gested: ONLY THAT WORK SHOULD BE DELEGATED WHICH CAN BE DONE TO GOOD ADVANTAGE BY THE STAFF, AND WHICH, IF PERFORMED BY THE EXECUTIVE HEAD, WOULD BE DONE AT THE EXPENSE OF SOMETHING MORE IMPORTANT. The adoption of this principle by the head of the high school would enable him to deputize the members of his staff for administrative work which they are capable of performing well, and as a result free himself for work which should be done by the school head only.

From the standpoint of the science of efficiency, it can be seen that team organization has potential possibilities for improving the managerial work of the high school. Team organization does not mean letting others do the work. It implies rational co-ordination and wholehearted co-operation, and the school that is properly organized along these lines should greatly add to its administrative efficiency.

SECOND SESSION

The second session was called to order on Tuesday, February 28, in the Ball Room of Hotel La Salle at 2:01 P. M. The Vice-President of the Association, Wm. A. Wetzel, Principal of the Trenton High School, Trenton, New Jersey, presided. Professor H. L. Miller of University High School, University of Wisconsin, spoke without notes on *Directing Study for Creative Thinking*.

DIRECTING STUDY FOR CREATIVE THINKING

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1. *The Situation.* The lesson-hearing school, a survival of the fourteenth century *quadrivium* method of education, is still the typical school in our democracy. Teachers all over America still hear the lessons "said." The *regurgitation* of daily lessons goes on unabated. Boys and girls are thought to be sick and in need of perpetual rest-cures in the form of daily consumption of dabs of information under a regimental uniformity which emphasizes the militaristic theory of life. The corporate spirit is sacrificed to regimentation. The class group, instead of the individual pupil, is treated as the educative unit.

It would be easy to say mean things about our conventional procedure. The lecture system is even worse than the recitation system. Both are wedded to the absorption of ready-made facts. "We toil," said Montaigne, "only to stuff the memory and leave the conscience and understanding void." Milton felt badly about it, too: "We hale and drag our choicest and hopefulest wits to that asinine feast of sow-thistles and brambles which is commonly set before them as all the food and entertainment of their tenderest and most docible age." But, gentle reader, I am not a rebel.

Yet, is it not true that the *recitation* belongs to an age when books were few and when schools were established to *impart knowledge* and to test the learner's absorption of facts? To recite (to regurgitate lessons) is to cite once more, to tell again, to repeat. The new teacher does not prepare a lesson, bound it on all sides by the *five formal* steps, and insist that all pupils shall conform to the pattern. The primary purpose of going to school is not *knowing*; yet, we still recognize as training and discipline the so-called voluntary attention which seems to be the ability to stare, ox-like, a disagreeable, uninteresting task or unintelligible thing out of countenance. The business of "holding the class" and "siphoning the vacuums" must appeal to any twentieth century, forward-looking mind as a tragic survival of fourteenth century education.

Our procedure has been reinforced by the ideal of organization since the day Horace Mann was captivated by the Prussian system of education. Life is squeezed into some educational formula or other, and the effort is made to turn out a standardized product. A methodology has been supported by a psychology built upon the theory of instincts *as data* with the result that groups of youngsters are regimented upon the theory that certain instincts, that we don't know anything about, are about to *burst forth* at given levels. Do we find any evidence of instances actually at work? May they not be just hypotheses? Nobody any longer really believes the mind works within any such rigid lines as are set down in the Herbatian steps. Yet we go on trying to negotiate education in a democracy in a kind of military lockstep, regimental uniformity—a procedure as ill adapted to modern life as the stage coach would be to modern transportation.

And just now our pedagegical commandments are suffering from an acute attack of mechanistic megalomania and its sequel, standarditis; some are happily growing convalescent. *Standardization of*

thinking has always hindered progress. The measurement fad is having its run. Tests of all sorts are being used to buttress fallacious arguments about people *in the making*. The difficulty lies in having a penchant for a single fact or group of facts. Are we not in danger just now of exhausting the supply of humus in the soil by this steady diet of proteins under this quantitative method extended to all studies in the curriculum? May we not be destroying the foundations for the cross-fertilization of ideas? The quantitative method has its proper and legitimate function in its field. Until we study "temperamental" attitudes, get at the biological foundations of human behavior, study defense mechanisms and protective coloring, we are liable to be victimized by an unhealthy fatalism in dealing with boys and girls. Let John's teacher say, "*John can't learn it,*" and the nerve of effort-making capacity is cut, and John's teacher proves an alibi. To substitute for the blighting "can'ts" a simple doctrine expressed about this way—"John has not learned it yet"—would be a world-shaking event, comparable to the invention of the combustion engine. With this new movement, really an old institution parading in the livery of science, we hear the rattling of the dry bones of minimum essentials of content, as if it were our primary business *to indoctrinate* the youth of the nation with a conventionalized, safe, and guaranteed set of ideas and ideals, forgetting that our social organization (state) is no cut-and-dried system, but the expression of a continually developing impulse to unify and co-ordinate our ideals.

Just when we are about to escape a deadening formalism; just when we are beginning to understand that the minimum essential is bound to become the maximum necessity; just when we are about to step up from the herbarium mode of education to a life basis, we find ourselves thrown back into the puzzle stage of education, asking pupils to answer tens of thousands of questions which rest on a 50-50 basis of chance of "rights" and "wrongs," or which fail utterly to challenge any creative or constructive thinking. Besides, isolated facts are taken out of context (tautology intended), often mutilated, and presented to youngsters in tests resulting in guessing and in recording ready-made answers. Moreover, the old errors recur. The ability to recognize a simple element in a relatively simple situation is no evidence of ability to use that same simple element in a new and relatively complex synthesis. The sheer mechanics of any subject in secondary education rarely needs to be learned in rote fashion. The simple elements may be cast up in a contest in which

the game may be made the basis of motivation. That is legitimate. But the mirror-minded pupil is not the ideal of a democratic education. To stuff and cram the memory is not vital education.

2. *Undirected Preparation of Lessons.* Lack of space forbids more than a mere mention of this important aspect of our problem. Any one with half an eye and with the happy mental condition of not "having been cut off as to his head" can make a first-hand study of the way in which lessons are "got." "Pa" and "Ma" agonize over son's algebra and daughter's assigned (Monday) theme. The good widow interviewed the superintendent in behalf of her flock of seven, suggesting that if it was all the same to him she would like to hear her children *recite* the lessons at home if the teachers would only *teach* her kiddies in school. But, it seems, we must keep the home fires burning educationally. Study a group of high-school youngsters in their habits of *getting* their lessons. Telephone is used: Jeremiah, how do you translate these hard sentences? And Constance takes it all down over the phone. Note the "spread," in a so-called supervised study period, of a solution of an exercise—right under the supervisor's nose, too. We have all met the *busy* college "student" who could "sit in" five minutes before class, get the hang of it, and make a passable stab at it in class. Some "goods" are borrowed outright and never returned—written themes and such. We leave this interesting story to the reader. There are great possibilities here for rich comedy.

3. *Varieties of Thinking.* Too much of our work results in types of thinking far below creative thinking. Our Mabels and Henrys are chattering on in our classrooms, saying and writing just everything and anything. It's a sort of reverie which sometimes results, accidentally, in a useful bit of thinking or poetry once in a while. Mabel, what will one pig cost if 20 pigs cost \$100? Mabel rattles it off: If 20 pigs cost \$100, one pig will cost $20 \times \$100$, or \$2,000; for 20 pigs is 20×1 pig, don't you know? And Mabel waits grinningly for the pedagogical benediction, wholly innocent of the prohibitive price of her class room pig. Mabel is the victim of *analysis*. When given the pedagogical stage direction, "Why, Mabel, don't you know you divide in a case like that," Mabel bolts it by the division route and gets the *correct* answer. Do we know, or do we care to know, that getting the *correct answers* to so-called questions and so-called problems is no evidence whatsoever that our kiddies (and college students included) *know* the correct answers? We

send our pupils to the printed page to assimilate, absorb, *learn* the facts *as such*, the conclusions and arguments of others *as such*, and then ask them to *recite*, regurgitate, repeat, rewrite what they have assimilated under all sorts of artificial standards, with the results that thousands of "students" thank God when they have *finished* their education in this and that course. Thinking? Yes. It is thinking of a sort. Practical thinking perhaps. A man has 40 cents and wants a lunch. He goes to Thompson's restaurant because he does not have \$5 to spend at the La Salle. Much of reasoning or making of decisions is of this practical variety, determined by circumstances.

There is also an enormous amount of *rationalization* in our schools. That means we spend a great deal of time and energy in finding evidence *to support a belief already accepted*. We are full of "good reasons" for supporting or opposing the League of Nations; what the "real reasons" are we seldom discover.

Gathering opinions, however "honest" or "scientific" they may be, and merely reciting them for the sake of the "loaves and fishes"—grades, diplomas, degrees—is deadening. "Nothing in education is so astonishing as the amount of ignorance it accumulates in the form of inert facts," says Henry Adams. The capacity of the human mind to resist the introduction of knowledge is not nearly so marvelous as the capacity of the "student" to absorb in a remarkably brief period enough facts to pass the course. "Philosophy Four" reads shockingly well. The good student in the course coached the clever intellectual loafer two days before the final examination. The "coached" duffer made a higher mark than his steady-working coach who took the course seriously from the first. There is irony in Philosophy Four. Many a pedagogue would have died laughing at himself had he ever developed any sense of humor. The old-time education considers the mind a graveyard, spacious and receptive. Data, events, knowledge of all kinds are so often dead matter ready for interment; the lesson sounds like a burial rite whether it be the dirge of Latin roots, or the dirge of tabourettes (manual training by the *amo-amas-amat* method)—a tedious ordeal, but very necessary in respectable places; the teacher, the only live entity in the analysis appears to be a combination of divine and undertaker; the examination is a sort of resurrection morning where, true to form, few resurrect.

Now, communicated facts may be made just as valid and important as self-discovered facts under some experimental questing;

but if only the former are given recognition, the great mass of dough is without leaven, and the salt has lost its savor. We need to think more about our thinking. *Enough* experimental questing should be done to enable us to hold in solution the mass of communicated facts, *enough* to give some taste for analysis and to furnish a basis of appreciation of man's task in building our civilization.

Creative thinking is possible even in the first grade. The child has already built his world before entering school. In every child is the stuff of aristocracy, and by that we mean the high potentiality for uprise or downslide according to circumstances and opportunity. The child's mimetic powers are tuned to the pitch prevailing in whatever concert room it happens to be an occupant of. Its creative genius is molded on the pattern of whatever performances happen to be staged there. This is the spirit of our new scientific humanism, and it expresses also our new faith in boys and girls. Capacity is an achievement, not a donation. Human nature is grown, built in the stream of life. A few children are born mentally deficient, but a vast number are gradually made so—dwarfed and stunted only by lack of opportunity. We have yet to conceive and build our technique by which human beings may grow to full stature. We spend our time and energy in critical, not constructive thinking. We exhaust ourselves in combating self-creative obstacles. *Freedom in work* is still confused with "honest" opinions and the anarchy of idle and irresponsible opinions.

And what are we to expect when the school promotes "habits of work" of this sort? (Adapted from an article by Professor Mead.)

Teacher: Class, come to order. Pay attention now. (The siphoning of vacuums is about to begin.)

T. Henry, you may read the first problem.

H. A piece of land has a frontage of 80 rods on a street. Into how many lots with a frontage of 60 feet can it be divided?

T. What will you have to do first?

H. Multiply. (Picture Henry drawing it out with a forced interest. It is no real problem for Henry.)

T. Multiply what? (Priming the old pump.)

H. Rods by feet.

T. How many feet in one rod, Henry? (Be careful! Now think! Pay attention, class!)

H. Five and a half.

T. Five and a half! Why, Henry!!!

H. I mean five and a half yards equal one rod.

T. Well, you might do it that way, too. (Think now!) What is it we do first?

H. Multiply. (After 10 minutes utterly wasted Henry arrives where he started, and the class is still exhorted to pay attention.)

T. Multiply what? Go ahead!!!!

H. Rods by feet.

T. Well, how many feet make one rod, Henry?

H. Sixteen and a half.

T. Correct. That's right. Go ahead.

(Really does Henry know the *correct* answer?)

Well, go on, Henry. (Contemplate the mind of the teacher still sitting in self-complacency at a salary of \$150 a month.)

H. $16\frac{1}{2} \times 80 = 1,320$ ft.

T. Now what must you do next with the feet?

H. Change them to lots.

T. And how would you do that?

H. Divide.

T. Divide what? Go on.

H. Divide by 60.

T. That's right. Go ahead.

H. $1,320 \div 60 = 22$.

T. 22 what?

H. 22 lots.

T. That's right. How many understand? (They always say yes to that.)

Is it any wonder we have tired Fridays and blue Mondays? Is it any wonder our students don't know anything? And then we try to measure what our children learn! Oh, complacent pedagogue! If the class *pay attention* to this ridiculous performance of Henry and his teacher, it is attention from the medulla oblongata *down*, not *up*. How could there be any spiritual explosion in such a formalism? Nothing gets over the loop. Mabel, as we noted, just chatters, chatters on, saying everything and everything without the slightest titillation of her higher brain centers. And yet, no commands are more frequent than these: Pay attention now, class! *Think*, John! Study your lesson, Susan! We are still milling tens of thousands of our children through the ritual in a kind of catechetical procedure. We are still in the puzzle stage of education. Here and there the

light is breaking. Here and there teachers refuse to be mechanics. They are beginning to see that where there is no problem there can be no constructive thinking.

And then we pass resolutions in conventions assembled: "The schools nourished the spirit of democracy and produced a soldier *whose initiative, resourcefulness, courage, and morale*"—etc. Oh, ye of blind faith! Is Henry growing in power to do creative thinking? What are his classmates thinking about while Henry and his teacher are doing this fool thing? Henry is no near-idiot. The trouble is the belt is off his generator. The system and the teacher contrive to keep it off. Henry is bound in his intellectual swaddling clothes. If the other 29 pupils are dead enough there is no problem of "discipline"; where there are no problems of discipline there are no "bad" boys; where there are no "bad" boys the mechanical supervisor is prone to believe he is running a "good" school; it may be an "efficient" school and nothing more. The real question is, efficient for what? We are not contending that our young men failed in initiative, resourcefulness, courage and morale; we raise the question, Is the school developing these traits through its intellectual stress in the classroom? There are life-giving oases in our educational deserts. Here and there, in spite of dogma and system, good teachers are at work assisting boys and girls in the building of capacity.

4. *New Procedure.* We can only illustrate our new procedure conceived along lines of creative thinking.

Try it on a little fellow 7 or 8. Use the method of Agassiz. Have you ever heard the story of Robinson Crusoe, Tom? No. (Now don't tell him and ask him to repeat it. Don't have him read it and *reproduce* it. That is the traditional way. It is not the way to develop thinking boys and girls.) Well, Tom, once there was a man left on an island all alone. There was a picture of a ship on the ocean in his home. (Furnish some data for Tom's mind to work on. Set up some hypothesis. Now it is becoming Tom's problem.) Tom, how did he get on that island? *Tom will tell you.* Go on fabricating controls. One day, your man (shall we call him Robinson Crusoe?) got sick, etc. What could you do, Tom, if you got sick, that your Robinson Crusoe could not do? *Tom will tell you;* i. e., *Tom will create his story* if he has not been repressed and corrupted to the very roots.

All sorts of challenges will occur to the directors of activity *as the movement goes on.* Not all stories need to be created by our

Toms and Marys in a *controlled* environment that does not repress. Some, in fact most, are to be read. And after Tom has entered upon the quest of building his own Robinson Crusoe, he may be put in the way of De Foe's story. It can be done cunningly. Robinson Crusoe furnishes the *motif* of all vital history.

Again, a teacher growing up as a director of activities, began his work in the "Social Studies" by saying: Let us write our own chapters. Each pupil provided himself with a loose-leaf notebook. The first chapter in the Story of Man's Progress was the "Development of Modern Science." They started their books by contemplating what our world would be if every dynamo in the world were cut off at once. Each built his own chapter. The printed page was used after raising real problems in their discussion. Faraday was pictured there in 1831 with a strip of copper which he was revolving between the poles of a horseshoe magnet, and that was the first dynamo. Over against it was placed a cut of that marvel on the Milwaukee road, the modern Westinghouse electric locomotive. These pupils (10th grade) were grouped for their readings. Slosson's Creative Chemistry was devoured. John Dewey's chapter on Scientific and Empirical Thinking was read by these boys and girls and read intelligently—far more intelligently than students of "education," teachers, supervisors, superintendents read it in our courses given *in abstracto* in normal school, college, and university summer sessions. Chapters on custom-thought and power-thought and the means (machines and cross-fertilization of cultures) of breaking down these old forms of thought were read. History books, science books, scientific periodicals were used. One boy gave a "lecture" on high frequency currents; another on radio and wireless. A good thing discussed in class was shared by all and worked into their own chapters in their own composition. Another chapter on "Transportation" was begun by having the pupils relate their experiences in travel. Railroad folders were collected. The cable was thrown back into a *moving past*, and the ways of travel in Greece and Rome were woven into the story of man's movement over the earth. Another chapter on "Sanitation" was developed in a similar manner. One boy worked up his own set of lantern slides and exhibited them to the class. He had worked up slides showing the way the Romans did it and then on into his own city. Incidentally these books produced by the pupils were substituted for the bi-weekly ritual of themes in the subject labeled English.

The point in all this is to get some productive question in front of some potential answer and then to use the printed page for a real (creative) purpose. There is no muddling here over thought questions and fact questions—a dreary chapter in the history of “pedagogues.” To ask what the causes of the civil war were, is not a thought question, if it is answered on page 301 in the text. The answer is there before the (so-called) question is put. Few indeed are the questions which really precede some potential answer.

Geometry can be taught by our Robinson-Crusoe procedure. The pupil may, if *we* will, *build his triangle as a thing to think with*, and not a thing to be recited.

Try it and test it for yourself. Use a small pad and write on it just what you say in a real, directed procedure. All on our marks now. The new challenge is 30 original exercises. Have your class of 35 pupils start and *work like the devil in the classroom*. Have them report their difficulties to you in this new “lesson,” now a challenge, lasting three to five days. You are not just policing study now. You are not sitting up in your little furtive pulpit writing a letter and gazing down at the mourners in the pews now and again, waiting for an impudent signal to stop study and *recite* for 32½ minutes. (Ineffable administrative bosh!) No, you are an active agent, very silent, perhaps, in this working group. Each pupil describes his dilemma to you. You write on the pad just what you say to each one, or each group, or to the class as a whole. *Then you may not talk too much.* Something like this ought to appear on your pad. (We leave it to the reader to supply the pupil’s dilemma.)

Ruth. “Supplements.” (This is what the teacher said and Ruth goes on and thinks it through.)

Henry. “Can you think exterior angle?” (And H. does it and it works.)

T. “How is BM drawn?”

S. “State all facts in your hypothesis in terms of your figure.”

W. “Talk to your figure.” (Talk to it? Yea, verily, talk to your figure. And he does and it works.)

O. “Trace your angles with your finger as you read them.”

B. (The teacher did not say a word; he just pointed out a significant construction line.) Oh! says B.

I, G, H. “Go to board over in corner there together and work out your angles in degrees.”

M. “Either way (alternative) will lay golden eggs for you.”

Mc. "Yes. Try it."

P. "Use page 62." (A page of summary directions.)

R. "Try to use proposition XXX," etc., etc. How absurd to hold that difficulties come by the clock! In the learning process difficulties are always unique.

All of you. "Here is a little algebraic device that will help you." All gave 5 minutes to its development.

H, M, O, D and C. "Come over here. Draw your figure and quiz each other. Put a construction line through point O some way."

L. "What are some of the ways of proving segments equal?"

C. "Try another exercise, and let this one soak a while."

About the third day, you will find two or three pupils emerging with the whole challenge *mastered*. Let them assist you, taking a pad and writing down just what they say to a class-mate needing a suggestion. They can do it. Here is a sample from Tom's pad, Tom being one of four pupils who assisted in the experiment, from which these samplings are taken.

B. "What do you know about the altitudes of some triangles? Look it up."

H. "How do you draw a line parallel to another line?"

K. "You are not using all of your hypothesis. You have a good chance to work in a fact you have omitted."

C. "Keep your finger on p. 62. Now what are the ways of proving angles equal?" Etc.

At the end of this challenge the class comes to a vigorous discussion of their work. It looks a bit like a recitation to the uninitiated. But it is a very different thing indeed. There has been some thinking at the *fork of the road*, at the point of crisis. The pupils are assisted in choosing some alternative. They are directed in seeking some plan of attack. They are supplied with facts that will enable them to go forward in their thinking. Any earnest thinker who tries some such plan of directing activity as is suggested in this procedure will soon sense the problem of creative thinking.

The scientific method may be interpreted in manifold ways. What is required, first of all, is some way (plan or hypothesis) of thinking. Data are needed. Facts and materials to work with are absolutely essential. The thinker examines his materials, facts and data. He throws the cable back into his experience, gathers up relevant data, sifts evidence, and always redefines his way of think-

ing in terms of his facts. The artist does just this thing. The scientist does it. The whole attitude of our twentieth century approach is coming to be one of experimental questing. Why should we fail to orient our teaching in school and college to this new technique?

A teacher of English, long since weaned from the literary canon, reads to his kiddies (9th grade and a whole mess of them—36, and 3 college seniors in with them *participating* in an honest way)—reads some ballads, tapping the meter lightly with his pencil. And the “bad” boys start keeping time with their feet. This new teacher says, “Come on all of you and tap it lightly as I read.” After a few were read he says, “How do you like them?” “Bully,” they say. “Then come to the desk and help yourselves.” An armful of books was brought in that day and he said, “Get off there now in groups of a half dozen and have one read aloud in each group.” A bear garden! No order! Bedlam! cries the visitor (perhaps a “suspector”)! Too much noise! And we have to ask him what kind of noise? And we may have to say, if you don’t want children to get out of order, and if you don’t want them to fail, don’t set up a mediaeval order and a lot of standards for them to get out of and fail in. And the class reads ballads in groups while the teacher guided the procedure here and there. Then he said, “How would you like to write some ballads yourselves?” They did, and the ballads they wrote did not have to be expurgated. Some of them were beautiful. Here is a sample of one of the best, one of six stanzas by a twelve-year-old girl who was not a “prodigy” in any mythological sense:

Fair Isabel of Rockloyal
At her window stood alone
Gazing the way her lover rode
When he to the wars was gone.
(Five more just as beautiful.)

Every pupil in that class wrote ballads and the college seniors tried their hand at the same game. Out of a controlled environment with some way developed, some “general frame of reference,” as it were, the pupils were enabled to create their ballads.

It can be done in chemistry, this building of initiative—this creative thinking. Try culminating “projects.” This was done. Two classes in chemistry spent the last eight weeks of the year on some big problem. Each pupil selected his “project.” Each pupil spent

some sixty hours in the laboratory on his own project. Such examples as paints, chewing gum, dyes, baking powders were worked out of raw materials into finished products; the various stages were exhibited and explained in legends and good English. The teacher was a consulting expert, always there to guide activity. Some pupils came out with negative results. The teacher sought to fix responsibility in each pupil and to assist each one in developing resourcefulness and initiative. The same general principles in our new general method are illustrated here. The effective socialization, if anybody likes to hear that good word, was brought about by having each pupil explain his achievement in full before the class. At commencement time these pupils exhibited their "projects," and took keen delight in explaining them to their friends and parents.

These illustrations could be multiplied indefinitely.

It may seem wicked to refer again to our conventional practices. The temptation is irresistible. To stop with destructive criticism is unprofitable. The pioneer must subdue the land, and keep down and cut out the water-sprouts as he drives forward with his constructive program.

Let Edward Yeomans clear the field:

"Class, turn to page 43. John, what is the subject of the story on that page?"

"Now stand up and read till I tell you to stop; stand up straight, please, and hold your book in your right hand. Speak clearly, and hold your head up. There—that's the first sentence; now tell us what mood the verb is in. What is the rule for the subjunctive mood? Can't anybody remember that? Why, we had it just day before yesterday. I will write it on the board; for that is something you must know before you go on to the next grade (9th)." (Don't miss the incentive, patient reader.)

She writes: *The Subjunctive Mood is used in a subordinate proposition when both contingency and futurity are expressed, or when the contrary fact is implied.*"

And, of course, these mirror-minded children (produced by the system) can learn to repeat the words in the definition and pass to the next grade. And yet, the defenders of the *status quo ante*, the *sat sapienti*, call us rebels and radicals when we urge something better than typical fourteenth century methods with, of course, certain modifications out of recent studies in psychology. Like Ephraim

joined to his idols these defenders cling to their self-created obstacles, thereby making constructive thinking very difficult.

Creative thinking is a possibility in our schools. We shall have to see to it that there is no lesion of the social sense. We can not have both regimentation and the corporate spirit. If we mean to work out a technique in keeping with our new scientific humanism of this twentieth century, if we would build for a shared life, if we would have *freedom in work*, if we would release the potentialities of our youth through education, we shall have to think of a new ethic, a new gripping of the problems of self-mastery, and perhaps abolish the "teacher" and try to turn our schools into the hands of directors of activity.

Another very mean thing to repeat, is to say that if high-school teaching is bad, college *teaching* is worse. The lecture system compels even a greater absorption of facts than the recitation system. The piling up of dabs of information by cord-wood methods against the day of examination serves to perpetuate the vicious circle. College students become our high-school teachers. They teach pretty much as they are taught. *The way to improve high-school teaching is to improve collegiate teaching.* When we go right down to the roots of this problem we shall probably find less need for so-called educational and pedagogical courses, and I hasten to say I hold no brief for these courses. Most of them are conducted in the good old academic fashion contributing very little except to the confusion of the candidate. There are notable exceptions.

Here is a university professor (teacher) of repute. He is doing constructive work both in teaching and research. He has a large registration of freshmen and sophomores in history—some 250. He used to prove an alibi by shifting the responsibility on the high school. He has quit that aggravating practice. Now he has for his assistants graduate students who have taught. He still lectures. The purpose is not to deliver facts and opinions, *as such*, ready-made arguments and conclusions, but to set problems and raise questions and direct thinking. He divides his students into study groups of some fifty each. They report at specified hours in his laboratory—a room equipped for work as well as for lecturing. Books are there, source materials, etc. The students have these graduate student-teacher assistants. *Each student writes the chapters in his loose-leaf book, i. e.,* he actually builds his history. These *books* are left each day with the assistant. He scrutinizes and checks them. Two red

marks automatically direct the student to the professor. If the student is loafing, he soon knows it—early in the semester, the first week or month in fact. If the work of the student indicates inability to study, inability to do creative thinking, the professor assists him in this problem. The main point is the fact of responsibility for the student's thinking and habits of work. The method is one of building human nature or intelligence—a fine example of creative thinking. An environment and a technique are furnished conducive to creative effort. The professor's lectures are a part of the material to be *used* by the students in building their own *chapters and book*.

Give us a new general method of this sort in collegiate teaching, and our high-school teaching will be improved immeasurably; we may be able then to detect evidences of progress in our pupils from year to year. For it is idle to talk of education as the production of changes in the individual when the procedure effects no vital changes. It is perfectly possible for pupils to "set" through a course without making any essential change in their intellectual and spiritual life. A veneer may be rubbed on, but the first shower after the course is finished washes it off.

It is not strange that a high degree of correlation is found, so universally, between so-called intelligence tests and school marks, when we remind ourselves that no vital intellectual changes have taken place under the ordeal of the accumulation of school marks. What would be the result if we actually built a procedure in our schools and colleges in which constructive, creative, scientific thinking were the goal of every day's work? That would be a world-shaking event comparable to the discovery of fire, or of the going down to the sea in ships of men with hearts of treble brass, or the invention of the alphabet or the dynamo. Constructive, creative, thinking for all normally-constituted children and youth is the challenge to our twentieth century forward-looking teachers and educators.

It appears that God does not care enough about our human nature to change it; so it must be our task to organize a technique that will produce or build our own human nature. It won't help much to shoulder the responsibility off on "gametes" and "chromosomes." We stand accessories before the fact; we are here. We should escape all insidious forms of pedagogical fatalism in facing youth. It is our job to use intelligence and turn modern science toward self-mastery and the development of these terminal buds of an immortal evolution.

5. *Summary.* Ability to recognize a simple element in a relatively simple situation is no final evidence of being able to recognize (or use) that simple element in a moving-learning (relatively complex) situation.

Inability to recognize (or use) a simple element in a relatively simple situation is no final evidence of being unable to recognize (or use) that simple element in a moving-learning (in-context) situation or synthesis.

Creative thinking undercuts and transcends the statistical method.

The task of education, as I see it, is the production of a people capable of thinking, and with a mental attitude which is tolerant, fearlessly honest, expectant of change, and creative.

Our schools have carried down the past tradition of "learning" as the acceptance of facts, while what we need is a mind capable of analyzing problems in the light of facts.

We have had our educational programs based on certain given analyses of human nature, "instincts," and so forth, when, as a matter of fact, psychologists cannot agree as to what the instincts or elements of human nature are. We have only a mind-body organism sensitive at every point and capable of being molded by whatever stimuli are presented. We *make* the human individual; and educational mass production on a uniform plan is surely not our highest hope.

The creative thinker is the hope of our human future and the great teacher is the one able to stimulate curiosity, to instill interest in searching for knowledge and enthusiasm before the challenge of a problem. This shift of emphasis in a new general method will serve to create the new teacher in the stream of life.

You see, I am taking it for granted that we shall never use the public educational service to impose any *one* form of political, economic, or religious belief. This is the darkest sin against the future. *The test of our educational system is—does it develop individuals who are vividly alive to the achievements of the human spirit in the mastery of nature, and capable of creative thinking.*

DISCUSSION

The discussion of Professor Miller's paper by PROFESSOR A. L. HALL-QUEST, SUPERVISOR OF HIGH SCHOOLS OF CINCINNATI,

OTTO, was read, in the absence of Professor Hall-Quest, by Principal E. H. Kemper McComb of Emmerich Manual Training High School, Indianapolis, Indiana:

One cannot refrain from wishing, after listening to Professor Miller's graphic discussion, that all those who agree with him (and their number must be considerable) would become champions of a teaching procedure that is based on common sense. Professor Miller calls attention to situations of which most of us doubtless have been a part either as learners or as teachers. It matters not whether one calls the point of view, elaborated by Professor Miller, Supervised Study, Directed Learning, Inductive Method, Social Period, or any other pedagogical term. Perhaps our danger is that we accept terms too easily and use them too glibly, forgetting the essential meaning of which the term is simply a label. It is quite useless to consider the adoption of any plan of directing study for creative thinking so long as the bulk of America's public school teachers persist in using the third degree method of education. Questions there must be, for they are stimuli, but the questions asked by a sage are quite different from those asked by a gossip. There are questions that open up a whole realm of reflections and others that simply are like the tapings of a woodpecker. The criticism of the question and answer method does not involve any policy of abandoning the question as an educational essential, but rather exalting it to a place where it becomes the quickening of the thought processes into eager action.

An English educator, Dr. Frank Hayward by name, has suggested the rather startling use of the detective story as a means of stimulating pupils to think. The method is simple: give the pupil the story without the denouement and let him construct his own solution of the mystery. Professor Miller's suggestions in the field of literature, mathematics, science, etc., are, of course, worthy of adoption. The teacher will find in a recent publication by Professor Boraas, "Teaching to Think," a stimulating discussion. Professor Parker's series of articles on "Thinking" in recent issues of the *Elementary School Journal* are also of considerable value. Educational literature is well supplied with references to discussions of the problem and project method whose purpose, obviously, is to provide situations in which the child will learn by thinking and creating. The need of revising the emphasis in teaching technic is recognized by practically all students of education. It is not at this end of the line that we are

weak, but rather at the other, namely, the teacher training and supervision functions.

There seems to be an increasing interest in the point of view that children in school should be taught how to study; that the school is to be, not an examination hall, but a study center where the intellectual work of the day shall be concentrated under the best possible conditions; where the teacher and pupil find a clearing house of such educational materials as will be mutually cultural and educational. The difficulty seems to be to develop a technic of direction and supervision that will be sufficiently different from traditional teaching to make the new clearly distinguishable. Professor Miller points the way to such technic. Our teacher training institutions would contribute a priceless treasure to the cause if they would assign an increasing number of graduate students to investigations in this field of technic.

For example, a considerable amount of investigation needs to be done in the field of the assignment. The technic of supervising reference reading has not been sufficiently perfected. The central library plan in the typical high school may need a thoroughgoing reorganization in the form of departmental libraries, and such a reorganization in turn would involve a different type of classroom from that which now prevails. School administrators and architects have evidently not been gripped by the truth involved in discussions like the one presented by Professor Miller. The average public school classroom is not planned for the purpose of stimulating pupils to think and create. It is fashioned to conform to traditional recitation method. Not only must there be a reorganization along the lines mentioned, but a longer period that provides for the warming-up process and the second swing of work and thinking must also displace the present fragmentary, local-stop plan of schedule. If this results in a longer school day, to which practically all of the formal school work is confined, with a minimum of home study (and this only of the informal variety), we shall find that the school day is really not lengthened, but shortened. We can hardly expect pupils to do much thinking under present conditions of piecemeal assignments and frequent stop schedule. Thinking requires time. It is evident that we have a long distance to go before we reach the heights where the public school is an institution whose chief function is considered to be not simply supplying pupils with necessary data for social intercourse, but also with such data as will become the mate-

rials with which the pupil reaches conclusions and solutions and evolves into a creator of ideas and concepts and ideals which, after all, are the essentials of progressive and ever-ascending civilization.

At this juncture President Prunty named the personnel of the following committees :

NOMINATING COMMITTEE

1. John L. Stewart, High School, Parkersburg, W. Va.
2. Louis P. Slade, Senior High School, New Britain, Conn.
3. David E. Weglein, Director of High Schools, Baltimore, Md.
4. S. M. Brame, Bolton High School, Alexandria, La.
5. R. T. Hargreaves, Central High School, Minneapolis, Minn.
6. Dwight E. Porter, Omaha Tech. High School, Omaha, Neb.
7. John L. G. Pottorf, McKinley High School, Canton, Ohio.
8. J. S. McCowan, High School, South Bend, Ind.

RESOLUTIONS COMMITTEE

1. R. R. Cook, High School, Topeka, Kan.
2. L. L. Forsythe, High School, Ann Arbor, Mich.
3. Lee Byrne, Director of High Schools, Dallas, Tex.
4. Chas. H. Slater, Cleveland High School, St. Louis, Mo.
5. A. J. Burton, East High School, Des Moines, Ia.
6. C. B. Walsh, Friends' Central School, Philadelphia, Pa.
7. T. J. McCormack, High School, La Salle, Ill.

NECROLOGY

1. Otto F. Dubach, Central High School, Kansas City, Mo.
2. M. H. Willing, Central High School, Springfield, Ill.
3. W. C. Graham, Wilkinsburg, Penn.
4. H. H. Culley, Glenville High School, Cleveland, Ohio.
5. Mrs. Lucy L. W. Wilson, South Philadelphia High School for Girls, Philadelphia, Penn.

AUDITING

1. G. W. Willett, Hibbing, Minn.
2. Eugene Briggs, Okmulgee, Okla.
3. Louis E. Plummer, Fullerton Union High School, Fullerton, California.