



**DR. GEORGE CRESSMAN**

# INTERVIEW

AN INTERVIEW WITH DR. GEORGE CRESSMAN

Former Director, National Weather Service

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## BIOGRAPHY

Born in West Chester, Pennsylvania, on October 7, 1919, Dr. Cressman received his bachelor's degree from Pennsylvania State College in 1941, his master's degree from New York University in 1942, and his doctorate from the University of Chicago in 1949.

He served in the U.S. Army as meteorologist from 1941-1946. After leaving the Army, Dr. Cressman served as a Research Assistant in the Department of Meteorology at the University of Chicago. From 1949-1954 he was in a civilian capacity as Consultant with the Air Weather Service at Andrews Air Force Base in Washington, D.C. In 1954 he assumed responsibility for establishing the Joint Numerical Weather Prediction Unit. This special forecast unit, sponsored jointly by the Weather Bureau, Air Force, and Navy, pioneered in the field of operational forecasting procedures by numerical weather prediction techniques. He came to the Weather Bureau in 1958 as Director of the newly formed National Meteorological Center. He became Director of the Bureau's Office of National Meteorological Services in April 1964, providing policy guidance and direction of Weather Bureau field offices. He became Director of the Weather Bureau on September 1, 1965. With the creation of the National Oceanic and Atmospheric Administration on October 3, 1970, Dr. Cressman became the Director of the National Weather Service, one of the primary organizational elements of the new administration.

**Digest:** Dr. Cressman, looking back on your tenure as Director of the National Weather Service, could you please summarize for us your thoughts on your successes and your failures?

**Cressman:** I think we, and I use this "we" not in the royal sense but we as in the organizational sense, have done a number of things. And first of all, let me say that I don't want to characterize these as personal successes or failures, but as what we have been able to do more as a reflection of the national mood, the pressures that are felt in one direction or another, and also the efforts of a lot of people.

I would say that we have made a great deal of progress in several areas. First, as you will recall, back in the early 1960s, we had arrived at a transition point in a number of areas: the first problem was how the forecast was prepared and by whom; second, the establishment of a career ladder for meteorological technicians; a third was re-equipping the Weather Service.

A major reorganization defined anew the duties of the meteorologists and the meteorological technicians, changed the forecast structure so that the forecasting was done at 52 WSFOs and decentralized the Great Lakes forecasts so that now Chicago, Detroit, Cleveland, and Buffalo now all make Great Lakes forecasts.

And I think there was a corresponding improvement in forecast quality. So you might say that the forecast reorganization was in effect a decentralization of forecasting, and to a large extent it was made possible by the steadily improving guidance from NMC.

At the same time, we clarified the duties of meteorologists and meteorological technicians, and we established a career ladder for meteorological technicians. In the early 1960s, there was no career ladder for these occupations. I remember during an early trip to Oakland, I was cornered by some meteorological technicians, and they said would you kindly explain to us what is the career ladder for meteorological technicians? I had to admit that there wasn't any. Now we have established a career ladder for meteorological technicians, so that meteorological technicians can now rise to being an Official-in-Charge at the GS-12 level at any one of a number of stations. So I think that there were substantial accomplishments in improving the way we do our day-by-day work.

We have also managed to re-equip the Weather Service in that we have first of all made a big rehabilitation of the quarters in which our people work. All our WSFOs are now in decent, modern quarters, and the same is true of most of our WSOs, not all, but most of them. In re-equipping the Weather Service, we have also managed to finish out the WSR-57 network, and to completely re-equip the local warning radar network. We now have approximately 55 to 60 WSR-74Cs, all of excellent quality. These have replaced the old

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motley collection of WWII aircraft radars. In all this I think that we should be extremely careful to emphasize that this implies no criticism of what was going on before this time. It's just that equipment gets old and wears out, that technology changes, and if we hadn't re-equipped, then we would have been at fault. We've also done a great deal toward automation of the hydrological observing network. We now have gone to AHOS, and the DARDC, which has been one of the chief problems, is now what I considered a solved problem. The new version has increased the reliability of the reports from around 75% to somewhere near 90%. In connection with this improvement of the hydrologic network, we of course, have to recognize the contribution of the satellite as a communications platform, as for example, the AHOS-S versions.

In addition to that, we have done a great deal toward improving the effectiveness of our workforce in the field stations, as for example, the telephone policy which was inaugurated in the late 1960s, which has led us toward a much greater use of telephone recorders and multiple automatic telephone answering systems. I know that some of the employees are less than thrilled with the idea that they're not talking so much with the citizens, but then on the other hand, a vast amount of time was wasted in answering simple inquiries that could have well been answered by automatic systems. We have lost a little bit in automating but I think we have gained more than we have lost. At the same time we have been implementing the NOAA Weather Radio network. With all its faults, this still gives a vast improvement in our ability to reach the public. The faults are several: first of all, there should be four frequencies rather than the three given us, and secondly, we were never able to get the maintenance staff needed to run the NWR. The contract maintenance is lower in quality than the maintenance that we are accustomed to getting from our own employees, and so that is a weakness of the NWR program. Also, we have had a problem with ceiling points in getting the personnel to put their voice over the radio. This particular problem is increasing more and more.

**Digest:** How do you respond to those that say that forecast accuracy is decreasing?

**Cressman:** I can say that general forecast accuracy has certainly improved. And this is a consequence of a number of things that have happened. First of all, the guidance from NMC has consistently improved. I think that last winter the guidance from NMC was spectacular, particularly in those most severe storms we had back in January and February. It's always possible to find some fault with us but, to be realistic, you have to compare the effectiveness of the accuracy of the guidance from NMC now with what the whole

Weather Bureau (then) was able to do in the decades past. Young people these days don't remember how it used to be, but in the old days it was exceptional to hit a really big storm 24 hours in advance. Now we're upset if we *don't* do that. On the smaller scale, we have learned a great deal about tornadoes and flash floods. Most importantly, we have made a great deal of progress in disaster preparedness and in dissemination of warnings. Flash floods are now getting to be a big problem. It didn't used to be one, and the reason is that there is much more building of all types of structures and much more inhabitation today of flood plains. This is a result of expanding population and pressure on the use of land. As I look at the system now, I am convinced that we have made a great deal of improvement in our readiness to handle flash floods. This is not to say that we're going to hit them all in the future. Here we can't omit the valuable contribution of satellites and radar in increasing our capability to cope with a flash flood threat.

**Digest:** Where have the areas for improvements been and where will they be in the future?

**Cressman:** Well, we have made substantial improvements in the guidance from NMC, and this has been through two things - first, in 1965 we got started on the use of Primitive Equation Models, and second, we improved our initialization, and that made a rather important difference in accuracy. We added latent heat into the models in the late 1960s, which made another improvement in accuracy, and further improvements through the 1970s have come about through increasing the horizontal resolution where we cut the mesh length in half going to the LFM, and we cut that almost in half in going to the LFM II. And the performance of the LFM II as compared to the original PE model of 1965 or the 3-level model of 1961 is quite dramatic. We have also developed the RAMOS system, and have now deployed the better part of 100 of these stations around the country, which are now giving us surface reports from areas that previously were blank areas on the map. We have also gone one step further and developed the AUTOB, an experimental version of what I would envision as the automatic station of the 1980s. We are hoping that the production version will be available by the mid-1980s, and that will enable us to increase the density of our surface reporting network by filling-in the holes. Another accomplishment, more of an effort now but nevertheless an accomplishment when it is done, is AFOS. AFOS will transform the way in which we do our work and will make the meteorologist much more productive, and will allow him to take full advantage of the Model Output Statistics. The forecaster will be able to call up his series of MOS FTs for example, look at them, and either let the computer-worded forecasts go out as is, make minor changes, or completely re-write

if he so wishes. It certainly will take a lot less time than writing everything from scratch. So this is what we mean by increased productivity. In this way the "dog-work" that is done by the forecaster today will be dramatically decreased. Also important is the shortening of the time needed to prepare and distribute warnings. I might add that today's forecasters are more innovative, and more open to fresh ideas than was the case 20 years ago. Also, there are still a number of things that a forecaster has to do in a station which are non-professional in nature and which are a waste of time. So AFOS is going to give us a substantial improvement in the way we do our minute-by-minute business in the forecast office.

**Digest:** It seems that the crux of the problem with the Weather Service right now, and at least for the very near future, is personnel staffing problems.

**Cressman:** That is correct. To understand this now you have to understand the national situation. The administration is extremely concerned about the problem with inflation. The Office of Management and Budget (OMB) leans on everybody that is lean-able, but they can't cope with the entitlement programs, the mandated spending programs, because that's not within their authority. So the pressure is very extreme on the controllable part of the budget and that's where we are. This means that the pressure is very intense for us to increase productivity, to do things more effectively and smarter, so that what we were doing with five people in the past we can now do with four or three. To ensure that we exert maximum effort to this objective, they have simply decreased the ceilings that we have. For example, take the NOAA Weather Radio. We simply did not get any extra people to do the job. You don't get your choice among ideal options - you get your choice among options which are much less than ideal, in fact, you have to choose between bad and worse. And the pressure has not let up at all. As you know the President has put on a restriction on hiring from the outside. You can only fill one out of every two vacancies, and now it's quite clear to me, that ceilings are going to drop again next year (1979). No doubt at all.

**Digest:** Do you foresee the possibility of a Reduction-in-Force (RIF) next year (1979) to meet these new ceilings?

**Cressman:** Well, I certainly couldn't exclude the possibility. We will try to take whatever cuts we have to take by attrition. But on the other hand, this may not be among the possible options. It depends on the extent of the cut and the nature of the cut. Here, I would like to say something to your readers about the budgeting process. It's not very easy to present hard benefit/cost figures for meteorological services which are precise, accur-

ate, and honest. How can you possibly measure the benefits of public weather forecasts? Certainly you could get an estimate of it by a comprehensive national survey in which you would ask people their opinions. Even asking people their opinion would not likely produce an accurate result. One way you might find out is to cut off all free weather information for some area and charge for it and see what the market would bear. The weather services of the government are designed to benefit mainly the small user - the one who can't afford to go out and buy his weather services from a private meteorologist, that is, the average farmer, the average member of the public, the general aviation pilot. And this is the hardest kind of benefit to establish in any convincing way. And I don't think it is realistic to ask for a precise benefit/cost figure in that respect. However, if you want to look at it this way, if you take the total budget of the NWS, NESS, and ERL weather research, this would come to something like three hundred million dollars per year. With a total population of approximately two hundred million, this works out to \$1.50 per year per person, or put another way, three cents per week per person. I think we could take as a given that there is more benefit than that. I think our weather services are a fantastic bargain.

**Digest:** Has Zero-Based-Budgeting (ZBB) helped or hurt the NWS?

**Cressman:** ZBB as applied to the NWS has certain assumptions inherent in it that I don't think are particularly useful. It assumes for example, that we have activities of low priority that can easily be discontinued. In our case, because of the constant and intense demand for our services and the pressure on us to do these within current staffing budget levels, we have constantly re-examined our system to find what could be eliminated or changed in order to provide resources for new things. And we have certainly done this. The amount of reprogramming that we have done in the last 15 years has been vast. Much of it has been accomplished through automation - automation of forecast guidance, automation of facsimile, means to distribute plotted and analyzed maps, automation of the upper air network through the use of minicomputers, and automation of the hydrologic observing network. Now all these things have yielded benefits in terms of manpower and dollars which we have immediately reprogrammed into higher priority activities in order to improve our services. Where do you think we got the resources for our marine services? They came from reprogramming.

**Digest:** Do you have some words of wisdom for the next Director?

**Cressman:** Yes. Lots of luck - you'll need it!