

**From TV to movies
to tape recorders—
electronics may help
light the way to a
solution of the teacher
shortage problem**

PUSH-BUTTON PEDAGOGY

by Norman Carlisle

IN A THIRD-GRADE CLASSROOM in New Jersey, my heart was warmed by the sight of a boy who was at last learning to read. The expression on his face was rapt, and he was plainly lost in the joy of words that had been mere gibberish to him before.

The teachers in the overcrowded schools he had attended previously had not been able to devote enough time to help him. He was being taught now by an electronic device and, his human teacher told me

wonderingly, it was teaching him far better than she could.

This was my introduction to a machine that teaches a startling new way of attacking education's most desperate problem—the teacher shortage. For all over the country, educators have awakened to the exciting possibility that electronics, in the form of television, movies, tape recorders and teaching machines may offer a realistic solution to a seemingly hopeless dilemma.

Dr. Alvin C. Eurich, former acting President of Stanford University and now Director of the Ford Foundation's Fund for Advancement of Education, warns, "Unless we turn some of the burdens of teaching over to these tools of science, we face a future of increasingly cut-rate education for our children—just when we desperately need better education, not worse."

For right now we are short more than 100,000 teachers. But that is only a start. The exploding school population is increasing 2,000,000 a year, and enlistment of new teachers just is not keeping pace. Responsible authorities predict a shortage of more than 250,000 teachers by 1965. The prospect looks even more alarming when you study certain sore spots, like science teaching.

When Russia's first Sputnik raced around the earth last fall, its ominous beep-beep sounded an urgent call to expand our teaching of science, the very area where the teacher shortage is at its worst. Furthermore, out of the 4,000 science teachers graduated last year, only 2,400 joined science faculties.

But will not this proposed elec-

tronic teaching be cold, mechanical and inferior to traditional personal teaching? For that matter, can electronics really teach at all?

In Pittsburgh I got my first glimpse of the kind of electronic teaching being given a trial run in hundreds of classrooms this year. It was an eye-opening form of open-circuit TV operating right in the school.

In a fifth-grade classroom, I saw a teacher speaking in another part of the building, whose presence radiated from a 24-inch screen in the room. The children were alert. They raised their hands eagerly at the questions, gave enthusiastic answers when asked to recite.

The teacher, a pleasant young woman, was making arithmetic come alive. She had been chosen for her already proved success in the classroom. She could give full scope to her abilities because she had no other duties beyond preparing this single arithmetic lesson each day. She could devote every minute of her working day to studying her materials, working out effects and perfecting her presentation.

This lavish use of time was made possible because she was simultaneously teaching every fifth grader in that school (and, as it turned out, in a number of schools, as others in the district hooked their TV systems in). Assembled in classes of up to 50 pupils, each class was supervised by a teacher who could, in quite a different way, also be lavish with her time.

"See that boy in the third row?" one asked me. "Maybe you noticed he hasn't raised his hand at all, or

shown much interest. He needs special help. And, thank goodness—rather, thank TV—I can give it to him."

This seems to be the emerging pattern of TV in the classroom: a studio teacher who does nothing but teach, via TV; a home-room teacher supervising each large group and giving special counsel and help.

This year, some 200 different schools under a national program are carrying out TV experiments sponsored by \$1,150,000 put up by the Fund For Advancement. In three elementary schools in Miami, for instance, one half the pupils work in conventional small, personally taught classes for half the school day. During the other half, they are taught via open-circuit TV in large groups of 150 to 187 in one room—about 40 to a screen.

Hagerstown, Maryland, is the nerve center of one of the biggest current experiments in educational TV. This year 12,000 students in 23 Washington County schools are being taught a variety of subjects ranging from first-grade art clear through 12th-grade English. In any one subject in a particular grade, one teacher can teach those 23 schools.

Do students really learn from watching a teacher on TV? Educators' reactions ranged all the way from the "Unbelievably more and better" of an enthusiastic Hagerstown teacher to the guarded "At least as well" of a Michigan one. Only those in schools which had not tried it were frankly skeptical, or downright hostile.

Students themselves seem to en-

tain the same range of opinion. "You learn more because somehow you have to concentrate harder," said one. "You get a better view of what the teacher is showing you," said another. Some students, however, did complain that they got tired of looking at the comparatively small screen.

At Levittown, New York, an important experiment was carried out last year with 214 students enrolled in five different subjects. Their scholastic standings, compared with those of pupils in regular classes, showed that above-average students in the TV group actually had a greater increase in learning than similar above-average students taught conventionally. Average students showed a 71 percent gain in learning in the conventional classroom compared with 70 percent for the TV students.

Francis E. Almstead, special consultant on educational television to the New York State Education Department, reports, "The results of the experiment show . . . that there is no significant difference in progress made by pupils receiving full-time teaching during the year by instructional TV and full-time classroom teaching."

At the college level, where the teacher shortage is really desperate, results have startled educators. At Washington University in St. Louis, where TV was used last year, 475 students were given freshman math via TV and 20 per cent came up with As. In another group, given the same course in standard classrooms, only 12 percent earned this.

In Hagerstown, as I watched a

geography teacher at work on TV, I got a revealing indication of how the pioneer electronic teaching tool, the educational film, may widen its already great usefulness. The teacher was talking about India when she announced, "Let's take a look at the life of a family in India."

Instantly, her students were transported across the miles and given a fascinating actual picture of an ordinary family going through an ordinary day in that faraway country. This superbly produced film added a new dimension to TV.

YEARS AGO, Thomas Edison predicted, "Pupils will learn from films everything there is, in every grade from the lowest to the highest. Films are inevitable as practically the sole teaching method."

The makers of educational films, who have turned out some 18,000 to date, have gone a long way toward making Edison's words come true. One company alone offers more than 800 films, and has 400 more in production or planned for the near future.

Perhaps films will find their greatest use in the era of TV teaching, where more time and effort can be devoted to integrating them into teaching programs, but already they are being used extensively in more than half the nation's schools.

"I couldn't have taught my physics class without films," a struggling science teacher in a Nebraska high school told me.

He was not just being modest about his science abilities, for he was not qualified to teach physics. He had stepped into the breach sim-

ply because his school had found itself without a physics teacher.

I could see that the film took over the job brilliantly as I watched one on color, a complex subject which is not easy to teach by ordinary means. Here was an amazingly clear explanation of the principles of color reflection and absorption.

Earlier in the year, the teacher had been able to hurdle similarly difficult jobs of presentation by the use of such films as *Using the Laboratory*, *The Nature of Light*, *The Nature of Sound*. Along with these basic films, he had used others on specific features such as Ohm's Law.

Even when the teacher is highly competent, educational films can produce a fantastic gain in the effectiveness of his teaching. Witness what happened when Dr. Louis Romano conducted an experiment among fifth, sixth and seventh graders in a Wisconsin school. Pupils in one group were shown selected motion pictures on science subjects, while those in another group used only regular textbooks.

At the end of the test period, the science vocabularies—a ready guide for grasping the subject—were tested. The film-taught sixth-grade vocabularies had doubled, the seventh-grade had jumped 200 percent, the fifth graders 300 percent, above those of the non-film-watching group.

At first, educators had grave fears about what "learning from pictures," whether on TV or films, would do to reading. To their surprise, it actually stimulated the demand for books.

One happy by-product of teaching

by TV and movies is the teaching time made available to individual students who need it. And even here the teacher can be aided by electronic devices which can teach a single student at a time.

One such machine is the remarkable "Language Master" which I saw teaching the boy who was behind in his reading. It works quite simply. On printed cards, a sound track is magnetically recorded. The child, wearing earphones, sits before the machine and feeds in a card. On it is a picture of, let's say, a cake with candles. Printed beside it are the words "Birthday Cake."

As the card moves through the machine, a voice speaks the words or sounds out the letters. The child repeats the word, silently or aloud, as he is asked to do.

Educators report that the device, which has been tried out in scores of schools, produces dramatic results. The combination of sight and sound, plus the intense, uninterrupted concentration of the child, help him to learn in days what might otherwise take weeks of classroom drill.

In "The Language Lab" at College of the Holy Cross in Worcester, Massachusetts, I saw another use of magnetic recording for teaching. In this pioneering classroom, which may be the first of many such in New England, were 40 earnest students, each learning one of the three languages being taught in the room.

The Lab is equipped with 40 soundproofed booths, each with its own tape-recording machine. A student sits before a recorder and pushes a button which switches him to the French, German or Spanish

channel. Donning earphones, he listens to a lesson being voiced, on tape, by a language teacher. At the same time, his own recorder transcribes it on his tape.

At the end of the period he has his own tape recording of the lesson, complete with his own version. He plays it back, then voices his corrections and improvements.

When the professor wants to check on how the student is doing, he can plug his own earphones into a jack at the side of each booth, or he can ask for the recordings and play them back at his leisure. Examinations too are given by records.

An elementary school in Covington, Louisiana, gives a striking demonstration of the ability of tape recordings to teach more than one group in the same room at the same time. The teacher, equipped with headphones and a microphone, stands behind a control board on which are four machines, each playing a different previously-made recording of her own voice.

As the lesson gets under way, children wearing headphones tune in on the lesson intended for each level, ranging from slow learners to highly advanced students. If a child wants to ask a question, he pushes a but-

ton, and a light flashes on the control board. The teacher then pushes a button, and the child talks into a microphone with which each is provided. The teacher can thus talk directly to a particular pupil without disturbing any of the others.

An ingenious arithmetic teaching machine has been developed at Harvard. The child sits before it, and problems printed on a tape appear in a window. By manipulating keys or sliders, the pupil brings up a set of figures that appear beside the window, then turns a crank.

If his answer is right, the tape advances to the next question. If it is wrong, the tape will not move, so the pupil tries again, until he does get the correct answer. It works the same way with spelling.

Science has many other teaching machines at the laboratory stage, but we do not have to wait for them to put electronics to work in education. Television alone, says Dr. Alexander J. Stoddard, former head of the school systems of Los Angeles and Philadelphia, can reduce our shortage of teachers by at least 50,000. If we use all the devices at our command there is no doubt that electronics *can* do much to solve the teacher shortage.

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