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.

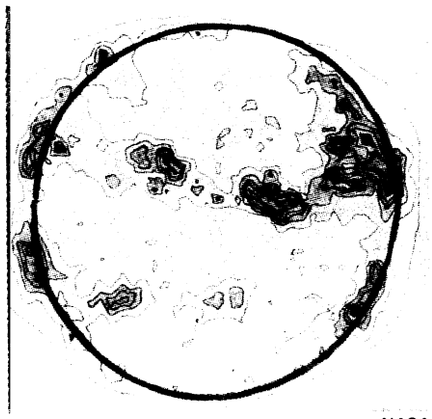
"If this holds," he said carefully, "it could mean that the tide may at last have turned."

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 wtih 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,

by generic names, to be authorized for use in Federally supported programs (SN 3/4). Under Sen. Long's proposal a nine-man Formulary Committee of physicians and Government officials would select those drugs to be included in the listing and would establish a "reasonable charge" for each. Federal representatives on the Committee would probably be the Commissioner of the Food and Drug Administration, Director of the National Institutes of Health and Surgeon General of the U.S. Public Health Service.

Although the Long amendment drew only lukewarm response from the Senate and fire from the brand conscious pharmaceutical industry, it won approval last week by a 43 to 37 vote, adding it to the legislation the House had enacted earlier. It goes to Senate-House conference within days. The vote in the Senate was close, and the amendment's acceptance by the House is not assured, but members of the Senate Finance Committee, which guided the bill through the Senate and will represent the Senate in conference, say the handwriting is on the drugstore wall: If economies aren't forced this year, they will be next.

The point of Sen. Long's amendment is to save Government money by avoiding expensive brands when low-cost counterparts are available. It also would be likely to lead to price-slashing on drugs across the board as consumer demand and industry competition followed Medicare-Medicaid purchases to force costs down. But broad as its economic ramifications are, its impact on the scientific world could be even more significant. The scientific implications of the amendment may present challenges of such magnitude they cannot be met for several years.

The crux of the matter is quality and therapeutic equivalency (SN:4/22). The Formulary Committee would first have to evaluate drugs, approving only those of acceptable quality. In handling two or more products with the same ingredients, designed to do the same thing, it would have to establish therapeutic equivalency in clinical tests to be sure they really behaved identically in the body. Both these requirements demand a large supply of qualified experts not readily available. Food and Drug Commissioner James L. Goddard says, "If all drugs were reliable, there would be a concrete basis for price comparison, and drugs could be included in a formulary solely on a cost criteria. Unfortunately, the FDA is not currently in a position to guarantee the purity and quality of every drug on the market." Estimating that it will be three or four more years before it can make that guarantee, Dr. Goddard says he would be "extremely reluctant" to see any action on the Long proposal at this time. It will be even longer before FDA could evaluate all apparently equivalent drugs for their actual identity of effect.

Health, Education, and Welfare Secretary John W. Gardner concurs. In his January 1967 "Aid for the Aged" message, President Johnson instructed Secretary Gardner to "undertake immediately a comprehensive study of the problems of including the cost of prescription drugs under Medicare." Jointly with the FDA, Gardner's Task Force on Prescription Drugs launched the Government's first study of therapeutic equivalency. They are trying to determine whether drugs from different companies approved and marketed for the same purpose actually behave the same way in a patient's body. For the study, which is being conducted at Georgetown University, they selected 50 of the 200 most commonly prescribed products which are sold under both generic and brand names.

The Task Force says it will be next June at the earliest before it has information on these 50 drugs. In answer to the argument that any drug in the marketplace is therapeutically equivalent to others sold under the same generic name, Dr. Goddard says simply, "we do not have controlled clinical studies to decide the issue in all cases."

Coming to the defense of brand names, a Parke, Davis scientist last week informed a Senate hearing of studies showing that copies of a Parke, Davis antibiotic are not as effective as the company's original version. The antibiotic is chloramphenicol (brand name, Chloromycetin), a highly potent drug used only for serious infections.

Since the Parke, Davis patent ran out last February, several drug houses have been selling versions of this antibiotic, all of which are certified, batch by batch, by the FDA. Dr. Leslie M. Lueck, quality control director for Parke, Davis, testified that in tests of competitors' products, he found they did not dissolve as rapidly as package labels said they should and that, in clinical tests, persons taking the competing companies' chloramphenicol had so little of the active ingredient in their blood that it could not have done them any good at all. As a result, the FDA has launched its own clinical studies of the chloramphenicols. Results may be available by mid-December.

Questions of equivalency and quality will inevitably come up before a Formulary Committee if one is set up. Dr. Goddard points out that the cost, in manpower, time and dollars, will be staggering. Legal challenges to Formulary Committee decisions are also anticipated, he says. The Committee would have to evaluate each of the 5,000 drugs available in the United States.

AILING DIVORCEES

A New Public Health Problem

Divorced persons suffer emotionally and they suffer financially, as has long been known. Now it seems they suffer physically as well.

Dr. Lester Breslow, director of the California State Department of Public Health, last week revealed his findings about disease and divorce. Divorced persons, especially men, are prime candidates for suicide, alcoholism, mental breakdown and an early death. All the chronic diseases which plague the population, including cancer, show higher incidence in divorced men, he finds, from study of records going back to 1900.

Divorced men had more than twice the death rate of married men, and were significantly higher in almost all other forms of disease.

Dr. Breslow is at a loss to explain why, but the parallel even extends to cancer; divorced people develop more tumors than their married friends.

Nor could he explain why divorced women fare better than the men, unless it is the natural physical superiority of women in resisting all kinds of disease.

"All of our health data indicate that women are better able to withstand the problems of life than men," he said.

Dr. Breslow says the department will now devote considerable effort toward finding special methods of treatment for divorced persons who become ill.

California is a logical state to pioneer in this direction. The divorce rate is almost twice the national average. In 1966, there were 62,648 final divorce decrees in California and 6,480 annullments as against 144,000 marriages.

DR. MURRAY'S MILESTONE

Doubt Cast in Toronto

Toronto General Hospital last week was engaged in searching its surgical records and X-ray library to determine whether it had on its hands a surgical milestone or something considerably less.

It was at a fund-raising dinner for the hospital that Dr. Gordon Murray claimed to have rejoined a severed human spinal cord (SN: 12/2). But the hospital's chief of surgery, Dr. William Drucker, now says that the records on patient Bernard Proulx show no such operation. In the midst of a battle carried by press conference and television interview, the hospital appointed a special committee to review the Proulx case and six others Dr. Murray claims.