



**A SOURCE *of*
STRENGTH
and INSPIRATION**

Melba Phillips at Oakland City College

RANDY MILLS

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When Indiana physicist Melba Phillips died in 2004 at the age of ninety-seven, her obituary in national newspapers reminded the general public of her amazing life and of her many contributions to science. Phillips had been an important participant in what has been called a heroic age of physics, a time when scientists were just beginning to study quantum theory and other aspects of the science that brought the world into the atomic age. Her many research collaborators included some of the greatest physicists of that time, and thus her story offered an important window into this exciting era. Most of all, the newspaper pieces noted that Phillips was a pioneer, courageously blazing a trail for other female scientists.

Phillips studied under and then collaborated with the father of the atomic bomb, J. Robert Oppenheimer, her name appearing in numerous passages in two major Oppenheimer biographies. Together at the University of California at Berkeley in the early 1930s, Oppenheimer and Phillips developed an essential formula for examining how deuterons (a subatomic particle consisting of a single neutron) reacted with other nuclei—a procedure that still carries their names. Phillips delivered several other important scientific papers throughout the 1930s and 1940s. Fate, however, eventually set a new course for her. In 1952 she stood up to the congress-

sional bullies of the Joe McCarthy era, a stand that cost Phillips her job at Brooklyn College. Phillips coauthored two physics textbooks in the interim after her firing, books that are considered classics in the field. Eventually, she worked her way back into teaching and became a national champion for science education. In 1983 the American Association of Physics Teachers recognized her commitment to education by creating the Melba Newell Phillips Award, a national honor given yearly to the individual who is judged to have made an exceptional contribution to physics education.

Oddly, historians most often disparage Phillips's early life as being something of an obstacle to her ascent to scientific greatness. Such greatness, however, did not occur in a vacuum. Among the events that have been hardly covered about her life is the all-but-ignored, yet important, story of her experiences at the tiny institution where she did her undergraduate work in the early 1920s—Oakland City College.

Phillips showed early signs of being a child prodigy, reading long before she started school and skipping two grades before entering high school. She graduated from Union High School in rural Pike County Indiana in 1923, when she was barely sixteen. By that time her gifts in mathematics were evident. Her love of geometry caused the young, dreamy girl to keep scraps of paper covered with geometry doodling stuffed in her textbook, which showed her naïve attempts to solve three of the unknowns in geometry: the trisection on a angle, the duplication of the cube, and the squaring of a circle. After graduating from high school, Phillips, as so many young intelligent women in her culture-bound situation, sought to become a teacher in one of the local country schools. Circumstances, however, intervened. "The year I graduated from high school I took an Indiana teacher's

license examination, which would have qualified me with one summer's college work to teach in a one-room school, and I passed it with flying colors," she recalled. "I think the average was 92. But I couldn't teach before I was eighteen. So I had to go to college."

In a 1977 interview, Phillips bluntly explained why she trekked to a nearby obscure college at Oakland City: "It was the cheapest and nearest college. The [19]20s were very bad times for farmers, and we didn't have any money." But even with the advantages of proximity and affordability, at first glance the school seemed a poor fit for this highly intelligent young woman. By the time of Phillips' attendance, the college boasted Normal, Liberal Arts, Theological, Industrial Arts, and Agricultural Arts departments. The school was also nestled in pleasant surroundings, being located on a slight ridge with a formidable stand of giant oak trees covering the east side of the campus hillside, where most of the college buildings sat. When Phillips, used to her quaint rural farm surroundings came there in the late summer of 1923, she encountered a sprawling administration building with a cafeteria in

the basement, a three-story women's dorm that also included a large and pleasant dining room, a large field house with a library in its lower level, an industrial and agricultural school building, the president's home, and a nearby orchard. Wheatley Hall, the imposing girl's dorm, would be Phillips's home while on campus, and any trip across the school grounds took her thorough the dappled shade of large oaks. An attractive brick archway on the east edge of the campus at the bottom of the hill invited students to "Enter to Learn."

Relative to Phillips's rural existence, the college offered many new social possibilities, with a legion of social and academic clubs available on campus. Enrollment during these prosperous times often reached more than a thousand students a semester, counting teachers in the area who came back for refresher courses. A college advertisement at that time touted the school as "especially well equipped for training for teachers. . . . The Indiana State Teacher's Training Board has approved an EXPERIMENTAL COURSE FOR RURAL TEACHERS for Oakland City College exclusively, which includes a scientifically worked out program for pre-



Members of Filia Rotunda at Oakland City College, a club formed "to combat the charges made by the Anti-Fats, the order of the opposite branch of the human race," according to the club's description in The Mirror yearbook.

paring teachers who expect to teach in the country schools.” This claim would have likely caught Phillips’s eye, as she aspired to return to her small high school to teach math.

A detailed Indiana state educational report, written during the time of Phillips’s attendance at Oakland City and printed in the school’s newspaper, offered important insights into how educators from the outside viewed the academic world she joined. “Oakland City College is preeminently the educational missionary of southern Indiana,” the report said, “practically all of its advertising matter being confined to twenty-five counties across the south end of the state. Since the school was open[ed], a large majority of the students have been teachers or those preparing to teach.” The report also noted the poverty of the region: “Twenty-five hill counties across the south end of the state, all state aid counties, contain only 9 percent of the state’s wealth and 16 percent of the state’s population.”

Reminiscing about her college years fifty years later, Phillips seemed to hold ambivalent feelings about her undergraduate work at Oakland City. In a 1977 interview, for example, she asserted, “The college was not a very good [school]. . . . I had to work terrible hard to catch up on all the things I never knew. We talk about rehabilitation and restarting. I was getting it for the first time [in graduate school].” Conversely, in another reminiscence, Phillips told of feeling very comfortable as a young woman in the school’s math program and highly praised two other aspects of the academic portion of her college experience:

I must have seemed just a kid, but if they minded my making A’s in the courses, I was not aware of it. And in math there was no trouble at all, plenty of girls, some of them making A’s, *and truly a great math professor*. The standards were high, and what we learned,

we really learned. To successive generations of students in the little Baptist College in Oakland City, Indiana, Professor William Jordan was a source of strength and inspiration well beyond the mathematics he taught.

A caption for Phillips’s senior class photo noted that she had made all A grades. This author, however, found that Phillips made several B grades along the way, including, surprisingly, a B in a college math course and a B in one of her biology classes. She also made a B in a physical-education class and in principles of high school teaching. These less-than-perfect marks may have been the result of her adjusting to a more difficult academic environment, being away from home for the first time, or some type of personal issue that distracted her from her studies.

School records discovered in this research also indicate that the Oakland City College experience expanded Phillips’s social and intellectual development, preparing her for the larger world. Her often brilliant observations and activities came to add to the vitality of the school, as well. However, the bright young woman confronted two major hurdles at the be-

ginning of her studies there.

In 1923 the college had only one professor in math and one in science. In the latter area ruled a reserved John H. Oxford, who seemed more concerned about religious denominational matters than science. Of further concern to Phillips was the fact Oxford himself held only an undergraduate degree from Oakland City at the time of her studies. The college’s math professor, William “Pop” Jordan, was another matter. Jordan held a master’s in math from DePauw University and had a powerful gift for teaching. Phillips wanted more than anything else to major in physics, but later reported:

There was no physics major [at Oakland City College], and it was very easy for me to know more physics than anybody else in the college. I took two physics courses. There was no way of becoming a physics major in that college. But I had fallen in love with physics in high school and managed to get in to the college physics course, one given only occasionally. The professor [Oxford] advised me strongly against taking it, not because I was the only girl, but because I was the only freshman who wanted to enroll. The text



Melba Phillips is on the left, bottom row, of the Phi Alpha Literary Society Club, 1926. One of the oldest organizations at the college, the club aimed “to further interest in public speaking and literature.”

was Webster, Farwell and Drew, rather far out in those days, and I learned more physics from it than the professor himself knew.

Archival material showed a bit of a discrepancy between the official records and Phillips's memory of being able to take only two physics classes. They show her taking at least four physics courses and receiving an A grade in all of them. These courses included studies in the areas of mechanics and sound, heat and light, and magnetism and electricity. Perhaps in order to sooth her disappointment regarding the lack of more physics classes or a physics major, Phillips majored in English, along with math and science.

Besides her reading of books, Oakland City College was likely Phillips's first exposure to a larger academic world. There were a few zany things going on at the school as well, reflective perhaps of the Roaring Twenties. In the fall of her first year, for example, there appeared a woman's Anti-Fat Club and its antagonist, the Filia Rotunda Club. The former had several members and their motto was, "Be short, be tall, but never be fat." The Rotunda Club was formed by a group of college woman "to combat the charges made by the Anti-Fats." Members of this group had to weigh "at least one hundred and forty-five pounds, net." While not belonging to either club, pictures of Phillips appeared in an exceptional number of organization photos in the college yearbook.

One of the most insightful sources regarding Phillips's activities during her first year at Oakland City is found in an ongoing *Collegian* feature column called "Social Notes." This source indicated a homesick Phillips went home almost every weekend during the first half of her freshman year. Still, she was active in her freshman class and one college newspaper article noted that her class was the



Top to Bottom: Views of the Oakland City College campus, including the east-side archway entrance to the campus in 1923, the year Phillips began her career at the small southwest Indiana school; the well house, a popular student meeting place in the center of the campus; and Wheatley Hall, the girls dormitory and Phillips's home and social center for the three years she was at the college.




HELEN LEMASTERS

Oakland City, Indiana
Home Economics and Science

Who said that a woman can't keep a secret? Well, Helen can because she certainly surprised us when she announced that she had been married a couple of months. She is also a member of the Germanae Sodales Literary Society, Home Economics Club, 3, and the Glee Club.

WILLIAM FERGUSON

English, Indiana
English and History

Ferguson has not been with us during the year but has found O. C. C. an enjoyable place to spend the summer quarter. He was a member of the baseball team.

MELBA PHILLIPS

Hazleton, Indiana
Mathematics, English, Science

Melba is "Mirror" editor, which goes to prove that a woman can hold down the job. She was on the Y. W. C. A. cabinet and was a delegate to the Bloomington Student Conference, 3. Last year she was president of Phi Alpha and chairman of the casting committee of the Dramatic League. She was a member of the Orchestra, 4. Melba is an A student and the youngest member of the class.

[35]

Phillips's senior picture in the college yearbook. The listing for her activities reveals the not-too-subtle sexism of the days, as it notes that she was an editor at The Mirror, which proved "that a woman can hold down the job."

"largest and most promising in the history of the institution." In November of that same year the college's Women's Club interviewed her class at the college library. Phillips must have stood out, as the school paper reported she was put in charge of the nomination committee for freshman class officers. A February 1924 *Collegian* article indicated that by the second term of her freshman year, Phillips was beginning to take advantage of the wide-ranging cultural opportunities available at the college. That month she and a handful of other students rode by car with the college president, Doctor William P. Dearing, to Evansville to hear the famous pianist, Ignacy Jan Paderewski.

At some point in her freshman year, Phillips would have come in contact with the school's dean of women, Ella Wheatley, who also served as the director of the girl's dorm, named after her. Wheatley Hall was at the center of social life for those women who stayed on campus, and Phillips soon found the dorm, with its warm and friendly atmosphere, a second home and Wheatley an important influence. By her second year, Wheatley Hall was probably where Phillips spent much of her social time.

Perhaps the most interesting artifact concerning Phillips's first year at Oakland City involved a long and detailed discourse the seventeen-year-old wrote for the college paper, "Squaring the Circle." The essay demonstrated her keen, playful, and freewheeling style of thinking; her love of reading; and her love and respect for the quiet, natural, rural life she was born to. It also announced the college had an extraordinary student in their midst. Phillips wrote:

I need not tell you that it is a strange and wonderful thing how these minds of ours think. You know it. I need not suggest that the processes of thinking are built up by trains of thought that

move through the realms of spirit with lightning rapidity and that certain lines of thought will call up strange and varied experiences which you thought were dead. As an illustration of this common thing that we all experience every day, let me tell you how I happened to select this unique subject, squaring the circle.

I went to church the other night and listened to a fairly good sermon. The speaker opened his talk by showing us that knowledge was acquired by passing from the known to the unknown through a series of logical steps. Sometimes these steps are well outlined in our minds; other times they are jumbled into one big heap which bridges the space between our past known thoughts and the unknown ideas which grow out of them. I liked the idea of building new structures out of old stones, and it struck me that this is a possible explanation for my liking geometry so well in high school. From the known to the unknown. Often-times it was a mere step; and again, many and difficult ones. Sometimes we cannot arrive at the unknown because of the lack of data or method.

I remember three unknowns in geometry that I was never able to build—they say no one has (in Euclidean Geometry) but I did not know it then; thus I thought a great deal about them. One, the trisection on an angle; another, the duplication of the cube; the last, the squaring of a circle. I thought hours and hours of these unknowns and I learned a great deal of geometry. It was just like the perpetual motion machine which we all try to think out when we were taking high school physics. We did not make the machine, but we found some principals [*sic*] which were worth the time spent.

As I sat there in church, dreaming as I like to do, I thought of squaring the circle and the old tattered papers with lines and circles and angles all over it, which I used to keep in my old geometry [textbook] in case I had some

spare time. But it did not stop with the circle. My mind went to O. Henry and his "Squaring the Circle," a little short story, the title of which I once found in the contents of one of his books. I like O. Henry especially well as a short story writer because he is always using the unexpected. I like his yank, his twists, his turns—he would have made a good chiropractor.

It might be interesting to replicate and write down the steps which my mind ran when the preacher began to speak. Let me do this with single words: preacher, unknown, geometry, squaring the circle, O. Henry, the story.

Interestingly, the O. Henry tale contained some of Phillips's strongest world views at that time: The rural world as more natural and therefore better than the artificial world of the big city, along with the importance of geometry, even when used in a playful way, as a vehicle for better understanding the world.

By the beginning of her second year at the college, Phillips had taken enough courses to be a part of the junior class. She

had also blossomed socially, her activities often approaching whirlwind propositions. One *Collegian* report related how Phillips and two other college friends drove from event to event one particular weekend like social butterflies, "motoring to Wheatland Saturday to Miss Enley's home. Sunday they left just as a big birthday dinner was in full sway. After eating some of the bounties, they hurried toward Vincennes to hear John Philip Sousa. They got there just in time for the great concert. After leaving the Pantheon, the Misses called on friends in the city. They motored back to Oakland City Sunday evening."

Phillips's junior class yearbook pictures revealed a dark-haired, dark-eyed young woman with an especially serious and intense look. The yearbook also showed her involved in a number of school activities, including the Phi Alpha Literary Society, the oldest club on campus. She was elected president of the society during her junior year with the *Mirror* reporting, "This year the Phi Alphas under the supervision of Melba Phillips, as president, took up a



Phillips poses for the camera while at the University of California at Berkeley in the early 1930s, wearing a dress she made for herself and preparing to study under the father of American atomic energy, J. Robert Oppenheimer. Phillips was Oppenheimer's first woman graduate student and together they made several important scientific discoveries in physics.

survey of modern drama the fall term; the study of ‘What Literature Can Do for Me’ the winter term; and modern poetry the spring term.” The tryout for the first Oakland City College women’s debate team was held during the second term of that same year. To no one’s surprise, Phillips was one of the three women chosen for the first team.

While Phillips stated in her 1977 interview that she always had maintained a nonchalant attitude regarding religion, the *Mirror* and the *Collegian* both suggested that she was heavily involved in the Young Women’s Christian Association on campus and in leading several of the chapel services. She was elected secretary of the YWCA and the *Mirror* reported Phillips was one of five school representatives sent to the state conference in Bloomington. But even when involved in religious discussions, Phillips looked at the subject from a mathematical point of view. One report in the college newspaper related her notions regarding how religious people might best get along with one another in a chapel meeting she directed: “The secret [of] getting along depends on the theme or motif which one selects to be the keynote of his life. This brings up the question of personality, and the question—are you triangular or round?” Phillips further discussed and illustrated her ideas by a series of drawings, adding, “The final thought, which applies to human realities as well as to geometry, is that as the number of sides of a regular polygon increase, the polygon approaches a circle as its limit. If our activities are limited to three or four sides, our relations with our fellows are necessarily less pleasant than they otherwise would be.”

Oakland City College strictly enforced a mandatory attendance policy at weekly chapel meetings. The practice grated Phillips, who went so far as to write in the college newspaper of her abhorrence of forced chapel attendance. The short

piece demonstrated her sometimes blunt but always straightforward reasoning: “I think that chapel attendance should not be made compulsory, as chapel now stands. If chapel exercises were as interesting as they should be, as interesting as I know that the members of our faculty are able to make them if they would only take the time and trouble, students would go of their own accord. Of course, I know that chapel is the only place where all the students meet together regularly, and therefore should be well attended, but I don’t like the idea of compulsory attendance.”

Just as she did when sitting before a congressional committee during the Red Scare in 1952, Phillips could push back at authority under the right circumstances. One of her professors, Raymond Shelby, headed the history department and taught in a poor manner that greatly disturbed Phillips. Her anger with the professor primarily concerned Shelby’s tardiness, yelling at students, often looking disheveled, and being unprepared. Phillips’s strong feeling about the professor’s incompetence appeared in a *Collegian* article where, in so many words, she called him a balding ass. Phillips also made bitter fun of Shelby in both the “jokes section” and the “calendar of events” section of the 1926 yearbook for which she served as editor. In the calendar of events section she wrote such items as: “Prof. Shelby dismisses political science class early again” and “Prof. Shelby was eleven minutes late, ‘Where oh where is my Greek history class gone?’” This ongoing criticism against the professor placed in the *Mirror* yearbook led to its staff being labeled “antagonists” and the yearbook being “outlawed” for a brief time. Eventually, there was a compromise with some of the lesser criticism being allowed to stay in the yearbook. Interestingly, Shelby was not on the college’s faculty roster the next year.

Further insight into Phillips’s personality and her hopes and dreams as a

young woman comes from another college newspaper interview. When asked what she would do if she had a million dollars, Phillips replied that she desired to pursue graduate work. “I should go to school until I finish here, than [*sic*] do about five years of university work, travel, buy books for the home, new furniture for the home, and a new automobile,” Phillips said. She also wished to “furnish a beautiful reception room for Wheatley Hall,” her beloved college dormitory.

During her senior year, Phillips played the violin in the college orchestra and became chair of the casting committee and appeared in several plays for the school’s Dramatic League. She was also chosen “most industrious student” by her senior classmates and in one yearbook joke Phillips claimed to have completed a great scientific discovery, having “achieved tardiness, absolute zero” on a chemistry test.

Perhaps the most interesting and important part of Phillips’s years at Oakland City involved her growing relationship with Jordan, the superb math teacher who sought to help her develop both her mind and social skills. He did the former by going out of his way to gently demand her best academic work and by buying her advanced math and physics books. Two stories found in this research also showed how he carried out plans to grow her social skills.

In the fall of 1924, Oakland City’s football team defeated their bitter rival, Evansville College. The next Monday, Phillips found, to her disdain, that no one in her Analytic math class, including Jordan, seemed able to concentrate on school work. Finally, Jordan gave up trying to teach and asked the unfocused class to vote on the football player who they believed had played the best game in Oakland City’s victory over its archrival. When one was chosen, a member of the math class, Jordan dismissed the students and

then picked a surprised Phillips to take the football player downtown and buy him a new Stetson hat with money furnished by Jordan.

In another episode, also reported in the school newspaper, Jordan carried out an experiment to see if different cliques of girls on campus could enjoy themselves when thrown together at a fancy restaurant. The paper reported the following groups were chosen for the experiment: the “funny gang,” the “serious-minded and studious gang,” the “dignity and all-it’s worth gang,” and the “young and frivolous gang.” Phillips and another young woman were chosen to represent the “dignity and all-it’s-worth gang.” The groups ended up experiencing “a splendid evening,” one that “proved different groups at the school” could enjoy each other’s company “outside their own particular choice of friends,” the paper reported. Phillips, the article added, “Could hardly hold her frivolity.” After the event, the girls “were then piled in ‘Pa’ Jordan’s Ford and delivered safely home.”

Oakland City primarily produced teachers, and Phillips, upon graduation, set out to find a teaching job in one of

the local high schools. Wheatley wrote a strong letter of recommendation for her that now seems prophetic. “I am pleased to recommend Miss Melba Phillips to any school board desiring a competent high school teacher in science and mathematics. . . . During the three years in Oakland City College she has been a leader in student activities. In scholarship she is excellent,” wrote Wheatley. “Her mental attainment combined with industry and enthusiasm will enable her to do valuable work in any community.”

Oakland City gave one more gift to Phillips after she graduated from the University of California at Berkeley. Jordan, the teacher whose strict but caring teaching style and commitment to students so influenced her, wrote a letter of recommendation for his former student, who was now seeking a job. It carries some irony, given the stature to which Phillips would rise. The letter said: “Miss Melba Phillips is one of the three best students, if not the best, that I have had in my classes here where I have worked for more than twenty years. Her character is of the highest type, her energy is boundless. . . . She was one of the leaders while here. She

was kindly, pleasant, and agreeable. . . . It is probable that she will add dignity and scholarship to any faculty of which she may become a member.”

In 1964, to commemorate her beloved college professor, Phillips endowed a scholarship in math in Jordan’s name. That same year she was also named Oakland City College Alumnus of the Year. In 1965 she returned to the wooded campus to receive an honorary doctor of science degree before a packed crowd in the same field house where she had received her own undergraduate diploma thirty-eight years earlier. Whatever its limitations, Oakland City College provided the first professional steps in Phillips’s long and highly successful professional journey. The caption beside one of her college yearbook photos stood especially poignant and prophetic in this regard. It simply read: “Where shall we play thee on glory’s page?”

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Phillips accepts an honorary doctoral degree from Oakland City College in 1965. Upon her death in 2004, the New York Times referred to Phillips as “a pioneer in science education” and noted that “at a time when there were few women working as scientists, Dr. Phillips was leader among her peers.”



FOR FURTHER READING

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