



*The hardest winter of this century is a matter of record. Now, farmers and others interested in food – and that takes in about everybody – are keeping an anxious eye out for the climatic conditions of spring and summer. Will the drought continue? How good are our weather forecasts? To the Missouri Alumnus, the time seemed right for talking to some of our atmospheric science people at Mizou. The work of department chairman Wayne Decker (climatic impact on food production), Dr. Ernest C. Kung (global weather studies) and Dr. Grant Darkow (studies of circulation patterns that generate thunderstorms, tornados, floods and other severe weather) is nationally and internationally known. If you can believe any meteorologist, therefore, you should be able to believe the Alumnus interviewee, Dr. Decker.*

**Q** Dr. Decker, what happened? What brought on the Winter of '77? And did weather forecasters expect it?

**A** Well, there's one thing about weather forecasting: If you keep making the same forecast long enough, you'll be right eventually. But I believe that anyone who would have contemplated a worst-of-a century sort of thing would have been way out. Many persons had some concern because of the series of mild winters we had experienced in the early 70's. Obviously, they couldn't last forever. There's this thing about circulation patterns: When one particular pattern gets established, it more or less locks in and the pattern is hard to break. That was true of our mild winters. And that's what we've seen this winter, too. When there are droughts in the summertime, the days without rain will persist because we locked into this particular circulation pattern. Similarly, when we go into a period in which we're getting above-normal rainfall, it generally continues for awhile.

**Q** Fortunately, this winter is over, but you mentioned droughts. What are the chances for another drought this summer?

**A** Science does not know how to forecast in February the 60-day rainfall from April 15 to June 15. There's no way. And that's when we have to get the replenishment for most of Missouri and the Midwest. These areas receive relatively small amounts of winter precipitation to begin with, and most of that becomes part of the surface runoff. Winter precipitation in these areas falls on frozen ground. So it won't be until April 15 that we can begin to expect to receive rainfall that will recharge the soil water for the summer growing season. But, because we have experienced dry years recently, I think that we must have above-average rainfall in order to adequately recharge the soil water to carry us through the summer without any trouble. So I'm apprehensive. But that's not a forecast. That's looking at the normal run of climatic events.

**Q** You mentioned that science couldn't forecast the rainfall a couple of months ahead. Just how accurate are long-range weather forecasts?

**A** One of the things we've been evaluating in one of our research projects is the skills of the long-range forecasts — in science we call them "outlooks." We've looked at the 30-day outlooks that are issued by both our National Weather Service and those from the Soviet Union. The interesting thing is that in both countries, the accuracy in forecasting trends in temperature and rainfall over the next 30 days is about 55 to 60 percent. And that's only forecasting the right sign of departure. In other words, is the temperature going to be above normal or below normal? Are we going to have more or less rainfall than normal? Now, 50 to 60 percent accuracy does not represent a great skill.

The Soviet Union has been releasing for some time seasonal forecasts three months in advance. Our extended forecast people in the United States have been doing this for a shorter period of time. The skills on those forecasts are even less than the 30-day forecasts. In fact, there's some evidence that there's not much skill there at all.

**Q** How do our Missouri forecasts stack up?

**A** In terms of long-range forecasting, none of our staff is regularly releasing information. If one of us has some information that might be helpful to a particular sector of the economy, we might make a projection. But our mission is one of teaching and research. Our responsibilities are not in the forecasting area, and I have discouraged both staff and students from making routine releases of their projections. There are two reasons for this. One is that it takes a lot of time to go through an evaluation to give an intelligent appraisal of even tomorrow's weather. That time would have to come from teaching and research responsibilities, in the case of the staff, and from study time, in the case of the student. The other phase is that, in a community the size of Columbia and probably a community any size, the public doesn't need two forecasting institutions. As you know, there's always the tendency for the press to play one side against the other when there are two sources of information.

**Q** If scientific long-range outlooks are so uncertain, what about relying on such indicators as farmers' almanacs, the amount of fur on the woolly worm, or the number of nuts a squirrel stores?

**A** I don't really think there's any skill involved in this at all. It doesn't make sense to think that a single meteorologist and his secretary sitting in a room down in Florida could make better long-range forecasts for an almanac than a group of scientifically trained meteorologists working in concert in a forecast center. Now people will paste the almanac projections on their bulletin boards and check them out. But they won't make management decisions based on them.

And I don't really understand how a creature can sense his needs for the coming season on the basis of events that occur now. I know that the extreme cold temperatures in the eastern United States occurred because of climatic events taking place over the northern hemisphere: the interactions between the oceans and the atmosphere and between the land masses and the atmosphere. And this allows me to

believe that a squirrel sitting in a hickory tree in my back yard probably doesn't have any great insight as to whether the oceans are warmer than usual in the North Pacific. But conversations based on such projections don't really do any harm. They're pro-I'll engage in that kind of talk myself, once in awhile.

**Q** When are we going to be able to do a better job in forecasting weather?

**A** We're going to see improvements in the forecasts of both short range — today, tonight, and tomorrow — and medium long-range forecasts — looking ahead at a period of from 10 to 14 days. We also will do a better job than the 55-60 percent skills on the long-range outlooks. Twenty years ago, you couldn't even see a long-range outlook. They were kept secret. But these improvements aren't going to come in a dramatic, sudden way, I think. It will be an orderly, slow process.

In the last 15-20 years, I've seen tremendous improvements. We're simply doing a much better job of preparing a weather map that looks more like the day-after-tomorrow's weather than we used to. There are three things responsible for this. You hear quite a bit about the computer. It allows the solution of equations that simulate the behavior of the atmosphere much better than man can alone. Without the computer, we'd still be sitting on tall stools and drawing lines on maps. We hear a lot about the satellite — it's been a bonanza to meteorology — and weather radar. The satellite lets us identify things we didn't even know existed before, and radar shows us not only where the clouds are, but also something of their intensity, their shape and behavior.

But what you don't hear as much about — and this may be equally as important — is what we are doing right here and at other major universities throughout the United States: putting into the field graduates who are very well trained in physics and mathematics and the applications of these physical laws to the atmosphere. The meteorologists today are so much better prepared than the meteorologists of 30 years ago, it's just unbelievable.

No, I don't expect any breakthroughs. But I'm confident that before I bow out of the picture, I'll be able to say to the young bucks with me, "Boy, you're doing a lot better than we used to do back in the 70's." □