Carl Albert
Carl Reistle
J. J. Mathews
J. Rud Nielsen

Distinguished Service Citations

The Reason for Recognition

Four new names have been added to the impressive list of recipients of the Distinguished Service Citation. They are Carl B. Albert, '31ba, Majority Leader of the U. S. House of Representatives; Carl Reistle, '22eng, president of Humble Oil and Refining Company; Oklahoma author John Joseph Mathews, '20journ, and noted physicist Dr. J. Rud Nielsen.

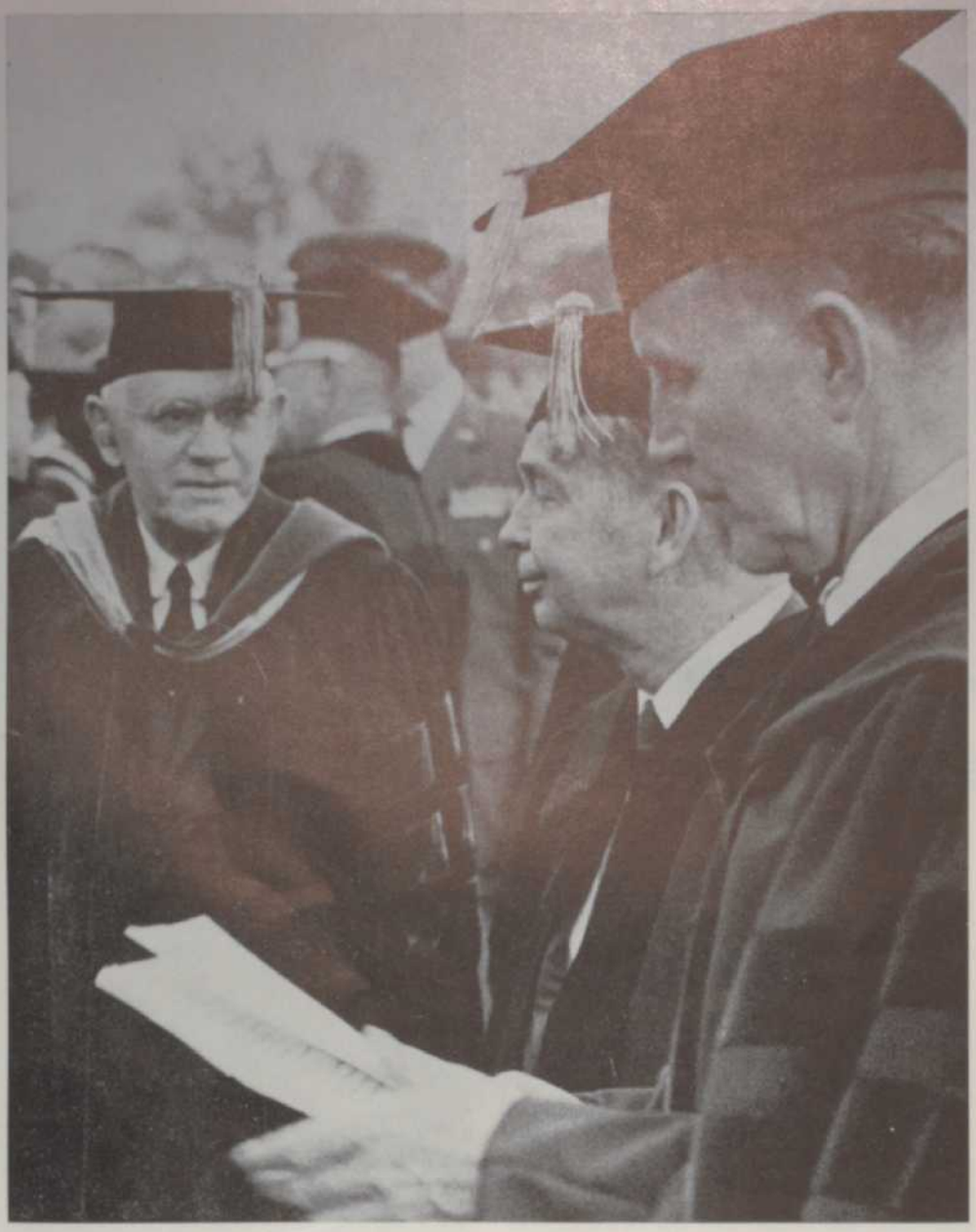
The Citations are awarded annually during spring commencement ceremonies by the University of Oklahoma and the University of Oklahoma Association in recognition of "positive contributions to human progress through devotion to enduring values and unselfish and sustained services to mankind." The 53 men and women who have received the Citation represent leadership in a wide variety of professions, national, state and civic affairs. Yet they all have one characteristic in common: they either received their start or gained their fame in Oklahoma.

No more than five Citations may be awarded each year, and the selection process is a year-around task of an anonymous faculty-alumni committee.

This year the first Alumni Institute gave the 1962 Citation recipients a greater opportunity to participate in the alumni activities. Two of the winners were called into service as the featured luncheon and dinner speakers on the European Common Market, one of the two Institute study topics. Majority Leader Albert, who has done extensive work in finding European outlets for American agricultural products, was able to give the Institute participants a better understanding of the administration's stand on the Common Market and his own opinions on the future of international economic cooperation. (See page 6.) Reistle, as president of the country's largest domestic operating oil company, contributed the big business view of the relationship of the United States to the Common Market and an evaluation of the ability of American business to meet competition. (See page 8.)

But not all the comments came from the speakers' platform during commencement weekend, and not all the discussion was on the two Institute topics. While the politician and the businessman concerned themselves with economics, Author Mathews was ready with some plain talk on the future of Southwestern culture, particularly Southwestern literature, its treatment of the Indian and the Indian's contribution to it. (See page 10.)

Dr. Nielsen, one of the University's most distinguished professors and a leading world authority on infrared spectroscopy, was more concerned with discussing his favorite topic, the growing University program in physics. Using the past as the best indication of the future, Dr. Nielsen has put his thoughts on paper for the *Sooner Magazine*. (See page 12.)



Waiting with other distinguished platform guests for the commencement exercises to begin is Dr. J. Rud Nielsen (left), renowned physicist, teacher and one of 1962's four Citation recipients.

DISTINGUISHED FOR SERVICE

Dr. J. Rud Nielse at the University o

When I arrived in Norman in the fall of 1924, I went to Room 118 in the Administration Building which was then the office of the physics department. It contained six or seven desks, one for each member of the staff and one for a part-time secretary and also two book cases which held what there was of a physics library in those days. When Dr. Homer L. Dodge, then head of the department, had assigned me my desk, he took me through a small lecture room and three or four other rooms, one of which contained some cases with electric meters and rheostats and another some simple apparatus for lecture demonstrations and for what appeared to be high school experiments.

I was rather puzzled, and when we got back to the office, I made a polite remark about what I had seen and asked, "but won't you now show me the physics laboratory?" "You have seen all we have," was Dodge's reply.

Facilities were indeed meager and primitive in 1924. The only evidence of research was a simple apparatus for measuring radon content of waters built by the late Dr. William Shriever, then associate professor of physics. The department employed no instrument maker and no glass blower. However, in the lecture room was a huge and heavy trap door that led to a basement room which contained a small lathe, a drill press and a few hand tools.

The course offerings were as meager as the quarters and physical facilities, in particular, an almost complete lack of courses in theoretical and modern physics.

reflects on the advances in physics Oklahoma and speculates on the future

Now, 38 years later, a visit to O.U.'s physics department is a very different and rather impressive experience. The department is housed in a well-designed physics building. It has large and fairly well-staffed instrument and glass blowing shops and an adequate library. Many rooms are filled with intricate and expensive equipment for research being carried on in gaseous electronics, plasma physics, fluid dynamics, high energy nuclear physics, high pressure phenomena, solid state and polymer physics, microwave spectroscopy, and atomic and molecular spectroscopy. The staff is nearly three times as large as in 1924, and the department has now some 250 undergraduates and 65 graduate majors. Forty-three graduate students have earned Ph.D. degrees in physics, the first in 1934.

For many years the advances were painfully slow, but during the last 15 years they have been rapid. This great change in the rate of progress has had two main causes: first, the fact that the Oklahoma legislature provided funds for the building into which the physics department moved in 1947, and secondly the very substantial support we have received in recent years from the federal government in the form of grants or contracts for research.

While I am not so afraid of federal aid to education and research as some people, it would certainly be desirable for the state to assume a larger part of the burden of supporting research and the training of scientists. In particular, this could give faculty members greater freedom to pursue new ideas and could make it easier for young staff members to initiate research.

The development of physics at the University of Oklahoma has, of course, been the work of a large number of staff members. Many of these, unfortunately, stayed at the University only a few years, and, as a result, much effort was wasted, and many forward steps had to be retraced. Fortunately, the staff has become more stable in recent years, and the present staff contains some excellent teachers and several very able and productive physicists who are making enviable reputations for themselves. There is nothing in which I take more pride than the fact that I have had a hand in finding some of these staff members and persuading them to come to the University of Oklahoma.

Time and space will not permit me to write a history of physics at the University of Oklahoma. Rather I shall try to illustrate some of the developments by examples drawn from my own work.

During the first year or two after coming to Oklahoma I was mostly concerned with helping to overcome the lack of theoretical and modern physics in the curriculum, and for a number of years I taught new courses every semester. I also attempted to do some research after hours in a corner of the elementary laboratory, but the little available space was utterly inadequate for research in physics. After two or three years I discovered some vacant space in the basement of the Administration Building and got permission to use it. To reach it, one had to dive under air ducts and only in parts of the area could one stand erect. The students aptly named the place "the Catacombs." Had I known that we should use this space for more than 15 years, and that the first six or seven Ph.D. theses in the department should be based on research done there I should hardly have accepted it. However, during the '20's the legislature appropriated money for a building in each session, and we had hopes of geeting a physics building fairly soon. We did not foresee the long depression years.

Next to the problem of space was that of obtaining equipment. Much of the apparatus needed for our research had to be constructed of glass. I had never before been in a laboratory that did not employ a glass blower, and hence had never had any need for learning to blow glass. Here, we had neither glass blower nor facilities for glass blowing. I was forced, therefore, to get some torches and other tools and learn the fundamentals of the art of glass blowing. For two or three years I built all the glass apparatus for my graduate students, but when the burden became too great, we introduced a one-hour course in the art to train the students to build their own apparatus. Fortunately, I had to teach the course only the first couple of times.

We began research on molecular scattering of light with change in frequency immediately after the discovery of this effect in 1928 by C. V. Raman in Calcutta, India. Our equipment for this work was unfortunately very inadequate until 1946 when the Lane-Wells Company presented us with funds to purchase a spectrograph especially designed for Raman spectroscopy.

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Advances in Physics at the University

J. Rud Nielsen—

(Continued from Page 13)

This instrument is still being used here, although much more powerful Raman spectrographs are now commercially available.

In order to get maximum information about molecular structure from the Raman effect, it is necessary to supplement the Raman spectral data with data obtained from infrared spectroscopy. Research in this latter field was initiated here in 1940 when Reynolds-Lee Engineering Corporation, a subsidiary of Reynolds Manufacturing Company, made funds available to defray the cost of an infrared spectrometer, designed by one of my former students, Dr. Norman Wright, and built for us in the physics shop of the University of Michigan. During the war years this instrument was used largely for research on practical problems, such as providing reference spectra of pure hydrocarbons and the analysis of ingredients of aviation gasoline and synthetic rubber. The spectrometer was in almost continuous use, night and day, during most of the war. When the war ended it was obsolete and in poor condition.

Infrared spectroscopy turned out to be of great importance for certain parts of the war effort, but large infrared spectrometers were not yet commercially available. In 1943 we therefore undertook to build such an instrument for the Naval Research Laboratory. It was delivered a couple of years later, and for several years this was the most powerful prism infrared spectrometer in existence.

For a number of years afterwards we collaborated with the Naval Research Laboratory in investigations of the vibrational spectra of the novel compounds, fluorocarbons and fluorinated hydrocarbons. Their infrared spectra were obtained at N.R.L. and their Raman spectra here. Most of the work on the interpretation of the spectra and the preparation of publications was also done here. This work was supported first in the Office of Naval Research and later by the Atomic Energy Commission.

Of course, we had a strong desire to get an infrared spectrometer for ourselves comparable to that of N.R.L. This finally became possible in 1953 by pooling funds obtained from half a dozen different sources. The National Science Foundation has since provided a reflecting microscope attachment to our infrared spectrometer which makes it possible to obtain the infrared spectra of tiny crystals.

The problems that my students and I have chosen to work on have been determined to a considerable extend by the fact that oil and petrochemicals are among the chief products of Oklahoma. We have investigated numerous hydrocarbons, and the simplest of all polymers, linear polyethylene. We were the first to obtain the Raman spectrum of a polymer. Recently, we have studied the infrared spectra of simple crystals of paraffin hydrocarbons and fatty acids and have discovered a new crystal form of the fatty acids.

While infrared spectroscopy, and to a lesser extent Raman spectroscopy, have become very important tools in most chemical laboratories and in many industries, these fields are no longer of great interest to physicists. Other fields, including those in which the younger members of the department work, are now closer to the forefront of present-day research in physics.

These facts illustrate the enormous expansion of physics that has taken place in my lifetime. This makes the study of physics a thrilling adventure, but it also places very great demands on the students and teachers of this basic science. Thus, for many years I have taught courses in quantum mechanics, a vast field that did not even exist when I was a student but began to evolve about the time I came to O.U.

Although one can look with considerable satisfaction upon the development of physics at the University of Oklahoma, especially since the last war, one must not forget that a similar development has taken place in almost all other universites, most of which had a much earlier start. While we need not be ashamed of the present status of physics at the University of Oklahoma, we must not be complacent but realize that Oklahoma, and the Southwest in general, is still behind many other parts of the nation in research and the training of scientists. It is to be hoped that this lag may be overcome as soon as possible.

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