

2. Beginnings of the Department

Natural Philosophy and Physics (1872-ca1908)

During the very early years physics and astronomy frequently were listed under the heading of natural philosophy. Physics was just being recognized as a separate discipline in the 1800's. It was in the late 1880's, for example, that the first building in the United States specifically designated for "physics" was constructed at Harvard. The *Physical Review*, the first major physics journal in the U. S., began publishing in 1893.

"Physics" was listed as a course to be taken in the third year of engineering in the 1873-74 catalog and "molar" physics was listed as a course in chemistry in the 1878-79 catalog. A course in "chemical physics" was listed as a prerequisite to organic chemistry also in 1878.

William J. Waggener (See pages 2-3) of the first graduating class in 1876 states that "there was no regular apparatus for physics until the fifth year (ca 1875)." (*Arkansas Alumnus*, Feb. 1933). He points out in one of his letters that the freshman class of 1872-73 studied physics, but "of course without apparatus." Continuing, when F. L. Harvey came to the University in 1875 he taught chemistry and physics and obtained some supplies and equipment for chemistry and "some physical equipment." "He secured an air pump and its accessories, a Holtz electrostatic machine, and a galvanic battery."

A precise and succinct description of the early instruction in physics was presented in the excellent book *History of the University of Arkansas* by Reynolds and Thomas (1910) and we quote edited selected sections from it here.

"The first definite information we have concerning instruction in physics is in 1878-79, when J. B. Gordon was professor of civil and mechanical engineering and mathematics. Under the "Departments of Instruction" we are informed that "natural philosophy" embraces "physics, mechanics and astronomy, and is postponed to the senior year in order that the student may have the light of the higher mathematics in investigating some of the problems

presented". This "higher mathematics" was algebra! The class recited three times a week throughout the year. Previous to this year "natural philosophy" had been required for freshmen for two terms.

"The following year the department of natural science and chemistry, in charge of Professor F. L. Harvey, was strengthened by the addition of Adjunct Professor C. P. Conrad. For that year physics is not mentioned in the description of courses, though "natural philosophy" is still included in the brief outline of courses leading to degrees and evidently was taught by Professor Conrad. A year later the course in "natural philosophy" reappears, divided into physics and astronomy. Freshmen studied elementary physics the last two terms, seniors advanced physics throughout the year, all under Professor Conrad. This arrangement, with certain modifications to be indicated, lasted until 1885.

"When Adjunct Professor C. P. Conrad of Chemistry and Physics, recently from the University of Virginia, joined the university, he tried to "secure a high degree of excellence" somewhat too unrealistically and too rapidly in the 1880's. "The (physics) department had practically no apparatus for experimental work in physics." Professor Conrad resorted completely to the lecture method and is reported to have demanded a very high level of performance. "The first year of his incumbency in the chair of physics a senior failed, apparently an unusual thing." There were complaints and it seems that about all that he accomplished was to dramatically reduce the size of the graduating class and ultimately the amount of physics that was required. The B. L. degree was also introduced at this time for students who were not "fit for the A. B."

Some of these problems involving Professor Conrad and the faculty and the students and the University president became so intense and divisive that the retiring president, General Daniel Harvey Hill, in his annual report to the board in

1884, discussed the whole University situation. He declared that the falling off in attendance and the internal troubles had their origin in two principles imported from the University of Virginia, namely (1) an exceedingly high standard of scholarship required for graduation and (2) a total indifference on the part of the professors as to the conduct of students outside the classroom. Both Professor Conrad and President Hill were forceful and determined and this conflict was most unfortunate, even if some of the ideas about academic standards may have been justified.

"Professor Conrad was asked to modify the course in physics and astronomy "so as to accord with the capacity and advancement of the students in those branches." After consulting with a special committee of the board Professor Conrad substituted "simpler, easier, text-books wherever attainable" and cut down his examinations one-half, though he still "leaned to the side of the higher standard."

Quoting again from Reference 1, page 252: "Upon the reorganization of the faculty and the courses of study in 1885 physics was relegated to freshmen in all courses with additional work for sophomores in the English and general science courses. It was taught by J. M. Whitham, professor of applied mathematics and commandant of cadets, who held this position two years. Physics was then transferred to the department of biology and geology, in charge of Professor F. W. Simonds, but at the end of the year was handed over to the department of mechanic arts and engineering, in charge of Professor Whitham and Adjunct Professor W. E. Anderson.

"Some laboratory work was introduced by Professor Whitham, consisting in "the manufacture of new apparatus, repairing apparatus, the deduction of laws, and the testing of principles taught.

"Note books were required. Olmstead, Ganot, Thompson (Electricity), and Larden (Heat) were the authors used. The courses on heat and electricity were for engineering students. The total amount, including laboratory work, does not seem to have exceeded eight or nine hours previous to 1902, when it was raised to ten, all taught by Associate Professor Rose.

"Then another change was made, this time

for an alliance with chemistry, then taught by Professor A. E. Menke and Adjunct Professor W. B. Bentley. This alliance was continued until 1904, when physics was transferred to the department of electrical engineering and taught by Professor W. N. Gladson and Instructor H. Schapper. The character of the work was changed slightly to make it bear more upon electrical engineering. At the end of another year the amount reached thirteen and one-half hours, all now taught by Adjunct Professor Schapper, except a part of the course in general physics.

The following was adopted in the University's Board of Trustees meeting on July 15, 1904: "Resolved, That Physics, in the Department of Chemistry and Physics be transferred to the Department of Electrical Engineering and that the latter be known as the Department of Electrical Engineering and Physics and the former as the Department of Chemistry."

In another reference to the electrical engineering offerings, one finds the statement that "as far back as 1886 a little "electricity" was taught, probably as part of physics". While physics was still being taught in chemistry in 1902, an elements of electricity and magnetism course was being taught by Professor Rose." The course is necessary for electrical engineering students and for specialists in physics." (1902-03 Catalog, p. 77)

Then when physics moved into the electrical engineering department in 1904 the course in electricity placed more emphasis on theory. It had higher mathematics requirements, including a course in vector analysis taught under the auspices of physics. The course now included a treatment of Maxwell's equations. (1904-05 Catalog, p. 127)

Thus one notes that the early physics courses at Arkansas were taught by civil engineers, mechanical engineers, electrical engineers, chemists, biologists, mathematicians, geologists etc. with engineering and chemistry teachers predominating.

The instruction of physics was to be strongly influenced by engineering and chemistry in the first few decades of the university, or until about 1907 when it was finally organized as a separate department.

It will be noted that from 1872 to 1908 physics was taught approximately twenty years by teachers with chemistry as their main field and approximately nine years by teachers with engineering as their main field. The alliance with chemistry was kept up until 1904 -1905 when chemistry moved into its own separate building.

The principal teachers of physics who had chemistry as their main field were Professor C. P. Conrad (1878-1885) already mentioned above and Albert Ernest Menke (1890-1904). He was listed as "Superintendent of Agriculture, Professor of Chemistry and Physics" in 1895. "He served at the University for fifteen years and did much to upgrade the university's standing in terms of science teaching plus research and public relations within the state."

The principal teachers of physics who had engineering as their main field were J. B. Gordon, J. M. Whitham, W. N. Gladson and Heinrich Schapper. Physics was in electrical engineering under Heinrich Schapper (1904-1907) after Menke resigned.

A list of at least twelve names of teaching staff who taught physics as part of their load



Giles E. Ripley, dean of students and first full-time professor of physics and department head 1908-1940.

between 1878 and 1908 can be identified and are listed in Appendix II.

Becomes Separate Department in 1907

"In 1907 for the first time physics was advanced to the dignity of a separate department, in charge of Associate Professor H. Schapper. Thus Professor Schapper was the first head of physics even though it was for only one year and he was responsible to electrical engineering. Then Professor G. E. Ripley, took charge in 1908 The number enrolled in the department for 1908-09 was 149.

"By 1907 a preparatory course of three hours was required. Besides two courses in general physics there were courses in measurements, theoretical electricity, the kinetic theory of gases, thermo-dynamics, heat, light, mathematical

COURSE FOR THE DEGREE OF B. S. IN PHYSICS.*

FRESHMAN YEAR	Hrs. per week	SOPHOMORE YEAR	Hrs. per week
Mathematics 1c, 2c.....	6	Mathematics 4a, 4b.....	5
Physics 1.....	3	Physics 2, 2a, 3.....	5
Chemistry 1.....	3	Chemistry 2, 3, 5.....	5
English 1.....	3	French 1.....	3
German 1.....	3		
JUNIOR YEAR	Hrs. per week	SENIOR YEAR	Hrs. per week
Mathematics 6b, 9a, b, 16.....	7	Mathematics 18.....	3
Physics 4, 5, 10.....	4	Physics 6, 7, 8, 11.....	10
Chemistry 8.....	1½	Chemistry 12.....	1½
E. E. 5, 12.....	3½	E. E. 6, 8.....	3½
C. E. 1.....	1	Thesis.....	
Scientific German and French...	1	Journal Meeting.....	
Journal Meeting.....			

* This course began in September, 1908; only the first two years can be offered at present.

This curriculum for a B.S. degree in physics appeared in the 1907

physics, and elementary acoustics, and a journal meeting for advanced students. The total of all except the last and the sub freshmen course was twenty-one hours, not all of which was given in one year."

The course for the degree of B. S. in physics was displayed in the 1907 catalog. It is interesting to look at the list of the titles of the physics courses required.

Physics 1 and 2 are listed as General Physics and apparently have high school physics or a two semester Elementary Physics course as a prerequisite.

Physics 1 was required of all engineering students and physics 2 was required of electrical engineering students. The first course included recitation work and laboratory work. The second course states that there will be special emphasis on mechanics, heat and electricity. Physics 2a was four hours of laboratory work to be taken concurrently with General Physics.

Experimental Physics 3 met three hours per week in class work and two hours a week in the laboratory. It "will include many demonstrations, experiments and problems with a systematic development of the important laws and principles of the subject and the application of the same to our everyday life. This course is offered for those students who desire to acquire some knowledge of the important principles of physics but do not care to go further in the subject. This course is open to any student of college grade who has had college algebra and geometry."

The remaining required physics courses were Mechanics (4), Heat (5), Electrical Measurements (6), Light (7), Mathematical Physics (8), Acoustics (10), The Teaching of Physics (11), and Journal Meeting (12). The detailed description of these courses are fairly standard.

A few words in the description of the course in Light (7) were interesting. "The class work will deal largely with the modern theory of light and a discussion of the recent discoveries in this field. There will be some work in spectroscopy. The laboratory work will include use and study of the photometer, optical bench, interferometer, optical pyrometer, etc. Courses 6 and 7 may be taken by students expecting to study medi-

cine, but must be preceded by course 1."

It is also interesting to note that the required mathematics courses for a B. A. physics degree included Algebra and Solid Geometry (1c), Trigonometry and Analytical Geometry (2c), a sophomore course in Trigonometry and Analytical Geometry (4a) and a sophomore course in Differential and Integral Calculus (4b), a junior-level course in Algebra and Calculus, also required of junior engineers (6b), Differential Equations using Murray's book (9a), Descriptive Astronomy (16), and Partial Differential Equations (18).

Two of the principal mathematics teachers were A. M. Harding and George W. Droke. Harding was to co-author a textbook on analytical geometry used by the author when he was a student at William Jewell College and Harding was to become University President. Droke was to become dean of arts and sciences and be honored several decades later by his grandson and his wife. They established the Droke observatory named in his honor.

"Under Professor Ripley the work has been slightly rearranged by giving more attention to general physics and the introduction of a teachers' course intended for those who intend to teach physics in secondary schools. Owing to the inadequacy of the teaching force only three courses, amounting to ten hours, can now be given, though more advanced work is called for by students."

Thus when Professor Giles E. Ripley was employed in 1908, he became the first full-time teacher of physics. He served as head of physics from 1908 to 1940 and dean of men from 1923 to 1937.

Early Astronomy

Astronomy was taught even from the very beginning of the University and was also a part of the Preparatory School offering. Professor G. W. Droke, after whom the observatory is named, was an early teacher of mathematics and astronomy. The 1906-07 University catalog lists only Professor George W. Droke and one associate professor in the mathematics and astronomy department.

Professor Droke taught astronomy from Moulton's Introduction to Astronomy and a

Practical Astronomy course using the sextant etc. and Spherical Trigonometry! He taught both in the preparatory school and in the College of Arts and Sciences. He was to serve as dean of the College of Arts and Sciences from 1915 to 1925. He was honored approximately seventy years later when his grandson, James W. Droke and his wife Kaye Barrett Droke provided a beautiful mountain-top observatory southeast of Fayetteville to be named in Professor Droke's honor.

Thus the astronomy course was listed in the department of mathematics and astronomy for many years. Two other professors of mathematics performed notable service to astronomy in the early years. They were A. M. Harding and Davis P. Richardson

Mathematician and University President A. M. Harding gave public lectures on astronomy all over the State of Arkansas and in other States. He frequently carried a 6-inch refracting telescope with him on the train or in his automobile to use in his lectures.

It was Davis P. Richardson who obtained the Spitz A-1 Planetarium in 1954. He was chairman of a committee consisting of B. H. Gundlach, also of mathematics, and Paul C. Sharrah of physics, who presented the proposal to the University administration recommending the purchase of a planetarium.

Professor Richardson and Professor B. H. Gundlach were the primary planetarium demonstrators from 1954 until 1957 when Paul C. Sharrah and several of the graduate assistants in physics began to make use of the planetarium from time to time with the physics laboratories. It was moved to the physics building in 1972 and was used effectively until 1992 when the remodeling of the Dickson Street physics building began.

The responsibility for teaching astronomy and the directing of the planetarium was taken over by Paul C. Sharrah in the physics department in 1967. A single popular course entitled "descriptive astronomy" was the only course at that time. By 1969 the enrollment had risen to well over one hundred students each semester in this one-semester course. It served as an elective for many students in various colleges and was used by some departments to satisfy certain

requirements.

A course on elements of celestial navigation and a variable credit-hour course in planetarium operation also became popular. These two courses frequently totaled thirty or forty students each semester. The planetarium programs for the public and the schools became a high light of the period.

The names of the early and part-time teachers of astronomy from the earliest days down almost to the present are listed in the Appendix III.

The first professionally trained astronomer, Carol J. Webb, was employed in 1972, and the second professional astronomer, Claud H. Lacy, was employed in 1980.

Electrical Engineering Provided "Jump Start" for Physics

Recognizing that the early teachers of physics had primary interests in other academic areas and that the preparatory department was a large fraction of the work and that most of the early staff members stayed at the University only a few years, it is no wonder that no physics degree program existed before 1907 and 1908.

From 1904 to 1908 physics was taught in electrical engineering with Professor Wm. N. Gladson and Adjunct Professor Heinrich Schapper.

The 1906-07 catalog listed only five courses plus laboratory in physics and they were taught by adjunct Professor Schapper. Three advanced courses required calculus as a prerequisite. They were a one-semester course in Theoretical Electricity including Maxwell's theory and modern electron theory, a course in Kinetic Theory of Gases and finally Thermodynamics. The (1907) courses on heat and electricity were for engineering students.

Even though there is no detail plan in the 1906-07 Catalog for a physics major, a sentence under the Electrical Engineering and Physics program discussion reads "five courses are offered in physics, and additional work may be arranged for by any student selecting his major in this department." This was a little premature as the first physics major would be graduated from the University in 1928 after a wait of twenty years.

Even though it all seems a little premature as

viewed from the present vantage point, the number of courses offered in physics jumped from the five in 1906-07 to eleven courses, exclusive of elementary laboratories, in the 1907-08 catalog! Physics is listed for the first time as a separate listing with now Associate Professor H. Schapper and three assistants in charge.

The five courses in the 1906-07 catalog involved a total of eight semesters of work or apparently twenty three semester hours excluding elementary laboratories and the eleven courses listed in the 1907-08 catalog involved a total of fourteen semesters of work, or a total of approximately 31 semester hours.

The 1907-08 catalog even goes so far as to lay out the four-year course of study required for the B. S. degree in physics. It included four years of mathematics, four years of chemistry, two years of electrical engineering, one year of civil engineering, one year of German, one year of French, one year of English, journal meeting for two years and thesis for one year, as well as a substantial number of courses in physics every year. A footnote goes on to read "This course begins in September, 1908; only the first two years can be offered at present".

This same course of study for the degree of B. S. in physics is printed in the 1908-09 catalog and in the 1909-10 catalog without change.

One of the early histories makes the following blunt statement about physics! "In 1907 physics, after years of subordination to different departments, was finally separated from its last master, electrical engineering, and given independence." It might be more benevolent to thank those usually overworked professors in all



George L. Harvey
(B.S. 1938)(M.S. 1940)



Howard T. Head
(B.A. 1941)

those other departments, especially chemistry and engineering, for keeping physics alive, even if somewhat subservient to their departmental needs.

Associate Professor Heinrich Schapper, who had been with the university since 1904 serving in electrical engineering, was "in charge" of the newly created department of physics in 1907.

Judging from the timing it would appear that the more complete listing of physics courses in the 1907-08 catalog must have been influenced greatly by Schapper, but it is also possible that Electrical Engineering Professor Wm N. Gladson, who was much interested in physics and x-rays and radio, would certainly have been involved.

"A highly specialized course in science leading to the degree of B. S. in Chemistry was introduced in 1904 and another in 1908 leading to the B. S. in Physics. All the work is prescribed in both cases."

Professor G. E. Ripley took charge in 1908 as



S. R. Parsons



Wesley M. Roberds



X-ray laboratory developed by Roberds and Sharrah

the first full-time head of physics and was to remain head until 1940. He had been graduated from Purdue University with a Master of Science Degree and taught physics and chemistry in high school before coming to the University. He also served as Dean of Men from 1923 to 1937!

The course listings and description of the physics major in the catalogs remained essentially the same after Ripley arrived except that



Lloyd B. Ham, second head of physics, 1940-1957. Portrait ca 1950.

the courses were described a little more fully. New courses on the teaching of physics and mechanics for agriculture students were added.

Even though, with all this planning no majors in physics were being produced, the number enrolled in courses in the physics department in 1908-09 was 149. (Ref. 1-p. 254)

"Physics" did come in for a nice three page

discussion in the excellent 1910 History of the University of Arkansas written by Reynolds and Thomas.

Physics also received a brilliant description and a positive thrust with a five page spread in none other than the Arkansas Engineer of January, 1913! After a nice summary of the nature of progress and even quoting some lines of classical poetry we find this statement about physics:

"PHYSICS"

"And all this (progress) is largely physics. Does it not occur to you if you have only glanced at the above importance of physics. Should not physics demand a place in every course of study, no matter the profession, be it engineer, farmer, lawyer, preacher or doctor?"

And

if we but consider the debt we owe to physics for present

conveniences does it not deserve all it ever asks for?"

A few more numbers for the year 1908, the year a separate physics department was organized, are interesting. Forty-eight males and four females received college degrees from the University of Arkansas that spring commencement. Thirty six were B. A. degrees and 5 were B. S. degrees and engineering totaled 17 and most of these were civil engineers. A large fraction, probably as high as 40%, had come up through the preparatory school.

The Summer Session of the University was inaugurated in 1910.

Colleges

The College of Liberal Arts, Science and Engineering was a single unit until 1912. "Not until this catalog (1912) are the degree candidates listed by colleges: Arts and Sciences (414 students), Engineering (139 students), Agriculture (58 students); total 611.

The 1912-13 catalog continues: "As to present divisions of the University, the College of Agriculture, long known as the School of Agriculture or the Department of Agriculture, appears as a separate division of the University in 1905. Until 1912 the only other division at Fayetteville was the College of Liberal Arts, Sciences and Engineering. In 1912 this was subdivided into a College of Arts and Sciences and a College of Engineering."

Early Teachers and Students (1908-ca1936)

The 1908-09 catalog lists Ripley and an assistant S. H. Rowland. Note that the assistants were actually recognized by having their name listed with the faculty! Professor Ripley's name as head of physics shows in all catalogs up until Dr. L. B. Ham became head in 1940. Other faculty names are listed in the Appendices.

The *University of Arkansas Bulletin* published April 3, 1928, the year the first physics degree was granted here, lists the physics faculty as "Professor Ripley, Associate Professor Parsons, and Mr. Roberds. Wesley M. Roberds joined the physics department in 1927 and returned to the University of Kansas for one semester to complete the work for the Ph.D.. He resigned in 1942 to go to work in industry.

These three names and later Ripley, Dr. Lloyd B. Ham and Roberds continue in the Bulletin until the early 1940's.

It is interesting to review the varied fields of service of these early faculty members.

G. E. Ripley served as Dean of Students and developed and patented several teaching devices.

C. B. Crofutt, Ph.D. University of Iowa, apparently was the first physics teacher with a doctorate in physics.

S. R. Parsons did work on the design and testing of air cooling for aircraft engines during W.W.I.

W. M. Roberds developed numerous pieces of physics demonstration equipment and an x-ray laboratory and took a position with RCA in 1942 and later with the North American Aviation Corporation. It is he who, along with physics student George L. Harvey, designed and built the first remotely controlled score board for the football stadium.

Dr. L. B. Ham came to the Department of Physics from New York University in 1932. His field of specialization was acoustics. He was the fourth physics teacher at the University to hold a doctoral degree in physics, having been graduated from the University of Illinois.

L. B. Ham did developmental work at the National Bureau of Standards during W.W.I on electroplating and frequently served as an acoustical consultant. He also played the pipe organ at one of Fayetteville's churches for several years.

Dr. Ham often told how fine that old frame building was for some of the acoustics work because it was so quiet! He was a charter member of the Acoustical Society of America and was elected a Fellow of the Society. Dr. Ham brought a strong motivation in both teaching and research. He was the second and last

head of the department and held that position from 1940 to 1957. The College of Arts and Sciences decided sometime in the 1950's to replace retiring departmental heads with chairmen (later called chairpersons). They were to serve



Picture taken by F. R. Wintker, ca winter 1931, showing the little studio of radio station KUOA.



Franklin R. Wintker (B.S. 1931) standing at the entrance to radio station KUOA on the University campus. He majored in physics and served "as program man" during his senior year and for a time after graduation. Cadet Colonel Wintker is in his uniform and ROTC was required of all male students well into the 1950's. (Photo courtesy Mr. Wintker)

a three-year term and could succeed themselves. The plan has worked quite well. If someone doesn't want to continue as chairman or if the department wishes a change,



Wintker inside the studio, evidently on an evening when "I was scheduled to play for a dance with Mitchell's orchestra."

it is no big catastrophe as it could be with the departmental head structure.

Except for part-time temporary assistants and instructors and a very large contingency of teachers from other departments during W.W.II, the physics

faculty was to continue to number three or four until the late 1950's. More information on the physics faculty is given in Chapter 9 and in Appendix IV.

Even though many students were exposed to the introductory physics and astronomy courses between 1872 and 1936, only three students had been awarded physics degrees! They were Roy R. Sullivan in 1928, Franklin R. Wintker, Sr. in 1931 and Nicholas M. Smith in 1934. Sullivan went into forestry research after being awarded a Ph.D. from the University of Minnesota and as of summer of 1995 the department still hears from F. R. Wintker, Sr.! He fondly remembers Professors Roberds and Parsons.

It appears that work of Professor Giles E. Ripley as Dean of Men required considerable



Old Main—Physics was there 1875-1893 and again 1936-1952.

time and the other members of the physics department probably took on more and more responsibility for the day to day business of the department. We quote here from Mr. Franklin R. Wintker Jr.'s. (B.S. 1931) letters of December 5, 1994 and summer, 1995. "This is a note of

appreciation to the department for being there when I needed them. I would extend special appreciation to Dr. Parsons (now long deceased) who headed the department and tried his best to make a good student out of me. Also to Dr. Roberds for his special attention in the then new field of x-rays. . .

"My real point in writing is that in due time I left radio announcing for the General Electric X-ray Corporation for a successful career ending in retirement as District Manager of South Central district in 1971.

"Since I was a Cadet Colonel in 1930, and thus was involved with the military, Pearl Harbor found me already on active duty stationed at the Army Medical Center in Washington, DC and, of all things, teaching radiation physics to the officer's classes. . ."

Professor Gupta also received a letter in June, 1995 from George L. Harvey (B.S. 1938, MA 1940), the sixth person to receive a degree in physics. He tells us several interesting things about himself in ex-cerpts printed here and several interesting things about the department and especially about its space in material printed on page 22, Chapter 3.

"My first job after graduating in 1940 was with an x-ray company and while I was debating about what to do in the war effort my dilemma was solved by Harvard University who recruited me to teach in the Officer's Training School. . .while at Harvard I also worked on a secret research project, developing an infra-red ship detector. . . After the war I worked several places but mostly I worked at the Naval Research Laboratory for 15 years and the Sperry Gyroscope Company for 15 years. . ." End of excerpts from the George L. Harvey letter of June, 3, 1995.

Also let us not forget W. J. Waggener, who, at an even earlier time, must have received some inspiration from his teachers at Arkansas, because he went on after being graduated in 1876 to continue his studies in physics and he became a physics teacher at the University of Colorado (See pages 2-3.).

These and several other facts about the early history are included in the Chronological Summary in Appendix I.

Teachers, Physicists (1936-1952)

What was going on in Old Main in the 1930's and 1940's? Teaching, teaching, teaching! Good teaching! And some research in your spare time. Heavy teaching loads, up to 21 credit hours during World War II. This extra load was for extra pay, a 50% increase.

Class attendance was required and classes were scheduled for five and one half days. The Saturday morning classes were finally eliminated in the 1960's, and night classes and the ninety minute Tuesday-Thursday classes came into vogue.

Another strictly followed procedure in those days was the reporting to the Deans and the Registrar of four-week grades and the ten-week grades. This procedure kept both students and professors on their toes. Semester grades were usually reported on time because the pay check was held back until the grades were received in the office of the Registrar!

There was always a shortage of teachers and the graduate program was small so that well qualified senior physics and engineering stu-

dents assisted with the laboratory teaching and demonstrations and in the physics shop. They are well remembered and were a joy to work with!

It was not until the early 1960's that the graduate enrollment increased sufficiently that there were enough graduate assistants to teach all of the elementary laboratories! Most of the faculty called this progress but some of us still remembered those bright, eager and competent undergraduates we had been able to employ. There are some advantages to the undergraduate in being associated with a small school where they will be especially appreciated and utilized.

Several new names showed up on the faculty list along with Ham in the 1940's. These were Clark, Sharrah and later Kellar, Oxford, and Morse. Finally in the late 1940's other names are Camus, Antoine, Harvalik, Schwartz, Sauer, Bennett, Testerman, Raible, and Lingelbach.

The physics department was indeed small, usually only three or four professionals at a time, but there were certainly some memorable people! It is interesting to study the various areas of service and expertise represented by these people.

Harold Clark worked with the cyclotron group at Washington University during WWII and then served with the Xerox Corporation in their early developmental program.

Paul C. Sharrah worked on torpedo depth control systems for the Naval Ordnance Laboratory in Washington, D.C. during WWII and worked on neutron diffraction at the Oak Ridge National Laboratory in Oak Ridge, Tennessee. He was to become the first chairman of physics and see the Ph.D. program in physics start. He was proud to be cited by his alma mater William Jewell College as one of their distinguished alumni.

J. B. Kellar and Charles W. Oxford taught physics when the large army groups were at the University for training in 1944 and 1945. Kellar taught physics at The Spartan School of Aeronautics in Tulsa, Oklahoma, and then became Assistant Registrar at the University.

C. W. Oxford was to serve in the Navy and later receive a Ph.D. in Chemical Engineering. He returned to the University to teach in



H. M. Schwartz



Dr. Ham with Albert Sauer

Class Numerals or Position			Signatures
Faculty		physics	Lloyd B. Ham
Faculty		physics	Paul G. Schuyler
1948	B.S.	physics	Henry Palmer Doty
1949	M.S.	physics	William E. Bowers
1948	B.S.	physics	Robert J. Mauer
1948	B.S.	physics	James J. Billings
1949	B.S.	physics	Eriflton Bobelack
1948	B.S.	E.E.	Madison De Keefau
1948	B.S.	physics	William A. Passarulli, Jr.
1948	M.S.	physics	H. F. Bollinger
			Howard L. Head
Alumnus	M.S.	physics	Robert L. Morse

Copy of signature sheet showing charter members of Sigma Pi Sigma

Chemical Engineering and serve as Associate Dean of Engineering and as University Vice-President.

G. D. Lingelbach worked at Westinghouse in Pittsburgh, Pennsylvania and at the Federal

Power Commission in Washington, D.C. before coming to the University. He also taught H. S. physics for a few years at Springdale, Arkansas, before joining the department.

Dr. Jean Camus came to the department from the University of Paris and after two years went to MIT to work in optics and diffraction grating work with Harrison.

Dr. Z. V. Harvalik was joint with physics and the ARNO project (See Chapter 4) and went on to work in research and development at the U.S. Army Corps of Engineers laboratory in Ft. Belvoir, Virginia.

Dr. H. M. Schwartz was joint with the AEC project in chemistry (See Chapter 4) working for Dr. Raymond Edwards and was most proud of the book on Relativity published first by Macmillan



Professor L. B. Ham had retired to Tucson and visited the Department in 1965. He had initiated the effort to start a chapter of Sigma Pi Sigma in 1948 and is shown here with the 1965 officers, Charles A. Stigers, Darrell W. Collier, and Carl T. Rutledge.

and then by J. B. Krieger.

Dr. Albert Sauer was joint with physics and the AEC project in chemistry (See Chapter 4) and went to work on a nuclear submarine project at Dobbs Ferry, New York.

Dr. Willard Bennett was the discoverer of the plasma pinch effect and he, with Maurice Testerman (See Testerman below), initiated a project to develop a light-weight mass spectrometer called the RF mass spectrometer. It did not use a magnet! He returned to work at the Naval Research Laboratory in Washington, D. C.

Dr. Maurice Testerman was primarily with the IST (See Chapter 4) but materially assisted physics by developing a "modern" electronics course. He directed the RF mass spectrometer project (See Bennett above). He was to organize and direct the productive instrumental sciences department at the Graduate Institute of Technology in Little Rock.

Even though the department was very small and just trying its wings, there were some very interesting faculty members as indicated above and outstanding students to brag about.

It is interesting to remember those early undergraduate and graduate students. Several of them continued with graduate studies here or elsewhere and several went on for the Ph.D. Some served in industry or government laboratories and some became teachers. Several had military service and at least three had a military career. One became a commercial airline pilot

and some went into privately owned businesses. One was awarded the Oersted Medal by the American Association of Physics Teachers for outstanding teaching and another had an outstanding success in heart pacer development. At least one did some important work in the early space program.

There will be more material on students and alumni in Chapter 10.

Sigma Pi Sigma and Sigma Xi Chapters

Marsh W. White of Pennsylvania State University came to officially install a chapter of the Physics Honor Society Sigma Pi Sigma in 1948. There were twelve charter members. Lloyd B. Ham, William E. Bowers, Clifton B. Clark, N. F. Bolling, Paul C. Sharrah, Robert D. Maurer, Macklyn McKeegan, Howard T. Head, Henry P. Hotz, James J. Billings, William O Pasarelli Jr., Robert L. Morse.

The Sigma Xi Club became a chapter in 1949. Paul Sharrah was president of the Sigma Xi Club the last year it was a club and Z. V. Harvalik of the Institute of Science and Technology and the Physics Department, promoted the change from club to chapter status. It was an active club then and has a reputation for being an active chapter now.

A Look Back at the Middle Years (1936-1952)

The record of the department of physics during the sixteen years in Old Main was interesting. We had gone

through a major war. We had learned how to turn out majors and graduate students. Majoring in physics was a little more popular! Veterans returning from WWII would look up the physics office and say that they wanted to major in physics.

We were becoming more involved in research largely at first through the efforts and funding of the Institute of Science and Technology (IST). Some of the IST physicists were strongly motivated in research and had been employed specifically on research projects.

We were now teaching a "modern" vacuum tube electronics course and were developing the theoretical physics courses to include quantum mechanics.

We had established the physics honors society Sigma Pi Sigma and assisted with the establishing of a chapter of the scientific research society Sigma Xi. The department was active in the Arkansas Academy of Science and Dr. L. B. Ham served as secretary and as president of the chapter. One faculty member served on the three-man library committee and one served on the commencement committee.

At an earlier time an x-ray diffraction facility was initiated by Roberds and it was equipped in 1951 with a completely new North American Philips X-ray instrument funded by University funds. A Littrow spectrograph was also obtained using the same funds.

Also earlier, the head of physics, Ripley, served as dean of students. One physics faculty member, Wesley Roberds, built and installed the first remotely controlled scoreboard at the football stadium!

But, most of all, fifty-five degrees were awarded between 1936 and 1952, and twenty-two of these were master's degrees.

Other People During the Middle Years

The University was indeed small in the 1940's. Old Main housed most of the departments of the College of Arts and Sciences; now called Fulbright College.

When the physics head office was on the main floor of the Old Main, it was nice to be able to walk directly across the hall to the Registrar's office with Fred Kerr, down the hall north to the

Business Office with Bunn Bell, George Stubblefield, Jacob Sharp, and Frances Lehman. The business practices were very antiquated but an error could be corrected at once. Now that we have computers one usually has to wait to get something corrected.

We often went upstairs to the typing and mimeograph facility of General Extension where the women and Director Libern L. Hilton worked with the machines, upstairs to the English Department, the Speech Department with Virgil Baker (he owned and flew his own Piper Cub airplane), Sociology and Social Welfare with Mattie Cal Maxsted, to Foreign Languages with Marinoni, Passarelli, McMillan, and Strauss, to the Museum with Sam Dellinger, to the Art Department on the top floor with Ralph Hudson, the office of the Dean of Arts and Science with Hosford and Nichols and to the office of the Graduate Dean with Jordan and later Adkisson. Dr. Dwight Moore of the Botany Department was in the south tower office at the third or fourth floor level for a time.

Professor Walter J. Lemke and the Journalism Department were housed in the north end of the basement in Old Main.

Only History and Political Science and Mathematics and Chemistry and Geology and Philosophy and Psychology were in other buildings.

