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OPPORTUNITY FOR THE BRILLIANT SCIENCE STUDENT

By Albert Q. Maisel

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Here is a simple plan, costing taxpayers almost nothing, which is helping gifted youngsters to enlarge their learning at a vastly accelerated pace

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Condensed from Parents' Magazine

Albert Q. Maisel

WHILE Congress has been pondering elaborate and expensive schemes to bolster science teaching in our schools, a simple plan, involving virtually no cost to taxpayers, has spread recently from the Niles Township High School in Skokie, Ill., to 42 community high schools from Newton, Mass., to Palo Alto, Calif. This is the way the plan works.

At 7:30 every Wednesday evening, year-round, 37 high-I.Q. teen-agers head for room 320 at Niles High. There they meet with 18 scientists from nearby industrial-research laboratories—who serve for a dollar a year, and the love of it—and settle down to a mind-stretching 2½-hour discussion of phases of advanced science and mathematics usually reserved for university upperclassmen.

At other times during the week, these 10th, 11th and 12th graders meet individually with their scientist-helpers to work on research projects in biochemistry, physiology, radiation physics, hydrodynamics and other branches of science far beyond

the usual high-school level. And in the laboratories of some of their adult collaborators at the G. D. Searle & Co. pharmaceutical plant and the Cook Research Laboratories, the boys and girls work with equipment no high school could possibly afford to purchase.

From sophomore through senior year, these students put in an average of 1200 hours apiece on their seminar and research work. None gets any extra school credit for it. But those who have graduated have found it easy to get into the best colleges, often with full scholarships. And all have had the priceless opportunity of enlarging their learning as fast as their gifted brains permit.

This program owes its origin to a tall, shy, soft-spoken Tennessean. As a boy, Jacob Shapiro had discovered the wonders of science in his dilapidated high-school lab in Columbia, Tenn. He put himself through Vanderbilt University and two years of graduate study at the University of Tennessee, then served as an Army medic during World War II. He returned to his home town to teach chemistry and physics. His salary: $35 a week—paid only while school was open.

Among his students he discovered a few who found science an inspiring challenge. Under his encouragement one, Alice Dale, entered the Westinghouse Talent Search Competition. Working nights and week ends, she built a Carrel artificial heart as her "project"—and the astonished Board of Education discovered that Columbia's high school had produced Tennessee's first winner in the nation-wide contest. The board rewarded Shapiro with $1500 to re-equip the run-down old lab.

During the next five years the young science teacher worked 16 hours a day. When the closing bells rang at Columbia High, he raced 40 miles in his old jalopy to teach at Middle Tennessee State Teachers College. Then, rushing home, he'd gulp a hurried meal and return to the high school to help his brightest students on their projects. In his "spare" time he wrote and mimeographed a textbook for other science teachers with ill-equipped labs, outlining a course of experiments that can be performed with only $5 worth of homemade equipment.

He relished every minute of it. But now he was married and a father, and raises were few and far between. Thus, when he was offered double his teacher's pay to direct the laboratories of a new nylon plant, he reluctantly gave up the work he loved to assure a decent living for his growing family.

In Tennessee, and later in Illinois, Shapiro prospered in industry. But he just couldn't get the teaching bug out of his system. In the fall of 1955 he walked into the office of Superintendent Joseph Mason at Niles High with a strange proposal. He offered to set up a special, after-hours program for outstanding science students. He'd teach these youngsters 52 weeks a year without salary.

Dr. Mason had been able to do

far less than he wished for the exceptionally gifted. Here was an opportunity out of the blue. After checking with his staff and school board, he told Shapiro, "Let's get going."

To screen seminar candidates, a special test was announced. Of the 70 who sweated through this exam, 21 emerged as potential seminar members. Letters then went out inviting these youngsters and their parents to a conference at which it was explained that the seminar would mean loads of extra work, and that those who failed to maintain their regular classroom grades would have to drop out of the evening program. In the end, there remained a hard core of 14 students whose parents were willing to back them up through a tough three-year adventure.

At the first seminar session Shapiro found himself floundering under a barrage of rapier-sharp questions on subjects ranging from crystallography to electrophoresis. "By the time I got out of there that night," he recalls, "I knew I'd need a lot of help—and fast!"

He found his first volunteer in Dr. Evelyn Tyner, a biochemist turned housewife, who had already helped him set up the program. Then, when his students stumped *her* with a botanical brain-twister, she recruited Mrs. Marjorie Edgren, who held a master's degree in botany. Soon their husbands—Dr. David Tyner, an organic chemist, and Dr. Richard Edgren, a research biologist—joined the brigade.

As the staff mushroomed, the present pattern of the seminars emerged. In free-for-all discussion the research men and the youngsters hammered out a series of topics for future meetings, covering such fields as meteorology, oceanography, hormones, atomic particles, electrochemistry, thermodynamics. Then the scientists most familiar with each field joined with the three or four youngsters most interested in that subject, and, as a team, they worked up a lecture and demonstration program for the rest of the group.

Meanwhile, the other students would read up on the topic. Thus, when the weekly seminar session ended, the entire group had acquired an over-all acquaintance with one broad area of science.

A second phase of Shapiro's plan got under way when each student chose an area of science that particularly interested him and set to work on a research project. Fifteen-year-old Ed Pollock, for example, was fascinated when he learned that certain chemicals could halt the wild growth of some types of cancer cells. He set out to experiment on a tiny laboratory animal, a flatworm called planaria, which normally develops a new head or tail when cut in half.

Ed's father objected when invited to join a Saturday expedition to the culvert in Schiller Park to secure a planaria supply. "Can't we just buy these critters instead of messing through slimy drains?" he asked Shapiro.

"Sure you can," Shapiro laughed

"They'll cost you about five cents apiece, and Ed will need about a thousand." Mr. Pollock set out with his son for the culvert.

In his basement, young Pollock used jars to house his worms. Then, over many months, he sectioned the planaria, noting the extent to which certain drugs inhibited regeneration and the manner in which abnormal regrowth developed. Realizing that inaccurate cutting was distorting his data, and that a microtome would cost several hundred dollars, Ed temporarily abandoned biology for engineering. Out of discarded razor blades and hand-cut gears, he built his own slicing instrument. Before the year ended, he had completed his project and could proudly point to a report published in *The Anatomical Record* which listed him as senior author and Dr. Edgren as "collaborating scientist."

Alan Berberick's adventure into research concerned the designing of ships' hulls. With biometrician David Calhoun helping him through the complicated mathematics, Alan began to pore over technical manuals on hydromechanics, soon was corresponding with marine engineering professors at half a dozen laboratories. Last year he was invited to Ann Arbor to use the University of Michigan's tanks to test the accurate scale model he had designed and built himself. Upon graduation this June he was offered scholarships at several leading colleges.

At first, many Skokie students shied away from the new program as something "for eggheads only." But last fall the 170 seminar applicants outnumbered the candidates for the football team better than two to one.

Among the 24 who survived last November's exam was a bright-eyed sophomore named Stanley Berg. His father, Arthur Berg, himself a physicist, was greatly impressed by the program, and said to Shapiro, "Bright youngsters all over the country ought to be getting opportunities like this."

"I agree," said Shapiro. "If only someone could afford the time and travel to do the missionary work."

"Let me talk to my father," Berg replied.

At Grandfather Berg's home, two days later, Shapiro found himself caught up in a whirlwind. Impetuously, Joseph Berg, a truck-parts manufacturer, had already put his lawyers to work on a charter for a nonprofit foundation. Office space had been secured in downtown Chicago. A working budget of $75,000 a year—more, if needed—would be provided if Shapiro would step in as director.

With a brief case full of Skokie seminar records, and the Bergs in tow, Shapiro flew to Washington for a meeting with officials of the National Science Teachers Association. He emerged with the officials' commendation for the seminar plan.

The new Joe Berg Foundation offered no subsidies, scholarships or teaching grants. But, to any school

or community that requested it, the foundation proffered aid in setting up a seminar unit. Shapiro would help in getting school-board approval, in lining up volunteer scientists, in testing and selecting talented youngsters, and in getting industry to open its laboratories to them.

First from the Chicago area, then from everywhere, requests flowed in. Since last December, Shapiro has been traveling almost constantly in a tour that has already taken him into 37 states.

In small towns and rural areas, school officials often doubted their ability to secure a seminar staff until Shapiro showed them how to get engineers from the local telephone company, power plant or water works, a pathologist, radiologist or other medical scientist from the local hospital, agricultural experts from the Farm Bureau or the County Agent's office.

To lick the staffing problem and assure a large enough student group, Holland, Mich., has grouped the talented students from both the public and Holland Christian high schools into a single community seminar requiring one volunteer staff rather than two. In Annapolis, Md., one seminar serves the outstanding students of all four public and private high schools.

Tax-conscious school-board members' brows have relaxed when Shapiro has shown them that heat, light, supplies, janitorial services and insurance expenses for Skokie have totaled less than $200 a year, or barely $6 for each gifted student. In about 2½ years of operation, the school board has paid out exactly $52 in dollar-a-year stipends (the Skokie school system requires that anyone who teaches in its schools *must* be an official member of the staff)—in return for which more than $200,000 worth of the volunteer scientists' time and talent has been received.

Scores of high schools are waiting their turn for a visit from Shapiro. And evidence is growing that the seminar plan need not be limited to physical science. For at Skokie the math fans have obtained a seminar of their own, and a unit in the social sciences is scheduled to start this fall. Thus, a movement touched off by one devoted teacher may soon open up hitherto untapped opportunities for thousands of our most gifted youngsters.

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