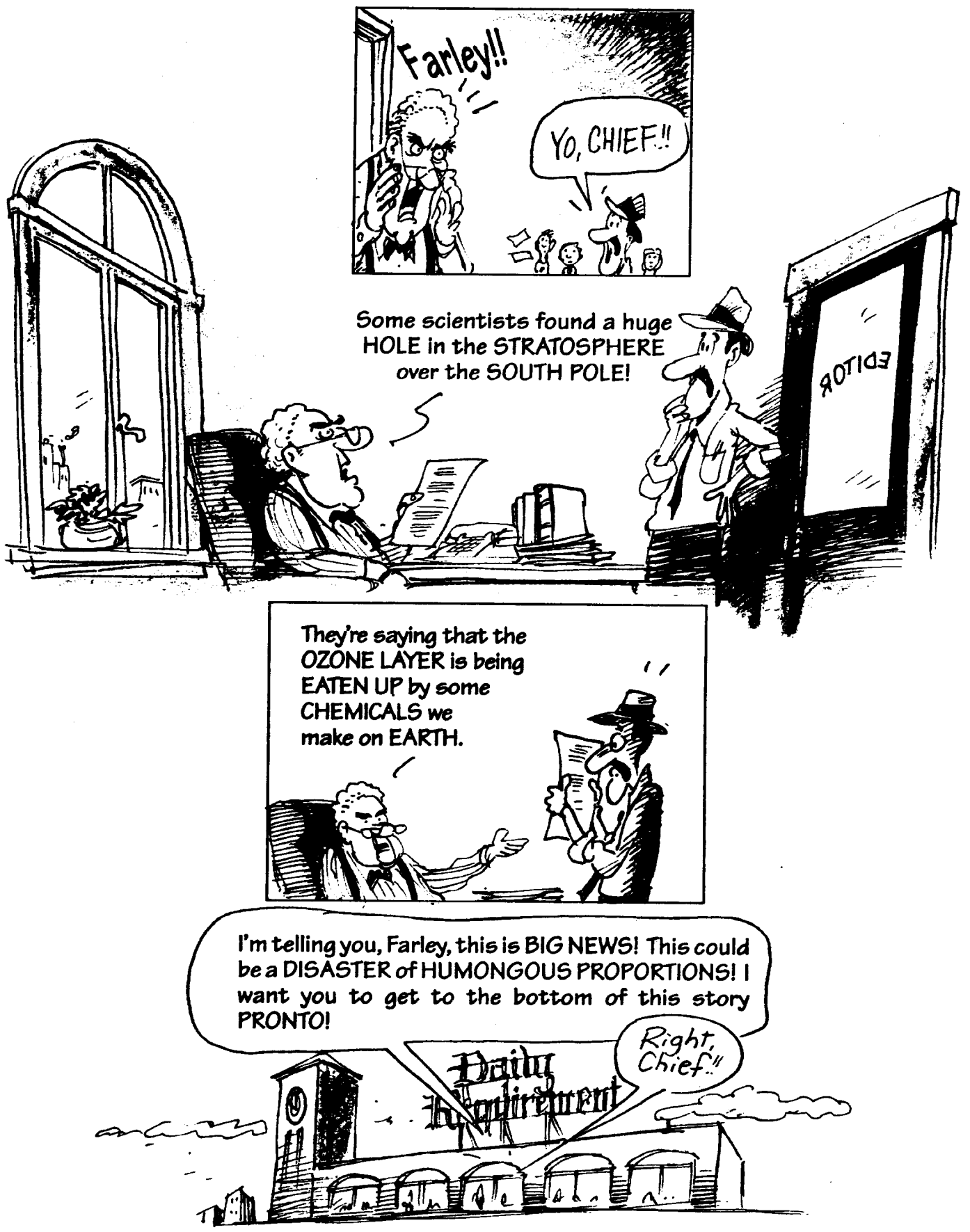
EPA

EPA909-K-93-001
April 1993

In the Newsroom of *The Daily Requirement*...



Farley meets with a scientist...

Let me see if I've got this... you're telling me the ozone is a thin layer of atmosphere that protects us from the sun.

It wraps all the way around the Earth, about 10 to 30 miles straight up. From the beginning of time, the ozone has blocked the sun's most dangerous ultraviolet, or UV, rays from reaching us. And it continues to keep UV radiation from harming life on the planet.

That's right. Each ozone molecule is made up of three small oxygen atoms that act like a safety net to catch most of the UV rays and keep them from getting down to the Earth's surface.

The ozone layer's big enemy is the CHLOROFLUOROCARBONS...

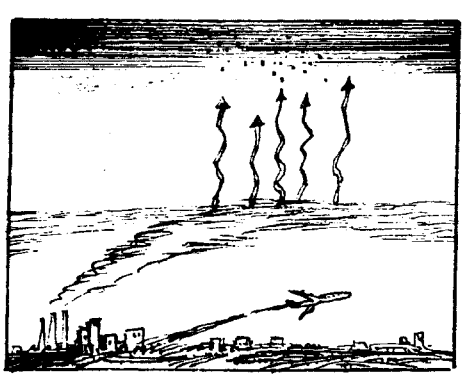
Chloro-flower-whatzits?

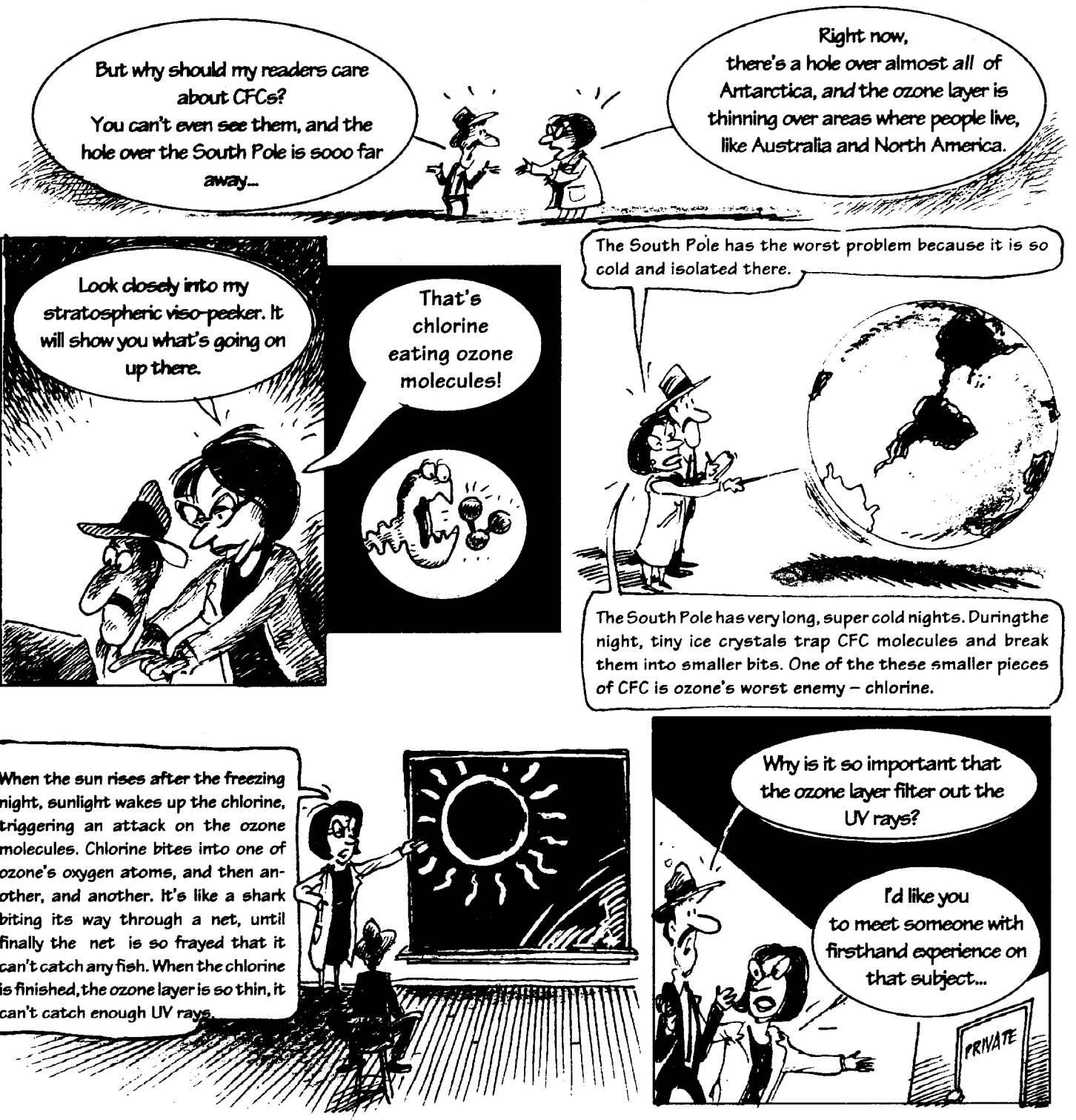
We call them CFCs. CFCs are chemicals we humans invented and we use them in many products that make up modern life. CFCs are used in manufacturing, to clean the insides of computers and to make plastic foam containers. We use CFCs inside refrigerators and to produce the cold air that blows out of every kind of air conditioner.

Air conditioners are dangerous!?!

No, no, no. There's nothing *dangerous* about things that use CFCs in order to run, or things that we manufacture using CFCs. CFCs only become harmful when they escape into the air. They escape from leaks in air conditioners or refrigerators, or when someone throws away a used appliance without draining the leftover CFCs into a tank to be reused. CFCs can also get into the air during manufacturing.

Once CFCs escape, they can float around in the atmosphere for years and years before they break down. Finally, they drift into the upper atmosphere, and <u>that's</u> where the trouble starts...



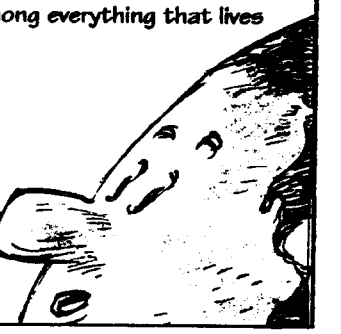


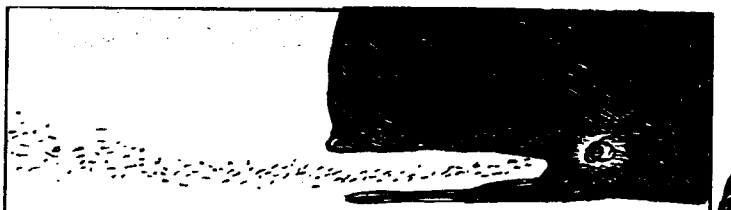
There are two kinds of ozone:

- The kind we want to save—STRATOSPHERIC OZONE—is the protective shield around the Earth.
- Ozone gathers in one other place—close to the planet's surface. There, it is bad for us because we breathe it. GROUND-LEVEL OZONE, the main ingredient in smog, is created when pollution from cars and industry mixes with sunlight. Ozone near the ground causes big health problems, like shortness of breath, lung diseases, eye irritation, and asthma.

As the ozone gets thinner, more and more harmful UV rays reach the Earth's surface...and that starts an awful chain reaction among everything that lives and breathes in the oceans or on land.

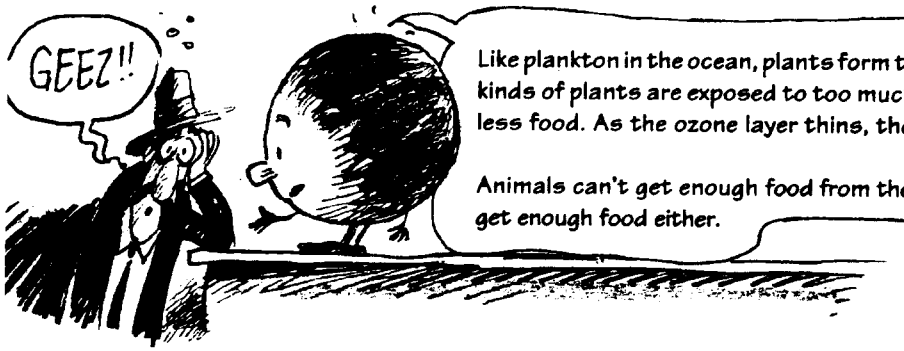
In the ocean, the smallest creatures like plankton and tiny shrimps, called krill, are among the first victims of too much UV radiation.





Plankton and krill are the basis of the ocean's food chain: these critters are nibbled like popcorn by bigger creatures, who are eaten by even bigger creatures. When too much of the sun gets through the ozone layer, the plankton die.

If all of these tiny one-celled critters are fried up by the UV rays, then each set of bigger creatures loses its food supply and they all begin to starve.

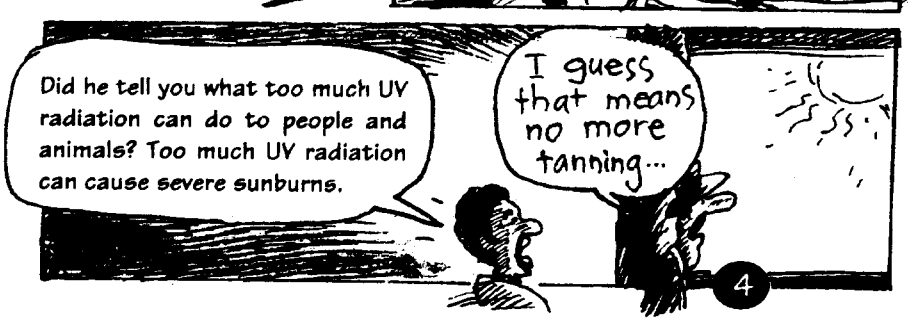


Like plankton in the ocean, plants form the base of the Earth's food chain. When some kinds of plants are exposed to too much UV radiation, they grow slower and produce less food. As the ozone layer thins, the food supply shrinks all over the Earth.

Animals can't get enough food from the plants to survive, and eventually people don't get enough food either.

Farley goes to a doctor...

The headaches started when this little round guy, George Global, was telling me about the effects that destruction of the ozone layer can have on life as we know it.



Global warming

- CFCs also play a small role in GLOBAL WARMING. Global warming occurs when too many of the wrong kinds of gases are created in the lower atmosphere. These gases, like carbon dioxide and methane, get trapped in the troposphere, less than 10 miles above the Earth's surface. They act like a heavy blanket that traps heat close to the Earth's surface and gradually raises the temperature all over the world. Some possible side effects of global warming include sea levels rising because of ice caps and glaciers melting, and farmlands turning into desert-like areas due to changing weather patterns.

Even with a sun screen, the longer you stay out in the sun, the more you're exposed to UV rays. Extra UV rays can cause early aging, wrinkling of the skin, and even worse—skin cancer. It's been proven to cause eye damage, like cloudy vision, after years of exposure. If we could phase out the use of CFCs, it would be like curing skin cancer in millions and millions of people, erasing millions of cataracts from people's eyes, or growing billions of dollars worth of food to feed people all over the world.

If using CFCs is causing these awful problems, do we really <u>need</u> them? Someone out there <u>must</u> know how to get rid of them.

SOMEONE must be working on a solution to this..

Farley goes on a search...and finds an inventor working on a refrigeration invention that won't use CFCs.

Many companies are working hard to develop new appliances that can take the place of ones that run on CFCs.

RE-INVENT!

My company really has something to crow about. We're trying to <u>re-invent</u> air conditioners and refrigerators that run on a new liquid that doesn't contain any CFCs—like this model!

GREAT!

While waiting for new inventions, find ways to <u>replace</u> chemicals with ingredients that do the same work, but don't destroy the ozone.

Some solutions are really simple. At our plant, we used to use liquid cleansers made with CFCs to wash off microprocessors—the computer's "brains"—to get them squeaky clean before they went into the computer. We found out we can use lemon oil and water to do the same thing!

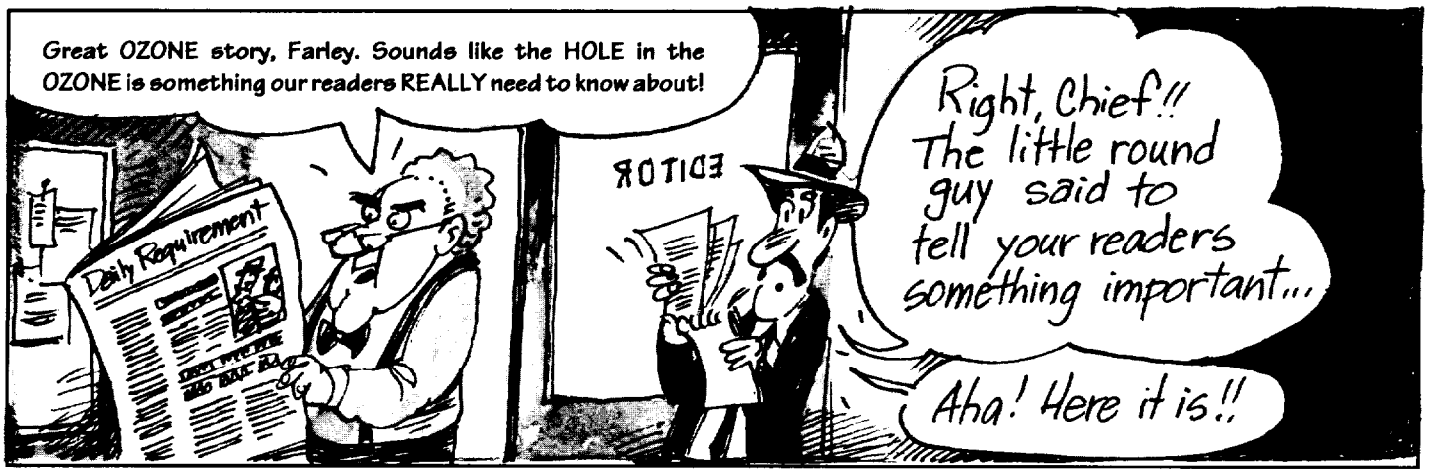
REPLACE

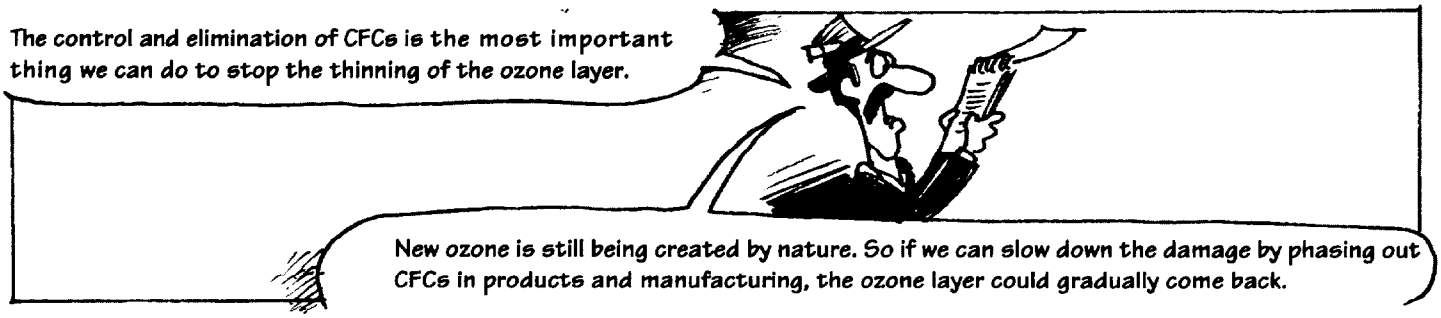
Everyday appliances in the car or home like refrigerators or air conditioners should be checked for leaks. If they need to be fixed, the mechanic should use the right equipment to contain and <u>recycle</u> the CFCs.

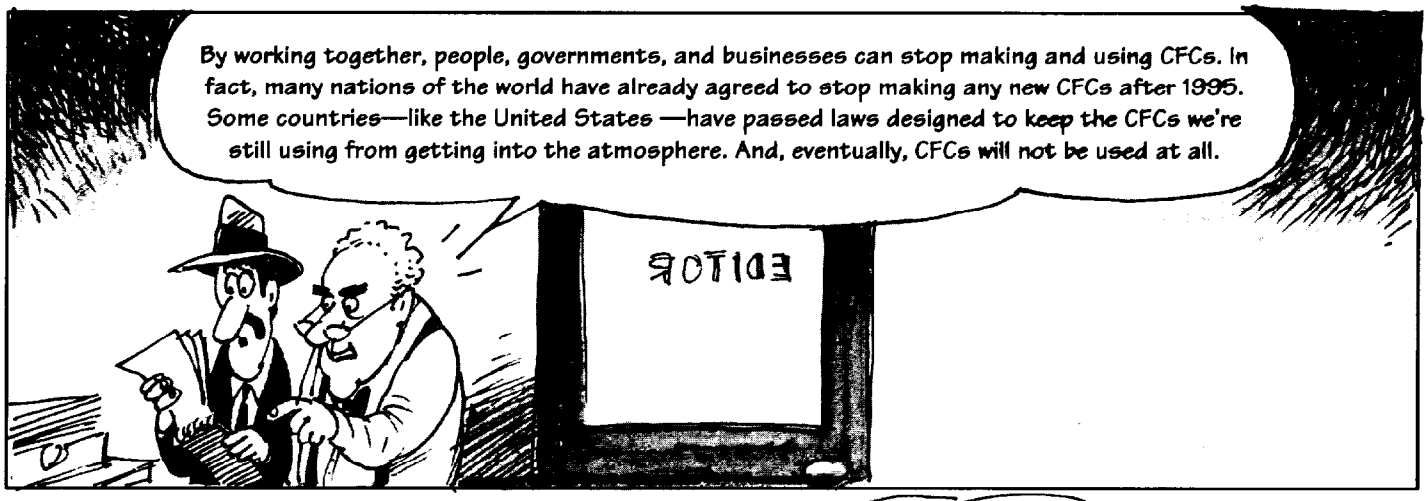
I make sure my garage has the right equipment to repair the air conditioner in your car. This gizmo captures cooling liquids that contain CFCs, so they don't escape into the air, and then I can use 'em again. You know—recycle 'em!

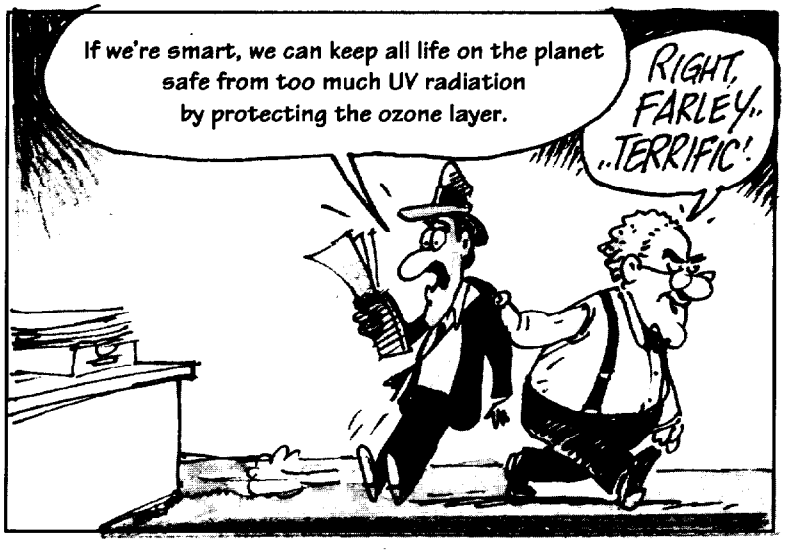
RECYCLE!

Farley returns to the newsroom...









QUESTIONS ABOUT OZONE DEPLETION?

For more information about ozone depletion and the rules and regulations designed to protect the earth's ozone layer, call U.S. EPA's Ozone Hotline at (800) 296-1996 between 10 am and 4 pm Eastern time.

Also check out *Our Ozone Shield*, one of the monograph series " Reports to the Nation on Our Changing Planet" by the National Oceanographic and Atmospheric Administration and the Office for Interdisciplinary Earth Studies. To order a copy, contact OIES at P.O. Box 3000, Boulder, CO 80307-3000; phone (303) 497-1682.

INTERESTED IN OTHER ENVIRONMENTAL EDUCATION RESOURCES?

Contact: U.S. EPA Public Information Center
401 M Street, SW (TM-211B)
Washington, DC 20460
(202) 260-2080

For additional information on EPA's regional environmental activities, contact the environmental education coordinator for that region:

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75 Hawthorne Street
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