

government had already paid farmers \$15 million in compensation, and the figure was expected to reach at least \$20 million.

Anguished livestock owners were becoming virtual hermits, sometimes refusing to admit even exhausted and overworked veterinarians. "Do not call in the helpful neighbor to see a slobbering cow," warns I. A. Graham, regional veterinary officer in Wales. "It is not easy for farmers and their families to be antisocial," he says, "but a stay-at-home attitude could pay dividends and make reunions all the sweeter when the tension is over."

Despite the cost of compensation, as well as the lost revenue to farmers who will need years to rebuild their herds, British officials have remained firmly in favor of slaughter over vaccine as the way to combat the disease. Only about 0.4 percent of the 50 million susceptible animals in Britain have had to be slaughtered, they argue, whereas a vaccination program would have to reach every cow, sheep and hog in Britain every year.

The government estimates that such a program would cost \$70 million annually and might still not work, since no single vaccine is yet known to exist that is effective against all seven types, 42 subtypes and possibly several sub-subtypes of the foot-and-mouth disease virus.

Animals that have survived infection by one of the major types are still susceptible to the others, and, after as little as two years, even to the one with which they were originally infected.

Yet the matter is widely controversial. In countries such as Panama, for example, where the number of susceptible animals is relatively small, the cost of vaccination may be worthwhile, compared to that of losing large numbers of livestock.

Even in the U.S., where the disease has not existed for almost four decades, some researchers are reluctant to take sides.

As the cure is uncertain, so is the cause. The current British outbreak has been variously blamed on viruses brought by starlings, or beef imports from Argentina (denied by Argentine officials) or other countries which together provide about one-third of Great Britain's beef.

The disease had not spread to any new areas for several days by the beginning of last week. Livestockmen and officials in Britain were still too battered for joyful anticipation, but one British official in Washington ventured a cautious hope.

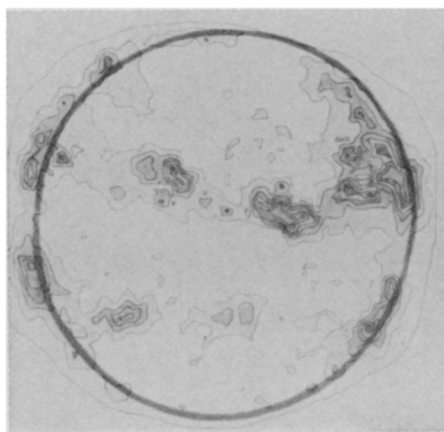
"If this holds," he said carefully, "it could mean that the tide may at last have turned."

SOLAR ASTRONOMY

OSO Reveals the Sun in Ultraviolet

Regular observations of the sun's ultraviolet light, virtually all of which is blocked off by the earth's atmosphere, are giving scientists, for the first time, a three dimensional map of the solar corona. The survey, from which photographs come in at the rate of 150 a day, could lead to a method for predicting solar flares.

The photographs also show for the first time the solar corona in depth over its entire face, rather than only at the edge as it is seen during an eclipse or through a coronagraph. The three-



NASA
Satellite view of sun in ultraviolet.

dimensional chart of the corona reveals new information about how different chemicals are distributed and how temperature varies at different heights.

The new pictures of the sun are being taken, and have been made since Oct. 24, by a sophisticated ultraviolet spectrometer constructed at Harvard College Observatory by a group headed by Dr. Leo Goldberg, in collaboration with Drs. Edmond Reeves and William Parkinson. Dr. Goldberg foresees that preliminary results of analyzing the thousands of photographs already available will be reported to the American Astronomical Society meeting in Tucson next February.

Although the spectrometer experiment is designed to have a lifetime of six months, Dr. Goldberg hopes it will last much longer, perhaps even on through the period of maximum solar activity, now predicted for early 1969. There is some basis for this hope since many instruments on other satellites have sent back data for months beyond their expected lifetimes. Some, such as the Tiros satellites, have transmitted for as long as four years after they were scheduled to stop.

Even if OSO-IV does not take ultraviolet photographs beyond May, however, it will still be in a unique position

to study solar flares, giant outbursts of charged particles hurled into space that could endanger astronauts.

A solar flare is accompanied by a surge of ultraviolet radiation. The Harvard scientists plan to record the occurrence and development of flares and the changes in temperature as the flares shoot through the corona. Their aim is to determine the precise mechanism responsible for the sudden bursts of solar energy, usually connected with sunspots. When that is known, they should be able to predict their occurrence.

Some believe a flare is triggered by an explosion of electrons that begins high in the corona and streams downward toward the center.

The OSO photographs show, as do those made from earth, that the sun has two belts of spots from east to west. In successive pictures, these spots move, since the sun itself rotates once every 27 days.

The way the ultraviolet instrument operates and the wavelengths in which the photographs are taken are controlled by Harvard astronomers, who meet each day to decide the plan for the following 24 hours. From 50 different wavelengths of ultraviolet they have their choice of seven in which to scan the solar corona during any 24 hour period. The pictures begin to arrive two hours after the satellite's program is changed.

The spectrometer can record ultraviolet radiation in two ways. It can concentrate on a small spot in the center of the solar disk and record, in about half an hour, the intensity of the radiation over the whole ultraviolet spectrum; it does this during one orbit a day. During the other 14 or so orbits, the entire disk is scanned to build up a picture of the sun at one wavelength at a time.

GENERIC VS. BRAND

Handwriting on the Drugstore Wall

For close to \$300 million a year, the Federal Government buys drugs for soldiers, hospitalized Medicare patients, welfare recipients and others. If it bought compounds by their generic titles instead of brand names, according to Senator Russell B. Long (D-La.), it could crop its bill by one-third, saving \$100 million.

This year Sen. Long introduced an amendment to the Social Security Act that would establish a Formulary of the United States—a list of drugs,