Choji Magono

Profile of Professor, Dr. Choji Magono

Professor Choji Magono, Department of Geophysics, Faculty of Science, Hokkaido University is known as a leading and outstanding meteorologist and professor in Japan and throughout the world. He is known for his thoroughness and disciplinary attitude in his scientific research and he is recognized for his efforts in education and training. His renowned and respected teacher, the late Professor Ukichiro Nakaya was known as "The Doctor of Snow" and he in turn has been called as "The Doctor of Cloud Physics (The Doctor of Ame-Kanmuri)" by his fellow workers. After dedicating his life to the study of meteorology, he will retire on April 1, 1980 having fulfilled his work.

Prof. Magono was born on Sept. 22, 1916 at the City of Komatsu, Ishikawa Prefecture. He was born as the eldest son to his father Mr. Choshin Magono and mother Mrs. Nobu Magono. In 1923 he lost his father, but he finished the Mukai-Motoori Primary School, Komatsu, entered the Komatsu Middle School and went on to study at the 4th Higher School at Kanazawa where he studied as a student of science. He excelled in science, and upon graduation he was admitted to, then, the newly founded Department of Physics, Faculty of Science, Hokkaido Imperial University. He made his choice of the Hokkaido Imperial University, because Prof. Ukichiro Nakaya who was Professor of Physics was from the same Prefecture, Ishikawa. His graduation assignment at the Dept. of Physics, as an undergraduate, was under Prof. Nakaya's guidance. Prof. Nakaya was concentrating his efforts on the production of artificial snow crystals, as part of the Nakaya group, undergraduate Magono had his special assignment in snow crystal of needle type in warm temperature regions. It may not be too far from the point to say that Prof. Magono formed the idea to study Cloud Physics, around this time when he was studying the growth of artificial snow crystals in the cold room. It goes without saying that the word Cloud Physics was not then conceived.

In 1940 as soon as he was graduated his first assignment as a regular member of the Hokkaido Imperial University was his appointment as a research associate to Prof. Nakaya. Around this time frost heave of railroad beds had become an important socialogical problem. And upon official request from the Sapporo Government Railways Bureau, Japanese National Railways, he conducted field observations by extensive digging of localities known as frost

heave danger areas of railroad beds. The work covered all Hokkaido and on the site work was continued. Prof. Magono recalls that he was inspired by these on the site observations under Prof. Nakaya tutelage, and he became convinced that such natural phenomena could only be dealt with by personal experience. The results of the work was written in Prof. Magono's name with Prof. Nakaya as co-author and published in 1940 in Japanese under the title "On the Mechanism of Frost Heaving" and reported in the "Journal of Meteorological Society of Japan". This was his Prof. Magono's first scientific paper. After the work on field observations on frost heave, the objective shifted to artificial frost heave in research laboratory. After accomplishing this work, Prof. Magono was called to colors and served in the army for 4 years. However, during his years in the service, he was employed in the study on sea fog in the Nemuro area, Hokkaido. In the cooperative study between the army and the scientific group, he was indeed lucky to have Prof. Nakaya as his mentor and guide and based on this work alone, he had much to gain in his future work.

After World War II, he was able to return his old assignment and he was again assigned to Department of Physics, Faculty of Science, Hokkaido Imperial University. He was appointed as associate professor in 1948. The year 1946 was a time of hardships. Post war Japan was not conductive for scientific works and the living conditions were deplorable. Appropriate with the times, Prof. Nakaya founded the Agriculture Physics Research Institute. From a stand point of securing food, he set up practical research targets. About this time in adverse settings, Prof. Magono invented "Integrating Thermometer" and the "Integrating Sunshine Gauge". He also tackled with such problems as water temperatures of rivers with the aim of preventing cold damage to rice, he also studied such problems as water temperature, raising water reservoirs. In 1951 he published his first paper in English entitled "Design of an Integrating Thermometer" which is a report based on the professor's invention of the integrating thermometer. He was awarded his doctor degree of science from the Hokkaido Imperial University based on this report and he further had this thermometer patented.

In 1951, at the young age of 35 he was offered a chair as professor at the Department of Physics, Faculty of Education, Yokohama National University. As a college under the new system, the school was lacking in facilities, yet Prof. Magono energetically conducted experimental works and field observations on precipitation particles. His works were published one after the

other in the Journal of Meteorological Society of Japan, Journal of the Japanese Society of Snow and Ice, and Journal of Applied Physics of Japan. Especially in 1954 in the Journal of Meteorology of America, he had published in his Hokkaido University days photographs under the title, "On the Shape of Water Drops Falling in Stagnant Air". Later his photographs were replicated and reproduced in many foreign text books – and they still hold a prominent place in the text books to this days. While in the professor's Yokohama National University days, his assignments were Hydrodynamics and Experimental Physics. From around this time, he became interested in the field of Atmospheric Electricity and he conducted various experimental works and field observations. His results were published in the Journal of Meteorological Society of Japan and Science Reports of the Yokohama National University.

In 1955 Prof. Magono was offered a chair at the newly founded Department of Geophysics at his Alma Mater, and from this day forward we can say that he was truly in his element and his scientific work took on a lustre. In 1957 he attended the 6th International Conference on Meteorological Radar held in Boston U.S.A. where he made many papers.

At the university Prof. Magono gave lectures to undergraduates on Atmospheric Physics and Geophysics. And for graduate students he held seminars on Cloud Physics and Atmospheric Electricity. And for the undergraduates assigned to Meteorology laboratory he personally gave guidance on such things as the handling of cameras, use of dark rooms etc. In the mean time on the 4th floor of the Main Science Building, he continued his work of the atmospheric electrical observations on precipitation particles. He set up a pre-fabricated Cloud Physics Observatory of 1.8 m$\times$1.8 m, on the summit of Mt. Teine on the outskirts of Sapporo where he made observations. On the other hand, as part of his field work, he commenced work on hydrological investigation in the Lake Shikaribetsu Basin, Tokachi, Hokkaido.

In the summer of 1958, the Cloud Physics Observatory at the summit of Mt. Teine was replaced by a permanent ferroconcrete two-storied building. From 1959, to actually prove Prof. Nakaya's *Ta-s* diagram in a natural condition, with the financial aid granted by NSF, U.S.A., a large scale observation was started. This work was continued up till 1964. The results of this observation was published in the Journal of Faculty of Science, Hokkaido University, Series VII (Geophysics) in 6 separate reports under the title "Investigation of natural snow crystals". While carrying out a full scale project, Prof. Magono

educated undergraduate and graduate students alike and at the same time published his results, as may be seen in his list of tremendous work, both in English and in Japanese.

In 1961 his field work in the summer took him to the Yufutsu Moors to carry out artificial fog dispersion experiments. With the cooperation of the Air Defense Force, Japanese Government, using helicopters, experimental attempts were made using downward air currents caused by the fall of water drops to disperse fogs. These experiments showed progress and in the summer of 1963 culminated in carrying out on the site large scale experiments using 100 propane gas burners of 18 cm in diameter from 10 reserve tanks each containing 500 kg. The results of this work can be seen in 16 mm cine camera recordings.

In 1963 based on the U.S. – Japan Science Cooperation Programs, the project "Clouds over the Pacific Ocean" was begun, in line with this, in December, test observations were made covering the air between Tokyo and Sado Island. In April 1964 the Tokyo – Los Angeles route, in October 1965 observations of clouds between Tokyo and Djakarta by plane were made. Prof. Magono was aboard the planes where the made personal observations and guided the observation work.

In 1964 and 1965 the project for "Studies of cirrus clouds" were undertaken, and in 1966 snow fall observations covering the Ishikari Plains were conducted.

In 1967 and 1970 again the U.S. – Japan Science Cooperation Programs, set up specifically between Prof. Schaefer and his groups in the State University of New York at Albany and Prof. Magono's team, was carried out in Lake Erie and the Ishikari Plains.

In 1968 a field work was conducted on "Winter Fog" at Asahikawa, while in the summer of 1969 to 1971 as part GARP, studies of "Cumulus Humilis Clouds" were done in the vicinity of Sapporo. Along this line over Fukue Island, Goto Islands, observations of cumulus clouds were carried out.

Where the center of attention had been on such research objectives as Cloud Physics and Atmospheric Electricity, from around 1970 as in other parts of Japan, environmental problems including air pollusion became an important problem of the times, and Prof. Magono's attention was drawn in that direction. Thus, research on aerosol gradually gained importance and as part "Environment and Human Survival", Prof. Magono studied the scavenging effect by precipitation particles.

On the other hand at the same time as an International Cooperative Program, GARP, AMTEX came into being and as part of this work, in 1972 as a preliminary observation the steam fog over Ishikari Bay was selected. As the main observation in 1975 at Miyako-jima Island and at the same time between Tokyo and Taipei, Formosa and following year between Tokyo and Manila observations of cloud distribution were carried by aerial photographs. In all such programs, little or big Prof. Magono was always on the site. At times he personally boarded the Cessna's to observe aerosols, and at other times he suited-up in protective clothing against the cold and took command. Thus, he always lived up to his motto, "On the field observations".

In January 1977, his work which had hitherto been confined to the study of snow crystals on the summit of Mt. Teine, Ishikari Plains, or cold room laboratories, was suddenly changed to the Arctic North in Canada. Even at –40°C in frigid conditions Prof. Magono was seen peering through his microscope. The scientific recordings of his results in the Arctic North in Canada were published in 1978 under the title of "Snow Crystals in the Arctic Canda".

As listed later, along with his numerous research papers, he took every opportunity to observe, think and write. These are listed together at the end of his long list of publications. In all cases, even in the observations of small phenomena, his piercing gaze can always be felt.

In 1969, the first publication of Prof. Magono appeared in the NHK Books series, titled "The Science of Clouds and Thunderstorms". It may be considered that this is a year by year record of his research, which is in itself is the main stream of the scientific work in Cloud Physics and Atmospheric Electricity, and gives an insight of Prof. Magono's never ending scientific quest to the truth in all matters. As of this writing, "The Thunderstroms" written by Prof. Magono is expected to be published by the Elsevier Scientific Publishing Company, Netherlands. After his retirement in full honors, we expect his book to be used widely and universally by various universities and the graduate school seminars.

Thus Prof. Magono has achieved much in his work, involving Cloud Physics and Atmospheric Electricity in the field of meteorology. Recognition of his work was made in 1967 when the Meteorological Society of Japan awarded Prof. Magono with the "Fujiwara Award" and again in 1976 the Japanese Society of Snow and Ice granted him the "Distinguished Achievements Award". Further Prof. Magono has held offices of the Meteorological Society of Japan as a director for a considerable length of time and has been

actively engaged in the work of the chief of Hokkaido Branch of the society and he has been an advisor to the Society of Atmospheric Electricity of Japan. He also has been chairman of many International Meetings, and also actively participated in congresses as the keynote speaker. He also was on many occasions invited to read his papers. In 1965 when the 7th International Conference on Cloud Physics was held in Tokyo and Sapporo, Prof. Magono played a key role in making this international gathering possible to be held in Japan.

That Prof. Magono could work and do his best in Japan and abroad is because of the infinite wisdom and loving care of Mrs. Chieko Magono who cooperated in every way to make his activity possible. Every year for 25 years at the New Year Party held at the professor's home, Prof. Magono's staff, graduate students and undergraduates, a total of 25 members or so have gathered. When the seniors are ready for graduation or when visitors from all Japan and foreign guests come to Sapporo, Prof. Magono and Mrs. Magono invite them to their home where Mrs. Magono prepares a delicious party dinner for their guests. The visitors enjoy the party and amid an exchange of drinks, the talk invariably turns to discussions of research work in the past and in the future. With their 2 daughters happily married, Prof. Magono is already a grandfather of 3 children. When the talk turn to his grandchildren he seems to be an ordinary well satisfied grandfather, yet when confronted with problems of this work, he still is the top notch scientist that he is.

In the Department of Geophysics, Faculty of Science, Hokkaido University during his 25 years, he has taught at least 100 undergraduates in his laboratory. More than 60 graduates including peoples from America, The Republic of Korea, The Korean Democratic People's Republic and Malaysia have taken their doctor of science under the guidance of Prof. Magono. These members are active in their respective field in various parts of the world.

There is one regrettable thing in his long career. I refer to the untimely death while on duty of the young Associate Professors S. Tazawa and T. Kasai who met with an observation plane accident on the Taisetsu Mountain range. They were engaged in the measuring of the snow cover as part of the work of IHD.

Hokuriku in Honshu Island with its frigid climate, where Prof. Magono spent his boyhood days, begins winter with a peal of thunder as it were, may have caused him to wonder at the divine rules of mother nature which lead him to become particularly interested in "Winter Thunderstorms" from several years before his retirement. Thus in a cooperative study between U.S.A. and Japan, a joint program was set up between Prof. Brook, New Mexico Institute of Mining and Technology and Prof. Magono. Thus he finally came to grips with his cherished dream.

On the occasion of Prof. Magono's retirement, we his selected team members and faithful students, wish the Professor the very best of everything in his years to come and we also wish him good health and prosperity to his family.

Katsuhiro Kikuchi

List of Research Work Publications in English

1. Design of an Integrating Thermometer. J. Fac. Sci., Hokkaido Univ., Ser. II (Physics), **4** (1951), 1–20.
2. On the Fall Velocity of Snowflakes. J. Meteor., **8** (1951), 199–200.
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12. On the Behaviour of Water Droplets in the Air at Temperatures below Freezing. Proc. Sixth Weather Radar Conf., (1957), 15–19.
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71. A Laboratory Experiment on the Electrification of Ice Crystals. (with T. Iwabuchi) Arch. Met. Geoph. Biokl., Ser. A, **21** (1972), 287–298.
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Book: Thunderstorms (in press in Elsevier Publishing Company, Netherlands)

List of Research Work Publications in Japanese

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