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N. J. Palladino:
a personal profile

SPECIAL FEATURE
The Fuel Cycle

Palladino: a man for all members

by Chris FitzGerald

It has been a pattern, more or less regular, in the American Nuclear Society to rotate the presidency of the organization among men from industry, national laboratories, and universities (and, for the first time last year, the utilities). The idea is a good one, because it assures members from the various fields of work that their interests will be fairly represented.

This year almost everyone can feel that *their man* is at the helm. Nunzio J. ("Joe") Palladino, who takes office this month at the ANS Annual Meeting in Los Angeles, is a veritable "triple threat" in the nuclear field. He has chalked up four years with the national laboratories (Oak Ridge and Argonne, on loan from Westinghouse) nine years in nuclear industry (Westinghouse), and eleven years as a professor and university administrator (Penn State). In addition, he has served as a member and chairman of the AEC's Advisory Committee on Reactor Safeguards, to which he is now a consultant. From the standpoint of his broad background of experience, the Society could hardly find a more admirably equipped man to serve as its president.

Perhaps even more important than this background, however, are the special characteristics of the man. One of his colleagues in the Society has put it well: "When you first meet Joe, the thing that strikes you is his humility, but it's not long before you realize he has a sharp feeling of damn good common sense. And you gain a real respect for his knowledge and his capability to work with people." Palladino has exhibited this capability during ANS Executive Committee meetings. When at times the discussion has become heated, he has very often been the one to cool things off by summing up the pros and cons of the dispute at hand and offer some constructive advice. He has the gift of



being forceful without being obnoxious. Those who know him are impressed by his receptiveness to new ideas, his empathy, and his objectivity.

Palladino is the sixteenth ANS president and the third to come directly from university ranks. Before him there were Norman Hilberry of the University of Arizona (1965-66) and Manson Benedict of MIT (1962-63). Palladino is dean of the College of Engineering and a professor of nuclear engineering at The Pennsylvania State University. He came to the University in July 1959, at the request of the dean of engineering, who wanted him to start a nuclear engineering department, and under his guidance a very fine department has been established.

In late 1966, Professor Palladino was appointed dean of the College of Engineering. Warren Witzig, a former vice president of NUS Corporation, took his place as head of the Nuclear Engineering Department.

Early years

Nunzio J. Palladino was one of five children* born to Joseph and Angelina Palladino. He was born in Allentown, Pa., on November 10, 1916. His father was born in Italy and came to the United States when he was 10 years old. His mother was born in New York City and was also of Italian descent. Joe speaks of his parents as very loving and of his family as very close.

His father, who owned and operated a barber shop on Jordan Street in Allentown, was also very strict. He was especially anxious that his children did not get into trouble in what was a rough neighborhood. In today's terminology, it was an "economically depressed" area. Jordan Street was the dividing line between the Tenth Ward, in which the Palladinos lived, and the Sixth Ward. Rival gangs from the two areas made life exciting, to say the least. For this reason, Joe Sr. "encouraged" Joe Jr. to help out after school in the barber shop.

His job was to sweep up and also to soap the faces of his father's customers. The young Palladino started doing this work when he was still in grade school—he first had to stand on a six-inch platform to get up high enough to reach the customer's face—and he continued helping his father until he was out of high school.

This activity did not keep Joe from getting into his share of mischief, however. If he did not belong to a formal gang, he was definitely part of a group, and in order to survive, he and his pals had to stick together. Joe was

*Robert, 17 years younger than Joe, is Section Chief at the Letter Kenney Arsenal near Chambersburg, Pa. Two of three daughters are still living; Madaline, a lawyer in Allentown, and Jeanne, a lawyer for the U.S. Navy in New York.

Palladino



Second grader



High school scholar



Young First Lieutenant

fully accepted by his peers although they recognized him as someone somehow set apart. He was a studious young man and somewhat frail compared to his buddies. But, when challenged, he recognized the basic law of putting up a good fight. It was even a challenge to go to church, according to Palladino, because the Catholic church that the family attended was in the rival Sixth Ward. The worst fate imaginable was to get caught in "foreign" territory wearing your Sunday best and being drawn into a fight, so Joe and his friends used to take a circuitous route skirting the Sixth Ward until the last block or so to get to church.

First and foremost, however, Joe was a student. On graduating from high school he was honored by the Italian-American Republican Club of Allentown as the top boy graduate of Italian descent and won a prize. The event had still more significance for young Joe, because the young lady who was named as the top girl graduate was one Virginia Marchetto, a popular girl for whom Joe had very special feelings. Because of his extreme shyness, however, he was not able to make these feelings known to her. The fact is, however, that Virginia was not even present for the ceremony, having already departed for vacation. They were to meet again, however, but only after Joe had acquired more education, more experience, and more nerve.

Palladino did his undergraduate work at Lehigh University, where in 1938 he received his BS in mechanical engineering. A year later, aided by a Gotshall scholarship, he received his MS in mechanical engineering from Lehigh.

On the job

After graduation, he went to work for Westinghouse at its South Philadelphia Works. As a steam turbine design engineer, he soon became involved in a marine turbine project that Westinghouse was working on to compete with an impulse-type turbine developed by General Electric. According to the Navy specifications, Westinghouse had to guarantee a turbine with the same weight, size, and capability as the GE unit.

The project was to become a "make or break" experience for young Palladino. Looking into the company's design book, he determined that the Navy's objectives could not be met with the existing plans. He convinced management of this and was given authority to design a set that would meet the space and weight parameters. The set was built, but when the turbine was tested on the eve of its scheduled shipping date, its performance was not up to snuff. "Well, it looks like you cost Westinghouse \$50,000," Joe was told after the test. The figure referred to was the performance penalty. In addition, if they went back to work on

the unit, there would be a late delivery penalty added to that.

When Joe looked over the test data, however, he was sure that the unit had not been given a fair test. For one thing, the superheat had not been held. He had a hard time convincing his supervisors that another test should be conducted, but in the end it was agreed to conduct such a test. Joe stayed on that night, and under his direction the tests were conducted once more. Superheat was held, and the test was satisfactory. The Naval inspector gave his stamp of approval, and the unit was shipped on time from the plant. It was a great day in the life of N. J. Palladino, who from that time on was known as "the small turbine expert" at Westinghouse.

It was while Palladino was working at the South Philadelphia Works that he renewed his acquaintance with Virginia Marchetto. Their meeting reads something like a movie scenario. One rainy Sunday night, when Joe was on his way to catch the Interurban Trolley to Philadelphia after a weekend in Allentown, he took a connecting streetcar to the depot to get out of the rain. To his surprise he found Virginia sitting near the front of the car. She worked at the Allentown hospital as a nurse and was on her way there. They recognized each other immediately, rode together on the streetcar, talked over old times, and brought each other up to date on their activities. It was

the beginning of a long romance between Joe and Virginia.

Military service

In 1940, Palladino was called into active duty in the reserves, but after a short time in the Army, he was given a deferment because he was needed at Westinghouse for defense work. After the attack on Pearl Harbor, however, he was eager to get back into the service. In fact, he turned down a second deferment that was available to him and entered the service in May 1942.

He served with the Maintenance Battalion of the Tenth Armored Division and later as company commander of an ordnance evacuation company. The company's function was to take damaged tanks and other equipment off the roads and bring them to repair areas. Palladino was with the first such company to land on Omaha Beach. He was also involved in the Battle of the Bulge. He served until December 1945, ending up with the rank of Captain.

Before he left the service, however, Joe and Virginia were married. Joe enjoys telling how he proposed to Virginia. A few days before VE Day, when Joe was stationed in First Army Headquarters near Weimar, Germany, he received instructions that his unit would be returned to the States early in June 1945, for preparation to go to Japan—an objective that happily never materialized. Joe arranged with an officer friend of his who was returning even earlier to the States to send a telegram to Virginia. It said: "Will be home in June for 30 days. Make wedding plans." Joe obviously had lost much of his shyness.

A new opportunity

After the war Palladino went back to Westinghouse in their Steam Turbine Division. He and his bride of less than a year bought a house and were ready to settle down for a while. Early in 1946, however, he was asked by the Westinghouse management if he would like to spend a year at Oak Ridge on an important project. At the time he was working in heat transfer, and his skills were very much needed. It was put to him that if he wanted to go, he had to make up his mind right away because he would have to be on a train that night to Pittsburgh. It was a tough decision for Joe, but

he decided that he would go. In Pittsburgh the next day he met C. Rogers McCullough, who was there with a group from Monsanto. Others from Westinghouse with Joe were John Simpson, Sidney Siegel, Bruce Ashcraft, Ernie Miller, and Phil Ross. The purpose of the group, he learned, was to build the Daniels Pile, a high-temperature, helium-cooled atomic power pile conceived by Farrington Daniels of the Metallurgical Laboratory.

Palladino's work in the project involved gas handling. He was concerned with the design of blowers, valves, piping, and general heat transfer mechanisms. During this time he also set up experiments to study the effects of radiation on water.

The Daniels Pile was never built, since the AEC felt that it was not ready to build a power plant. But the experience was very valuable for Palladino. While at Oak Ridge he attended lectures in reactor physics by Harry Soodak. He also took courses in modern physics at an extension of the University of Tennessee at Oak Ridge. In fact, he was well on his way toward a PhD when he was asked by Westinghouse to go to Argonne National Laboratory. With some reluctance, Palladino decided to take advantage of the opportunity, and he, like many of the others on the Daniels Pile Project, went to Argonne to work on applications studies for submarines.

Harold Etherington of Allis-Chalmers was director of Naval Reactors Division at Argonne in an AEC-sponsored project. At his direction the group made studies of water-cooled, gas-cooled, and liquid-metal-cooled reactors. The steering committee of the division finally decided that water-cooled reactors had the greatest likelihood of first success.

First teaching experience

Etherington made Palladino his staff assistant, and one of his duties was to supervise a training program for engineers being added to the program. In this connection, a small crisis developed that led Palladino into his first teaching experience. It seems that the first man Walter Zinn appointed to the job of teaching reactor physics to the engineers was a top-notch physicist but not an effective teacher—at least for this class. For some reason he was not getting across to the students. The

result was an open revolt by the engineers. Palladino and Etherington went to Zinn and stated the complaints. Zinn said something to the effect that "it just shows these engineers don't have the background for reactor physics." "Not true!" answered Palladino. Zinn countered, "Can you teach it?" Palladino answered, "Sure." And so he got his first teaching assignment.

It was no easy task for Palladino, but he had his notes from Harry Soodak's course at Oak Ridge plus a lot of determination. In the process of putting together the reactor theory course, he had to think things out thoroughly for himself and thus his own education was furthered.

His other duties at Argonne included considerable work in heat transfer. Together with Tom Moore, he set out to develop data on the impact of mechanical tolerances on performance in reactors. One of his early contributions was in the area of hot spot and hot channel factors. Most of this was classified work.

Return to Westinghouse

Westinghouse kept up its support of the program with the idea that one day it might get a contract to build naval reactors. While Palladino was with the group at Argonne, the company decided that if it was going to do something in this field it had better start planning for it. For this reason the company decided to buy Bettis Field, an airport near Pittsburgh, as the site for a naval reactor facility.

Late in 1949, Westinghouse entered negotiations with the Navy to be the first vendor to supply reactors. Simpson, Ross, and Palladino were called to Pittsburgh to help write the proposal. This involved several trips. In December 1949, the company got the contract, and in May 1950, Palladino was called back to company service at Bettis. His initial responsibilities were in the thermal and hydraulic section. He was primarily concerned with non-reactor components, such as turbines.

In early 1951, Palladino was placed in charge of core design for the Mark I submarine reactor. In this capacity he demonstrated independence of thought and persistence. When everyone else seemed to be saying that nuclear was the limitation in the core design, he held that thermal was the limitation. He pressed for more burn-

Palladino

out data—i.e., loss of heat transfer at extremely high temperatures due to plasma formation. Working with Stan Green and John Zerbe, Palladino set up a special heat transfer section at Bettis to make these studies, and Bettis became renowned for its work in this field.

Palladino demonstrated that good ideas can come from almost anywhere when he attacked the problem of finding a way to hold the fuel elements of the Mark I reactor in place. Admiral Rickover impressed upon the group that this had to be done very cautiously. For one thing, the elements would have to sustain rigorous Navy shock standards. Palladino studied the problem intensely, and it became his habit to look at almost anything to see how things were held in place. One day while he was deeply engrossed with the problem, he noted how posts for a toilet partition were secured. It occurred to him that with some modification the fitting that held the post to the floor offered the answer to the Mark I fuel holding problem. The flanges of the fitting were simply turned inward instead of outward, and basically that is how Palladino came up with the answer. Ingenuity can strike almost anywhere.

After his work on the Mark I reactor, Palladino participated in the Shippingport reactor project, the first

reactor designed for utility plant operation. His main concern here was with the pressure vessel and its internals, including control rods and control rod drives. And although his responsibility was mostly in heat transfer, he was not reluctant to let his colleagues in reactor physics know about it if he thought their flux plots were off base.

During his nine years at Bettis he continued graduate work at the University of Pittsburgh.

In August 1955, a paper prepared by Palladino and Simpson describing their work on the Shippingport reactor was delivered at the Geneva Conference. In the following year, the authors received the Prime Movers Award from ASME for this paper, "Description of the Pressurized Water Reactor (PWR) Plant at Shippingport, Pa."

Another honor that Palladino is especially proud of is the Westinghouse "Silver W," its Order of Merit, which he received in January 1958 for his work on the Mark I, the Nautilus, and Shippingport.

As mentioned earlier Palladino left Westinghouse in 1959 to institute the Nuclear Engineering Department at Penn State. When asked for a comparison of industrial experience and his academic responsibilities, Palladino said his present work is as challenging a job as he has ever had. A university, he said, works with a different power structure than industry. You can't always *direct* people to do things. He spends many hours communicating with the faculty and with students in order to arrive at mutually satisfactory goals.

At home with the Palladinos

Being a good listener is no doubt one of Palladino's key roles at home, which he shares with his wife and three daughters. The two older girls were adopted by the Palladinos when it appeared they would not have any children of their own. Linda, 19, is a first year elementary education student at the Mont Alto branch campus of Penn State. Lisa, 16, is a high school sophomore. The youngest daughter, Cynthia, 13, was born to Joe and Virginia three years after Lisa was adopted. She is a seventh grade student.

In addition to enjoying life with his wife and children in their home not far from the campus, Joe occasionally tries his hand at bowling and golf. He is a member and past president of the

State College (Pa.) Rotary Club.

In addition to the ANS, Palladino is active in the ASME, the ASEE, and the National Academy of Engineering (he served as chairman of its annual meeting in May 1969). He is a member of the Pennsylvania Advisory Committee on Atomic Energy Development and Radiation Control and has served as chairman of that body. He is also a member of the nuclear division of AIChE. In addition he has served on many committees in government and the academic world. Among the honorary societies to which he belongs are the Sigma Xi, Tau Beta Pi, and Pi Mu Epsilon.

Observations

In approaching his role as president of the American Nuclear Society, Palladino has stated that he believes much work still needs to be done on nuclear standards development. He also feels that the Society should deal with the broad issue of public acceptance of nuclear power. By this he doesn't mean that we should automatically serve as proponents of nuclear power but that we should examine the widespread fear of radiation. He believes that not only the public but many in the nuclear field—including members of the American Nuclear Society—should become more knowledgeable about what exactly is involved in the types and amounts of radiation that are released from nuclear power plant operation.

Palladino also believes that thermal effects must receive increased attention and that guidelines or criteria for evaluating the problem are needed.

On another matter which is strictly internal to the Society, Palladino has expressed some concern over the size of its meetings. He thinks that perhaps the number of papers or sessions or both might be reduced. Further, he believes that guidelines are needed on the ratio of invited papers to contributed papers. Invited papers, he believes, have become too common. Because of this, they are often approached casually by the authors and are hastily constructed.

One thing members of the Society can be sure of is that their new president will not carry out *his* responsibilities in a casual way. In his long journey from Jordan Street to University Park, Palladino has learned the value of hard work and determination.

Palladino visits with Samuel H. Levine, professor of nuclear engineering and director of Penn State's reactor

