

Peter B. Dow, of New Zealand, a professional seedsman, has sent to me sprouted seeds in lieu of the seeds that I had ordered, a very pleasant surprise. They were of *Rhopalostylis* species and were in fresh, moist peat, enclosed in a plastic bag. It was like receiving orchid seedlings from community pots. The "seedlings" arrived in perfect condition. They were sustained en route at least in part by the endosperm. No leaf had emerged. The roots were well-branched. From the point of the sheathing structure from which the leaf would finally emerge to the bottom of the root system was about an inch and a half. I would guess that the endosperm was about half consumed. These sprouted seeds were ready to be potted.

It is clearly evident that sending sprouted seeds has great advantages. Viability of the seeds is no longer a consideration. Only one problem presents itself and that is with a few genera in which elongated cotyledons emerge from the seeds and carry the embryos some distance from the seeds before they sprout. These cotyledons are very fragile. They also elongate rapidly once they have started to emerge. Examples of such palms are *Borassus*, *Copernicia*

and *Hyphaene*. In most kinds of palms the elongation of the cotyledon is slight.

Several years ago I collected some *Borassus* seeds on Kandahar Island in the Zambezi River about eight miles above Victoria Falls. Elephants are very fond of these seed. In some way they get over to the island for them. The only seed left by the elephants had been dropped and stepped on by them so that they were level with the surface of the moist soil. The elephants could not pick them up. I had some difficulty in digging them out with a pocket knife. When I put them in a plastic bag germination began immediately and within two days the fast growing cotyledons had emerged so far that the seeds were worthless for shipping.

There should be more activity in the exchange of palm plants between members of the Society. The distribution of seeds through the Seed Bank of the Society is a most valuable facility. It could be supplemented if members would declare themselves willing to engage in the exchange of palms. Two to four years of time could be saved for each palm over having grown it from seed.

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## Our Changing Weather

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The weather: Cold . . . frost warning . . . freezing . . . more of the same.

That forecast could be somewhat premature for Florida. But the experts say cold warnings will be more frequent for the Sunshine State.

The state spends huge sums to advertise sunshine, glittering beaches, a benevolent sky that guarantees a coppery skin, and the unspoiled beauty of wild-life sanctuaries of semi-tropical birds

and animals, all of which can be enjoyed during the season when much of the rest of the nation shakes and shivers and huddles next to the floor furnace. But even the most optimistic interpretation of what is happening to our climate stirs a vague worry when the facts are known.

To begin with, the facts themselves seem contradictory. A century ago the world emerged from the Little Ice Age,

and temperatures have been getting milder most of the time since then. For a while, the world temperature went up one degree but the temperature rose four times as much in the Arctic as near the Equator, and none at most of all around the North Atlantic. Also, winters in most places accounted for all the change. It was in Spitsbergen, an island northeast off Norway where the most radical jump took place. It seemed that on this island all of the trends combined. In one twenty-year period there, winter temperatures went up 24 degrees.

In our Northeastern and North Central states, average winter temperatures have climbed 3.5 degrees during the last 50 years or so. Southern winter temperatures rose a little more than 2.5 degrees in the period between 1894 to 1954. In the Southwest, however, the temperature rise there was but an average of one degree.

Summer temperature trends are up everywhere by less than one degree except in our North Central states where the increase seems to have been a little more than that.

Significantly, tropical and sub-tropical zones have become if anything, a little cooler in the last half century. What has brought about this change in climate?

This is where the trouble lies. If we knew precisely what caused climatic fluctuations, we might be in a better position to forecast whether warmer, colder, wetter, or drier weather is ahead. Present theories of why climates change involve the wobble in the earth's spin on its axis, differences in the amount of dust in the air, shifts in ocean currents, changes in the quantity of carbon dioxide in the atmosphere and the elevation or depression of the continents.

Climatologists say there is no doubt that all of these factors have played some role in influencing the earth's cli-

mate at particular times and places. But even the best weather prognosticators admit that the problem of world-wide climatic change is still very much of a mystery. Each time a cause of change is investigated somehow an alibi is developed for it.

The business about the eccentricity of the earth's orbit in space producing a variation in the rate at which radiation is received from the sun does not seem to be a satisfactory explanation for the sweeping climatic changes that are being foretold.

It is true that presently the earth swings closest to the sun in January and farthest in July, making seasonal changes milder in the northern hemisphere and more severe in the southern.

But this is of little consequence unless you want to take the long view. In 100,000 years the phases will shift so that the reverse will be true. Summers in the northern hemisphere will be hotter and the winters colder. Then in about 21,000 years we will be back to January for the closest approaches of the sun again.

The most promising theory for a decline in temperatures is that carbon dioxide is the culprit of change.

When trees are chopped down, when once rural land is open to new suburbs, when factories and refineries continue to pop up it becomes apparent that the amount of carbon dioxide taken from the air by growing plants is decreased. At the same time the amount added through fuel consumption is increased. In a sense, carbon dioxide has a greenhouse effect. It lets sunlight in, but won't let heat rays out.

If industrialization continues at the present rate, the theory would suggest that by the year 2080 temperatures might be up by as much as four degrees. A four degree rise, if maintained a few thousand years would surely melt

a great portion of the six million square miles of ice and snow now collected at the poles. This would have the effect of raising the levels of the oceans around the world.

Such an increase would very likely bring tropical conditions to most of the earth. Carried far enough, though no one knows precisely what this might be, ten degrees would be enough to melt all of the gigantic ice sheets of the South Pole.

If this happened ocean levels would rise a couple of hundred feet, for these ice sheets are as much as two miles thick. In such an event coast lines would change enormously, ocean currents would shift and the whole pattern of climate as we know it would be altered.

Lest anyone become apprehensive that in the near future Miami will disappear in the ocean or that steaming jungles will overrun Chicago, he can take heart from the fact that nature would require at least five thousand years to bring about such a dramatic climatic change.

But going back to the carbon dioxide theory, if this gas were, in fact, a regulator of climate then the increase of carbon dioxide in the air from burning coal and petroleum would neatly coincide with the warming trend the world has experienced. Unfortunately, the theory has some serious holes in it because despite increased carbon dioxide, the world is getting colder.

The fact of the matter is climatologists don't know really what is changing our climate. They must rely on historic cycles to predict what the future might hold. We do know that the United States experienced a warming trend until about the second half of the 1950's.

The early fifties were warmer than ever in the United States. By all the signs it had to end. To our north, Canada has turned colder. To the east, the

ocean temperature plummeted to what it had been 25 years before. To our west, in the Rocky, Cascade and Olympic Mountains, glaciers that had been slowly thawing in balmy weather started advancing again under new accumulations of ice.

In any case, the trend maps of the climatologists showed the world's warm spell ending. Although the cold has yet to hit us hard, the evidence is indisputably that 30 per cent of the warm trend has been slowly cancelled by colder weather.

In Florida, birdwatchers for the past several years have discovered the conspicuous absence of many feathered creatures that used to winter here.

The cardinal, tufted titmouse, mocking bird, and hooded warbler, once regarded as southern inhabitants, have been found in recent years in north central states and even in New England.

The Gulf Stream, which constantly replenishes the seafood basket in the Gulf of Mexico, has been getting warmer. But if the cold trend continues in the southern hemisphere, it is possible that the Gulf Stream, which has helped push back the Arctic ice pack hundreds of miles, would cool off.

The effect would be that the ice pack would start advancing south again. At the forefront of it icy air masses would make a Siberia of northern states and the continuation of such fronts would drop temperatures down even farther in the south.

But the economic effect would be catastrophic to Florida's seafood industry. The Gulf of Mexico produces one-fifth of all the seafood consumed in the United States annually.

Cooling of the Gulf Stream would kill much fragile life which matures in the womb of the great current. Fish would retreat farther south, the nurseries of marine life, bays and estuaries,



would become virtually barren due to intruding cold water.

As an example, the growing Florida oyster industry would be seriously affected. Due to relatively constant temperatures ranging from 75 to 80 degrees, Florida oysters mature in a year to eighteen months. It is conceivable that colder weather would lengthen the time it takes our oyster crop to mature.

In Chesapeake Bay, where temperatures are much lower the growing season for oysters is four to five years. In terms of dollars and cents, Florida's commercial and sports fishing industry pumps over \$400,000,000 annually into our economy. The effect of colder weather cannot be estimated in terms of what it might do to this important source of income.

Climatologists are suggesting, however, that the Gulf Stream is already undergoing an almost imperceptible change. This is due to a phenomenon with which pilots have been familiar for years.

This is called the jet stream. Airline pilots have hitched rides on the jet stream to speed them along on flights. The jet stream marks the southern boundary of the polar air mass which expands when it is cool and contracts when it is warm.

Thus, pilots will have to fly farther south to hitch a ride on this swift air current.

And at sea, since the limit of the polar air mass is set at the edge of the Arctic ice pack, ship captains will again have to watch out for icebergs as the pack grows southward. Icebergs that have almost vanished from the sea lanes to Europe may become serious navigational hazards again.

Of course, many of the things that happened in the warm trend will reverse. Birds, animals, fish and plants will retreat south. As the glaciers grow,

the sea level will drop, the growing season will be shorter, and so will the ice-free season on the Great Lakes to the north.

While it is true that all of the United States seems to be in for a cycle of cold weather, southern climes such as Florida will still be the warmest areas in our country, but even so we can expect less warm weather than in previous years.

The Florida Department of Agriculture suggests that if the state is to have cooler nights and days, then tomato farming may replace growing oranges as a major crop. Tomato plants will not grow unless there is a daily fluctuation of temperatures. It is doubtful though that tomatoes could replace the value of the Florida citrus industry which contributes \$1,167,000,000 annually to our economy. Freezing nights could virtually ruin this important segment of Florida's economy.

In addition, a shorter growing season could affect the whole agribusiness of the state. The cattle industry, truck farming of vegetables and melons, would be altered. At present, agribusiness represents annual sales of 4 billion dollars and a total investment of 12 billion.

Climatologists, being, however, human don't mean to scare by making cold weather predictions. But if in fact colder weather is ahead, there is another, brighter perspective in which it should be viewed.

As our climate has grown increasingly variable, plant and animal forms have become more capable of adaptation. Having to respond to changing conditions has caused plants to become more hardy and animals more intelligent. And man, who has been able to develop a technology that enables him to control more and better the environment in which he lives, may, by the time the cold is upon us, reverse the conditions that produce it.