

HISTORY OF THE TULANE UNIVERSITY PHYSICS DEPARTMENT¹

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The First Century, 1850-1960

The history of the department begins in 1850, when Claudius Wistar Sears was appointed professor of mathematics and natural philosophy and Dean of the Collegiate Department of the University of Louisiana in 1850. The university had been founded in 1834 as the Medical College of Louisiana and became the University of Louisiana in 1847. A graduate of the U.S. Military Academy, he trained undergraduate liberal arts students in the sciences for a decade. He taught a one semester senior-level course in natural and experimental philosophy followed by a one-semester course in astronomy. The former course included “rudiments” of mechanics, hydraulics, hydrodynamics, acoustics, optics, electricity, magnetism, and chemistry. There was no instruction in heat and thermodynamics, which had not yet seen the impact of Carnot, Kelvin, and Clausius.

The university closed during the Civil War, and although the Medical and Law Departments reopened immediately after the war, the Collegiate Department did not reopen until 1878. In that year James Lucius Cress was made professor of natural and experimental philosophy, a position he held for two years. His course was patterned after the Cambridge University *Course of Natural Philosophy*, and Ganet’s *Physics*.

Brown Ayers, a graduate of Stevens Institute, was appointed professor of physics and mechanics as well as professor of chemistry in 1880. The Department of Physics was reportedly added after the purchase of a substantial amount of equipment, apparently in a joint trip to Europe by University of Louisiana and Vanderbilt University staff,

including Professor Ayres. Some of this equipment survives in the department today. The introductory course was at the junior level, and used Atkinson Ganet's *Physics* as a text. Ayres introduced demonstration lectures and many new laboratory experiments.

A second, senior-level course was also offered, consisting of analytical mechanics, potential theory, the mechanical theory of heat, and general mathematical physics, with differential and integral calculus as prerequisites. Texts were Weed's *Analytical Mechanics* and MacCulloch's *Mechanical Theory of Heat*. Ayres also gave a series of fifty lectures "to the mechanics of the city on the application of physics to machinery and the mechanical arts." Degree programs were established to award the B.A. and an M.A. degree with a major in physics. Subsequently a B.S. degree in physics was added.

From 1850 to 1882 the Physics Department was housed in the main University Building, facing Common St. in the central business district of New Orleans. The department was moved to the old Mechanic's Institute in 1882. Following the move a new laboratory course was added, emphasizing the determination of physical constants and the use of instruments. The 1881-2 catalogue describes a new course in electricity and magnetism for seniors, to include concepts of lines of force, telegraph lines, ocean cables, and terrestrial magnetism. The text was Cummings *Theory of Electricity*. At this time Ayers became professor of physics and astronomy, and a course in astronomy was introduced.

The move of the Academical Department to the Mechanics Institute building provided the Department of Physics with additional space. New texts, Thompson's *Electricity and Magnetism* and Gillet and Rolfe's *Natural Philosophy*, were introduced.

In 1883 an advanced course on the wave theory of light was introduced, as was a laboratory course for seniors in the determination of physical constants.

In 1884 the University of Louisiana became the Tulane University of Louisiana. The Academical Department was soon named Tulane College.² The annual Catalogue for 1884-5 contains eight pages of description of the physics courses and available apparatus. Curricular changes accompanied the new name, and physics was made a requirement in three curricula: three years in the mathematical program, two in the natural science program, and two in the mechanical (engineering) program. Three basic physics courses were offered for undergraduates. The junior mathematical and mechanical students met for three hours of class work and six hours of laboratory per week, while the seniors studied electricity and magnetism three hours a week, with six hours of laboratory in work in optics and electrical and magnetic measurements. The natural science students had four hours of laboratory. In 1888 the mechanical course was renamed the engineering curriculum, forming the basis for the College of Technology, eventually to become the School of Engineering. A mechanical shop, with shop assistant, was available in 1888-9.

In this period the catalogue declared that the physics lecture room and laboratory were “supplied with electric current for arc and incandescent lights and for electric meters.” Thermodynamics was listed as a senior course in 1890-91. To meet the increased load an additional instructor was employed, that being William von Phul in 1890 and Douglas Smith Anderson in 1892. Anderson had received the M.A. degree from the physics department and would become Dean of the School of Engineering.

Tulane University began relocating to its present uptown location with the dedication of the Arts and Sciences building, now Gibson Hall, in 1894. Brown Ayers was given the responsibility of designing and planning a new physics building, which was completed in 1895. It was occupied by Physics for over 75 years and is now (2009) the F. Edward Hebert Building, housing history and other functions.³ The building was oriented along the cardinal directions and had other special features, including little or no iron in its construction (for magnetic reasons), slate slabs for instruments, and piers for instruments that were isolated from the framework of the building. At the time of its construction, it was the only laboratory in the South built exclusively for physics.

Ayers became Dean of the College of Technology and Professor of Physics and Electrical Engineering in 1894 and continued as Professor of Physics and Astronomy in the College of Arts and Sciences. He was Dean of the Graduate School in 1900-04, Dean of the Academic Colleges 1901-04, and left in 1904 to become President of the University of Tennessee.

At the turn of the century, the physics major program consisted of 22 semester hours of physics in both the B.S. and B.A. programs. Twelve semester hours of physics were required in other degree programs. The introductory physics courses were offered in the sophomore year, with advanced courses in the last two years. A full program of graduate courses was offered by Ayers, Anderson, and James Adair Lyon of Newcomb College. Lyon came to Newcomb in 1900, and served for 41 years as professor of physics and head of the Newcomb College Physics Department. He continued for almost twenty years as Professor of Astronomy in the extension division of the university, retiring at age 86. He was chosen the first W.R. Irby Professor of Physics in

1938. During this period the departments of physics in the College of Arts and Sciences and Newcomb College were separate, but the programs merged at the graduate level.⁴

After Douglas Smith Anderson left the department in 1900, Arthur Whitmore Smith was appointed instructor in physics for 1900-01, and he in turn was replaced by George Howe in 1901-02. The course load was 7 undergraduate courses and 3 graduate (for the year), and shortly reduced to six and one.

According to Karlem Riess, there was little progress from 1905 to 1920. Samuel Jackson Barnett, a Cornell Ph.D., became professor of physics and head of the department in 1905. Again according to Riess, Barnett was “a good research man, but not a teacher or administrator, with the result that the affairs of the department were handled in a somewhat chaotic fashion. “ Reportedly the registrar had difficulty getting grades from him and local merchants frequently lodged complaints for non-payment of bills for materials furnished the department. On the other hand, in 1909 Barnett commenced a study of what is now known as the relativistic *Barnett effect* (related to the Einstein-de Haas effect), which is magnetization by rotation. Barnett published this result in 1915 and a related result in 1935⁵ and was the author of at least one textbook, *Elements of Electromagnetic Theory*, published in 1903 when he was at Stanford. He left Tulane shortly for Ohio State and finally ended up at UCLA (and Cal Tech), where he taught from 1926 to 1944. His *Elements of Electromagnetic Theory* is currently in print as historic text, and has been digitized by Google.

Professor Dinwiddie was teaching astronomy at Tulane in 1910 when Halley’s Comet returned, according to the *New Orleans Daily Picayune*.

J. Harry Clo Succeeded Barnett in 1911, serving until 1920. His principal accomplishment was the establishment of a radio-telegraphy school in the department during WWI. Daniel Stanley Elliott, a graduate of Johns Hopkins (and the namesake of the Daniel Stanley Elliott award for undergraduates), was appointed professor of physics and head of the department in 1920, in the aftermath of the war. According to Karlem Riess, Elliott was not strongly research oriented, recognized Tulane's limitations, and emphasized teaching as Tulane's core value. One of his accomplishments during the early years of the Elliott administration was the establishment of an amateur radio station (1922-3), with call letters WAAC. Instrumental in this endeavor were Joseph Chandler Morris and William Pendleton Lehde . Morris was then an instructor, and Lehde a lecturer on radio design. This was the first collegiate radio station in the U.S.

Elliott, assisted by Walter C. Bosch and E. Scot Barr, strengthened the undergraduate program by introducing courses in "modern" physics. In July 1943, Tulane was one of the U.S. universities awarded a Navy V-12 program. The entire teaching program of the College of Arts and Sciences was revamped to meet the specifications of the Navy program, in which physics was a required course. Additional staff members were added to the department, including Karlem ("Ducky") Riess. Professor Riess had enrolled at Tulane in 1933 and after receiving his Ph.D. from Brown in 1943 (Dissertation "Electromagnetic Waves in a Bent Pipe of Rectangular Cross-Section"), and following a stint at Fortier High School, he joined Tulane as an assistant professor. He would retire in 1983 but continue to work in the dean of students office where he had advised the Greek system since 1949, almost until his death in 2005 while evacuating Hurricane Katrina. Members of other university departments (classics,

geology, and philosophy) were given special training in physics so that they could be used as laboratory instructors.

In 1938 the astronomer William Henry Pickering, who had retired from Harvard College Observatory in 1924, and had been living in Mandeville, Jamaica, died. His granddaughter, Margaret Pickering Zemurly, who had married into United Fruit Company, gave the reflecting telescope which he had used in Jamaica to the university. Plans were made to build a small observatory around it, with the help of the noted telescope builder Russell Porter. The observatory was built in 1941 and dedicated to Thomas Cunningham at the request of a donor. Cunningham Observatory was the seat of Tulane's astronomy program for 60 years, when it was finally torn down in favor of a business school expansion. The Physics Department would take over the teaching of astronomy in 1972.

Upon the death of Elliott in 1944, professors Bosch and Barr were appointed acting heads of the department. J.C. Morris, a Tulane physics graduate (see above) and Princeton Ph.D., joined the Newcomb faculty as a visiting professor in 1939. During WWII he was on leave much of the time working in the federal government. He was appointed department head in 1945 and held that position until June 1960. There was a shift in emphasis during the Morris administration to increased research by staff and students, which eventually led to a growing number of research contracts and grants. A notable innovation was the introduction of a course in biophysics by Dr. Riess in 1945 for pre-medical students, and in 1946 a special Biophysics Committee, with Joseph Morris as chair, was established to develop a research program in the field, and such a program was established in 1947, with private funding. Robert Nieset, whose Ph.D. was from the

University of Michigan, was appointed director. The program was a joint effort of the College of Arts and Sciences, Newcomb College, the School of Medicine, and the Graduate School of Medicine. The first Army contract was for the construction of a mass spectrometer for radioactive tracer studies. The research staff of the biophysics program worked closely with the hospitals of New Orleans in setting up radioisotope laboratories.

The biophysics program expanded to include photomechanical and photochemical, radiation and radioactivity, electron microscopy, and blood and circulation studies. Electronics and microwave laboratories were added. Eventually the biophysics program spun off from the physics department as the Radiation Laboratory, which finally closed in the late 1960s. From the outset, the biophysics program was housed in the old university refectory (old Bruff Commons), which housed Tulane College and now is home to the Newcomb-Tulane Undergraduate College.

The Morris years also saw the establishment of an amateur television station in 1946-7. Dr. Morris became a university vice-president in 1948 while remaining as head of the physics department, relinquishing that post in 1960 when Robert Nieset became head, serving for two years. Joseph J. Kyame, who received his Ph.D. from MIT in 1948, joined the faculty in that same year. Professor Kyame would become known for his rigorous teaching of mathematical physics until his retirement in 1990. Charles Leroy Peacock (Ph.D., 1949, Indiana) was the first experimental nuclear physicist hired, in 1949, as the department began to make nuclear physics one of its strengths, and would serve as head of the department from 1962 until 1969. Karlem Riess records a total of 37 faculty members who served the department between 1850 and 1958.⁶ The remaining faculty in 1958 were Bosch (until 1959), Maerker (until 1959), Nieset (until 1962),

John Shewell (until 1960), along with Peacock, Riess, Kyame, and Dorothy Daspit, M.S. in meteorology, the only female member of the faculty until Ulrike Diebold was hired in 1993.

The first female member of the department (a Newcomb appointment) was apparently Jennie Abney Gore, from 1919 to 1922, and Rose Mooney served from 1926 to 1952, serving as Newcomb head from 1941-52. She left Tulane for the National Bureau of Standards, married John Slater in 1954, and was a researcher at MIT, where Slater was, from 1956. When Slater left MIT for Florida, she joined him there. He died in 1976, and she died in 1981 at the age of 79. According to Mohr and Gordon's history of Tulane,⁷ Prof. Mooney had been one of the highest-ranking female members of the Manhattan project as associate director of the x-ray structure section of Metallurgical Laboratory at the U. of Chicago, where she had gotten her Ph.D. in 1932.. She had been a Newcomb undergraduate as well.

In 1954 Tulane became one of the founding members of the Institute for Defense Analysis, organized by MIT president James Killian. Vice-President and Physics head Joe Morris served as Tulane's first representative to the IDA. In the discussion of the 1950s debates over communist influence at Tulane and other universities, Mohr and Gordon quote both Prof. Morris and astronomer and former mathematician J.Frazer Thompson. The latter taught astronomy, as an independent department, from at least 1953 until 1972.

Modern Era, 1960-2005

At the dawn of the “modern era,” then, the department had a teaching staff of seven. The shock of Sputnik I in October 1957 shook the country out of its post-WWII doldrums, with the result that federal funding for the sciences began to grow rapidly, and many Ph.D. programs in physics were initiated around the country; Tulane was no exception. Under Robert Nieset there was increased emphasis on research, and soon a Ph.D. degree program in physics was added as the direction of the department shifted toward experimental nuclear and solid state physics. In this post-Sputnik era, with the prospect of rapidly rising federal funding of science, the department, with the new Ph.D. program, would hire 10 faculty in the 9 years beginning in 1958, including three in 1960. The first doctorates awarded were to Lionel Dureau, Daniel Veith, and William Barnard, in August 1963, and by 1967, nine Ph.D.s had been given. Prof. Peacock was named acting head in 1962 and became permanent chair the following year, serving in that capacity until 1969.

Beginning in the 1960s the department admitted career U.S. Army officers into the M.S. and Ph.D. programs. These students formed a significant part of the graduate enrollment into the early 1970s. Many of these students joined the research program in experimental nuclear physics, which centered on a 3 MeV van de Graaff accelerator which was installed on Tulane’s Riverside Campus in 1967, purchased with funds from the Stern Foundation and the National Science Foundation, and supported for a number of years by NSF. In the 1960s, the department had two machinists and one additional technical staff member, and the Newcomb and A&S departments, which were still housed separately, each had a secretary (Jane Dunn and Virginia Austin).

Among the dozen additions to the faculty in 1958-67, five each were hired into the solid-state and nuclear physics programs. The new faculty were John Robert Shewell (Ph.D., Rice), who came in 1958 and stayed for two years, Robert H. Morriss (Ph.D., Rice, 1959), who joined the Newcomb faculty in 1959; and Frank E. Durham, (Ph.D., Rice, 1960), David Restor, (Ph.D. Rice, 1960), and Ron Laing--who left in 1966—all of whom were hired into the College of Arts and Science. Restor departed Tulane for industry after two years. Ray Wilenzick (Ph.D., Duke, 1962), joined the nuclear group in 1961; Ronald J. Deck (Ph.D. LSU, 1961), was hired by A&S in 1963 as a low temperature physicist but was housed at Newcomb; Salvatore Buccino (Ph.D., Duke, 1963), also a nuclear experimentalist, came to the department from Argonne as a member of the faculty in 1965; Robert D. Purrington (Ph.D., Texas A&M, 1966) was hired in 1966 as a theorist in quantum scattering (and the history of science); and Allen Hermann (Ph.D., Texas A&M, 1965) joined the department in 1967 as a condensed matter experimentalist. With the hiring of Hermann, the number of faculty stood at 10, including Ms. Daspit.

Profs. Durham, Wilenzick, and Buccino, along with Charles Peacock, were the principal investigators on the NSF grant which funded the Nuclear Lab with its van de Graaff accelerator for the better part of a decade. Dan Purrington later joined the grant. During this period, and up through about 1990, the teaching faculty fluctuated around 10 people (e.g., 10 in 1967, 11 in 1978, 11-1/2 in 1989)

The physics department moved into the newly built Percival Stern Hall (after initially being excluded from the building which had been intended primarily for physics) in 1971, and in 1972 it assumed responsibility for the astronomy program, which had

previously been independent, and staffed by Joseph Frazer (Tommy) Thompson. Prof. Purrington would carry most of the astronomy load for nearly the next 40 years.

Professor Robert Morriss, who had been Newcomb Head, succeeded Charles Peacock as departmental chairman in 1969, a position he held until 1974, when Frank Durham took the post, also holding it for 5 years.

There were no additions to the faculty for nearly a decade between 1967 and 1976, the year Alan Goodman, nuclear theorist with a Ph.D. from Berkeley in nuclear engineering (1969) was hired, and there was a net loss of three faculty positions as Hermann and Wilenzick left, and Peacock and Daspiet retired. Herman left for the Solar Energy Research Institute in 1975, eventually teaching at the U. of Arkansas and at Boulder. He would become a pioneer in low-temperature superconductivity.

In short order two more theorists joined the faculty: John Perdew in 1977 (Ph.D. in 1971 from Cornell) in condensed matter, and George Rosensteel in 1978 (Ph.D. Toronto, 1976), in nuclear theory. Prof. Perdew would become a world leader in density functional theory and be mentioned in the Nobel lecture of Walter Kohn. In most or all of these hires, the department was searching for an experimentalist, but failed because the university did not offer adequate start-up funds. All three were supported by NSF funding for most of their careers and founded the Tulane Theory Group, which included some theoretical chemists as well. In 1978, the department had six theorists (four of them active) and five experimentalists on the faculty.

When the experimental nuclear lab shut down in 1974, Profs. Buccino and Durham continued their experiments at Florida State and Lawrence Berkeley lab, collaborating with one of Tulane's former undergraduates, Dr. Sam Tabor. A total of 17

Ph.D.s were awarded to students who did their research at the Riverside nuclear laboratory. After a year's training in medical radiation physics in Houston Ray Wilenzick left the university for Ochsner Foundation Hospital in 1974.

Into the 1970s, the computing facilities used by members of the department centered on an IBM 7044 mainframe with punched-card input. In 1975-6 the van de Graaff accelerator was sold and the funds were used to purchase an Interdata 7-16 minicomputer for interactive computing and graphics in the department. Soon "time-sharing" or distributed computing was introduced on campus, based on DEC-20 machines, greatly benefiting the department.

In the mid-70s, the department admitted more than a dozen graduate students from Saudi Arabia, Libya, and Iran. Their undergraduate preparation turned out to be inadequate in most cases, and only one student managed to finish the Ph.D., Mr. Mubarek, who did his research with Prof. Mel Levy in chemistry.

Dan Purrington assumed the chairmanship in 1979, serving for two three-year terms. During that time the next addition to the department was in a position shared with mathematics and filled by Frank Tipler (Ph.D. Maryland, 1976), who was hired as a mathematical physicist in theoretical general relativity and cosmology in 1981. Finally, in 1985, Wayne Reed (Ph.D. Clarkson, 1984) was hired as an experimental biophysicist/polymer physicist, breaking the string of four consecutive hires in theoretical physics during nearly a decade (bringing the faculty size to 11-1/2 after Karlem Riess retired in 1983). He was thus the first addition in experimental physics since Allen Hermann nearly 20 years before. George Rosensteel became chair in that same year (1985) and served until 1991. The hires of the mid-70s to the mid-80s dramatically

enhanced the research activity of the department as well as overall external funding, and the additions of the 90s would accelerate that trend.

After five years without additions or losses (so that Wayne Reed was the only hire between 1978 and 1988, other than Frank Tipler), the composition of the faculty underwent great changes in the 1990s as eight new faculty were hired and there were six retirements, the first being Joe Kyame in 1990.⁸ Of this number, however, three experimentalists hired in that period, Toon Cheam, Mark Millonas, and Jeff Gardner (see below) did not stay long enough to gain tenure, reflecting, perhaps, the difficulty of developing a vigorous experimental program with a limited infrastructure and modest start-up funds. In the early 1990s the department hired a condensed matter theorist, James McLaren (Ph.D. Imperial College, 1986), in 1990, followed by two senior hires (at the full professor level), the first in the recent history of the department: James McGuire (Ph.D., Northeastern, 1969), a quantum theorist, to the Murchison Mallory Chair in Physics in 1991, probably the first endowed chair in the department in over a half-century, and David Ederer (Ph.D., Cornell, 1963), who had retired from doing x-ray studies of surfaces at NIST, the following year. John Perdew served as chairman between 1991 and 1994.

Cheam (Ph.D., Michigan, 1982), an experimentalist with interests in Raman spectroscopy, joined the faculty in 1988, but left after three years, allowing Ulrike Diebold (Ph.D., 1990, Technical University of Vienna) to be hired as an experimental surface physicist in 1993. Dr. Diebold would eventually occupy the first Yahoo! Founder's Chair in Science and Engineering. With this addition, and Ron Deck's

retirement, the staffing level of the department peaked at 12-1/2 in 1993 (of whom six were experimentalists).

Shortly thereafter, in 1997, Jeff Gardner (Ph.D., Duke, 1993) was hired as an experimentalist in the area of laser-trapping atomic physics, and Mark Millonas (Ph.D., Texas, 1992) joined the faculty as an experimental biophysicist the following year. As mentioned earlier, neither Millonas or Gardner would stay long at Tulane, and several retirements came in the same time period, including Kyame in 1990 and Deck in 1993. Morriss, Durham, and Buccino all retired in 1996. Only Prof. Purrington remained from the faculty of the 1960s, and only two others, Rosensteel and Perdew, survived from the 1970s. ⁹

In 1994 Dave Ederer became chairman and served in that capacity until 1997, when Wayne Reed took over the position. In the latter year James Maclaren succeeded Reed as chair, but after one year became associate provost of the university and John Perdew returned to the chairmanship for the remainder of Maclaren's three-year term, 2001-2003. Professor Ederer would retire in 2001.

As the university entered the new millennium, a new faculty member would be added in each of the years 2001-2003: Fred Wiedtfelt (Ph.D., Berkeley, 1994), who came from NIST where he worked in cold neutron experimental physics; Ziquiang Mao (Ph.D., University of Science and Technology of China, 1992), as a low-temperature condensed matter experimentalist; and Lev Kaplan (Ph.D., Harvard, 1996), a theorist with interests in quantum chaos. The faculty count was now up to 10-1/2, though Alan Goodman would soon retire, in 2004. Jim McGuire assumed the chairmanship of the

department in 2003 and would serve into 2010, as the longest-serving chair since Charles Peacock in the 50s and 60s.

In 2001 the Cunningham Observatory was razed to build an annex to the business school and a new observing facility for astronomy was constructed on the roof of Joseph Merrick Jones Hall, housing a modern computer-controlled 16-inch telescope, thanks to the efforts of Prof. Purrington.

Post Katrina, 2005-present

Undoubtedly the singular event in the history of the department was the devastating blow that Hurricane Katrina delivered to the city and the university on Aug. 29, 2005, one day after a physics department retreat. Labs and offices were inaccessible for two months, faculty and students were scattered, and classes suspended for the fall semester.¹⁰ The university suffered over \$600 million in losses, insured and uninsured, raising questions about ongoing support for programs all across the university. Although research programs were interrupted and displaced, the biggest change wrought by the storm was the discontinuation of most of the engineering programs, leaving only chemical and biomedical programs. The relevance to the science departments was that these engineering programs had to go somewhere, almost literally forcing the creation of a school of science and engineering, hence a separation of the sciences from the arts, humanities, and social sciences, a difficult and traumatic for a liberal arts university like Tulane. The first Dean of the new school was former engineering dean Nick Altiero.

By 2008-9, the university had largely recovered from the effects of Katrina, and the same was true of the department. No faculty were lost in physics, no departmental programs were cancelled, and after a poor recruiting year following the storm, university applications surged and enrollments recovered. Part of the recovery plan for the university was a strategic plan for the School of Science and Engineering (SSE), which was likely to determine the shape and focus of the department for years to come. Indeed, in early 2009 the decision was made to change the name of the department to the Department of Physics and Engineering Physics, reflecting the responsibility for engineering education assumed by the department. This consisted of both an engineering physics major and a proposed 3+2 program in physics and engineering. The Strategic Plan also intensified the focus of the department's mission on materials and surface physics. Jim McGuire led the department through the post-Katrina period and its wrenching transitions.

The first faculty member added post-Katrina was Norman Horowitz, in 2007, who was hired as a *professor of the practice* to create design courses for the various engineering programs, and Dae Ho Kim (Ph.D, 2003, Seoul National University) joined the faculty the following year as a thin film, nanostructure experimentalist. At this point the department now had 10-1/2 full-time tenure-track faculty, plus Dean Maclaren (now dean of the undergraduate college), three professors of the practice, four adjuncts, and four research assistant professors. In 2007 the Tulane Center for Polymer Reaction and Monitoring Characterization (PolyRMC) was founded under the direction of Prof. Reed.

The department began the new millennium with new responsibilities and new opportunities. The introduction of an engineering physics major, which will require

additional faculty and staff, is expected to swell enrollment in the traditional curriculum and lead to new course offerings. This program has expanded the departmental horizons, and the strong emphasis on surface and materials science at the graduate level has given the department a critical mass in these areas and provided new opportunities for obtaining university resources and external funding, which had reached \$3 million by 2009.

¹ This recounting of the history of the department through about 1965 is largely extracted from two histories of the department prepared by Prof. Karlem Riess, and in many cases is essentially verbatim.

² In fact it is difficult to maintain the position that Tulane University was founded in 1834. The University of Louisiana became defunct and its resources were turned over to the Administrators of the Paul Tulane Educational Fund.

³ See Karlem Riess's *History* for details on the building.

⁴ Prof. Purrington has a copy of a laboratory manual, titled "Laboratory Manual and Notebook for Elementary Practical Physics," by Mary C. Spenser, M.S., professor of physics, dated 1899.

⁵ *Phys.Rev.* **6** (1915) 239 and *Rev.Mod.Phys.* **7** (1935) 129.

⁶ There have been 25 more since 1958.

⁷ C.L. Mohr and J.E. Gordon, 2001. *Tulane: The Emergence of a Modern University, 1945-1980*.

⁸ He would die on 27 February 2009.

⁹ These retirements left the department at a staffing level of 9-1/2 in 2000.

¹⁰ Although a late-spring "Lagniappe" session was added