A CHARMING scene depicting a child learning in Plato's Academy is still visible on an ancient vase resting in the Agora Museum in Athens. The young scholar stands erect in passive mask before his masters who demonstrate their skill in music, the arts, literature, and philosophy.

A rollicking scene depicting children learning at the edge of the Renaissance now hangs in a Vienna museum. The children, so active it is difficult to remember that Breughel's canvas is actually static, jump, run, tug, lead, dare, pursue, scramble, ponder, practice, imitate, meditate, create. Each child—actually every child intent upon pursuing his individual victory singly or in a small group—wears an identical mask and concentrates with eager yet intense eyes, challenging the unknown.

The eager, intense and searching eyes are the ones today's schools yearn to produce. Yet these same schools may rely on the ancient ritual of model demonstrations and subsequent copying, rather than on providing an atmosphere for stimulation to exploration, experimentation, innovation, creation and evaluation.

How may the school foster exploration, experimentation, innovation, creation and evaluation? Are these its goals? Edgar Allan Poe delineated his method of achieving the desired effect by his philosophy of composition. According to his system of creative invention, one "begins with the effect to be wrought." He then invents, carefully plotting each word, phrase and mood needed to create the finished effect, until he reaches the point at which he must begin his story, poem, or other invention. This seems also to be the method of the contemporary musician, scientist, engineer, artist or educator.

The Effect To Be Wrought

One begins with the effect to be wrought: students thinking, discussing, creating; students comparing, considering, questioning; students responding, appreciating, maturing; students analyzing, evaluating, wondering; students inquiring, pursuing, extending interests. These are some of the behaviors—some of the desired effects—teachers glowingly describe as they report on successful promising practices.

Students thinking, discussing, creating. . . . Fourth graders have been thinking about others—the influence of the environment upon their homes, their agricultural and industrial patterns, their food, their habits, government, occupations, craft, values. The children have examined how others have expressed these values in the arts and the youngsters have created original sculpture, painting and songs from the materials indigenous to each region. These are nine- and ten-year-olds, thinking, discussing and creating.③

Students comparing, considering, questioning. . . . Students in the secondary schools, freed from the rigidity of traditional programs and limited texts read widely in paperbacks, discuss freely in small groups, penetrate issues of immediate concern in their interdisciplinary humanities classes. These classes enable students to become involved and to determine patterns for their own learning; to discover unifying elements which each may utilize in the integration of separate subjects; to become aware of, to understand and appreciate great achievements of man; to discuss issues important to students and to men of all times; and to raise further questions.④

Students responding, appreciating, maturing. . . . Individuals—ninth, tenth, eleventh, or twelfth graders in individualized reading programs—free to select reading according to their own interests and tastes; free to read at their own pace; free to discuss their reactions at individual conferences with the teacher; free to make their next selection.⑤ Free for responding, appreciating, maturing.

Students analyzing, evaluating, wondering. . . . Rural secondary students in a nongraded elective program, evaluating the effectiveness of two tragedies—one by Aeschylus, the other by O'Neill. Which presented the more moving tragedy based on the return of the general of the armies? Which has the more skill at resolving the problems of the stage? At speaking to his age? At delineating character? Fifteen-, sixteen-, seventeen-, eighteen-year-olds, wondering at man’s conflicts, his sense of duty, his acceptance of responsibility. Wondering right through class and into lunch hour, wondering.⑥

Students inquiring, pursuing, extending interests. . . . Hundreds of students engage themselves each year in independent voluntary study for science projects, in selective Boys and Girls


States, and in isolated experimental interest grouped classes or independent study programs.7

Some of these carefully wrought effects have originated in the classrooms of the schools; others, under the aegis of outside agencies. Each represents an aspect of the vitality in learning so desired by teachers and so yearned for by students. In each are opportunities for acceptance of divergency in thinking, for creativity in action. Each is open, open for further inquiry and experimentation. Each begins with a desired effect to be wrought, followed by creative invention and the careful plotting of each experience needed to create the finished effect.

Creative Invention with Careful Plotting

Creative invention with careful plotting demands not only creative plotters, but also discipline, rigor and dedication. Who will chart that clear course leading to the effect to be wrought? The professor, administrator, department chairman, teacher, or student? Or what combination of these? No procedure outlined here could apply in all situations. Each institution has already decided for itself how goals are established and how learning is organized. Has each school evaluated its procedures recently? May a student suggest or elect his intended finished effect and help plot his course? May a teacher and student plan jointly? May students and teachers and supervisors plan jointly? May administrators join the discussions? Is there opportunity for dialogue across the organizational and leadership lines?

Should there be? Why? Each school must decide for itself who its plotters will be.

But that is only the beginning. Creative invention with careful plotting implies discipline, rigor and dedication. The planners will need to give disciplined attention to those behaviors expected in the final effects and provide exploratory models for these. Fostering creativity may serve as one example. How may a school or teacher foster creativity? Analysis of the creative response and solutions is difficult, disquieting. Creative behavior may appear aggressive or even hostile, if interpreted inaccurately. It may actually become hostile if rejection of ideas and questions becomes habitual.8 What may appear in writing, for example, as unnecessarily incongruous, humorous, playful, or even violent is one such characteristic of the highly creative.9 Yet such deviations sometimes are not recognized and encouraged as expressions of the creative. Rather, they are rejected and even ridiculed as inappropriate.

Barron found in one study that even though "creative intellectuals" were given poorer grades by teachers than the other two groups of gifted high school students (the studious and the social leaders), yet the creative excelled in competitive examinations sampling a wide range of information.10

The schools—teachers, counselors, ad-

7 Ibid. Also Project APEX, Trenton, Michigan, Title III, P. L. 89-10.


ministrators—may begin by accepting the creative child, encouraging him, recognizing his talents, and helping him and his classmates understand, respect and value his divergence. Automation, with its attendant leisure promised for the next decades may well become intolerable to man if his creativity has not been encouraged and developed.

Creative invention demands rigor in investigation. How may the teacher and pupil establish patterns of inquiry into the unknown? Patterns which will serve in any inquiry into the unknown are crucial for pupils who will be living in the Twenty-first Century amid problems, challenges and pleasures yet unknown. One such pattern of inquiry is urged by one concerned educator who cites the mysteries of the UFO as topics demanding objective inquiry. How should unexplained phenomena be regarded? How should critical inquiry be directed toward those who allegedly witness these phenomena? What inferences may be made? What are the implications of these?

Creative invention demands dedication to the interests of pupils. How may the teacher build upon the interests of the child? Or should he? The implications of Strong's longitudinal study on interests of young men challenge the school to study means of helping the young to develop worthy and lasting interests. The involved educator realizes that the student's involvement in his work leads him to display the dynamic characteristics of interest: inter esse, that state of being in between the problem and the solutions.

The student, as he delves into his chosen area of specialization, discovers its dependence upon and contribution to the total discipline. He comes then to a better understanding of the structure of the whole, and thereby expands his knowledge and presumably his interest in the subject. The school's concern would not be considered exploitation of the student's interest, but rather an educationally legitimate reliance upon it "in the degree in which the activity in question involves growth or development." Flanagan reports that the differences in the levels of information that an individual displays often reflect his pattern of interests more than his pattern of abilities. Should interest grouping—even nongraded interest grouping—be considered?

The teacher or other educator may also recognize the need to foster rather than to neglect the child's natural curiosity to investigate many things before deciding upon one for specialization. Sometimes the lack of commitment to any interest is looked upon as boredom.

11 Torrance, op cit., p. 8.
13 E. K. Strong, Jr. "Permanence of Interest Scores over Twenty-two Years." Journal of Applied Psychology 35: 89-91; 1951. From a correlation of .81 for 17 years old boys over an interval of 23 years and a correlation of .72 for 19 year olds... over an interval of 19 years, one may infer the high permanency of interests among young men.
Such apathy, Murphy suggests, has been caused by insistence upon practices of so-called enrichment, or as he prefers to label them, “cognitive stuffing.” 18 He comments upon those periods in the life of every child of “tremendous yearning” for the time and attention of someone concerned, someone who can help him discover what it is he wants to study and how to study it. The child sometimes works apathetically, if at all, not because of dullness, but rather from boredom. Reflecting upon the fact that some youngsters even in the ninety-ninth percentile in some field often behave listlessly, Murphy asks: “Can we focus on gathering the kind of information about the growing, craving mind which will give what that growing, craving mind is craving at that particular time?” 19

Wisdom demands that schools consider interests as at least one of the variables in grouping. Certainly schools have given a fair trial to age, ability, and achievement grouping, each of which has staunch advocates as well as adversaries. One limited study in experience and interest grouping has revealed a high correlation between the student’s expressed interests and his actual experiences. 20 Do schools need to structure more broadening experiences for children in order to develop their tastes and interests? 21 Careful plotting of open-ended learning—open to opportunities for the inquiring, the interested, and the creative—are mandatory if the pupils are to achieve that intended effect.

Not all attempts may prove rewarding. Uncle Abner (in Mark Twain’s *Innocents Abroad*) observed that the fellow who “had took a bull by the tail had learn’t sixty or seventy times as much as the person who hadn’t,” and said that “a person that started to carry a cat home by the tail was getting knowledge that was always going to be useful to him.” Some experiments or attempts might cause bellowing or yowling, but learning would be occurring (if not for the student, at least for that careful plotter).

### The Point of Beginning

The Point of Beginning (according to either Poe or Tyler) rests beyond the determination of the effect to be wrought, beyond the creative invention. Still decisions remain. What age pupils may benefit? Would the open school benefit the child, the youth, the undergraduate, or graduate student? And what of the tyrants—tyrants of time, of requirements, of detail: of schedules, curriculum, and governance by committee? Such tyrants challenge the bold strategists.

21 One such project, “Design for Achievement: Accent on the Arts,” a Title III, P. L. 89-10 program of James A. Garfield Schools, Garrettsville, Ohio, is so structured. Teachers for the project, developed in curriculum institute resource units, laid plans for extensive field trips, and purchased artifacts, art prints, recordings and books for the permanent collection and for the CHUM Kits which became the children’s own property after they had studied the concept of the children’s humanities which they illustrated.
What of other hazards of a wilier variety? Will siren promises lure the educator to innovations of mere maneuvering—maneuvering time blocks or personnel, materials or machines to give the effect of providing more personalized learning? These may become tyrants of another sort. Such tyrants challenge the wise strategist to impress such innovations into positions of service and usefulness.

The educator must now decide whether or not he has arrived at the point of the beginning—beginning his work of art, his newest masterpiece in his art of teaching. Will he choose the static institutionalized pattern depicted on the Greek vase or extolled by Plato:

Any change whatever (except from evil) is the most dangerous of all things."

Or will he choose the dynamic open-ended learning characterized by creative invention and inquiry?  


The Changing Curriculum: Science—A Correction

March 29, 1967
Editor, Educational Leadership
Dear Dr. Leeper:

I read with a great deal of interest the recent ASCD publication, The Changing Curriculum: Science. We in the Introductory Physical Science project though were disappointed to read on page 10 the statement that Introductory Physical Science is a "course in physical science at the ninth grade level. . . ." We have never stated that the course was designed for the ninth grade or has the use of the courses by the schools been restricted to the ninth grade. During the last three years approximately one-third of the pilot classes were eighth grade classes.

Because the question of the grade level placement of the IPS course is one which is the most frequently asked, it is unfortunate that your booklet carried incomplete information on this point. We have already received inquiries on this question as a result of your publication. To correct this matter, we request that you publish a correction as soon as possible in the Educational Leadership. Your cooperation in this matter would be greatly appreciated.

Sincerely yours,

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