

AMONG THE EDUCATIONALOIDS



BRING BACK THE OLD MATH

by Caleb Nelson

It is no longer news that American children know little about mathematics. One 1986 national study, for instance, found that more than one-fourth of our 13-year-olds are unable to perform consistently such calculations as "Subtract: $604 - 207$ " and "Find the product: 21×3 ." Only six percent of 17-year-old students, and hardly any 13-year-olds, can answer such questions as:

The number of tomato plants (t) is twice the number of pepper plants (p). Which equation best describes the sentence above?

- ☐ $t = 2p$ ☐ $2t = p$
☐ $t = 2 + p$ ☐ $2 + t = p$

$\sqrt{17}$ is between which of the following pairs of numbers?

- ☐ 4 and 5 ☐ 8 and 9
☐ 16 and 18 ☐ 288 and 290

As a result, American math students at all levels invariably rank near the bottom in international comparisons. In the Second International Mathematics Study, for example, the average score of the top five percent of American calculus students was below that of all Japanese calculus students.

Most observers agree that the spread of the "New Math" in the 1960s is at least partly responsible for this state of affairs. In traditional curricula, teachers showed their pupils how to solve a particular problem, and then assigned similar problems as homework; in this way students progressed, with little overlap, from arithmetic to algebra to geometry to trigonometry. The new programs, which professional mathematicians helped educators devise, linked diverse mathematical topics with a new stress on abstract proof; students had to justify even simple arithmetical identities by reference to forbiddingly named Laws, such as those of association, commutativity, and distribution. In an effort to make grade-schoolers think like research mathematicians, the new programs also

encouraged children to use their own creativity rather than rely on teachers. Thus the programs emphasized unusual mathematical systems, so that children could make discoveries for themselves about the structure of more familiar systems. But as children learned that $2 + 2 = 11$ in base three, that a line is best thought of as the illustration of a particular set of points, and that a circle is topologically identical to a triangle, they made only one discovery: that they were extremely confused.

Despite a limited return to basics in the early 1970s, the continuing influence of the New Math is evident in test scores. American youngsters do relatively well on tests of "set theory," an abstract topic that New



Math programs introduced to help students see the connections between traditional mathematical subjects. But students do much worse on tests of algebra, geometry, and calculus—the subjects that set theory was supposed to make more accessible. As these test results suggest, most modern American math curricula are incoherent blends of New Math and traditional math.

The education establishment is therefore lumbering toward further reform. It has assembled solidly behind the recent *Curriculum and Evaluation Standards for School Mathematics*, published by the National Council of Teachers of Mathematics (NCTM). Some of the foremost mathematicians and educators in America have issued a report (egregiously titled "Everybody Counts") urging parents to "demand that schools meet the new NCTM Stan-

dards." The NCTM's book has also been endorsed by the nation's two largest teachers' unions and a number of other distinguished groups, some of which are expected to release similar books of their own. The media, too, have been receptive; the *Washington Post*, for instance, hailed *Standards* as a "bold and comprehensive program" that will replace the "outmoded" current curricula with "patterns of active, creative learning." By all accounts, *Standards* represents the wave of the future in education reform.

Unfortunately, it also represents a curious but familiar mixture of trendy relativism and trendy absolutism. Except when political orthodoxies dictate otherwise, New Age education deliberately attacks the idea of the black-and-white answer, and *Standards* is no exception: even as it condemns "questions that require only yes, no, or a number as responses," it urges teachers to present the idea of ratios by asking, "If 245 of a company's 398 employees are women, how many of its 26 executives would you expect to be women?" Indeed, to judge from appearances, the proposal's principal aim is to extend this selective assault on certainty from the humanities to mathematics.

As in the New Math, which NCTM publications helped popularize in the 1960s, *Standards* students are to "construct their own meanings" for mathematics; the teacher must become a "facilitator of learning" rather than a "dispenser of knowledge," and ought to "suspend judgment" so that students learn to "guess courageously." The NCTM consequently touts problems that "have no [single] right answer," such as the following exercise for middle school students: "A national magazine surveyed teenagers to determine the number of hours of TV they watched every day. How many hours do you think the magazine reported?" Similarly, *Standards* calls for students to "formulate problems themselves," as in this sample exam question: "Four

of every five dentists interviewed recommended Yucky Gum. Write a question to go with this statement to make a problem. Solve the problem."

Of all the traditional staples of mathematics instruction, computation drills have the highest concentration of clear-cut answers, so the NCTM reserves special scorn for them. It urges that drills be replaced with "fun" exercises:

A set of cards is prepared, each one bearing the price of an object and a particular discount in percentages (e.g., \$10.95, 15%). Each of the two players has a calculator. One player turns over a card to reveal a price and a discount. Then both players estimate the final, discounted price. They use the calculators to find the discounted price, and the player who comes closest to the actual discounted price earns one point. A game played to ten points takes ten minutes or less.

In fact, the NCTM baldly asserts that in the calculator age, students "should not be expected to become proficient with paper-and-pencil computations with [numbers of] several digits."

School mathematics has traditionally been distinguished from the humanities by its exactitude. But in order to downplay certainty, *Standards* carefully blurs this distinction by stressing other disciplines at least as much as math. NCTM students are not to learn calculus, but "it is important that they develop an awareness of, and appreciation for, the historical origins and the cultural contributions of the calculus." Youngsters are not to be drilled on computation but "might draw pictures and then tell or write stories about the equation . . . $18 \div 6 = \square$ "; in addition, they should learn "about other countries and cultures" in math class. High school students are not to study how factoring techniques can solve polynomial equations (an impor-

"Students can approach this 'problem' in a variety of ways: '[They] can discuss their predictions in small groups, write summaries of their group work or of their own ideas, share their predictions with the class, discuss their reasoning, and compare their predictions with the magazine's report.'"

tant topic in algebra); the time freed by this and similar reforms will let them "keep journals describing their mathematical experiences, including reflections on their problem-solving thought processes."

At the same time that *Standards* introduces the uncertainties of sociology and psychology to math class, it strives to transform math itself into an active experimental science, filled with uncertainties of its own. According to the NCTM, "Measurement situations should continually be part of the program," to such an extent that "parents who expect students to do mathematics homework on paper at a desk rather than by gathering real data to solve a problem will be surprised." Math students, the NCTM suggests, might study traffic congestion near their school, assembling statistics from which to draw subjective conclusions. They might collect information about the pulse rates of their classmates, analyzing how the rates go up during exercise and down during relaxation. They might use computers or dice to simulate various experiments in probability. Such exercises, not incidentally, involve very few definite answers.

One of the NCTM's biggest fears is for the psyches of children

whose math homework might be labeled "wrong." Mathematics instruction, the group insists, must be "consistently positive." Activities should be designed to "help students clarify feelings about mathematics," and there should be "discussions about any negative feelings and [about] ways to deal with unpleasant experiences." Though American schoolchildren already lead the world in thinking themselves good at math, the NCTM's paramount goal is to boost that inflated self-confidence even more: "What matters is that students experience mathematics in situations in which they come to view it as personally empowering." *Standards* cares deeply for students' "sense of mathematical competency," and accordingly urges that examinations give "decreased attention" to "assessing what students do not know," as opposed to "assessing what students know and how they think about mathematics."

In keeping with its overriding concern for students' self-esteem, the NCTM would dramatically reduce the importance of grades. *Standards* rejects the "demeaning" institution of failure: "No student should be denied access to the study of one topic because he or she has yet to master another." Instead, it recommends presenting each mathematical topic at a wide range of levels,

to accommodate children who have failed to grasp earlier material. Inevitably, in each of the NCTM's examples only the students at the top level might actually learn any math; the others, who lack the prerequisites, spend much of their time plugging numbers into computer programs that they have not written and do not understand. Though this system gives all but the best students no more than the illusion of mathematical knowledge, the NCTM asserts that "further efforts toward mastering computational skills" may be "counterproductive" because of "the effect of failure on students' attitudes."

Like the rest of today's education establishment, the NCTM can think only in terms of appeasement. Lest students be bored, games and experiments replace lectures; lest students be discouraged by failure, certainty disappears. But though the NCTM can banish drudgery and failure from school, it cannot banish them from life. In the real world, perseverance and accomplishment—not lowered standards—are what is "personally empowering."

As far as math is concerned, Americans tend to neglect this fact. They regard math as an elite subject, in which success is determined more by aptitude than by effort. Thus they rou-

tinely speak of mathematical "geniuses," a hyperbole that they never apply to students who excel in other subjects. This elitism should be overcome. At every grade, math students should be expected to succeed, and therefore be required to work hard at their homework. At the same time, curricula must pick up speed. By seventh grade, American students should have moved from arithmetic to algebra, as have their counterparts across the globe; today most American students do not begin the serious study of algebra until ninth grade. Students must master arithmetic sooner in order to get to algebra and geometry sooner; they must master algebra and geometry sooner in order to get to precalculus sooner; they must master precalculus sooner in order to get to calculus. Along the way, their studies might be complemented by serious courses in computer programming, instead of the NCTM's fluffy computer "applications."

Unfortunately, this prescription marks no less severe a departure from present practice than the NCTM's. The back-to-basics movement of the 1970s, though it halted the spread of the New Math, never inspired the necessary changes in curricula and attitudes. Old-style math education has not failed our children; of late, it simply has not been tried. □

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THE TALKIES



SEX AND CANDY

by Bruce Bawer

Steven Soderbergh, the 26-year-old writer-director of *sex, lies, and videotape* (lower-case letters, please), has never been to film school. And it shows: the slick, style-over-substance look and the glib, assembly-line sensibility that typify movies by today's film-school alumni are nowhere in evidence here; while technically unimpeachable, Soderbergh's debut picture also glows with a refreshing distinctiveness of tone, a fine quirkiness of imagination, and a gratifying sensitivity to details of character and atmosphere. As for the story, Soderbergh has put together what is essentially (like Edward Albee's *Who's Afraid of Virginia Woolf?* or Noel Coward's *Private Lives*) a witty, provocative, and fastidiously crafted four-character play, has set it in Baton Rouge, Louisiana, and has cast it with an attractive quartet of gifted, thirtyish performers.

The least likable of the four characters is John Mullaney (Peter Gallagher), a slimy, fast-track, red-suspender-wearing yuppie lawyer, whose boredom with his sweet and beautiful but oddly naive and sexually impassive wife, Ann (Andie MacDowell), has led him into a sleazy, clandestine affair with her wanton sister, Cynthia (Laura San Giacomo), a seductive artist who tends bar. Enter John's old college buddy, Graham (James Spader), a sensitive, laid-back, underachieving drifter who floats into town and inadvertently lures both of John's women into his orbit.

How does Graham do this? Well, Ann's drawn to him out of empathy; she's touched by his shabby, solitary existence, his dread of commitment, his desire to live in his car rather than in an apartment because "I like having the one key." And she's touched, too, by his sexual plight: as he confesses to her (on the day after their first meeting, no less), he's psychologically impotent, unable to make it with women. The sex-happy Cynthia, for her part, is fascinated by Graham's inventive, if aberrant, means of achieving release:

during the last several years, he's talked a number of women into sitting on his couch, staring into the lens of his videotape camera, and outlining their erotic histories in graphic detail. He has the tapes neatly labeled, by name and date, and views them regularly in private. This turns him on in a big way.

Which—when Ann finds out about it—turns her off in a big way. But in fact both Ann's conviction that "sex is overrated" and Graham's video fetish exemplify a shared fear of intimacy; if character, sex, and circumstance have interacted in such a way as to make John and Cynthia unusually randy, the same forces have operated together in the cases of Graham and Ann to the opposite effect. Not to put too fine a point on it, Ann and Graham are birds of a feather, and one of the questions the film implicitly poses is whether they'll try (and, if so, manage) to burst the bars of their respective cages and fly off together.

Needless to say, this is quite a neurotic foursome, who in raw summary may not sound much different from the bizarre, empty-headed Southerners that populate the plays and movies of Beth Henley (*Crimes of the Heart*, *Nobody's Fool*). Much to his credit, however, Soderbergh steers com-

pletely clear of Henley territory: compared to her goofy stereotypes, his characters are living, breathing people, whom we soon find ourselves caring about (or, in the case of John, despising). It's a testament to Soderbergh's skill, moreover, that he manages to introduce all four of them in apt, memorable, and funny ways—and to establish their relationships and conflicts—before the movie's first ten minutes are up. The entire film, as a matter of fact, is marked by an admirable precision and economy of word and gesture. It takes only two brief, flawlessly delivered lines of dialogue, for instance, to convey the purely utilitarian, businesslike nature of John's liaison with Cynthia: after a midday roll in the hay, they don't part with a kiss, a romantic word, or a lingering look, but with a mechanical request by one to "drive safely" and the other's sneering reply of "Yeah, right."

It's not until the last half-hour or so, when Graham's videotape fixation takes center stage, that the movie falters. Nor is it his videotape fixation, *per se*, so much as it is his ardent, cryptic, and protracted account of its etiology—which he delivers in an awk-

ward, unprepared-for scene with Ann—that throws this hitherto exquisitely poised film off balance. All at once, the focus shifts unaccountably, motivations seem to enter out of left field (nine years ago, Graham reveals, he was deeply hurt by a girl named Elizabeth), and an apparently vital thematic nexus (between love and lying) is introduced but not clearly enough explained. During Graham's speech, one has the uncomfortable feeling that Soderbergh, who all along has kept a seemly distance from his characters, is suddenly embarrassingly close to one of them; that the speech, which does not work well dramatically, exists primarily for other than objective dramatic purposes; and that Graham's predicament has a far more profound meaning for the writer-director than he has succeeded in communicating to his audience.

One feels, to speak plainly, as if it's not Graham but Soderbergh himself who's crying out in pain and confusion over the traumas and betrayals of youth. Suddenly, during this scene, one recalls how very young, after all, the film's writer-director is. And one's disappointment is compounded by the film's pedestrian and overly tidy wrap-up, which betrays both the movie's distinctiveness and its sense of verity.

Yet for most of its length, *sex, lies, and videotape* is an intelligent and remarkably compelling piece of work. Notwithstanding the failure of his big scene, Spader mostly does a very fine job. And the other actors are commendable without qualification: Ann, who might have come across as either a tic-ridden dingbat or a locker-room joke (the sex goddess with no interest in sex), is invested by Andie MacDowell with charm and dignity; Laura San Giacomo succeeds at the difficult job of making the truculent, devious Cynthia sympathetic; and Peter Gallagher, down to his last gesture, gets John exactly right. This is, Gallagher makes clear, a man who will never be able to understand sexual relations beyond the level of macho conquest and intramural competitiveness. These are top-



Bruce Bawer is The American Spectator's movie reviewer.