covered with dense growths of gigantic oak, elm, ash, and hickory, when our forefathers first came; of how those monarchs had been made into many kinds of lumber, and how the Indians lived and roamed and hunted over what is now our farm land.

Was this afternoon ramble in search of knowledge devoid of good results? — Was it a waste of time? Did it encourage disorder and lack of system in study? Was it heresy against the established methods of school work?

In the following school-days, a deeper interest was manifested in the usual school routine. The compositions were vastly improved, and in their recitations, the pupils would often speak of what they had observed, or of information they had acquired that day. Theory had given place to practical reality.

Fellow teachers, will you give this plan a trial in your school work? Do not permit it to be an idle romp, but put your whole effort into it, as you would an interesting text-book lesson, and it will be a success.

"The bubbling brook doth leap when I come by,
Because my feet find measure with its call;
The birds know when the friend they love is nigh,
For I am known to them, both great and small.
The flower that on the lonely hillside grows
Expects me there when spring its bloom has given;
And many a tree and bush my wanderings knows,
And e'en the clouds and silent stars of heaven;
For he who with his Maker walks aright,
Shall be their lord as Adam was before;
His ear shall catch each sound with new delight,
Each object wear the dress that then it wore;
And he, as when erect in soul he stood,
Hear from his Father's lips that all is good."

—Jones Very.

Queries for Students

[This is a standing subdepartment for the benefit of all who are students. It should enable every one to read the EDUCATOR and every other paper more intelligently. All these "Queries" are taken from the articles in this number of the paper, or directly suggested by them. They are excellent for general information exercises in the school and home. The EDUCATOR will be glad to credit the best set of answers to these questions, sent each month, by school or individuals.]

1. What is? — "Crookes's Tube," philosophy, electrode, pillory, day line, "virgin soil," humus, "Sherringham's Valve," Tuskegee Institute, School of the Evangelists, Delphic oracle, phosphorus, silt, morainic.

2. Who? — "Idumean Emir," Nicola Tesla, Dreyfus, last President of France, the author of "The White Man's Burden."

3. Distinction between? — Myth, fable, parable; galvanism, magnetism, electricity; allopath, homeopath, hydropath, eclectic.

4. Pronounce — sentient, courtesies, exemplary, débris, résumé, *malaise*.

5. Define — curricula, desideratum, phenomena, hypothesis, deprecate, excerpt, vitiate, dogmatic, apperception, apologue, *malaise*.

HOW TO WRITE COMFORTABLY.

THE height of the chair you sit on while writing, and that of the desk you write at, are matters of some importance. Every person who writes habitually ought to have a chair especially made to suit his height; and the seat of the chair should be exactly one quarter of his height from the floor. Thus, if you are six feet high, the chair seat should be eighteen inches. The width of the chair should exactly equal its height, and it should slope backward three quarters of an inch to the foot. The back should be a trifle higher than the seat and slope slightly, not too much. Finally, the desk should be two thirds as high again as the seat of your chair. Thus, if your chair seat is twenty-four inches, the desk should be forty inches in height.

When you have attended to all these little details, you can sit and write all day without feeling that backache which comes from chairs and desks that don't fit you. — *Publicity*.

NICOLA TESLA claims to have invented a method by which electricity at an enormous voltage can be transmitted thousands of miles without wires or other artificial conductors. Unmanned torpedo boats could be operated by it even beyond the horizon of the battle-ship from which they were despatched. The plan has not yet been demonstrated outside the inventor's laboratory.

Conducted by A. J. Bristol, A. B.

EDUCATIONAL HAND-WORK.—NO. 8.

In order further to carry out the idea of helpfulness, teachers will find, I think, the model illustrated this month of great value. These wintry days require the younger members of the home to be indoors, and many a pleasant hour may be whiled away by the use of the toy sled brought home from school by brother or sister. Or it will afford entertainment and instruction for several hours if those too young to use the knife be granted the privilege of watching the older children as they develop the toy in its various stages. Personally, I have been pleased to note the interest taken by a seven-year-old in every step of the work, including the drawing as well as the whittling of the model given in this number.

As the processes involved in this model have been more or less accurately described in previous articles, we will only call attention to some of the things most likely to give trouble.

In general, be sure that the pupils cut the straight lines so that a line across the edge will form a right angle with the face of the piece, otherwise the sled when completed will be considerably out of true.

In making the curve at the fore part of the runner, use a radius of at least four and one-fourth inches, drawing from the pupils the best method of finding the point that will bring the circumference of the circle through the desired points marked out.

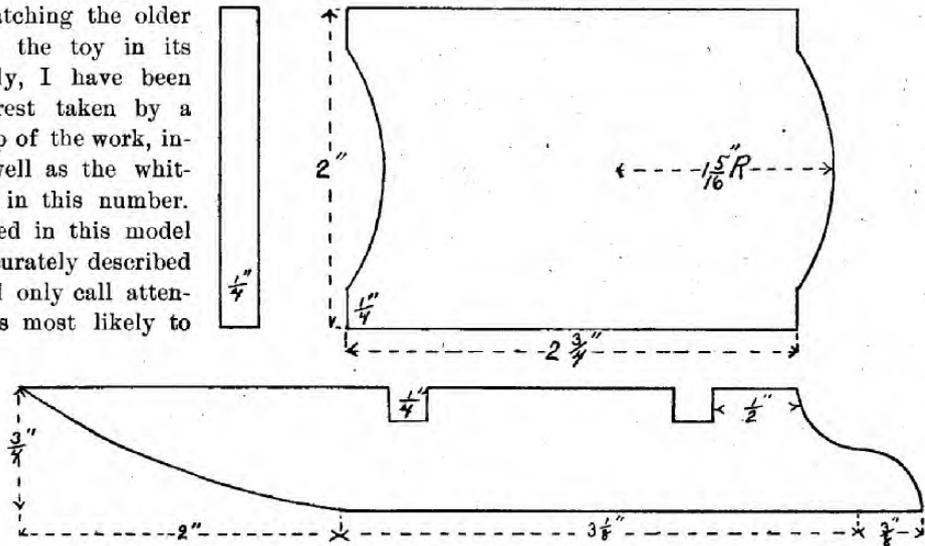
A small blade will work best in cutting to the concave curve at the rear of the runner, and it may be well to mark out these curves on both sides of the piece, as it will form a better guide in cutting.

The crosspieces will be more apt to fit closely if they are cut out first and the breadth of the notches marked by the end that is to be placed in each one.

See how many of your pupils will tell you that it will require a piece at least three inches long to make the seat of the sled. Nail the seat on by four brads passing through the ends of the crosspieces, but have the children see beforehand that they will not pass through the runner also

This model may form the basis for some boy to make a more serviceable sled. Draw from them whether they could use this with some set scale—say two inches to the foot. If not, what measurements would need to be changed?

But do not think that this sled in order to be of any valuable service must be made large enough to use in doing errands. We are living in a time when the inventive genius of many men is employed in making the most complicated toys. These by the aid of machinery are made so cheap that



they are within the means of the vast majority of people. But who has raised his voice in protest against the harm that is done the rising generation? Where is there any lawful opportunity for the play of the vivid childish imagination? and where is there any stimulus to exercise his creative instinct, when the boy looks to his father for money to purchase the desired articles? Let me urge parents to invest early in some good tools (not toy ones) and encourage the children to make many of their own playthings.

EDUCATION FOR GIRLS.

In childhood our girls should have the same preliminary training as the boys. They should be encouraged to play with their brothers. Boys grow more gentle and considerate by this association, while the girls gain in vigor and force. Indeed, this exchange of courtesies we find all

through life, first in play, next in the coeducational schools, and, lastly, in the new homes that are made.

If a daughter is delicate, she should not be crowded with work. Let her education take a longer time. There is no need of hurry. Why can not the truth be recognized that the years of training are the most beautiful years of life? They are full of hopes and aspirations which beautify the soul, even if they are never fully attained. The wise mother will do all in her power to extend this delightful period.

A thorough education makes it possible for a young woman to enter almost any occupation she may desire. For those who have been brought up tenderly it is not always pleasant to be compelled to care for themselves, but it is a thousand times better to be able to do so in an emergency than to eat the bread of dependence. Education will fit them to meet just such emergencies.—*Woman's Home Companion.*

EXERCISE AND MENTAL DEVELOPMENT.

WE have not considered the value of exercise in connection with the periods of growth, for it seems at first only remotely related to mental growth, while in fact it is second only to nutrition in the initiation and execution of mental processes.

A very large part of the whole brain area is given up to the control of muscles and the reception of the sensory impressions that call them into action either directly or reflexly. As all the brain cells are connected more or less closely, it seems fair to say that whatever assists or injures one part must to some extent help or harm the whole.

Muscular exercise may, then, be a valuable method of rousing into activity the largest number of brain cells, and, through the improved circulation of the blood, most powerfully promote the nutrition of the brain as well as secure such a change of the cell contents as is demanded by the law of its life.

Many of the so-called nervous diseases are perversions of the activity of brain cells that are unused in normal ways and that consequently exhibit their energy in abnormal form.—*Jay W. Seaver, M. D., in Good Health.*

SCHOOL DOMESTICS.

THE public schools in many cities are following the example of Chicago in arranging for instruction in domestic science. The Grand Rapids, Mich., public schools until recently have firmly resisted

all popular demands for manual training in any form. In common with the boys, the girls attending the schools were allowed to study bugs, beasts, and birds, but no instruction, scientific or otherwise, was given them in the noble art of making bread. They were taught drawing, music, and astronomy; but no light was given them upon how to darn a sock or sew on a button.

It is true that the domestic sciences should be learned at home, but only too often, if any home instruction be given, the hired girl is the teacher, and the training at best is fragmentary, incomplete, and unscientific. If every girl who is graduated from the Grand Rapids high school shall come forth able to make a shirt, and bake a good loaf of bread, she will have accomplishments more substantial, enduring, and beneficial than if she were able to discourse fluently in sixteen different languages, and in a vast majority of cases these homely accomplishments would be more conducive to future happiness than all the "ologies" combined.—*Selected.*

THE BETTER WAY.

THE mind is not a receptacle where all kinds of knowledge can be indiscriminately poured to advantage. There must be the capacity, the mental aptitude, or the process of education is torture, and the end failure. The theory of increasing the number of brain loops through mental discipline is sound up to a certain point, and even then it is a signal failure without the consent of the scholar, and the profoundest sympathy and appreciation of the teacher. Some of the brightest scholars can not learn mathematics, but in language and history they are proficient. Some can learn mathematics readily, but can not draw, write, or spell well. These limitations which the Creator has defined should be respected. The object of an education for the average boy should be to make him a breadwinner by developing him along the educational line of least resistance, and the girl a homemaker by the same process. Going beyond this is torture. To put flesh and blood, nerve and sinew, brain, heart, and soul through an educational mill for the sake of a diploma, as the unfeeling ore is crushed and wheat is ground, is turning the school into a machine.—*Normal Instructor.*

EDUCATION comprises more than a knowledge of books. Proper education includes not only mental discipline, but that training which will secure sound morals and correct deportment.—*E. G. White.*

WISE ADVICE.

THERE is a "critical period" in the lives of most young men and women that is often met without advice from father or mother or teacher. A mysterious silence is maintained concerning the most important interest of life—the safe emergence from this period out upon the highway to uprightness and happiness. The youth who is not wisely directed by the advice of safe counselors in this crisis misses what may make all the difference between joy and wretchedness for life. Happy the boy, and girl too, who has a mother to say: "Son, there will come a time when the homely girl will have scarcely a place in your affections, and all you will be able to see will be the girl with the pretty face and form. But, be careful; for they do not always make good wives and mothers. It is not always possible to judge a book by its cover, and it is just as true that a pretty girl is not always made of sound, enduring material. Always remember that 'handsome is that handsome does.'" — *Selected.*

THE HAPPY AND THE UNHAPPY WAY.

It is the mother, much more than the father, who gives character to the children, because she is nearly always with them. Her voice, her manner of speaking, her way of working, her habits generally,—all have their bearing upon the future life of those committed to her care. Thus it becomes the mother's duty studiously to avoid everything in her own life that will cause her to make an unfavorable impression upon the character of her child. The success, or failure of the mother in this respect, is due almost wholly to the way in which she bears the cares of life. She may carry them lightly with song in her heart, or she may allow them to bear her down into the very earth.

We go into some homes where the mother is jolly. Her countenance is always becoming. She never worries about anything. You scarcely know how her work is done; but it all comes around in good time. If a neighbor comes in during the morning's work, she welcomes her with her ever-ready smile, is never so hurried but that she can sit down and chat a while. She manages to have her kitchen work done in the forenoon; and after the dinner work is over, "tidies up" her children, changes her own apparel, and is ready if a friend

comes in to spend the afternoon, to make it pleasant for her. She generally takes up some light sewing; or, if alone, occupies some time in reading or music; or she may take a stroll with the children, or visit a neighbor. Thus the day passes pleasantly and profitably; and when bedtime arrives, she is not overwheated, but lies down to sleep sweetly, and rises in the morning refreshed, to enter upon the duties of a new day.

Again we enter other homes, where there is the same number of children, or perhaps a smaller number; and we find the mother full of care. She shows it in her countenance and manners. She talks and acts as though everything would stand still if she didn't put her "shoulder to the wheel." It is push and hurry all day. If a neighbor calls, she feels that she is encroaching upon her time. This mother works all day, and sews evenings, and retires at a late hour, so tired that she can not rest; and rises in the morning nearly as weary as when she lay down. Who can portray or imagine the difference in the impression made upon the children of these two mothers?

Now, in the latter instance, the mother may have been just as conscientious as in the former, and even more desirous of doing right; but she thinks she is doing the very best she can under the circumstances. She often says, "I don't see how Mrs. So-and-So finds time to go around so much; I work all the time, and then my work is never done." Ah! little does she think that in this remark is contained the mystery. No mother should "work all the time." She needs to spend an hour at least of the early morning outdoors among the flowers. If she must work, let her use the hoe. It will be a pleasant change. Or she may take a walk and visit a neighbor a while, and talk about cheerful things. When she returns to her work, it will be with a lighter heart. She should cultivate her social qualities, visit other homes, become interested in other lives. Some one may be sick, or in trouble. A word of comfort, or a deed of kindness may be what is most needed. How it will lighten the mother's care to lift the shadows from other lives.

No woman is called upon to sacrifice her talents, her interest in the well-being of others, her love of the beautiful in nature and art, her taste for reading or music, or any of Heaven's gifts, because

she is a mother. All these, if used judiciously, will combine to render her a better mother, a better companion. Try it, young mothers; and you who are farther advanced in this work, and are bearing your cares heavily. It may be an effort for you to break loose from the old way; but it will pay. Let your voices ring out upon the air as of yore; and other hearts may catch the melody and be lifted up.

JULIA LOOMIS.

THE MORNING BATH.

MANY believe in the virtues of a cold-water bath every morning, but fail to practise it regularly because of the inconveniences that attend its application. An exchange describes a method of bathing which eliminates most of the unpleasant features. Its chief recommendation is in the use of "bath mittens."

The bath mittens are simply bags, which would be mittens if they had thumbs, made of a kind of turkish toweling which absorbs water most readily. On rising you should thrust the hands into the bags, dip them in the water, rub the soap between them, and then pass the hands rapidly over the whole body, ending between the toes. Drop your bath mittens into the wash-bowl, do not rinse off the soap, and put on no water except what was in the mittens at first; then rub the person rapidly and vigorously with Turkish towels. The whole bath occupies less than a minute, can be taken in all temperatures with pleasure, and produces a sense of cleanliness which is very satisfactory. This bath may be taken while standing on any carpet without danger of wetting or soiling it. Altogether, it is a most cleansing, rapid, cheap, and satisfactory bath. Try it.

THE MAN IN HIS HOME.

THE seclusion of a home gives to a man a certain freedom and attendant privileges which no other place in the world affords, and it is right that it should. But it is not right that this freedom and those privileges should be abused to the disadvantage of the wife. Too many men seem to have the idea that they can drop into constant disconsolate and churlish moods, at home with their wives, which in any other place and by any other person would not be tolerated. It is when a man is within the walls of his home that he is himself. Then it is that he should be at his best. When a man gives the best that is within him to those closest to him, his home will be the ideal place that he wishes it to be. No man has a right to expect from his

wife what he on his part does not give her. If he wants her sympathy, he must give her his consideration. If a man lacks the element of consideration, he should cultivate it; and cultivate it not for the benefit of his friends, but for those in and of his home. Consideration should begin at home; not in the homes of friends, as it so often does—and ends there, too. The atmosphere which a man creates in his home by example becomes the rule by which his children live. The husband and father strikes the key-note for right or wrong living.

—*Ladies' Home Journal.*

MAN AND NATURE.

THE devout student of nature can not fail to see that all things visible and material were created to supply the constitutional needs of man; that he, viewed simply as an animal, can not frame a wish for which nature has not an abundant satisfaction. For man the sun rules the day, and the moon rules the night, and for his happiness the countless and unnamed worlds exist in fathomless space. For him the seasons, winter with her ice and snow, spring with her swelling buds and enchanting prophecies, summer with her harvest and fragrance, and autumn with her crimson and gold and bursting garners, roll on in endless progression. For him nature attunes her voices, and for him, changing yet changeless beauty lives in perennial youth. For him the oceans wash his shores, the rivers murmur anthems of peace, mountains lift their snow-crowned peaks into the blue vaults above, and grass carpets the valleys on which he walks. Nature's God has been prodigal, and he has written over all his works, in every language and dialect in words too plain to be misunderstood, that all these things are for the happiness of man.—*Dr. Ashley S. Johnson.*

KNOWLEDGE of one's self is slowly gained. It takes time and change of circumstances thoroughly to test and discipline men. The best of us are constantly meeting fresh tests of character, and moving toward perfection through the progressive revelations of our imperfections.—*The Social Gospel.*

THE closer the relationships entered into, the greater is the tension put upon love. He who would have the full joy of fellowship must pass the tests of intimate association and individual revelation. A character of pure love fears not to be uncovered, and can bear all the tests of brotherhood.—*The Social Gospel.*

BRANCHES OF BEECH AS SEEN IN SPRING.¹

PROF. W. J. BEAL.
Michigan Agricultural College.

THE following illustrations of limbs of beech were made from specimens cut early in May, when the buds had some growth. The beech bears buds singly and not in pairs, with one bud at the end of the branch. The upper or outer portions of the

branches are light brown in color, much like those of the maple, excepting they are more slender and the specks smaller and less pointed. The buds are mostly long, slender, and sharp-pointed, and

the scales are not arranged exactly in rows extending up and down. At intervals a series of scars can be seen, considerably like those observed on the maple.

As we look at the branch (Fig. 1) held right side up as it grew on the tree, the scar on the right side of the stem is a little to the left of its bud, while a scar of a bud on the left side is at the right of a bud; that is, one leaf scar is at the left of its bud, while the scar above is at the right of its

bud. This rule holds good throughout the tree, whether the branches are more or less spread out on the tree or whether they are near the top and erect. Near some of the leaf scars there may be seen for each a tiny round bud which commonly amounts to nothing. Extending nearly around the stem from each leaf scar, may be seen a slight ridge or single scar.

If the pupil should carefully dissect an enlarged bud of the beech, he would find that these scars mark the place from which a pair of brown bud scales had fallen. Some of the older pupils may learn to think of a pair of such scales as *stipules*, and forming a part of the leaf which grew between them. In this case the stipules were the

bud scales which in some other plants look much like small green leaves.

Each bud on the side of a branch is planned to produce a side branch. This is illustrated by Fig. 1, where three side buds for last year are represented as without stems, while the bud on the growth of the previous year (at the bottom)

shows a short stem bearing a bud at the end.

Most of the tiny branches of the beech shown in Fig. 2 are on one side of the main branch; probably because the light was most favorable on that side. This branch was cut later in May, and represents the buds somewhat enlarged. They are small, however, indicating a feeble growth for the summer, and along their sides are small leaf scars between sets of bud scars, indicating that only one, two, or possibly three, small leaves were carried thereon in a single season. The illustration shows on the main branch twelve sets of bud-scale scars, and one

to be left for the present bud at the top, showing the whole to be the growth of thirteen years. Some of the leaf scars are not well represented, as the leaves were very small, and some are turned away from the observer; but with such a branch in hand, no one should have any difficulty in counting the scars where each leaf had fallen, thus numbering all the leaves that were required to build up the branch during these thirteen years.

The tree toils all the growing year, gathering in from the soil, water and other materials which

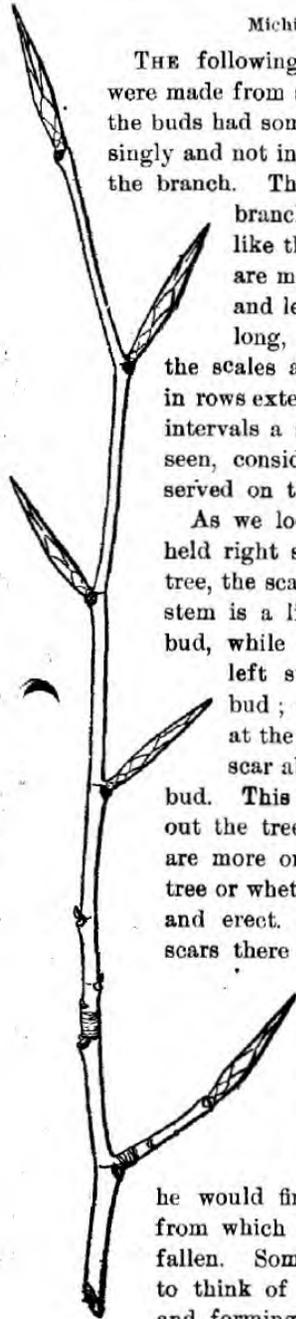


Fig. 1.

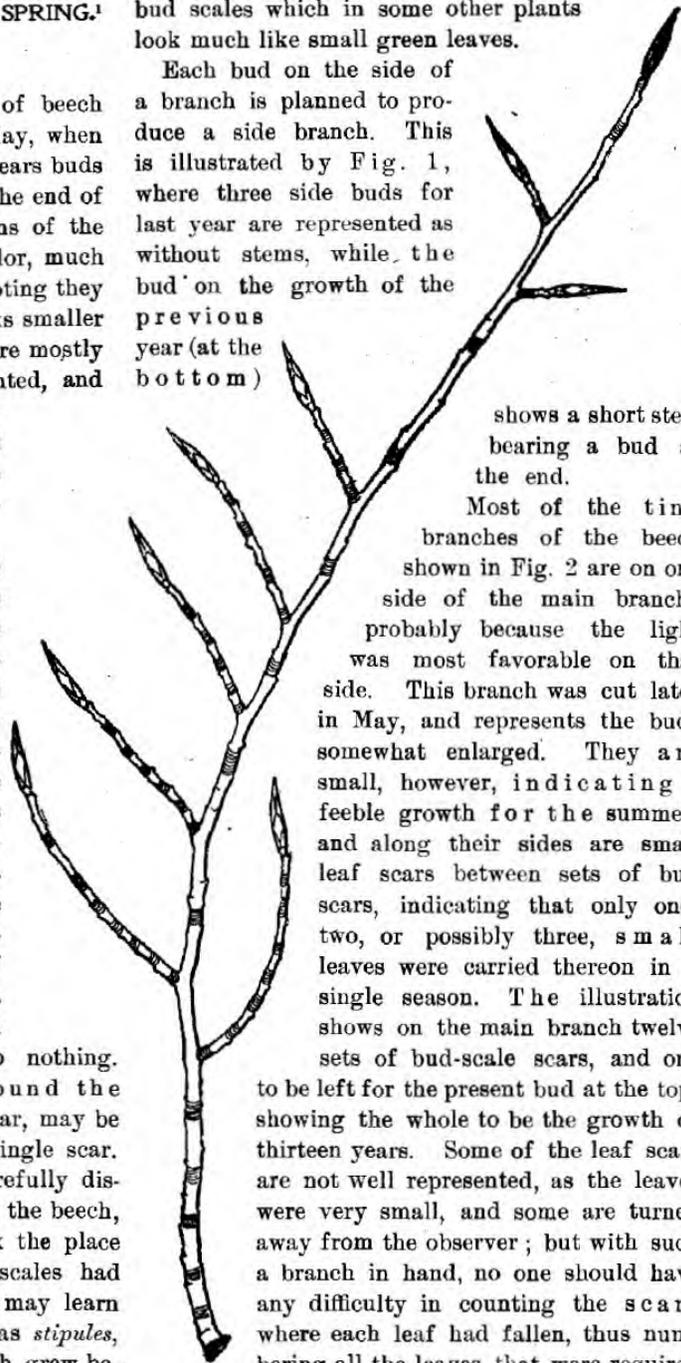


Fig. 2.

¹The matter and illustrations of this lesson are used by permission from a series of Elementary Science Leaflets issued by the Experiment Station.

the water dissolves, and from the air carbonic acid enters the leaves, and out of these substances, through the aid of sunlight, the stems are lengthened and perfected early in the season, and for a considerable portion of the year the buds are preparing for an early start the succeeding spring.

Probably, every member of the class knows that a cross section of a stem of maple or beech shows pith in the middle surrounded by wood, outside of which is the bark. Furthermore, he knows that trees grown in Michigan in the open air usually indicate by rings or layers of wood the age of the tree. This rule holds good generally, though in some cases there may be exceptions.

Many other points concerning branches of maple and beech could be enumerated and recorded, but these are enough for our present purpose. The forests of the State contain about seventy species of trees and one hundred and fifty species of shrubs, any two of which would make as good a lesson for study as the branches of maple and beech. There is certainly no lack of an abundance of materials right at hand profitably to occupy young persons during the bleakest months of the year.

USE AND ABUSE OF NATURE.¹

THE tearing off and casting aside of all Nature's embroidery in shrubs and trees, the burning of her drapery by sweeping out of existence the vines with which she has embellished the waste places, creates a barrenness in life more to be regretted than barren acres. The ruthless destruction of forests will not be balanced by the immediate income from the virgin soil thus exposed, nor will the offense be condoned even if the wealth thus garnered is employed to endow a hospital, a library, a university, or even an experiment station. The best product of the farm, the children, may be dwarfed and warped out of comeliness by a bald, barren home from which has been taken all the beautiful things which were intended as a legacy, — in the interest of more acres or a larger bank account.

I wonder if it has occurred to you what a mean fellow the average man of this country has been in his relation to God? The question of how he prays, or how devoted he has been to his church, or what church he belongs to, has nothing to do with his case. He may keep the Sabbath, and, in truth, be exemplary in obeying the injunctions of

the decalogue, have family prayers and give tithes to the poor, and still in his most direct relationship to "the Giver of all good and perfect gifts" be thoroughly mean. I have known many a God-fearing man, full of religious fervor and activity, and overflowing with love to his fellow man, sweep off the great heritage of timber from a wide area of land, convert the income from it into his bank account, leaving behind him *débris* which becomes tinder for a passing spark, which soon turns a beautiful piece of green earth into an abomination of desolation; and not only this, but through his criminal carelessness, unmeasured wealth of beauty and utility is destroyed from untold acres upon which he had no rights whatever, through the impetus given an element of destruction there is no power to stay.

I have known men renowned for sweetness of temper and perfection of character, taking crop after crop from a rich virgin soil, returning nothing, and without a word or an act of gratitude continue the process until the humus was all gone and only barrenness remained; then abandon it and invest the ill-gotten proceeds in mortgages upon other lands not yet impoverished. Is this treating God fairly? A son who would thus treat an inheritance from an earthly parent would justly receive the severest condemnation of his fellows. The agricultural experiment station finds this condition of things and a good many of those men who have not yet met with a change of heart. It is an instrumentality to aid in the work of regeneration, and has only entered upon the threshold of its usefulness.

To seek the hidden movements of God's laws, and give to them a new and marvelous application in subserving the highest interests of mankind; to awaken in men a knowledge and appreciation of the wondrous beauty of the world, and develop an ability to utilize its principles in the evolution of a beautiful farm; to develop in man a conscience with reference to leaving that part of the earth in which he dwells and for which he is responsible, better, more attractive, and more useful as a result of his sojourn in it, certainly deals with the attributes of what we denominate the higher life, and places the work of the experiment station as an ally to the pulpit.

HE who helps a child, helps humanity with a distinctness, with an immediateness, which no other help given to human creatures at any other stage of their human life can possibly give again.

Phillips Brooks.

¹ From an address by the Hon. Chas. W. Garfield, at the Experiment Station of Cornell University.

Conducted by A. B. OLSEN, M. D., M. S.

HUMAN PHYSIOLOGY.

RESPIRATION.— VENTILATION, ITS IMPORTANCE.

DURING the warm season of the year ventilation is easily secured, for doors and windows can then be thrown wide open with no fear of chilling drafts; but with the advent of cold weather it becomes a problem requiring careful study.

Ventilation (from Latin *ventus*, wind) may be briefly defined as the exchange of foul air for fresh air. This exchange is brought about by currents or streams of air passing into and out of a room or building. Heating the air causes it to expand, and hence it becomes lighter. An upward current of warm air is at once started, and cold air comes in to fill the partial vacuum. This, in brief, is the physics of ventilation depending on a difference in temperature. Mechanical means are often used, especially in hotels and large buildings. A rapidly revolving fan forces the fresh air into the room, while another fan draws out the foul air. But this method requires special and expensive machinery, and consequently is seldom available for the ordinary dwelling house.

The natural life for man as well as other animals is undoubtedly that which is spent out-of-doors. Such a life is the best means of preserving health and combating disease, especially that terrible scourge, consumption. The chief reason why a consumptive patient is advised by his physician to seek a milder climate and a higher altitude is that he may live outdoors as much as possible, and breathe pure fresh air. The higher the altitude the lighter and purer the air.

Rarefied air contains less oxygen than the denser air of the lowlands and seacoast. In this rarefied condition, respiration is increased; in other words, the light air acts as a gentle stimulus and gives the lungs more exercise. Both rate and depth of breathing are slightly increased. Care must be taken not to overwork the lungs while they are diseased, because death would thus be hastened instead of delayed. All consumptive patients should not be sent to the mountains. In the later stages of the disease the exertion required to breathe in high altitudes may be too great, and thus work injury instead of benefit. But in the earlier stages, before the tubercular processes have become deep-seated, a change of climate and alti-

tude may accomplish much in alleviating suffering and prolonging life.

Outdoor life can not be too highly recommended to all classes of people who desire health and happiness. Such life is almost impossible in the large cities where the handiwork of nature is so largely replaced by that of man. Fortunate, indeed, are they who enjoy the peace and blessings of a country life, surrounded on every side by the wonderful works of the Creator.

But in this lesson we intend to consider more especially the subject of artificial ventilation, or ways and means for introducing fresh air into our homes, schools, and churches. As already stated,

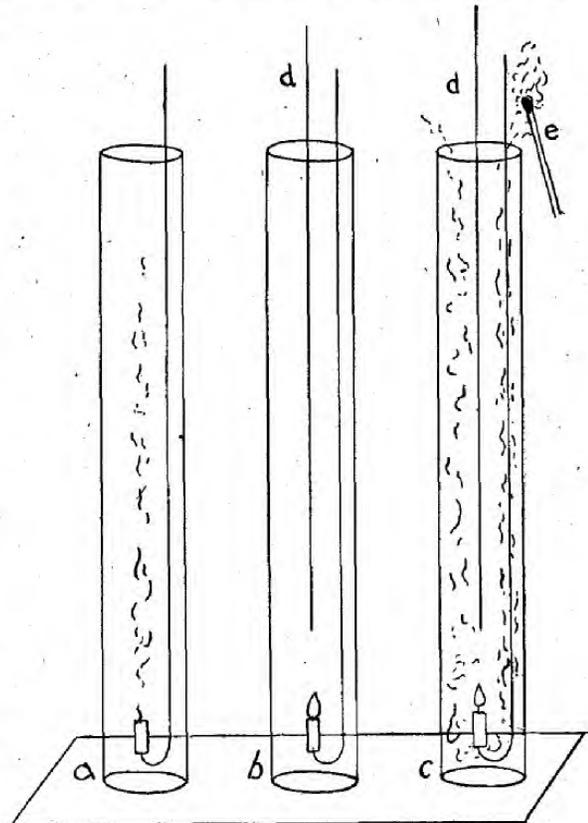


FIG. 19.

Three glass cylinders: a, Burning candle goes out for lack of oxygen. b, circulation established by means of pasteboard partition d. c, Direction of currents demonstrated by smoke from match e.

the principle is simple. All that is necessary is to secure a draft or current, and provide an inlet for the fresh air and an exit for the contaminated air. Heat will produce the current, and cause a circula-

tion of air. This principle is well illustrated by a simple experiment shown in Fig. 19. To perform the experiment a tall glass cylinder or jar, a small candle, a stiff wire, and a long piece of pasteboard as wide as the diameter of the jar are needed. A two-quart glass fruit-can may be used instead of the tall jar. Fasten the candle to the wire, light, and carefully lower it to the bottom of the jar. Almost immediately the flame weakens and soon dies out. (*a*, Fig. 19.) This phenomenon is due to the consumption of the O in the jar and the accumulation of CO_2 , no fresh O being supplied. CO_2 is a product of combustion, and, being heavy, gathers in the bottom of the jar.

After removing and lighting the candle, it is again placed in the jar, and the pasteboard introduced. At once the flame burns brightly. (*b*, Fig. 19.) Why?—Because the pasteboard divides the jar into two chambers, forming an inlet and an outlet. The heat at the bottom causes the air to expand and rise on one side, and fresh air comes down on the other side. The presence of this current of air is readily demonstrated by holding a smoking match or taper to the mouth of the jar. The smoke will be rapidly drawn down on one side and escape by the other chamber. (*c*, Fig. 19.) Ventilation has now been secured, and the burning candle lives. This simple experiment teaches that a single opening is not always efficient. It is better to provide two openings, one for the entrance, and another for the exit of the air.

Deep mines are sometimes ventilated by the use of this simple method. A fire is kept burning at the bottom of the shaft, and this maintains a draft which carries out the impure air and makes way for a new supply of the fresh. Ventilation does not remove all the stale air at once, but dilutes it with that which is fresh, and thus keeps it in a state of relative purity.

The amount of air required by an adult varies with his physical development, health, and state of activity. He breathes on the average 16 to 18 times each minute, the rate depending on a number of factors too numerous to mention. When lying down, respiration is slowest; exercising vigorously, it is most rapid.

It is estimated that the average man exhales about twenty quarts of CO_2 per hour. Three thousand cubic feet of fresh air are required to dilute this quantity of CO_2 so that the air will be sweet and wholesome. Then there will be only two parts of CO_2 to 10,000 parts of air. When there are four parts per 10,000, the air is somewhat "close." This should be the limit. No one ought constantly to

breathe air containing more than four parts of CO_2 to 10,000 parts of air, or 0.04 volumes per cent. When 10,000 parts of air contain six parts of CO_2 , the air is disagreeably "close," and has an unpleasant odor. When the amount of CO_2 reaches eight or ten parts, the air becomes oppressive and foul, and should not be tolerated.

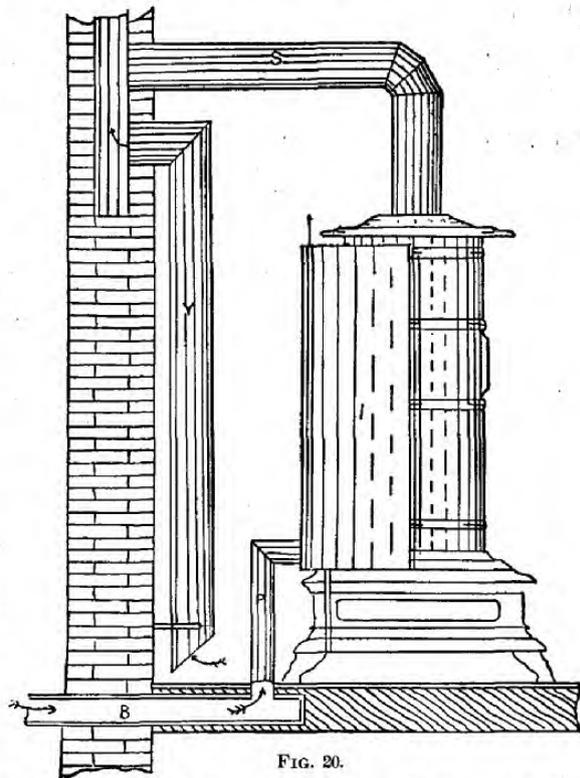


FIG. 20.

A simple method of stove ventilation. *P*, pipe conducting fresh air from inlet *B* to the space inside screen *J*. *Y*, foul-air outlet leading from floor to chimney, mingling with smoke from stove pipe *S*. (After Kellogg, "Home Hand-Book of Domestic Hygiene and Rational Medicine.")

It must not be forgotten that this disagreeable, "close" odor is not due to the CO_2 , but rather to the so-called "crowd-poison" of the breath, which is composed of numerous organic tissue wastes excreted through the lungs. Each breath is laden with these poisonous and offensive wastes, and they can not be breathed over and over again with impunity. A small amount of CO_2 artificially mixed with the air produces no odor, and does little or no harm. It is not so, however, with the CO_2 from the lungs, which is accompanied by effete matter from the body, that is not only disagreeable but decidedly harmful, and causes headache, languor, and general *malaise*.

The virulence of "crowd-poison" was well demonstrated in the tragedy of the Black Hole of Calcutta, June 18, 1756. A company of English

prisoners numbering one hundred and forty-six were confined in a cell but twenty feet square, with only two small windows. Words fail to portray the terrible suffering of the unfortunates from the heat and thirst, but especially the lack of air. The following morning found but twenty-three survivors, and these were as ghastly forms as could be imagined.

Stoves, lamps, candles, and gas-jets also consume O and produce CO₂. An average lamp requires as much O as an adult, often more; a gas-jet two to ten times as much, according to the size of the flame. It is important to bear these facts in mind, and make ample provision.

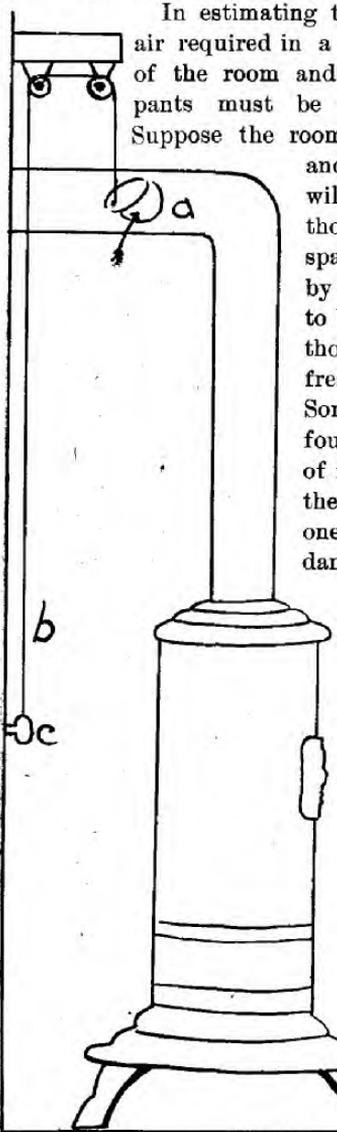


FIG. 21.

Damper ventilator. a, damper which can be opened or closed by cord b attached to knob c.

In estimating the amount of fresh air required in a given time, the size of the room and the number of occupants must be taken into account. Suppose the room is ten feet square and ten feet high. It will then contain one thousand cubic feet of space, and, if occupied by one person, will have to be supplied with three thousand cubic feet of fresh air every hour. Some authorities give four thousand cubic feet of fresh air per hour as the proper amount for one adult. There is no danger in an over-abundance of pure air. The more the better. If occupied by two adults twice as much fresh air will be needed, and if they are using a lamp, an additional three thousand cubic feet must be supplied. But it is only when a man is quiet and physically at rest that three thousand cubic feet per hour suffice. If engaged in active labor or taking ex-

ercise, double this amount or even more may be required.

Sick people require a greater abundance of fresh air than healthy people. Through the processes of disease a large increase in the amount and virulence of the tissue wastes is produced, and the breath contaminates the fresh air more rapidly.

In building a house, it is well to provide large, airy, well-lighted rooms. At least 1,000 cubic feet of space should be allowed for each person who is to occupy the house. The ceiling should be high, ten feet or more, and the windows should be equivalent to one third or one half of the floor space. Basements and cellars should be

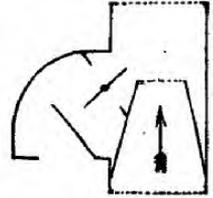


FIG. 22.

Stovepipe ventilator. (After Kellogg, "Home-Hand-Book of Domestic Hygiene and Rational Medicine.")

thoroughly ventilated and lighted so that they will not become damp and musty and furnish a breeding ground for disease-producing germs. The damp, foul air of a poorly ventilated cellar containing decaying fruit and vegetables, is a serious menace to life.

METHODS OF VENTILATION.

We come now to consider methods of ventilation. Of these the hot-air furnace is one of the most efficient means for cottage use. The furnace, a large stove surrounded by a jacket of sheet-iron enclosing a hot-air space, is in the cellar or basement. It should be set deep so that there will be a sufficient rise to the pipes to provide a good draft. The registers opening into the pipes should be placed in the floors of the rooms and on the protected side. A large box communicating with the outside and opening into the hot-air space serves as an inlet for the fresh air. It should be on the protected side of the house away from dust and dirt. Barn-yards, cesspools, and outhouses should be far removed from the fresh-air inlet.

It is very evident that in this arrangement, the stove acts as the candle in the jar, and heating the air in the jacket causes it to rise and enter the rooms of the house, which are thus supplied with pure, warm air, fresh from the outside. In the room it rises to the ceiling, and gradually diffusing throughout the room, sinks to the floor as it is cooled. If the doors and windows are loose, with occasional cracks and crevices, an outlet may not be necessary. But if otherwise, an outlet, on the floor and located on the opposite side of the room, should be provided. It would be well to connect

this with the chimney so that a current will be set up drawing the foul air out of the room. A still better method is to provide two compartments in the chimney, one to serve as a foul air outlet, and opening into the room near the floor, the other serving to carry away the smoke. If the house is heated with steam or hot water, a special system of ventilation must be provided.

But the mere provision of fresh- and foul-air shafts is by no means sufficient. The most elaborate system of ventilation may be entirely useless, or even worse than useless at times, by taking the foul air from one room, and introducing it into another room. Strange to say, this is not an uncommon occurrence. Care must be taken to see that the air circulates in the proper direction, that fresh air actually enters the room by the fresh-air shaft, and that the foul air is passing out through its proper shaft. To accomplish this, a good current is necessary. This may be secured by means of a small stove in communication with the air, or by a double chimney as before described, one of the compartments serving for the foul-air shaft. Or mechanical means may be utilized, and the fresh air driven into the room by a revolving fan, and the foul air drawn out.

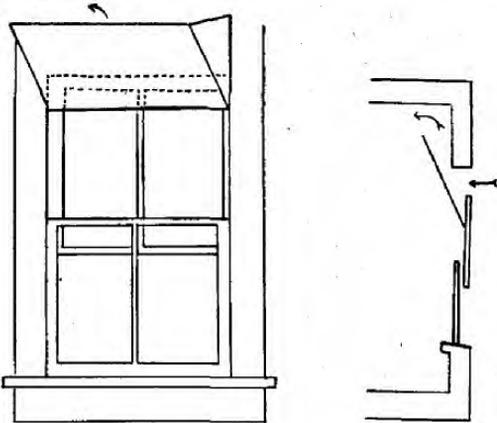
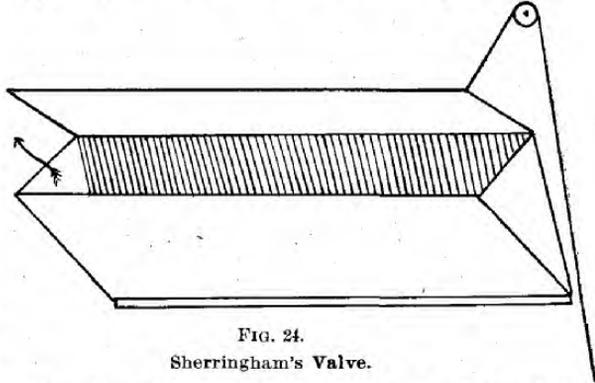


FIG. 23.

Window ventilation by use of the triangular box.

But in the country, and often in small towns, rooms are heated directly by means of an old-fashioned fireplace or a modern stove. The open fireplace forms an admirable means of ventilation, although it is very inefficient for heating purposes. The impure air passes up the chimney, and fresh air enters from the outside through cracks and crevices and open windows and doors. The stove is much less efficient, although it furnishes better heating results. Numerous simple devices for ventilation in connection with the use of stoves

have been suggested. A pipe leading from the outside may be arranged, and the cold air thrown against the stove as shown in Fig. 20. Thus the air is quickly warmed, and then rises to the ceiling, from which it falls slowly as it is cooled. A foul-air outlet connecting with the chimney opens behind the stove, near the floor. (Y, Fig. 20.) A very simple device for the outlet is an open damper

FIG. 24.
Sherringham's Valve.

in the stove-pipe, which can be opened and closed at will. (Fig. 21.) An ingenious contrivance for the same purpose has been suggested by Dr. Kellogg. It can be attached to any stovepipe. This ventilator is provided with a valve, which allows the air to pass in but one direction. As soon as the air begins to enter the room, the valve is closed. (Fig. 22.)

But many times it is impossible to use any of these methods, and it becomes necessary to depend upon the windows and doors for the entrance and exit of air. Even then fair results can be obtained if proper attention is given to the matter.

One method is to lower the upper sash, insert a board containing a circular opening into which is fitted a pipe leading to the center of the room, where an elbow is so arranged that the incoming air is directed against the warm ceiling, from which it spreads out and diffuses through the room. To make this successful, an outlet should be provided, and even then it may not always work, for the warm air of the room may be conducted outside instead of the fresh air led into the room. When properly arranged, there is no draft.

Another method is to fasten a narrow triangular box to the upper part of the window, so that when the upper sash is lowered, the air is directed upward against the ceiling, and partially warmed, thus preventing a cold draft. (Fig. 23.) The amount of fresh air is easily regulated by lowering or closing the sash.

Ventilation can also be secured by means of "Sherringham's Valve," which is fitted to a nar-

row opening in the wall near the ceiling. Here the amount of fresh air is regulated by raising or lowering the lid. (Fig. 24.)

A simpler but less efficient method is to lower the upper sash and introduce a tight-fitting board to close the opening. Then the air enters the narrow opening between the two sashes, and is thrown upward in a wide, thin current, and rarely produces a draft. Two windows thus arranged will ventilate an ordinary room on a cold day. Still another simple and efficient method is that devised by Dr. W. W. Keen, and illustrated in Fig. 25. This provides two narrow openings, one for the inlet and another for the outlet. A piece of pasteboard or thick paper may be tacked across the lower twelve inches of the window, and the lower sash raised.

A cold draft directed against a person sitting quietly in a warm room is likely to cause an ill-

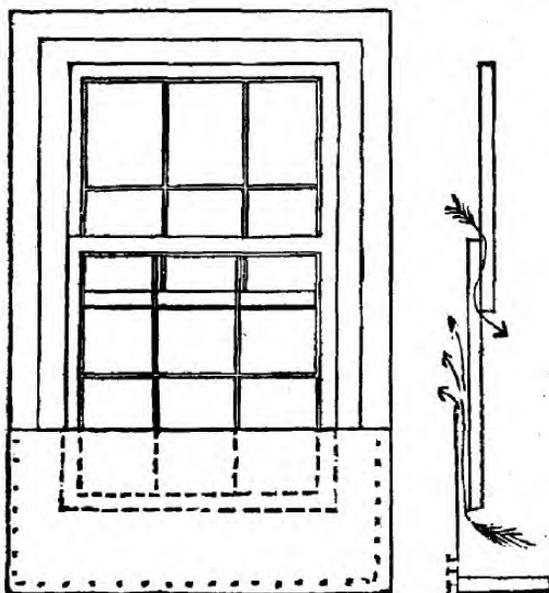


FIG. 25.

Keen's arrangement. (After Hartshorne, in "Our Homes.")

ness, which may be serious or even fatal. Some one has said that a man who sits with his back to a draft, sits with his face to his coffin. Drafts should always be avoided, and yet the room should be properly ventilated. It may be necessary to put on an extra wrap or coat, or even to take some brisk exercise while airing out the room by opening the doors or windows.

MOISTURE IN THE AIR.

The air we breathe should contain a certain amount of moisture, usually estimated at 70 vol-

umes per cent. Moisture to saturation is unnecessary. Dry air is irritating to the delicate air-passages and the lungs, and will abstract too much water from the tissues. Ordinarily the average man loses about nine ounces of water through the lungs in twenty-four hours. Furnaces are usually provided with a small vessel for water, the slow evaporation of which moistens the air as it is carried to the rooms. Steam and hot-water radiators, and stoves also, dry the air without adding any moisture. A small pan of water placed under the stove or radiator, will in most cases be amply sufficient. The bracing air of winter is usually deficient in moisture.

PRACTICAL HEALTH HINTS.

THE carpenters who have built schoolhouses without ventilation, and the directors who allowed them to do so, were at one time children in the public schools. Why didn't they learn better? Those who will build the schoolhouses for the next generation are in the schools now. Will they learn better?

A few hundred persons are poisoned yearly by copper cooking utensils. In Pennsylvania, a few years ago, a farmer's wife cooked meat in a copper kettle for a party of fourteen. Ten of them died. And yet this woman had been in school when a girl.

Universal knowledge of the fact that vinegar becomes poisonous when allowed to stand in a tin vessel would save a few lives every year.

"Killed by Trichina" is a common newspaper heading; and still people eat raw ham without knowing that they risk their lives every time they taste it. There is only one way to get tapeworm—eat raw meat, or raw fish.

Consumption is a contagious cow disease. Its victims outnumber those of smallpox or yellow fever. Yet little precaution is taken against it.

A lamp burning in a bed-room makes the air unfit to breathe. The lamp, besides using the oxygen, gives off carbon dioxide and carbon monoxide, the latter gas being a deadly poison.

There is no danger of "catching cold" in a sore or cut. The so-called "cold" is produced by microbes in the air which attack a wound as soon as it is exposed.

Night air is not poisonous, nor is cold air necessarily pure, as some seem to suppose.—*Will Scott, in Teachers' Institute.*

A Good Law.—The legislators of Norway are certainly wise in their day and generation, in one respect at least, as this bit of current news abundantly proves: "Norway has recently enacted a law forbidding the sale of tobacco to youths under sixteen without signed orders from adults. The police are empowered to confiscate the pipes, cigars, and cigarettes of boys who smoke in the public streets, a fine for the offense being likewise imposed."

Cleveland's "School Farm."—A despatch from Princeton, N. J., the present home of ex-President Grover Cleveland, says that Mr. Cleveland, has abandoned the plan of using his big farm as a school of agriculture for homeless waifs. It was intended to train the boys in the best methods of agriculture, at the same time giving them the advantages of a good "communal home." The youths were to be allotted parts of the farm, and were to be given credit individually for the amount of farm produce raised on their respective lots. In practise the scheme failed, and the ex-President has determined to return to the original method of farming.—*The Pathfinder.*

A Rapid Transit.—The marvelous perfection attained in the rapid transmission of mail-matter by the Post-office Department of the United States government finds new illustration in the remarkable journey made by a small package from Juneau, Alaska, to a place in New Jersey, as the following press despatch proves: "A report to Second Assistant Postmaster-General Shallenberger from the railway-mail division headquarters at New York, announces the transmission of a mail package from Juneau, Alaska, to its destination in New Jersey, in eleven days. This is the quickest transit on record. The package was mailed at Juneau, January 13; reached Seattle, Wash., the 19th; was recorded at Pittsburg the night of the 23d, and completed its quick journey the following day."

Annual Negro Conference.—Once every year there is held at Tuskegee, Ala., a conference composed of hundreds of representative farmers, mechanics, ministers, and teachers from all parts of the South. These conferences were instituted by

Booker T. Washington, president of the Tuskegee Institute. In connection with the conference is held a special workers' meeting, which is made up of the presidents and instructors in the colored institutions of high grade in the South. These conferences can not fail to be of great value to the large and rapidly increasing colored population of our Southern States, bringing about more unity in educational work, and making that work of more practical benefit to those to be educated and trained for the actual duties of the life that is before them. The conference this year is set for February 22 and 23.

The New French President.—M. Emile Loubet was elected president of the French Republic Sunday, February 19, only three days after the death of M. Felix Faure. Fortunate indeed is it for the nation that her system of filling such vacancies requires such a short time. The Orleanist and Bonapartist claimants to the defunct throne of France were not ready to seize the opportunity of a lifetime. Beyond the empty shoutings of the low Parisian mob, no demonstrations have been made that required the attention of the police. M. Loubet has an excellent reputation for uprightness and honesty. He has been a successful lawyer and politician, and for some time he has been president of the senate. His attitude concerning the case of Dreyfus is not definitely known, but it is thought he is favorably inclined toward the Hebrew ex-officer. M. Loubet's simple habits of life are made the butt of coarse caricature by the press in Paris, but these very traits tend to unite him to the common people, and rural population of France. In this respect he appears in marked contrast to his predecessor, who loved ostentatious display.

Some Recent Events.—The New York legislature is considering a bill to legalize the selling of horse flesh for food.—A soap manufacturing trust is in process of organization. It is expected that prices will be reduced.—President Mc Kinley has recommended the laying of an American cable to the Philippines.—Among the names recently suggested for new battle-ships are the following: "Colonization," "Expansion," "Imperialism," and "Military Drill in Schools." What next?—Rear-Admiral Dewey has been raised to the rank of Admiral, with a salary of \$13,000 a year, by a special act of Congress.—The "Army Bill" authorizes the extension of the U. S. army to 100,000 men until July 1, 1901.

EDUCATIONAL CO-OPERATION.

SOME months ago the EDUCATOR set forth in several articles the important advantages of co-operation between such schools as are distinctively devoted to Christian education. Institutions like the School of the Evangelists, described in this number, and Battle Creek College, whose work was noticed in the preceding number, might be cited as examples of an effort to build up a system of education based upon the principles of the Bible.

There are few schools of this kind to be found, though their number is increasing in an encouraging way. By correspondence and personal interviews, the editor of the EDUCATOR has recently ascertained that there is now a strong sentiment among many of these schools to unite together in co-operatively working out the problems that lie before them. Before the present volume of the EDUCATOR was begun, it devoted some space to a department of "News from the Schools." Items of interest were occasionally received from Union College (near Lincoln, Neb.), Walla Walla (Wash.) College, Healdsburg (Cal.) College, the Keene Industrial Academy (Keene, Tex.), the Southern Industrial School (Graysville, Tenn.), South Lancaster (Mass.) Academy, from the Mt. Vernon (Ohio) Academy, and from several smaller schools pursuing a similar line of work. But these items gradually fell off in interest and frequency, and the department reserved for them in the magazine was abandoned for lack of matter with which to fill it. Items of interest from Battle Creek College have frequently appeared in the *Review and Herald* and in a special publication issued by the school.

It has been the fixed purpose of the EDUCATOR not to become recognized as the exponent of any local educational interest, but rather to present illustrations of progressive educational work in all the various sections of territory represented in the schools mentioned. It was the original expectation that the paper should serve largely as a unifying agency between the teachers and patrons of these schools. Co-operation has been the key-note of the EDUCATOR from the beginning, and has been sounded at intervals from month to month in one phase or another.

Only recently, however, has the response become sufficiently unanimous to promise a definite plan of united effort. The rapid growth of the "church-

school" idea, the question of the proper qualifications of teachers, supervision, etc., has molded sentiment in favor of a better definition of the relations existing between the schools concerned. Under a former condition these schools were properly regarded as integral parts of a system, co-ordinated with other branches of the work carried on by Seventh-day Adventists. The experiences of the last two years have unmistakably shown the advantages of a closer co-operation on all the matters of common interest that grow out of the work of these schools. Such topics as the proper qualifications of teachers and students, the right textbooks and courses of study, the best methods of teaching and administration, industrial work, financial support, etc., can all be best considered by co-operative action.

Now that this era of trying to see "eye to eye" rather than "eye through eye" has come, the EDUCATOR heartily renews its endeavor to be the exponent of the *best system* of education that the world has ever seen. No one claims that such a system is yet perfectly exemplified in modern times, but it is *coming* in the life of every one, old or young, who lives long enough to see its possibilities developed in co-operative, rather than competitive, effort.

More might be said; but the EDUCATOR will be better prepared in its next issue to set forth the plans and methods of systematic co-operation that may result from this brief forecast. Our readers will not be surprised if the EDUCATOR should soon present itself in a new phase that will make it more valuable than ever. Look for it.

APOLOGY.

WE wish to announce that previous to the publication of the December EDUCATOR's answers to the questions on the *ing-forms*, a *correct* set of answers had been mailed by Mr. H. G. Mortson, of Saxeville, Wis. His letter was not discovered until after our January number was printed. His answers agree almost *verbatim* with the EDUCATOR'S, and so we take pleasure in issuing the promised subscription to Mr. Mortson.

HAPPY is the man who is discontented.—*Persian Proverb.*

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of the State Industrial Home for
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