chased for a few dollars, is directed at the night sky it can be used as an effective pointer. The beam loses itself at a sufficient height to make the pointing unambiguous to a small group. This use of a flash-light recalls the use of an electric light pointer by the lecturer in a Zeiss planetarium.

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SPECIAL CORRESPONDENCE

CANADIAN PARTICIPATION IN INTERNATIONAL POLAR YEAR

IN view of the great extent of Canadian territory in high latitudes, it is natural that Canada should take an active part in the activities of the second International Polar Year. In this great international enterprise, intensive observations according to a uniform plan will be made at a large number of Arctic and sub-Arctic stations in terrestrial magnetism, meteorology and aurora. Observations in these subjects, which began soon after August 1, 1932, will continue until August 31, 1933.

The Canadian Meteorological Service has been in charge of the organization of the Canadian program. Parties will occupy three stations in Northern Canada, in addition to extending materially the magnetic observations now being taken at Meanook, Alberta.

The largest party, consisting of F. T. Davies, formerly magnetician of the Byrd Antarctic Expedition, B. W. Currie, assistant professor of physics, University of Saskatchewan, S. T. McVeigh and John Rea, will go to Chesterfield Inlet, latitude 63° N., longitude 90° W., on the northwest shore of Hudson Bay. Chesterfield Inlet is about 475 miles from the north magnetic pole and is the nearest point to the pole at which continuous magnetic records will be taken during the "International Polar year." Using a set of the recently designed laCour magnetographs, three continuous records will be obtained of each of the magnetic components—horizontal and vertical magnetic force and declination. With an equipment loaned by the Department of Terrestrial Magnetism, Carnegie Institution of Washington, continuous records will be taken of the feeble electric currents which flow through the earth's crust, and which have been found to vary closely with magnetic disturbances.

It is planned to photograph the aurora, simultaneously at two stations about 30 km apart, using the Krogness f. 1.25 auroral cameras. From these photographs the height of the aurora may be determined. Using the McLennan night sky spectrograph, it is hoped that the spectra of all aurora will be obtained, and thus establish whether aurora of a certain spectral type are associated with auroral displays at definite elevations above the earth's surface.

The meteorological program, in addition to intensive routine observations, includes daily kite ascents, pilot balloon observations and temperature data to a level of 3 km or 4 km from the Patterson light-signalling meteorographs. The kite equipment both for Chesterfield Inlet and for Coppermine has been loaned by the U. S. Weather Bureau.

Records of the atmospheric electric potential, nuclei of condensation and of the temperature at the top of the radio mast, 45 meters high, will throw further light on the atmospheric conditions in this region.

R. C. Jacobsen will be in charge of a station at Coppermine, on Coronation Gulf on the Arctic Ocean. The supplies and equipment for this remote point have been forwarded by steamer from Vancouver *via* Behring Strait, but the observer in charge and his assistant will be flown in by airplane from Northern Alberta. The program at Coppermine will be devoted to meteorology and auroral observation. An interesting feature of the meteorological work will be an attempt to determine the height of the stratosphere by the grid type of Moltchanoff meteorographs. These instruments emit automatically every few seconds radio signals giving the temperature and pressure of the point aloft at which the meteorograph is situated. These signals, which resemble a Morse code, are picked up by a receiver on the ground, and from them the true temperature and pressure are determined. The Moltchanoff meteorographs have been donated by the Rockefeller Foundation on the recommendation of the International Polar Year Commission.

At Coppermine on the bleak Arctic coast line the temperatures of the air up to 3 km or 4 km will be taken at frequent intervals by kite and light-signalling meteorographs. Both the Chesterfield Inlet and Coppermine parties will use the Robitzch actinometer to record the solar radiation, while at Chesterfield Inlet readings of the kata thermometer will be taken thrice daily.

A third station at Cape Hope's Advance, Latitude 61° N., Longitude 70° W., on Hudson Strait, will be operated by J. E. Lilly, with the assistance of the operators of the radio station here. The program will be meteorological and auroral, similar to that at Coppermine, but not as extensive. Cape Hope's Advance will serve as an effective link between the Danish and French stations on Greenland and the réseau of American stations.

Supplementing the data taken at Chesterfield Inlet,

Coppermine and Cape Hope's Advance, a group of 15 northern stations will report the occurrence of aurora, giving its intensity in terms of the brightness of the auroral green line in a direct vision spectroscope.

From the data obtained at "polar year" stations in both eastern and western hemispheres, one may expect information that has been needed for years in geophysical science. The movement and characteristics of polar air masses, their interaction with air masses in temperature latitudes, the simultaneity of auroral forms, and magnetic disturbance over the earth are examples of large-scale problems which could only be treated by each nation contributing a share in a world-wide endeavor.

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QUOTATIONS

HOW A NEWSPAPER LOOKS AT COSMIC RAYS

THE *New York Times* for September 18 prints a leading editorial article entitled "Cosmic-Ray Romancing" which reads as follows:

Your physicist is supposed to be a hard, matter-of-fact measurer who suppresses romantic speculation and talks only of energy, volts, ions and electrons. Confront him with a mystery and he proves to be as human as the rest of us. Consider the cosmic rays. For years Millikan in this country and Kolhoerster, Hess, Regener and others in Europe have been studying them only to their own mystification and ours. Measuring instruments are dropped into lakes a thousand feet deep or elevated twenty miles above sea-level. Piccard imperils his life to determine the true nature of the rays. Professor Compton and a devoted band of physicists station themselves at the Equator, in the far north, on mountaintops, in deep mines to conduct their investigations. And the result? Romance—sheer romance.

Millikan spins a tale of electrons and protons combining in space, and of resultant cosmic rays that proclaim the continuous upbuilding of the universe, contrary to all the laws of thermodynamics. Jeans holds us spellbound with a poem about stars dying in a fierce radiance and bombarding us with cosmic rays in the process. Regener, as practical as the Irish foreman of a railway section gang when it comes to counting ions, looks at his equations as into a crystal and sees the beginning of things—sees primitive stars shedding cosmic rays and suffusing a relativistic universe from which they can not escape because it is closed and finite. Stimulated by him, others imagine that, just as the bones of a dinosaur tell us something of the life that was on earth a few million years ago, so these fossil cosmic rays reveal the Almighty in the act of fashioning electrons and protons into nebulae, suns, planetary systems and man himself.

For all the instruments and methods invented to test the cosmic rays, the physicist is still the medicine-man from whom he is descended. Electroscopes and ionization chambers and other cosmic-ray measuring instruments seem strangely like wands and totem poles, and Einsteinian equations but incantations that make us believe we know more than we really do. That we are actually dealing with something like wish-fulfillments in the cosmic rays is evidenced by the results obtained. Here is Millikan convincing himself that the cosmic rays prove that the universe is self-perpetuating. And Compton, adopting precisely the same methods, reaches the conclusion that the rays are only electrons swerving to the Poles because the earth is a great spinning magnet. What are the cosmic rays? There is no positive answer. We simply try to reconcile what the instruments indicate with our hopes and beliefs and imagine we understand the cosmos.

The same issue of the *Times* contains an editorial note entitled "It is Done with Mathematics" which reads:

It is a relief to read that Professor Compton is back from studying cosmic rays in the Arctic region with the definite report that Professor Millikan is wrong. The cosmic ray, says Professor Compton, is not a wave, as Millikan thinks, but a particle.

It is a relief to find that when two men in the high realms of science hold opposite views one of them is right and the other is wrong. Hitherto the public has had to get used to the idea that when two great physicists differ radically about something in the universe the answer is that both men are right.

What is the electron, a wave or a particle? It spreads after going through a hole, like a wave. It hits other electrons like a particle. Easy, says science. An electron is both a wave and particle. That would be nonsense by the rules of common sense, but it makes sense in the new sciences. There is a formula for it.

Some people think the universe is expanding. Some people think the universe is contracting. They are both right, says science. Professor Eddington can think of its being an expanding universe and a contracting universe simultaneously. Or, rather, he can find a mathematical formula that will describe that startling situation.

In the same manner space is finite and space is infinite. There is a formula.

Obviously it is a delightful world in which you can have the coffee simultaneously hot and iced and out of the same cup, your egg simultaneously hard-boiled and scrambled, and the griddle cakes at the same time round and oblong.

But occasionally it is a relief to find black as the opposite of white and right as the counterpart of wrong.