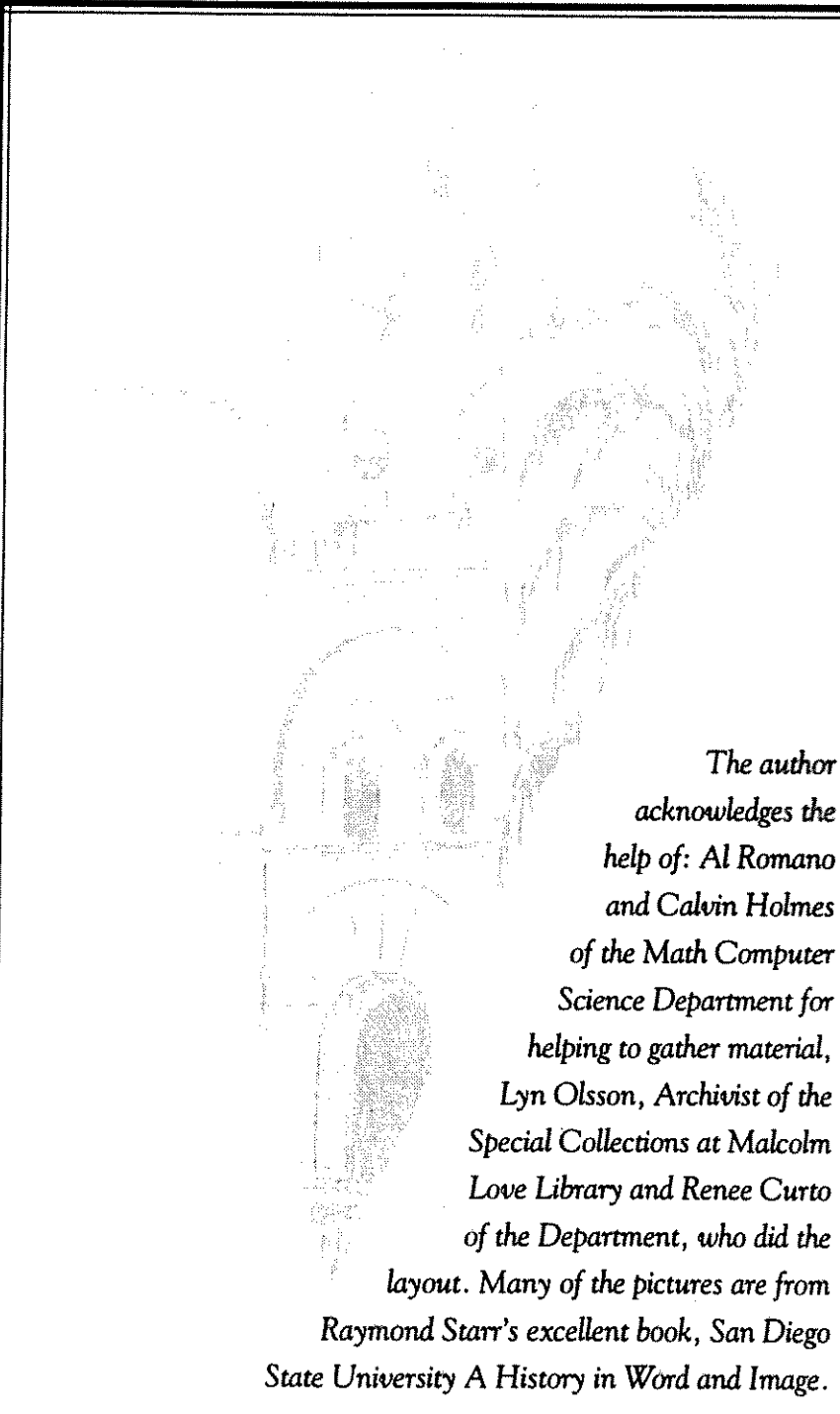


HISTORY

of the
Department of
Mathematical & Computer Sciences
of
San Diego State University

By David Lesley





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San Diego Normal School was founded on March 13, 1897 when Governor James Budd signed the act appropriating \$50,000 for its support and maintenance. A Board of Trustees was soon appointed and this group selected the site, in University Heights, on which the Normal School building was constructed at a cost of about \$100,000. In September of 1898, Samuel T. Black resigned his post as State Superintendent of Public Instruction in order to become the first President of the School. The faculty

B e g i n n i n g s

The purpose of the school was "to prepare suitable persons to teach in the public schools of the state."

were selected in the next month, and the School opened in temporary quarters at the corner of 6th and F on No-

vember 1, 1898. The faculty were 8 in number and the enrollment was 83. A new class

1898 - 1899

was admitted on February 1, 1899. The new building was dedicated on May 1. The first catalog is for 1899-1900. The purpose of the School was to "prepare suitable persons to teach in the public schools of the state". Students who

*One-two-three
Who are we?
We're the Normals,
don't you see?
Are we in it?
I should smile
we are in it
all the while.*

had graduated from high school followed a 2 year course, while those admitted after the 9th grade followed a 4 year course. Those completing the course of study earned a "diploma of graduation", which entitled the holder to a grammar school certificate from any county or city board of education in the state. With two years of "successful experience" teaching in the public schools of this state, the holder obtained a permanent certificate to teach in any primary or grammar school in California. The first two people to be listed as teachers of Mathematics were *Emma F. Way and Charles T. Meredith*. Ms. Way is listed in the catalog immediately after President Samuel T. Black and has the title "Preceptress". Her education was received at Grand River Institute in Ohio, while Meredith's was from Grant Academy in Kentucky. Both had experience in high school teaching and administration.

There were 2 courses of mathematical study in the first catalog. These were to be taken in the first two years, so that they need not be taken by a high school graduate. Algebra I and II were a 40 week course, while Plane Geometry I and II and Solid Geometry comprised a 60 week course. These were organized into 20 week semesters.

The description of the geometry courses indicates that there is no text, "the demonstrations being worked out entirely by the students themselves".

This optimistic expectation apparently was not met, as President Black's first annual report noted that "the great majority of students" had little idea of how to study effectively. The next year the courses used 3 books by Milne: High School Algebra, Plane Geometry, and Solid Geometry. In the 1900-1901 catalog, Emma Way is listed as "subject to assignment", rather than as a teacher of mathematics. Additionally, a "junior course" has been added, namely "Arithmetic", for which no text is specified, but which is described as "stressing bookkeeping methods".

1900 - 1901

The course offerings remained essentially the same for the next fifteen years, with minor changes in description or the balance of units between Algebra or Geometry, or the dropping or addition of Solid Geometry. In 1901-02, Emma Way taught both Mathematics and Reading and a new member was added to the set of mathematics teachers. *J.F. West* had an AB from Stanford and had spent a year of graduate study at Harvard.

He was not a fresh faced graduate, having been a high school principal since 1888. The next year, 1902, saw the departure of Charles Meredith, and in 1905, Ms. Way taught only Reading and Latin, leaving West as the only teacher of Mathematics courses. By 1906 students at the Normal School were required to be high school graduates and the course of study was two years for all. The Math courses were presumably taken by those who had not taken them in high school. In 1909-10, Edward L. Hardy became the President of the School. This year also marks the departure of Emma Way from the School faculty. The next decade appears to have been one of contraction, or at least stagnation for the whole college. J.F. West disappears from the catalog in 1914-15, and there are no faculty listed as teaching mathematics for the next few years. The algebra and geometry courses have disappeared, but arithmetic still ap-

pears, presumably taught by the Education department. This seems to have been the Dark Age for mathematics at San Diego State.

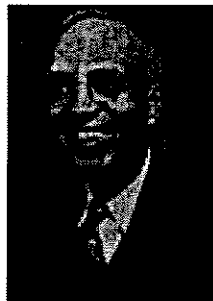


World War I had considerable impact on the campus, which did much to further the war effort. ... A loyalty pledge was signed by all faculty, staff, and student body: "Realizing that the guarantees of safety and freedom in a democracy lie in the mutual pledges of its people and in their active cooperation for the preservation of national independence... (I) pledge my active support to its measures for prosecuting the war against Germany and her allies."

The academic year 1919-1920 was the last for the Normal School, as all Normal Schools in California were declared to be State Teachers Colleges by an act of the legislature in April of 1921, which meant that the program would expand from two years to four years. At this time the faculty numbered twenty, none of whom were described as teachers of mathematics. There were, however, courses in Algebra, Solid and Spherical Geometry, and Plane and Spherical Trigonometry which were offered as "Collegiate Courses". This was a

new program, and a year of Collegiate Courses, taken after the regular professional course, was sufficient for a junior high school certificate. The Lecturer listed for these was

Miriam Besley, who was also Director of the Training School. Ms. Besley, who held a Ph.D. and MA from Wellesley and Chicago respectively, had been at the School since 1913, but was only listed as a mathematics teacher in this one catalog. The 1920-21 catalog is the first for the State Teacher's College of San Diego. There is no mention of mathematics or teachers thereof. The catalog for 1921-22 is not to be found, which is unfortunate, as this was a period of tremendous change. New programs were approved and the size of the faculty jumped appreciably. The College applied to the Department of Education for the right to grant the BA degree, with a major in Education. In order to be admitted, the prospective student had to be qualified to enter the



George Livingston,
"the true father
of the
Mathematics
Department."

ety of fields, both for students planning a transfer to the University, and for those intending to continue

preparation for teaching in the new curricula leading to the BA in Education. The most significant new feature, present by 1922, is a collection of 2 year programs in Engineering. These apparently precipitated the arrival in 1921 of the true father of the Mathematics Department. *George Robert Livingston* had an MA

from the University of California. He taught at the San Diego Junior College (located downtown) from 1914-18, and had been head of the Mathematics Department at Santa Barbara Junior College during 1919-21. Now the course offerings blossomed. The 1922-23 catalog lists Math 3A-3B and 4A-4B, a two year course in Analytic Geometry and Calculus. These courses were intended for students of Chemistry and Engineering, as well as for students of Mathematics who might wish to transfer to the University of California. With variation as to distribution of content, these were the numbers for the Calculus sequence for several decades. The 1923-24 catalog lists the following curricu-

1920 - 1921

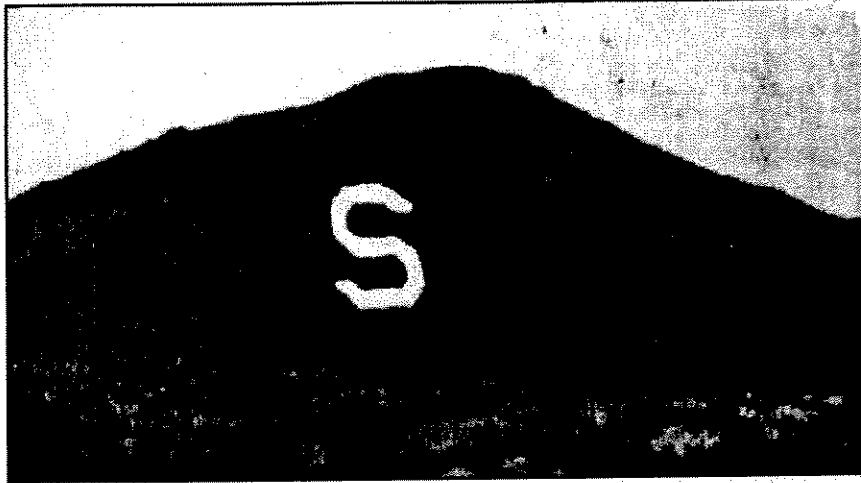
University of California and in fact the application had to be made on a UC admission form. This standard was set in May of 1920. In June of 1921, San Diego Junior College was merged with the Teacher's College. Thus, lower division College courses were offered in a much wider vari-

lum: Math A. Algebra Math C. Trigonometry, Math 1A-1B General Course. This covered topics from Geometry through Calculus for non-engineers. Math 2. Mathematics of Investment Math 3A-3B. Plane Analytic Geometry and Differential Calculus Math 4A-4B. Solid Analytic Geometry and Integral Calculus. Math A and C were taught by *N. M. Cummings* of the Physical Science Department. One section of Math 2 was taught by *William Wright* of the Commerce Department (as it was for many years). The rest of the courses were taught by *George Livingston*. In 1925-26, a new course in Projective Geometry, Math 6, was added, also taught by Livingston.

1927 - 1928

The academic year 1927-28 saw two significant changes. Firstly, the College is now known as San Diego State College, so that the stress on being a teacher's college is lessened. (The name did revert back in 1930.) The major in Education remained the only BA degree, but the Liberal Arts Division offered courses in 17 fields, from Anthropology to Zoology (including Mathematics). Secondly, academic ranks have appeared, and George Livingston is an Assistant Professor. There are also

two new courses for him to teach: Math 101, Elementary Geometry for Advanced Students (with prerequisites Math 3A-B and 6) and Math 112, Analytic Geometry of Space, (with Math 4A-B and 6 as prerequisites.) These upper division courses were to be taken by students pursuing the BA in Education as electives during the Junior year. The course offerings continued to expand. In 1928-29, two engineers pitched in to teach some Calculus. Indeed, Math 3A and 3B each had two sections! The department (i.e. Livingston) added two new upper division courses: Math 102, Elementary Algebra for Advanced Students, and Math 111, Theory of Equations. The latter course concerned "General solutions of algebraic equations, approximate numerical solutions, applications." With changes in topics, this course persisted until it evolved into the Modern Algebra course. This year also saw San Diego State granted the right to offer a secondary credential. Thus, the "academic major" has appeared, requiring at least 15 upper division units. Mathematics does not yet offer a major, and there are still only 4 upper division courses in the catalog. Meanwhile, Math 4A-B has become "Engineering Mathematics," taught by an Engineer, and Math 3A-B has separate sections, one for En-



"S" Mountain, located on Cowles Mountain overlooking the campus, was created on February 27, 1931.

gineers, and one for others. taught
respectively by an Engineer and by
Livingston. A new course, Math 5A-
B, is the second year Calculus for
non-engineers. The 1929-30 catalog
clarifies the difference between an
academic teaching major and an aca-
demic major. Mathematics offers an
academic teaching major, requiring
12 units of upper division mathemat-
ics (all that was offered at the time),
required for teaching the subject in
high school. The academic major is
meant to prepare the student for
post-graduate research work in the
field. The year 1930-31, was certainly
an important one, as the College
moved to its present campus on Feb-
ruary 1, 1931. Livingston was pro-
moted to Associate Professor, and a
5th upper division class, History of
Mathematics- Math104 is intro-
duced. Math 5A-B has disappeared,
and the Calculus is back to one track
for Engineers and non-Engineers to-
gether. The only courses which are
not taught by Livingston are Math
of Investment, taught by W.H.
Wright of the Commerce Depart-
ment, and Math 4A-B, taught by S.
Lavendar Stovall, an Associate Pro-
fessor of Mechanical Arts. The fol-
lowing year, Livingston's isolation is
relieved. John Mortimer Gleason ar-
rives from UC with an MA, and the
course offerings blossom again, pre-
saging the possibility that an aca-
demic major will appear. New
courses include Math 105, Modern
Geometry ("the geometry of the
circle and the triangle!") and Math
119, Differential Equations. In addi-
tion, a confusing variety of lower di-
vision Calculus courses is now of-

ferred. There appear to be 3 such courses. In 1932-33, the presecondary major finally arrives, requiring 24 upper division units, to include Theory of Equations, Analytic Geometry of Space, and Differential Equations. As it happens, the total upper division curriculum consists of 8 courses, so they are essentially all required, however, the student could take as many as 2 courses in other departments. For example, Economics 140, Statistical Methods, or Education 112, Mathematics in the Junior High School. The lower division offerings continued to change, with a course in "Intermediate and Advanced Calculus", Math 14A-B, as a possible replacement to Math 4A-B. Curtis Walling, with an EE degree from Stanford, teaches Math 3A-B, and is listed as an Instructor in Mathematics and Industrial Arts. The growth of the department is indicated in the next year by the presence of 2 sections of Calculus.

In response to the Depression, the registration fee for full-time student was raised to \$6.50 per semester, up from \$1.50. The newly imposed parking fee is fifty cents a semester. The towel fee was set at a dollar. John Gleason was promoted to Assistant Professor. At this time nine of the sixty-one College faculty possessed a Ph.D. In 1934-35, math

101, Elementary Geometry for Advanced Students was dropped from the curriculum and replaced by Math 124, Vector Analysis, which was taught by Gleason. Gleason also demonstrated his versatility by teaching a course in surveying. The only change in 1935-36 was the addition of a collection of "Introductory Mathematics" courses taught by Gleason. These are high school courses intended as review classes. Since the year before, Gleason had also offered a new course, Math 19, Foundations of Arithmetic. This appears to have been an axiomatic course, open to all with sophomore standing, but required for no one. On September 1,

1935

1935, *Walter R. Hepner* became the third President of the College. This coincided with the change of name of the college back to San Diego State College by official legislative enactment this time. This change allowed the college to drop the requirement in education courses from the curricula which were previously known as presecondary and to convert them into liberal arts curricula leading to the AB degree with any one of 13 majors, including Mathematics. That is to say, San Diego State now offered a major in Mathematics which was

not tied to high school teaching. The year 1936 shows more development of the Mathematics curriculum. A year course in Physics is required for the major. Math 102, Elementary Algebra for Advanced Students, and Math 104, History of Mathematics, and Math 124, Vector Analysis all disappear, replaced by Math 118, Advanced Calculus, Math 199, a Special Study course and Math 140, Statistical Theory and Method. This was



Every year President Hepner entertained the student council in his home with a holiday meal.

taught by Raymond C. Perry of the Education Department, who also taught the like numbered course in the Economics Department. The course descriptions differ, however, the math course being "from the mathematical standpoint", and requiring Math 4A-B as prerequisite. This is then the first Mathematical Statistics course taught in the department. The demand for Calculus must have been increasing, as there are 3 teachers listed for the course in 1937-38. These are Livingston, Walling and C. E. Smith, Assistant Professor of Astronomy, who is noteworthy as the first person with a Ph.D. to teach in

the department. Math 2, Mathematics of Investment, became Economics 2, Mathematics of Finance, where it continued to be taught by Professor Wright of the Commerce Department.

In 1939, Selected Topics in Algebra, Math 102 appears, while Math 104, History of Mathematics, reappears. For the first time there are more than 8 courses to choose from, although all are taught in alternate years. At this time Gleason and

Livingston are the only full time members of the department, with 3 courses of various levels being taught by outside people, including Walling. But in 1938 the first member of the department with a Ph.D. arrived. This was Assistant Professor Lewis Walton, with a degree from the University of California. He begins by teaching a new course, L5, Solid Mensuration, which is required of those whose grades do not allow them to enter 3A directly. But in 1940 he also teaches Math 111, Higher Algebra, and Theory of Equations. The new course description is "Linear dependence, matrices, quadratic

forms, groups." This is the first time that any of these terms has appeared in the catalog. As long as Walton taught this course, this was the course description. When he left and was replaced by Livingston, the content reverted to "theory of algebraic equations". The impact of the new faculty member is felt again in the 1941-42 catalog, when Math 112, Analytic Geometry of Space, becomes Analytic Projective Geometry.

Evidently the Physics De-

WWII

partment felt a need for Vector Analysis, which reappears, taught by a physicist. The "National Emergency" of WW II brought on many changes in College requirements, meant to get students graduated more quickly. There are also two new lower division courses in Computational Mathematics. These are evidently meant for non-majors, possibly to work in the war effort doing the kind of rote calculations that computers now do. Livingston is now promoted to Professor. In February of 1943 we find the first documented graduation of a mathematics major with a degree in Liberal Arts and Sciences. This was Edwin G. Swann, who was followed in the Spring of

1943 by William F. Downing. Graduates were not listed in the commencement program by department until 1940, so there may have been graduates before that. One very close call was *Julia Bowman Robinson*, who spent 3 years here in the late thirties, but transferred to Berkeley with Gleason's urging. The initial inspiration for her to go to Berkeley was Dr. Clifford Smith of the Astronomy Department (who also taught Mathematics occasionally). Her intention while in college was to be a high school teacher, which provided a reason for her to transfer. It was still necessary at that time to spend a post-graduate year at UCB or UCLA to obtain a general secondary credential. Of course, the level of mathematical culture at Berkeley was far richer than that which Gleason and Livingston could provide. Julia Robinson later became the first woman mathematician to be elected to the National Academy of Sciences and the first woman to be President of the American Mathematical Society.

There were apparently no "pure" math majors graduating other than Downing and Swann from 1940 through 1947. There were 3 in 1948 and 7 in 1949, including the first woman, Frances Shumway. Ms Shumway later became one of the

first 4 recipients of a masters degree from the department, in 1957. The catalog of 1943-44 is missing. In fact they skipped it to save paper for the war effort, recycling the previous year's catalog. During the war the enrollment of the College dropped

from 2077 in Fall of 1940 to a low of 860 in the Spring of 1943. Of this latter number only 21% were males.

Indeed, men were drafted in batches of dozens at a

time, and they were required to report, with no delays for finishing the semester. There was a corresponding drop in the number of faculty, from 112 to 60. Among those faculty who took non-military leave was Lewis

1943

Walton. In the 1943 yearbook, we find a picture of the three remaining faculty, Gleason, Livingston and Walling. The next year, however, the departmental picture features eight teachers of Mathematics. A study of Mathematics was necessary for a stu-

dent to become an officer in the Armed Forces. The resulting increase in demand for math classes meant that several members of other departments, who were capable of teaching Mathematics, were pressed into service. Since the overall enroll-

ment at the College dropped so drastically, they were available. Several of them had doctorates in their own fields. When the war ended, the enrollments be-



A "pre-commando" physical education course was implemented to prepare SDSU males for military service.

gan to climb rapidly. A veteran would be admitted even without a high school diploma, provided "he can demonstrate through examinations of the college or of the United States Armed Forces Institute that he is capable of doing satisfactory college work." In response to this demand, the College hired John E. Eagle, who became an Assistant Professor in 1945 and was granted an Ed. D. from Stanford University in 1947. Arriving with him were Assistant Professor Earl Prugh, who had earned his B.S. in 1899 and his M.A. in 1923, Instructor Edward Tilley,

whose training was in Chemical Engineering, and Instructor Eugene Corcoran, who had a BS from North Dakota State. These last three were at State for brief periods, while Ed Eagle was here for many years, retiring in 1974. Meanwhile Lewis Walton is no longer listed as "on leave" in the 1946-7 catalog, so he must have never returned. The Chair of the department had been Livingston for all these years, but Gleason became Chair by 1946, and it was he who initially guided the postwar expansion. Evidently the department's response to the enrollment pressure was to hire non-tenure track people for the short term. Indeed, they probably had no choice. In 1947-48, we welcomed Acting Assistant Professor *Arthur Emerson*, Acting Instructor Herman Englander, Acting Instructor *John Graham*, and Acting Assistant Professor *Ole Schey*. Thus the department had grown to eight and a half (Walling being in Engineering and Mathematics.) But of these, only Ed Eagle possessed a doctorate. This might explain why the course offerings are little changed from those in the late thirties. In 1947, the department acquired Associate Professor *Maurice Lemme*, whose M.A. was from Indiana University, with his Ph.D. awarded by Purdue. Lemme's training was in Statistics. The following

year saw the arrival of Assistant Professor *Ray Harvey*, who had a Ph.D. in Complex Analysis from Harvard. This year also saw the retirement of Professor George Livingston and the beginning of Ed Eagle's tenure as

1950 - 51

Chair. In the 1950-51 catalog, the courses finally begin to change again. Math 118A-B is a course in Advanced Mathematics for Engineering Students, with 4 semesters of Calculus as prerequisite. There is also Math 121, Advanced Calculus, with prerequisite Math 118A or Ordinary Differential Equations. Math 121 was then essentially a course in multivariable Calculus. The course offering in Statistics was doubled; Math 140 became a full year course- Math 140 A-B. More significantly the first graduate courses appeared. These were Math 210 Concepts of Geometry from an advanced view point, Math 202, Concepts of Algebra from an advanced view point, and Math 204 Advanced Work in the History of Mathematics. Evidently these were graduate courses for school teachers, rather than courses in mathematics. In the next year, 1950-51, the trend to hiring Ph.D holding faculty continued with the arrival of Assistant Pro-



Mathematics Department - 1950
Arthur T. Emerson, Dr. Albert R. Harvey, Dr. Maurice M. Lemme,
Mrs. Helen S. Clark, Dr. Vincent C. Harris,
Dr. Richard G. Stoneham, and Ed Eagle.

fessors *Vince Harris* and *Lester Riggs*, both from Northwestern. With Walling completely in Engineering since 1949, the department now has 5 doctorates out of a faculty of 7, with Gleason the only permanent member without a doctorate. The Chair as of this year was *Maurice Lemme*. The graduate offerings now included a pure mathematics course, Math 224, Functions of a Complex Variable, which was initiated by Lemme. Since there was still no graduate degree offered in mathematics, this course was taken by teachers. The degree offered was an MA in teaching, which was first of-

ferred by the College in 1950-51. The MA with the "Teaching Major in Mathematics" was first offered in 1952-53, so the course in "Thesis or Project" first appeared at that time. All Masters degree candidates were to complete the requirements for the teaching credential. Because of the drop in enrollment which was caused by the Korean war, Lester Riggs departed for the year 1951-52. He returned in the next year when the last of the prewar faculty, John Gleason, died. Gleason had suffered from the effects of being gassed in World War I and this injury was connected to his death. Thus the faculty

were now Professors Eagle and Lemme, and Assistant Professors Harris, Harvey(now Chair of the department), Riggs and Emerson, the last being the only one without a Ph.D. President Malcolm Love, who arrived on campus in 1952, exercised a policy of not granting tenure to any faculty member of the Mathematics

1950 - 51

Department who did not have an earned Doctoral degree. During the fifties and sixties, when enrollments were growing steadily, there was an acute shortage of Ph.D.'s in mathematics who wanted to teach at San Diego State. Consequently a great number of temporary people were used. This enabled the department to hold positions without permanent commitments until the late sixties, when the supply of Ph.D.'s was more plentiful. In 1953 there is a new Assistant Professor, *Richard G Stoneham*, with a Ph.D. from the University of California. In 1954-5, two new courses in Statistics appeared, the lower division Math 12, and Math 177, Quality Control, which was the same as Business 177 and Engineering 177. So there are now 4 courses in Statistics in the department. *Newton Smith* and *William Stoner* have

arrived from Iowa State College as Instructors, Smith holding a Ph.D. In 1955-56, a course in Probability, Math 134 appeared, further strengthening the Statistics offerings. The graduate courses Math 201, 202, 204 and 224 disappeared, to be replaced by Math 200- Seminar, which could be one of several areas of Analysis. There is also a new course, Math 107, in Non-Euclidean Geometry. New faculty included another from the Iowa State pipeline, *Deane Branstetter*. Also arriving was *Peter Shaw*, who had not quite yet finished his Ph. D. at Stanford, and *Leroy Warren*, with a Ph. D. on Algebra from Oregon. Robert Stoneham

1956

has left by 1956. The Chair of the department is now Vince Harris. In 1956-57, we have a new course, Math 135, Numerical Mathematical Analysis. This coincides with the first offering by the College of a Master of Science degree "designed to increase the candidates occupational competency and his ability for self directed study". One of the 5 majors in which this degree could be obtained was applied mathematics. Still, the only specific course (as opposed to seminars) in the department at this time was Math 210A-B, Mathematics of Chemistry

and Physics, which was the same as Chemistry 210A-B and Physics 210 A-B. Despite this apparent lack of courses, 4 people received the MS degree in June of 1957. Helen Clark was elevated from Lecturer to the rank of Assistant Professor. Also, *Calvin Holmes* arrived from the University of Kansas with a Ph.D., specializing in group theory, and *Margaret Willerding* was a new Ph. D. with a specialty in math education. It should be noted that she was the first woman with a Ph.D. to be on the Mathematics faculty. The faculty now numbered: Branstetter, Clark, Eagle, Emerson, Harris, Harvey, Holmes, Lemme, Riggs, Peter Shaw, Roger Shaw, Smith, Stoner, Warren and Willerding. In 1957 new Assistant Professors included *Bert Bone*, whose credentials were a BSCE from California and graduate work at San Diego, and *Bernard Gedanken*, with an MA from Cal. Also arriving was *Betty Kvarda*, with an MA from Ohio State. She would later be reincarnated as Betty Garrison, with a Ph.D. from Oregon State in number theory. The only new acquisition with the Ph.D. was Donald Squier, from Stanford. Stoner, meanwhile, had departed. The catalog for 1958-59 shows a sudden blossoming of new courses. A second course in Numerical Analysis is instituted to "prepare problems

for solution by digital computer" (the first mention of computers in the catalog). A second semester of Advanced Calculus is instituted, with the first course now emphasizing real numbers and limits. There are also new undergraduate classes in partial differential equations and modern algebra. But more importantly, there are now year long graduate courses in complex variables, real variables, and abstract algebra, and a semester course in advanced partial differential equations. The new arrival was *Gerald Becker* with a Ph.D. from Iowa in math education. The Chair is now *Lester Riggs*. There had been a course in the use of the slide

1959

rule taught by the department for many years. In 1959, the future was foreshadowed by a new course, Math 9 - Use of Desk Calculators. There was also a new semester course in Advanced Ordinary Differential Equations. There was another explosion in faculty: *Chuck Bell* with Ph.D. in Statistics from Notre Dame, *Chuck Burton* with a Ph.D. in Logic from the University of California, *Jack Hursch*, with an MA from the University of Denver, *Joe Moser* with Ph.D. from the University of St.

Louis, and *Daniel Saltz* with a Ph.D. from Northwestern. Roger Shaw has departed, and Betty Kvarda is off to graduate school. For the first time an MA is offered in (non teaching) mathematics. Also appearing for the first time is a collection of upper division courses for the National Science Foundation Institute for Mathematics Teachers, run by Ed Eagle, with Margaret Willerding as Associate Director. In this program 50 mathematics teachers from around the nation spent a year in full time study. Twenty five of these were selected to continue through the following summer. Half of the course work was in regular mathematics courses, and the rest from a special group of courses open only to participants in the Institute. These courses were either in pedagogy or in mathematical topics which could be taught in secondary schools. The department has had competitors in the Putnam Competition since its inception. This is an annual examination, taken by undergraduates in the US and Canada. The top five competitors are identified and they are held in awe by all who know the Putnam Exam. In 1959 a San Diego State undergraduate, Alan Waterman of La Mesa and Helix High School, was a member of the exalted five. He was recognized with a graduate fellowship at Harvard

University. In 1977, another SDSU student, John Lamping, was ranked fifteenth out of 2131 participants. In-

1960

identally, the median score on the exam is usually zero. In 1960 the State Colleges came under the administration of the Board of Trustees, rather than the State Board of Education. This was part of the Master Plan, which created the troika of the University, the State Colleges and the Community Colleges, to provide a universal opportunity for higher education in California. The most significant new course offering is Math 137, Introduction to Computer Programming. There are also Math 130A and 130B, both titled Statistical Methods, and Math 155, Mathematical Logic. There is also a new graduate course in Mathematical Statistics. It appears that, since the war, the offerings in Statistics had lead the rest of the department. New Assistant Professors included *Ed Deaton* (Ph.D. - Texas), *William DeMalignon* (MA-Wisconsin), *Robert Dezur* (Ph.D.-Oregon), *Leonard Fountain* (Ph.D.-Nebraska), *Herb Gindler* (Ph.D. later -UCLA), *Ray Killgrove* (Ph.D. later - UCLA), and *Lee Van de Wetering* (Ph.D.-Stanford). In 1961, Math 150, Modern Algebra,

split into a full year sequence. The second semester course absorbed the teaching of matrices and determinants and the venerable course in theory of equations, Math 111, vanished from the catalog. Further, the year-long graduate course in Modern Algebra, Math 230A-B, was replaced by separate courses in Groups (Math 231), Fields (Math 232) and Linear Algebra and Matrix Theory (Math 233). Another notable new course was the General Education course Math 18- Introduction to Mathematics. The frantic pace of hiring slowed, with only *Gene Lopez* (Ph.D. -UCLA) as a new addition. The faculty listing now included 6 Full Professors: Branstetter, Eagle, Harris, Harvey, Riggs, and Smith (who became Chair this year); 5 Associate Professors: Bell, Holmes, Shaw, Warren and Willerding, and 13 Assistant Professors: Becker, Burton, Clark, Deaton, de Malignon, Emerson, Fountain, Gindler, Killgrove, Lopez, Moser, Saltz and Van de Wetering. All but 3 of the 24 had doctoral degrees. This year also saw the first digital computers brought to campus. Richard Bacon was affiliated with the the Computer Center and the Mathematics Department. The Math faculty person most involved in computation was Chuck Burton, who was awarded several

• NSF grants for introducing teachers
 • to the occult art of computer programming. The department had
 • grown enough that it now rated a
 • half time secretary . *Evelyn May*
 • (Boyle at the time) had worked part
 • time for the NSF projects in the pre-
 • vious year, and now spent the other
 • half working for the department. The
 • following year she began working
 • full time, and served with great pa-
 • tience until her retirement at the end
 • of 1987. In 1962 several new courses
 • were added. Math 152, Number
 • Theory, Math 156 Logical Founda-
 • tions of Mathematics, and Math 175
 • Functions of a Complex Variable. It
 • seems odd that the graduate version
 • of this course was the first pure math
 • graduate class, but there was no
 • undergrad class. Now, of course the
 • graduate course was much more ad-
 • vanced: analytic continuation, ellip-
 • tic functions, conformal mapping
 • and Riemann surfaces. (I must say it
 • has not been that advanced since
 • 1970, when I arrived.) There is a new
 • lower division computer course,
 • Math 7, Introduction to computer
 • programming; “ Elementary math-
 • ematical principles of computation.
 • instruction in the use of some of the
 • peripheral equipment. Program-
 • ming of problems and operation of
 • the computer will be stressed.” The
 • computer course, Math137 was re-

named Combinatorial Principles for Digital Computers, described: "Comparison of digital and analog computers. Number base representation theory. Boolean functions and generalized binary operators. Code controlled machines. Logical organization of digital computers. Externally programmed machines. Turing machines, algorithms and their implications to computability and writing of programs. Coding of combinatorial algorithms." It seems to be very theoretical. Note that no programming language is mentioned. The new graduate course that year was Math 220 A-B Topology, which was a course in point set topology. There were 3 new faculty: *Henry Bray* arrived from Iowa State (and was an undergraduate in this department), *Y.K. Feng* from Missouri, and *Betty Koarda* from Oregon State.

In 1963, we added Math 108- Differential Geometry. The year saw the arrival of *Saul Drobnies* from Texas, *Al Romano* from Virginia Polytechnic, *Leon Nower* from Stanford, and *Richard Osborne* from the University of

1963

Arizona, all except Osborne with the Ph.D. The first of the Math Ed type courses appeared. Math 10 had been

a course in arithmetic which was recommended for prospective elementary school teachers. In 1964 it became "Structure and Concepts of Elementary Mathematics", open only to students working toward a teaching credential in Elementary Education. So the Normal School has risen again. *Steve Bryant* arrived with a doctorate

1964

from Missouri. The Chair was Deane Branstetter. It was in 1963 that the department took up residence in its current location in the Business Administration and Mathematics building. During the early years at the Montezuma Mesa campus the department was housed in the original buildings near the Quad. As the number of faculty grew, the department (which had no central office until about 1961) was housed in a building that was originally built to house the Campus Laboratory School. Private offices were nonexistent and even the Chair shared an office with several others. In the late fifties the mathematicians were housed in the new Physics building, until the present facility was finished. The Mathematics curriculum had been well developed for some years now, and it continued to expand. There is

a new graduate course in 1965, Math 205, Advanced Mathematical Logic. In 1966 we added an undergraduate Topology class. There is also a new upper division Math Ed series, Math 110A-B, with Math 10B as prerequisite. There are new graduate courses in Geometrical Systems (Math 202) and Topics in Analysis (Math 204A-B, for secondary teachers). In 1966 more new Assistant Professors were hired: *Allan Accomado* (MS, NYU), *James Bjerring* (MA, Oregon), *Margaret Davies* (Ph.D., Wales), *Judith Elkins* (Ph.D., Wisconsin), *David Osteyee* (MA UCLA), *Hung Ta Ho* (Ph.D. Brown), *Bob Kopp* (Ph.D. Michigan), *Bernie Marcus* (Ph.D., Arizona), and *Edgar Howard* (Ph.D., New Mexico State, and a graduate of State, with an MS in Math). The first five were here for only a couple of years, and the others were permanent. Chuck Bell left for Case Institute, and would hold positions at Tulane, Michigan and the University of Washington before returning some years later. The major curriculum change was the addition of Math 20, Mathematics for Business Analysis. This included topics from finite mathematics and calculus. Until this time, business majors took Math 21, which was Calculus for non-physical science majors. Also added was Math 230, Rings and Ideals. In 1967 the fees were up to \$61.50 per semester. One new course for the year was Math 37, Intermediate Computer Programming, which dealt with machine language. Another notable addition was Math 149, the first undergraduate course in linear algebra: "A study of linear equations, Euclidean spaces, linear transformations, matrices, determinants and eigenvalues." There had been a graduate course, Math 233 in Linear Algebra since 1960, when the year long course Abstract Algebra split into 3 courses in Groups, Fields, and Linear Algebra. The Chair was Leroy Warren. Betty Kvarda became Betty Garrison when she married Jack Garrison of the Physics Department. New faculty included *David Bulman*, who had a Diplom from a German University, *Albert Froderberg* (PhD Washington), *David Jones* (Ph.D. Wales), *Nick Morez* (Ph.D., Colorado), *Dorothy Rivera* (Ph.D. candidate Wayne State and *Jimmie B. Smith* (Ph.D. Arizona). None of these people stayed more than a few years. While he was here, Bulman developed and taught the new courses in Computer Science. In 1968 the graduate offerings continued to grow with the addition of Math 222A-B, Functional Analysis, covering Banach spaces, Hilbert spaces, spectral theory and Banach

algebra. The list of courses offered was quite extensive now. The year saw the arrival of *David Beverage* (Ph.D., Florida), *David Burdick* (Ph.D., New Mexico), *Dan Davis* (Ph.D.,

139- Programming Languages, and Math 158- Automata Theory. At this time there was still no Computer Science major, so students with an interest in CS obtained a Bachelors de-

gree in Mathematics, with as much course work in CS as they could get. This was also the first year of the Distinguished Visiting Professor program, as we were visited by Helmut Hasse, a noted number theorist from Hamburg and Goettingen. The Chair was Calvin Holmes. There were 6 new faculty Richard Hager

1969

Colorado) and *Arnie Villone* (Ph.D., UCLA). The last three were permanent acquisitions. 1969 greeted a bumper crop of new faculty, all with the PH.D.: *Carl Eckberg* (Purdue), *John Elwin* (Oregon State), *Bill Hintzman* (Wiscon-



John Elwin arrived in 1969 as a new faculty member and has been Chair of the Department since 1989.

sin), *R.G. Khazanie* (Purdue), *David Macky* (Michigan State), *Jim Ross* (Minnesota), *Don Short* (Oregon State) and *David Whitman* (UC Riverside). This was quite a recruiting year, because as of 1996, all but Khazanie are still with the University, and Don Short has been Dean of the College of Sciences for 20 years. It is notable that Math 8, Theory and Use of the Slide Rule, is still in the catalog, but not for long, as the pocket calculator is becoming affordable. In 1970 there are now several new courses in computer science. Math 138- Data Structures, Math

(Minnesota), *David Kaskowitz* (MS Stanford), *David Lesley* (UCSD), *Carl Mortensen* (MS Purdue), *Gordon Pritchett* (Wisconsin), and *Will Self* (Wisconsin). There was a new course, Math157 on the Theory of Recursive Functions. In 1971 The department began to offer an MS in Statistics, so that 7 new graduate courses in Statistics were introduced. In anticipation of the MS in Computer Science, there were also 4 year-long graduate courses in Computer Science introduced. The sole new member of the faculty was *Pia Pfluger Korevaar* (ETH Zurich), who was the daughter of one

well known mathematician (Albert Pfluger) and wife of another (Jaap Korevaar). Pia was a numerical analyst who was a member of the group developing the Computer Science offerings in the department. The others were *Carl Eckberg*, *Chuck Burton* and *Carl Mortenson*. Pia left the faculty after a few years when her husband took a position in Amsterdam. The Distinguished Visitor was Professor Ikeda, who lectured on Lie Groups. This topic was very fashionable at the time because a Swiss Mathematician had derived some physical constants by purely mathematical methods, in particular he "derived" the reason for the (previously observed by Eddington) fact that the ratio of the proton mass to the electron mass is near to $6\pi^5$. The Swiss paper was later found to contain errors. Lie Groups remain a very important area of pure and applied Mathematics, however. President Malcolm Love retired in 1971. He is largely credited with develop-

1972

ing SDSU as the flagship campus of the CSUC system, at least with regard to the level of research going on. President Love enjoyed a good

relationship with the department, as did his successor, Brage Golding, who taught a course in Trigonometry while he was President. In 1972, The State College system became the California State University and Colleges. This led to San Diego State being named California State University, San Diego in 1973, and finally, in 1974, we became San Diego State University. New faculty included *Sara Baase* (NYU) and *Doug McLeod* (Wisconsin), *C.J.Park*(Wisconsin), and *Vernor Vinge* (UCSD, also a noted science fiction writer). *Wanda Marosz*, who had been an untenured Lecturer for some time, became a tenured Assistant Professor. The Distinguished Visitor for the year was Einar Hille, who lectured on Functional Equations. In addition, a series of lectures on Fourier Integral Operators was given by the eminent French Mathematician Jean Dieudonne. On a merit weighted basis, the department was quite distinguished for that semester. In 1973, two new academic programs were born, the A.B. in Mathematics with an emphasis in Statistics, and the MS in Computer Science. The graduate program continued to expand, with new courses in Fourier Analysis and Generalized functions. The visitor was Steve Warschawski, of UCSD, who lectured for three semesters on Confor-

mal Mapping and Extremal Length. New faculty included *Tom Carpenter* (Wisconsin), *Mary Ann Herndon* (Texas A&M) and *Frank Flanigan* (UC Berkeley), who moved across town from UCSD. Herndon was the first faculty member with a Ph.D. in Computer Science. Pete Shaw began his 3 year stint as department Chair. The Computer Science offerings expanded again in 1974 with the introduction of the major in Mathematics with Emphasis in Computer Science. The old course, Math 137, Combinatorial Principles for Digital Computers, became Finite Mathematics, with Computer Applications. This course, along with Numerical Analysis, Data Structures and Programming Languages, formed the emphasis, along with one of Advanced Calculus or Modern Algebra. This year also saw the first degree in Computer Science granted when Gregory Noel graduated with the MS. One new member joined the faculty. *David Salomon*, of Hebrew University in Israel joined the Computer Science group. Ed Eagle retired after 28 years on the faculty, about the same length of service as that of Livingston. This year marked the inauguration of the Literary Group, which is the departmental in-house seminar. The idea was inspired by the "journal clubs" which many Biology labs and de-

partments conduct for the purpose of presenting current research papers, usually not written by the members of the club. The Literary Group has been meeting weekly since 1974, featuring talks by our own faculty and the occasional visitor or guest. In the best academic tradition, the math-

1975

ematical discussions are continued in a "Nachsitung" which has been conducted at the Two Bit Sandwich Shop, Salazar's Mexican Restaurant and, lately, the San Diego Brewing Company. In 1975 the University went to a new numbering system for courses, so all numbers changed. The big event, however was the introduction of the Computer Science Major. A curious phenomenon at that time (and earlier) was that there were 2 majors in each of math and computer science. One was an AB in Liberal Arts and Sciences, and the other was an AB in Applied Arts and Sciences. The only real difference between these was that the Liberal Arts degree required a foreign language. In 1976 *Nick Branca* arrived with an Ed.D. from Columbia., and Ed Deaton took over as Chair. The mathematics major introduced the emphasis in Applied Mathematics, the precursor to

the BS in Applied Mathematics. This emphasis required courses in statistics and in computer science, as well as in some science to which math-

1977

ematics can be applied. The Distinguished Visitor was I. J. Schoenberg, of the University of Wisconsin. Professor Schoenberg lectured on the theory of splines. The BS in Mathematics arrived in 1977. This gave the student 4 possible emphases, in a science, applied mathematics, statistics or computer science. The degree replaced the AB in Applied Arts and Sciences. This degree brought on another influx of new courses in "Applicable Mathematics", notably the courses in Mathematical Modeling. In this year, John Donald arrived as a Lecturer. Originally an Algebraist from UC Berkeley, he eventually became a computer scientist permanently here at SDSU. The years from 1976 to the early 1980's showed little growth in the faculty. This was caused by budget problems of the State government, both before and after the passage of Proposition 13. But in 1979, *Ed Silver*, a Math Educator, did arrive from Columbia, and *John Carroll* came from Nebraska to teach Computer Science. *Bill Root*,

with an MS from this department, also began teaching Computer Science as a "part time" lecturer. Eighteen years later he is living proof that tenure is not necessary for "permanent" employment. It's sufficient to be indispensable. Lee Van de Wetering became Chair in 1978. In 1980, one new member of the faculty was *Peter Salamon*, who has a Ph.D. in Chemistry from Chicago. Hired more or less off the street as a lecturer, Dr. Salamon later became a tenured full time member of the department. Following a similar path was *Pat Thompson*, who began as a lecturer in Math Education courses, and eventually became a permanent member of the department. His wife *Alba Thompson* was in the Department of Elementary Education at that time. A third new member was *Leland Beck*, who came from SMU to teach Computer Science. The fourth new member was *Nenad Marovac*, with a degree in Computer Science from Imperial College in London. The Distinguished Visitor this year was Thomas Bancroft, a noted Statistician from Iowa. Since no pure mathematicians had been hired for some years, the department also began a postdoctoral program, beginning with Luby Liao, who is a complex analyst from Washington University in St. Louis. He is now on the faculty

of USD. The next postdoctoral member of the department was Roger Lui, who arrived in 1981 with a degree in Applied Mathematics from Minnesota. The permanent acquisition was the Computer Scientist from Madras, *Kasi Ananthanarayanan* (later mercifully shortened to Anantha). In 1982, the third postdoc to arrive was *Fred Brulois*, from Stanford. Fred worked in partial differential equations. *Sevki Erdogan* arrived from Manchester

1984

University to teach Computer Science, and the auspicious visitor was *David Carlson*, from Oregon State. Dr. Carlson, who had his BA from San Diego State, eventually moved here permanently. He became Chair of the department in 1984, succeeding Lee Van de Wetering. He was the first of a series of faculty who came to visit and stayed. The following year, *Goker Gursel* arrived from Northwestern to teach Computer Science, and *Chen Han Sung* joined the evolving group in Applied Mathematics. He was a graduate of UC Berkeley, as was *Amanda Golbeck*, a Statistician. The postdoc this year was Susumu Okada, who worked in measure theory and whose graduate degrees were from Australia. Also visiting

was *Steve Pierce*, who repeated the David Carlson trick by visiting in 1983, and then becoming a permanent faculty member the next year. Steve is also a linear algebraist, and fled the climate of the University of Toronto. Yet another visitor who became a tenure-track faculty member was *Doris Fisher-Colbrie*, whose interest was in minimal surfaces. She moved on after a few years, when her husband, Rick Schoen, left UCSD for Stanford. The Distinguished Visiting Professor program was revived in 1984, and the postdoctoral program was discontinued. The visitor was Michael Golomb, of Purdue University, who lectured on Approximation Theory. The University was also host to a regional meeting of the American Mathematical Society in November. The featured speaker at this meeting was Louis de Branges, also of Purdue. Professor de Branges had recently proved the Bieberbach Conjecture, a famous 70 year old problem in Complex Analysis. The lecture was in Montezuma Hall, with an audience of over a hundred, expecting an exposition of his work. Instead, Professor de Branges delivered a criticism of the mathematical establishment in general for not appreciating his work, and of some specific mathematicians for publishing a much shorter proof of his result (though they gave him

complete credit for the proof of the conjecture and the idea for their own approach.) This led the Los Angeles Times to publish a page 3 story by their science writer, headlined "Proof Peeves Purdue Prof". In 1985 there was another visitor who would eventually take a permanent position. *Tunc Geveci* is a Turk who came to us from South Africa. His degree was actually from UCSD, and his field is Partial Differential Equations. *Roger Whitney* came from UCSD to teach Computer Science, and *Joe Mahaffy* came from Brown University via North Carolina State, to join the Applied Mathematics group. The Distinguished Visitor was Albert Edrei, from Syracuse University. Professor Edrei lectured on Polya's approach to entire functions. The department was clearly experiencing steady growth and the addition of new fields of expertise. The curriculum had evolved in new directions. Around 1970 there were many offerings in pure mathematics, reflecting the sort of graduate offerings one sees at a Ph.D. granting school, e.g. Functional Analysis and Fourier Analysis. There was a major contraction in the graduate program in the late 70's, but the Applied Math programs eventually generated enough students that new courses in Applied Mathematics were instituted. For

example, there were courses in mathematical modeling, optimization, and systems theory by the late 80's. At about this time, the department was organized into groups: Pure Mathematics, Applied Mathematics, Statistics, Mathematics Education, and Computer Science. In 1986, yet another visitor came who would stick like glue. *Bob Grone*, a linear algebraist on the faculty of Auburn University, visited for a year, was offered a position, and came to stay. *Don Lutz*, a specialist on ordinary

1986

differential equations pulled a new trick. He visited USC, gave a lecture here and was hired in 1986 in a permanent position. The Math Education group was bolstered by the arrival of *Larry and Judy Sowder*, who had been on the faculty at Northern Illinois University. In addition Kurt Eisemann, who had been Director of the University Computing Center, moved into the department full time. The Distinguished Visitor was Caspar Goffman, from Purdue. He was the last of the Distinguished Visitors, who numbered 10 all together. *Mary Koehler*, a graduate of SDSU, joined the Math Education group in 1987, coming from the University of

Wisconsin. *Steve Kirschwink*, who specializes in singular perturbation theory moved across town from UCSD. In 1988, the department had a major growth spurt. The enrollments were up and the state was in a period with few budget problems. *Duane Steffey* came from Carnegie-Mellon to join the Statisticians. Roman Swiniarski, was a recent immigrant from Poland who came to teach Computer Science. The pure and applied math groups were joined by 3 new faculty Steve Hui came as a complex analyst from the University of Washington. Mark Dunster, with a Ph.D. from Bristol, UK, works on asymptotics. Jose Castillo, a Venezuelan with Ph.D. from New Mexico is a numerical analyst. The

1989

department began to consider building a Ph. D. program in Applied Mathematics, which would be joint with UCSD. In 1989, the department added one new member, *Alfinio Flores*, who had a Ph.D. from Ohio State, and John Elwin began serving as Chair. In 1990, the department made its last additions for several years to come. Pat and Alba Thompson returned to the University after several years at Illinois State Univer-

· sity. This time Alba came to Math-
 · ematics rather than Elementary Edu-
 · cation. K.J. Lui, with a degree in Sta-
 · tistics from UCLA, came from the
 · Center for Disease Control.
 · Mahmoud Tarokh, with a Ph.D. from
 · New Mexico, joined the Computer
 · Science group. The recession of the
 · early 90's began to hit the California
 · economy especially hard, because the
 · end of the Cold War already began
 · to affect defense spending. At the end
 · of the 1991 academic year, budget
 · problems began to worsen, and large
 · service departments in the University
 · cut back many sections, as the part
 · time faculty were not rehired for the
 · 1991-92 school year. The CSU system
 · also chose to make large increases in
 · tuition and fee charges so that in 1991-
 · 92, the registration fee was \$559 per
 · semester. In 1994 this had risen to \$871
 · per semester and in 1996 it was \$951
 · per semester. Not surprisingly (ex-
 · cept to the administration) enroll-
 · ments dropped by about 20% in the
 · early '90's The recession continued to
 · worsen during 1991-92, and at the
 · end of 1992, SDSU President Thomas
 · B. Day announced the layoff of about
 · 140 tenured faculty. Of these, nine
 · were in the Department of Math-
 · ematical Sciences. This announce-
 · ment had a devastating effect, as
 · some faculty members were notified
 · of promotion or granting of tenure on

a Wednesday, and were given layoff notices on the following Friday. All plans for a joint Ph.D. program had to be dropped, because all of the nine targeted members of the Mathematical Sciences Department were on the proposed Doctoral Faculty. As it turned out, the end of the cold war also radically changed the national employment picture for new Ph.D.s. Thus the reason for having such a program, anticipated strong demand for mathematicians, was a chimera. The threatened layoffs never occurred, of course, because faculty retired in large numbers. Thus this department lost 6 faculty to retirement in 1992, and several more left in the

next years to the present. Finally, in 1996, two new people were hired in Math Ed. *Joanne Lobato* came from UC Berkeley and *Janet Bowers* came from Vanderbilt University. During this period of contraction there were a few bright spots. In 1993, the joint Ph.D. program in Mathematics and Science Education came into being. The following year the Computer Science program was accredited by the Computer Sciences Accreditation Board. In 1995 the B.S. in Statistics was offered for the first time. In 1996 the Computer Science division of the department instituted an industrial internship program.

1997

It can be argued that only the college of Education at SDSU is 100 years old this year. Since mathematics instruction existed on campus from the very beginning, we view ourselves as one of the very few departments actually entering their second century.

The End