



Mars G. Fontana *A Tribute*

Mars G. Fontana, 77, professor emeritus and former chairperson of metallurgical engineering at the Ohio State University died February 29, 1988 at his home. On that date, the corrosion community lost one of its greatest champions and for many of us who knew him well, we lost a truly great friend. "Font's" personal commitments and priorities need not be reviewed for his colleagues; however, there are others to follow who need to know that men of such dedication have indeed lived and provided the leadership of our society. To provide an indication of the type of man Font really was, a number of his former students, associates, and friends have provided short remembrances of their association with him. He was truly a nice guy who finished first.

Resolutions In Memoriam — Mars G. Fontana

The Ohio State University Board of Trustees

The Board of Trustees of The Ohio State University expresses its deep sorrow upon the death on February 29, 1988, of Mars G. Fontana, former Chairman and Regents' Professor of the Department of Metallurgical Engineering and beloved member of the University family.

In 1927, Mars Fontana was a bright and enthusiastic seventeen-year-old student from the Upper Peninsula, beginning his studies at the University of Michigan. He received his Bachelor's of Science in 1931 and continued graduate study in Chemical Engineering at Michigan. In the Fall of 1934, he had completed his doctoral research and was writing his dissertation. The DuPont Company in Wilmington, Delaware offered him a good position. He accepted and, with the blessing of his Faculty Advisor, Dr. John Chipman, he reported immediately to Dr. Harold Maxwell at DuPont. For the next 53 years, Mars Fontana gave his productive mind, body, and spirit to the advancement of the science and engineering of materials developments and the prevention of corrosion and material failures in engineering systems. The first nine of those years were spent at DuPont, the next thirty at The Ohio State University, and the last fourteen as a senior adviser, writer, and lecturer.

All of us who knew Font as a colleague have many wonderful remembrances of his work and personal dedication. Mars Fontana was really many people. He was a scientist, an engineer, a teacher, a consultant, a leader, a friend, and, most importantly, a loved member of his family. Throughout

his career, he received many awards and recognitions for his research and teaching in the fields of corrosion, metallurgy, and materials.

Mars Fontana carefully studied the mechanisms of the interactions of water, harsh chemicals, and stresses on metallic alloys. At DuPont, his science and engineering talents merged as he framed the mechanisms of corrosive attack and designed alloys, inhibitors, coatings, and electrolytic protection systems to prevent failures in production plant systems. These efforts led to his famous definition of *The Eight Forms of Corrosion*. At The Ohio State University, he created a Corrosion Research Center and organized and led a Department of Metallurgical Engineering that put Ohio State in the forefront of materials research and corrosion science. Dr. Fontana is widely recognized as the *Father of Modern Corrosion Science and Engineering*. In his role as department chairman, he recruited and nurtured young faculty members, he led efforts to obtain funds for new laboratories, and he took an active part in the administration of the College of Engineering and in the faculty governance of the University. In the latter regard, he served as a member of the Faculty Council and as an effective senior faculty adviser during many University crises. By the time of his retirement in 1975, he had presented most of the important international lectures in his field and he had been named a Regents' Professor, a member of the National Academy of Engineering, and a Fellow of all the technical societies in his field. In 1981, the Faculty and Board of Trustees officially renamed the building that he had worked so hard to create *The Mars G. Fontana Laboratories*. Other responsibilities and honors fell on him over the years. He was particularly proud of his honorary doctorate from Michigan and his honorary membership in the American Society for Metals. Just two years ago, he was the

first recipient of the Outstanding Educator Award of the Metallurgical Society of AIME.

Mars Fontana, the teacher, changed the lives of all the students in his classes. He emphasized good analysis, clear and concise presentations, and simplicity wherever possible. In his consulting work and later industrial leadership as a director at Worthington Industries, he was famous for his ability to find the key to a complex problem, to identify the critical concerns, and to propose practical and successful courses of action. He passed that on to his students during his entire teaching career. His book *Corrosion Engineering*, used throughout the world as the definitive engineering textbook on corrosion, emphasizes clear thinking and conciseness.

In Mars Fontana's life, responding to a sophomore student with a question was just as important as meeting a visiting dignitary. He was always open to questions and new ideas. He was very accessible and available to young people. He treated everyone with respect. He was generous with his own funds in many ways. Quietly he helped students and friends over rough spots. His generosity, along with that of his colleagues, friends, and family, led to the endowment of the Mars G. Fontana Professorship. Earlier, a scholarship fund was created in his name.

The Department of Metallurgical Engineering and the Fontana Corrosion Center at The Ohio State University, its faculty, and its students are deeply indebted to his creative efforts. All of the companies for whom he consulted and the men and women who run them were enriched by the advice of Mars Fontana. The quality of public higher education is better because of his dedication to the pursuit of excellence in teaching, research, and public service.

On behalf of the University, the Board of Trustees wishes to express its deep sympathy to Mars Fontana's wife, Betty, and his children, Martha, Mary, Elizabeth, David, and Thomas, their spouses, his beloved grandchildren, and his brother and sister.

R. W. Staehle

Consultant

In his professional life, Font had three major commitments. First, he was committed to being unfailingly courteous. I never heard him say it, but it was always clear to me that the maxim "what you are speaks so loud I can't hear what you say" was the cornerstone of his personal code.

Second, he was committed to teaching students so they would learn. From his insistence on student's writing papers in his classes to his relating personal experiences as virtual engineering parables, he was determined that students would learn. At Ohio State, he built excellent facilities and attracted an outstanding faculty to assure that the students would be well educated. In his short courses and evening speeches, he was delightfully entertaining while still conveying the corrosion message. No one will forget the roaring responses to his famous lion pictures.

Thirdly, he was committed to connecting science and engineering. He understood the feedback. Engineering problems defined challenging problems for science; science provided usable principles for engineers. He lectured frequently on this subject and committed his personal efforts to assuring the effectiveness of the communication. Codifying corrosion into its eight forms was vintage Fontana. Such a formulation provided scientists and engineers with a common language and common directions.

In the larger perspective, Fontana expanded on his work to connect science and engineering to his efforts to connect the University to the society around it. In Columbus, home of The Ohio State University, he was as well known and liked throughout the city as he was at the University for his good works and his genuine niceness.

Fontana symbolized what is good and what is possible from enlightened academics. His students and grand students today permeate the international technology society. Like Fontana, they too are characterized not only by their hard work and commitment to their profession but by their working to make their own institutions and societies better places.

Fundamentally, Font was a magnificent family man. In his professional life, his students, colleagues, and institutions were family.

R. D. McCright

*Lawrence-Livermore Laboratory;
Chairman, NACE Publications Committee*

Mars Fontana was a very unassuming man, yet he commanded an enormous amount of respect. It was a privilege and an unforgettable experience to have studied at Ohio State University in the Department that he built. Fontana was the Godfather, in the most positive sense of the word, to all of us.

R. M. Lantianison

*Department of Materials Science and Engineering,
Massachusetts Institute of Technology*

I have often been asked how I came to choose corrosion engineering as a career. The answer is surprisingly simple. During my second year as a graduate student at OSU in 1965, Font buttonholed me in the corridor outside his office. He said "Ron, we have a new man on the faculty. His name is Roger Staehle and he has lots of good ideas and money. You're going to like corrosion engineering!" In the words of a well-known TV sportscaster, "the rest is history!" Actually, this was one of the best decisions I never made!

My association with Roger Staehle and Roger's, in turn, with Font, is very special — three generations of Fontana engineers! I will never forget the NACE Banquet in 1972 when Font presented me with the Campbell Award. I don't remember his words exactly, but he introduced me as a grad student of Roger's and then quickly added that since Roger was his student, that made me his grandson! He said that with the pride of a father... and grandfather; it was clear in his voice that he was very proud. This was a really moving moment for me and, I think, for him and for those in the audience. I remember responding to his introduction by saying that nothing could have made me happier than to have been presented with the Campbell Award by him. I understand how he felt. Last year, fifteen years later, Pete Searson, one of my gang at MIT, won the Campbell Award. And, this year, Dave Burleigh did it again!!

T. and Y. Kondo

Atomic Energy Research Institute, Japan

My wife and I had a great luck of studying corrosion as graduate students at The Ohio State University back in 1962 to 1965, where Professors Fontana and Beck were our advisors. Among many pleasant memories of the days spent under the fine research-humane climates, we particularly appreciate those on the class room activities in the Advanced Corrosion

course conducted by Professor Fontana. In the classes, much time was spent on the presentations and discussions on the extensive literature surveys of the various subjects assigned to each student. He was generally very quiet and gave minimum comments and suggestions, which were very essential. In this way, he stimulated his students to extend their own thinking to more creative directions. So many world-known corrosionists have been thus raised.

J. H. Payer

*Professor of Materials Science,
Case Western Reserve University*

From helping this second-year transfer student at OSU find a summer job more than 25 years ago and throughout my career, Dr. Fontana was always available to listen and provide sound counsel. Mars Fontana continued to open doors of opportunity and to expand the horizons of my goals and achievements. He instilled in many of us a curiosity and conviction to understand and solve corrosion problems.

Mars built esprit de corps in many ways, from student/faculty golf outings to stories from far off lands, e.g., the leisure activities of the king of beasts. An annual testimony to Font's impact and success is the Buckeye Party at the NACE Conference. Mars and Betty would proudly reside over the festivities and glow with satisfaction at good news from around the world.

Many of us are thankful to Mars for help he gave in his personal, quiet way. His special gift was to make each of us feel special.

D. D. Macdonald

*Director, Chemistry Laboratory,
SRI International*

Mars was one of the founders of modern corrosion science and engineering. His contributions to the development of these disciplines was enormous and perceptive, including the education of students, directing of research, and transferring technology to the field. His establishing and nurturing of the corrosion program at Ohio State University provided that university with a world-class center. The impact that the FONTANA Corrosion Center has had on science and technology was amply demonstrated at CORROSION/88, when fifty present or former associates in the FCC, including two past directors, assembled for dinner to pay tribute to Mars. He was acclaimed universally as a gentleman and a scholar, whose memory will live on through the disciplines he helped form, corrosion science and engineering.

H. P. Godard

*Aluminum Company of Canada;
Former Editor of Materials Performance*

I was somewhat of a late comer on the North American corrosion scene, being engaged by Alcan to be their corrosion expert only in 1945. By this time, Fontana, LaQue, Speller, Hackerman, Compton, Mears, Larrabee, Ivy Parker, Wachter, Tracy, Whitney, Boyd, and many others were already well established. Of course, even before them were Speller and Whitney. There were of course many others. I entered the field of corrosion completely "cold," with absolutely no knowledge of corrosion and an equal background in aluminum.

I was less of a newcomer to NACE, which I joined in 1941 when I attended the 3rd annual meeting in Chicago, where the

attendance was 631 (at least by my records). Realizing my deficiencies, I sought to broaden my knowledge and establish a number of corrosion "contacts." I arrived in Chicago with a list of desirable contacts I had gleaned from *Corrosion* magazine and brashly invited them to breakfast, lunch, or dinner just to get acquainted. This way, I met people like Fontana, LaQue, Brannon, Fair, Hackerman, Holcombe, Humble, Munger, Noppel, Olson, Van de Bogart, and others, not only in Chicago, but at later NACE meetings which I attended annually; maybe I even met Boyd this way, but I don't keep a diary which could now refresh my memory.

It wasn't long before I sought out Fontana, and found him only too willing to help a newcomer. His wife Betty was equally friendly and we had a long association of pleasant visits at corrosion affairs over the years. My activities on the Abstract Committee chaired by Ivy Parker put me in even closer contact. Then there was the fateful committee selected to review the editorship for both *Corrosion* and *MP*, of which I was a member. We decided to ask Mars to step down for someone with more time and it was my job to try and make peace with Fontana. That experience really taught me the gentleman that he was, for our discussions then and later were always calm and friendly, even when I told him that I had voted for the change, and was probably most responsible for it. We remained close, and to prove it, when many years later I got an invitation to give corrosion lectures in South Africa, the first person I called to ask about South African experience was Mars, as he had been a similar lecturer some years before. His helpful advice contributed greatly to my enjoyment of this pleasant visit.

When I joined the "inner circle" of NACE officers as Vice President in 1958, I began seeing more of Mars and Betty at NACE executive functions, associations that continued until 1983 when I resigned as editor of *MP*, and dropped from sight in NACE.

Mars was, of course, an undisputed corrosion authority, a warm friendly person beneath his sober mask, and ever willing to help anyone who approached him (which I did countless times over the years). I join all in the corrosion community who knew him personally to mourn his passing. Mars was a corrosion stalwart who will long be remembered. I will drink a silent toast to his memory – *Well done, Mars. We will miss you.*

H. W. Pickering

*Department of Materials Science and Engineering,
Pennsylvania State University*

Font once invited me to travel with him and his lovely wife Betty to Philadelphia for an ASM meeting. He said he was driving because it was such a beautiful ride through Pennsylvania that time of year when the fall foliage would be displayed in deep reds, bright yellows, and browns. From his comment, I had the impression that Pennsylvania was some place special and I guess the impression stuck. In any case, what I remember best was not the meeting itself but rather the drive through Pennsylvania with Font and Betty. It is probably a coincidence that I have lived in Pennsylvania since those OSU days but, then again, maybe not.

All memories are now fond ones, but I remember one that was hardly pleasant at the time. Font, too, wasn't very happy. He gave me that famous look of his. He thought I was ready for the comprehensive exam and I probably was but the oral part of the exam proved to be somewhat of a problem. The outside member of the committee was from the Chemistry

Department and an expert on x-ray diffraction and its application to microstructural analysis. He began the questioning and revealed some weakness on my part. Afterwards, I wondered how much Font had to do with my passing that exam. I doubt that anyone else remembers that event over 25 years ago (professors Beck and Hirth were the other committee members), but I sure do and maybe if Font were still with us, he would too.

There are many other fond memories, but I will summarize by saying that I have been fortunate and some of the factors that have contributed to this state of well being include the first and foremost direction Font gave me, a focus in the technologically important corrosion area. For this and his many other inputs, I feel a closeness to my former thesis advisor, Professor Mars G. Fontana, who I will also fondly remember as a friend and highly respected educator.

F. H. Beck

*Retired Professor Emeritus,
The Ohio State University*

During the forty-five years that I was acquainted with Font, I knew him as a friend, as a coworker, as my teacher, as my graduate adviser, and as chairman of the OSU Department of Metallurgical engineering of which I was a member. Regardless of the categories listed, Font always treated me simply as his friend.

Font created an environment in his department at OSU that was conducive to excellence in both teaching and research. I was fortunate and glad for the opportunity to stay at OSU and work with him. It was a rewarding and pleasant experience.

Most engineers are familiar with the *Eight Forms of Corrosion*. Font frequently showed slides of his other more recently identified and less well-known forms of corrosion. For example, a severely corroded automobile he identified as *Automobile Corrosion* and a severely corroded bicycle was identified to suffer from *bicycle corrosion*, etc. Some of you may have seen his slides of the passionate lions. I'm not sure about the type of corrosion they suffered from.

Font always enjoyed melting and pouring metals. On many occasions, we would spend an afternoon preparing heats of experimental alloy steels in a 12-pound induction furnace. We used an iron rod to help introduce alloy additions into the molten charges. Before the rod became hot enough to melt, we would plunge the hot end of the rod into a bucket of water for a brief time and then reinsert the still very hot rod into the molten metal.

One day, when I happened to be passing by the furnace room, there was an explosion from within. Some graduate students said that they stuck an iron rod into a charge of molten metal just like Professor Fontana did and the metal exploded. The difference was that the students used a *wet* rod.

Being a good teacher, Font always tried to be available to his students for consultation and suggestions concerning their work. From this, he gained the admiration and respect of the many students going through his department.

B. E. Wilde

*Department of Metallurgical Engineering,
The Ohio State University*

I first met Mars Fontana and fell under his spell as a recent graduate from RPI whilst attending a Stress-Corrosion Conference at The Ohio State University in 1967. Although I was

familiar with his research and teachings in corrosion science, I was immediately attracted by his rare gift of being able to communicate comfortably and meaningfully with the *doers* of this world – the engineers.

Over the intervening 21 years, I have come to recognize first hand that Mars G. Fontana was one of the true founding fathers of American Corrosion Engineering who was at home either as an educator or as an industrial problem solver. I am proud to have known him, and to have the on-going privilege of teaching his course in Corrosion engineering in the Department of Metallurgical Engineering that he created at The Ohio State University.

I shall miss him.

R. A. Rapp

*Department of Metallurgical Engineering,
The Ohio State University*

On February 29, 1988, Professor Emeritus Mars G. Fontana passed away. At his memorial service, his son David Fontana eulogized his father by starting out "Mars Fontana, he was quite a guy." By comparison with David, my relationship over 25 years with Font as my boss, colleague, friend, and role model was far too brief. But I also knew Font's kindness, fairness, friendliness, guidance, and generosity. I was treated like a son by Mars Fontana. He was one of the nicest gentlemen that I have ever met; how lucky to work with him and exchange thoughts and jokes over those years. How lucky I was to receive encouragement and support from my Department Chairman and the excellent faculty which Font drew to Ohio State University. We all appreciated it, and we all will miss Font.

I have mentioned these personal matters, because Font's professional achievements as a teacher, a researcher, an author, and a consultant are all pretty well known and recognized.

Yes, Mars Fontana, he was quite a guy.

T. Murata

*New Materials Division,
Nippon Steel Corporation, Japan*

I often stopped writing this short memoir recalling and traveling the most pleasant and thank worthy memories with Professor Fontana. Whenever we saw him with typical student's problems, he was ready to ease our worries especially on the bitter days after tough exams. A red sports car parked in front of the office, picnics at golf courses, and Park of Roses, students/faculty banquets which were full of jokes, holidays in Tokyo with his lovely wife, and so on. Those shall remain in our memories. Please be with us forever.

R. C. Clark

Olin Chemicals

In 1976, while I was working on my master's degree, I had the honor of being the grad student who was doing the metallography for Dr. Fontana's failure analysis consulting work. I learned a lot about integrity and ethics, as well as how to conduct a real failure analysis, working for him.

The day I remember best occurred in early summer. I met with him to discuss the progress of a current failure analysis job. However, Dr. Fontana had just returned from an ASTM committee meeting and was upset by the outcome.

He and Duriron had presented some results of an investigation into unexpected corrosion problems with high alloy castings. They covered the problem, the cause of the problem, and the solution of the problem. Other vendors, who constituted a majority on the committee, voted not to incorporate any of the suggested improvements in the applicable ASTM standard.

He told me that if they had taken that stand because they disagreed with his experiments or his conclusions, he could have respected them. However, no one disagreed with the presentation. He told me that the majority had voted against changing the ASTM standard to require improved casting quality, because they would have had to buy some new equipment to meet the new requirements. He could not respect them for knowingly voting to block new standards promoting better castings.

I have never forgotten him, his views on right and wrong, and his common sense attitudes.

W. K. Boyd

Consultant

At the time I graduated from Ohio State University, Font was just coming on as chairman of the Department of Metallurgy. I have regretted that I did not have the opportunity to study under Font. However, living in Columbus and working just across the campus at Battelle afforded me a rare opportunity to have Font as both a friend and colleague for more than 40 years. You might say I had the best of two worlds. We played golf together, shared jokes, and withstood the vigors of losing at cribbage to our wives, but, best of all, we were friends. I can't tell you what it means to have a friend like Font.

Each year at the annual NACE convention, Font would take it upon himself to acquaint the ladies with the various facets of corrosion and corrosion prevention. At first, the tour through the exhibits involved only a few ladies; however, as the word got out, it evolved into what became known as *Font's Harem*. In fact, Font leading a group of ladies through the exhibits became a regular part of the corrosion show. He was in his glory and so were the ladies — just ask any of them what they most remember about the annual meeting.

G. R. St. Pierre

*Department of Metallurgical Engineering,
The Ohio State University*

I was recruited by Font in the Spring of 1956, but I didn't actually start as a regular faculty member until late 1957. My 32 years of association with Font are filled with warm recollections. We played golf and bridge together on many occasions and he was always a gentleman of good spirit. We had the same faculty adviser, John Chipman. Font's PhD degree, with Chipman as adviser, was awarded by the University of

Michigan in 1935. In 1954, I received my PhD from MIT, with Chipman as an adviser. Many other coincidences linked us in time and place. Font will always have a special place in my heart beside my Father, John Chipman, and Carl Wagner. Font was the father of modern corrosion science in engineering, but he also influenced many young scientists and engineers throughout the entire field of materials science and engineering.

On behalf of the students, staff, faculty, and alumni of the Department of Metallurgical Engineering, I am pleased to send a special message of our undying love and admiration for Mars G. Fontana.

S. Abe

*Yawata Technology Division,
Nippon Steel Corporation, Japan*

I heard the very sad news of Professor Fontana's death. As I recall, Professor Fontana has planted the fruitful seeds of corrosion scientists and engineers throughout the world. From the heaven, he must be watching those seeds still growing even in Japan.

R. B. Puyear

Monsanto Chemical Company

In 1977, a group of us had just formed the Materials Technology Institute of the Chemical Process Industries, Inc. and were looking for a person to serve as our first Executive Director. When we considered the people who might be available for this part-time job, we immediately thought of Mars Fontana, who had recently retired from The Ohio State University. However, the word was that when Mars retired, he made it clear that he had no interest in working. In addition, we felt that it was a bit presumptuous to ask a man of his stature to take this part-time job at the rather low salary we were able to offer. Nevertheless, we worked up the courage to approach him at the NACE meeting to see if he would be interested in working with us.

This brings me to the point of the story. We interviewed Mars along with several other candidates for the Executive Director job. With the other candidates, the interview went about how you might expect. We outlined the requirements of the job and the candidates explained how they could satisfy these requirements. With Mars, the interview immediately took a different turn. Instead of us interviewing him, he interviewed us to see if we at MTI met his standards and if we were serious about supporting it. It wasn't until the interviews were completed that we realized how completely the tables had been turned. We passed the test; he became our Executive Director!

Mars was in control of the situation! We came to learn that this was one of his characteristics. He had such strength of personality that others instinctively differed to him. His leadership got MTI off to a strong start and helped make it the influential organization that it is today.