The mathematics faculty at Western in the 1950s — Henry Yarborough, Hugh Johnson, Suzy Howard, and Perry Snell — are remembered with special admiration by students. This dedicated team taught students to respect those who had contributed to the depth and breadth of calculus, the cornerstone of a math, science, or engineering education. In particular, two students, Shirley Barnes ('57) and her future husband Harry Gray ('57), used the same text in successive semesters and still own their copy of “Granville.” That background would lead Shirley on a special quest years later.

After graduating from Western, Shirley Barnes Gray remembers thriving on teaching and scholarly activities. “After years of extensive study and travel abroad with my husband, and having three children, I arrived at mid-life determined to achieve my goal of a Ph.D. I was lucky to win a small scholarship since women of my generation were not encouraged, especially in mathematics,” explained Gray.

A few problems arose. Could she support a teenage son, take the Graduate Record Examination (GRE) at age fifty, complete a degree before she was too old to reap the subsequent benefits, and finally find employment near her home?

Her first priority, like almost any woman graduating in the 1950s, had always been her family and her home. But she wanted to do something. She wanted to keep her private life in order, while also being able to pursue the demands of graduate education and then to earn tenure in an academic post.

“As a fifty-year-old who had not lived off a university campus since entering Western, I was often critical of the requirements. There were times when I truly struggled with some of the nonsense that goes into graduate education,” Gray said. “But I was blessed with support from my family. Also, we now recognize that the Gray family had been blessed with good health during this period.”

After completing her Ph.D. and finally arriving at her goal of a university position, she then had to ask herself what she should really do. Most young faculty members immediately
Agnesi’s "ubicat avversiera" or
verted sine curve, was minored as "avversiera" meaning
witch" or "wife of the devil," a
mistake that gave the "Witch of
Agnesi" a permanent place in
future calculus texts.

Shirley and her husband, Harry, at Oxford
University.

The first surviving mathematical work
written by a female mathematician,
Maria Gaetana Agnesi.

He also had more Ph.D. students and
postdocs (approximately 125) teaching
in universities around the world
than any other single U.S. professor.
Shirley had been part and parcel of
this process. She knew the struggles
that go into juggling many distractions
while trying to remain focused on a
lengthy academic pursuit. She felt she
had "been there, done that." Harry
courage her to do something that
was fun, to spend time on things she
really enjoyed.

She had lots of positive feedback
on her teaching. She had often been
told she was a great teacher. The
rewards of giving a good lecture,
of being a popular instructor, were
not lost on her. Students had often
remarked that her enthusiasm for
math was outstanding. For Harry and
Shirley, to stand in front of students
and not be well prepared is a sin. But
her scholarly achievements apart from
teaching took a more circuitous route.

In the 1990s, remembering
"Curves for Reference" in the back
of her Granville Calculus text from
Western, she was intrigued by the
curve known as "The Witch of Agnesi"
and with Maria Gaetana Agnesi (1718-
1799), the first woman to publish a
surviving work of mathematics,
Istituzioni Analitiche (1748). Earlier
women may have published a book,
or written a manuscript, but their
work has simply not survived.
Shirley has often wondered about identities of
authors, "Surely some woman wrote
something that exists in some library,
but is assumed to be a man, or is
disguised under a man’s name. After
all, the history of mathematics has
documents spanning 3,000 years."
Equipped with legitimate scholarly
credentials, Dr. Gray gained entrance
to rare sources and started building
a large circle of professional friends.

To take advantage of Harry’s travel,
Shirley started to collect Agnesi
materials from many of the world’s
great libraries. In particular, days in
the British Library and at the Royal
Society in London, the Bodleian Library
at Oxford, and the
University Library at Cambridge, will never
be forgotten.

She had one of Harry’s Ph.D.
students take photos
of the church in Turkey
where the palimpsest
had rested for several
centuries. Shirley herself visited
the library in Jerusalem where the
palimpsest was moved after the Turks
took Constantinople in 1453. Classical
scholars were more than willing to
help her.

Moreover, she was building a
broad network of friends through
attending conferences and work-
shops. "The lessons on this important
aspect of building a professional
career I learned from Harry," Shirley
said. "Chemists thrive on knowing
one another and working together.
Students who major in lab sciences
know they must have help from
others. They have benefited from an
apprentice system. "She wishes this
were more common among
mathematicians.

To write a long biography of
Agnesi would have taken several
months of combing archives in Italy.
While this would be a challenge, she
had no desire to leave her home in
California for an extensive period of
time. But she was modern enough,
realized there was more to be done than merely
commemorating Agnesi. In
2001 she proposed to the National
Science Foundation (NSF) the
idea of building a national math
archive. Europe has several. The
United States has only recently "caught
the wave" of looking into its relitively short
mathematical history and
supporting Yankee scholarship. This
includes everything from Granville, Smith,
and Longley’s clas-
sical text to Tom
Lehner, baseball, and
Mandelbrot’s fractal
gometry. NSF funding has resulted in http://
curvebank.calstatela.edu/

The National Curve
Bank (NCB) Project is
designed as a resource
for students of math-
ematics. Dr. Gray, as
director of the NCB,
strives to provide
features on the web — for example,
animation and interaction — that a
printed page cannot offer. She hopes
to bridge the gap between
traditional math classroom
instruction and computer
media, the dominant
technology of the
current generation of
students.

But having learned to enjoy the
new mathematics-related software
programs, web development tools,
and graphing calculators — the
visual communication of
mathematics — Shirley
...
“The printing press has controlled mathematics communication for almost 500 years,” she said. “Our notation is awkward, often a mystery, even for mathematicians not working directly in a given field. This is certain to change. Free web information will inevitably illustrate and support chalkboard instruction where appropriate. The sciences are thriving on technology. Math is certain to move in this direction.”

What now? The National Science Foundation encouraged the NCB project to focus on undergraduate topics. The project is taking on a life of its own as the number of “deposits” in the Bank builds and the archive expands.

Current Western math faculty members, Tom Richmond and Bettina Richmond have made a contribution to the NCB and Wanda Weidemann serves on the National Advisory Board. Long-time Western faculty member Pat Hooper was Shirley’s roommate in McLean Hall. “Patsy will certainly tell me if something is wrong,” quipped Dr. Gray. The NSF and the NCB Board are now encouraging building in the area of Calculus surfaces. Collaborators in Computer Science want to add pages using JAVA.

Shirley’s students at Cal State Los Angeles are providing much of the expertise that goes into polishing the contributions to the National Curve Bank Project. Shirley encourages the faculty at Western and their many graduates in high schools across Kentucky to work with their students. On many aspects, Shirley says she has learned from, rather than taught, her 20-year-old students. “At this point many college students have much to offer older faculty members,” she declared. “Many undergraduates may not be so well versed in the classics but they have never read a line of code that did not interest them.”

The collection of materials and the network of friends continue to expand as new invitations arrive. Harry has plans to go to Rome in the fall. Shirley is already plotting to get herself admitted to the Vatican Library to see the only two very old copies of Euclid’s *Elements* in the world. She has read the D’Orville 301 (888 AD) Euclid at the Bodleian. But the Vatican has another Euclid, which may be older, and is slightly different. Naturally she wants to compare the two.

But seeing the Vatican’s Euclid, which she considers as one of the great treasures of civilization, is only her first stop. She has been in communication with *Il Direttore* of the *Divisione Filatelia* of the Italian postal service. Shirley thinks Italy should issue a stamp in Agnesi’s honor. She will try to arrange a meeting with the officers to present the credentials for an Italian woman, well represented in American mathematics texts and well known to American students, but not well-known in her native country.

 Needless to say, Dr. Gray is pleased that an illustration she saw in the back of a math text in the 1950s at Western is still very much a part of her scholarly life.