

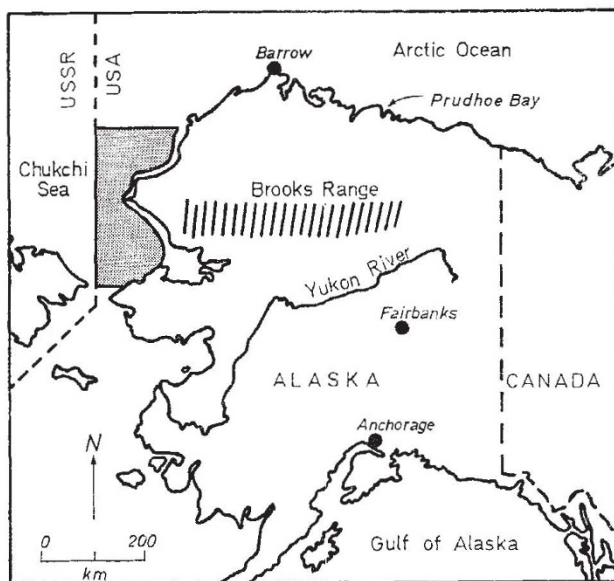
strains of phage λ and the techniques of nucleic acid hybridization, he has established that in his cell free system the RNA polymerase is not only initiating at the correct sites but terminating at the correct sites so long as ρ is present; the RNA made *in vitro* with ρ is the same size as that made in the cell when the same genes are transcribed. The ρ factor is therefore complementary to the sigma factors; it plays an essential part in the mechanism which results in RNA polymerase recognizing termination signals—specific sequences in DNA templates. Whether more than one species of ρ factor exist in *E. coli*, whether the ρ factor and the polymerase are the complete termination machinery and precisely how termination of RNA synthesis is effected are all questions that can now be asked with some hope of a meaningful answer.

SURVEYING

Arctic Ocean Oil

from our Geomagnetism Correspondent

IN the search for oil, the North Sea and the North Slope of Alaska each has its own peculiar hazards. When these hazards are combined with pack ice conditions, the task becomes formidable. Yet the US Geological Survey and the US Coast Guard have now completed a preliminary survey of the Chukchi Sea, north-west of Alaska, which shows that geological conditions in the area favour the existence of significant quantities of oil and gas.



The Chukchi Sea is an obvious area in which to search for oil because it is a geographical extension of Alaska's North Slope. The survey set out to discover whether there is also geological continuity by seismic profiling, magnetic field intensity profiling and precision depth recording. Dangerous pack ice stopped two-thirds of the planned programme, but in eight days seismic profiles were obtained along 1,350 nautical miles of track. Investigations were carried out from the US Coast Guard cutter *Storis*, a 237-foot ice-reinforced buoy tender.

What emerged was that the eroded and truncated

roots of the Brooks Range extend at least 175 miles from Cape Lisburne on Alaska's north-west coast to Herald Shoal in the northern Chukchi Sea. Folded and faulted sedimentary rocks were discovered on both sides of the Brooks Range extension, those to the south being 20,000 square miles in area and at least 10,000 feet deep in the central part of the sea. Much of the Chukchi Sea floor is thus geologically similar to the oil, gas and coal rich North Slope, which suggests that the Great Alaskan Oil Rush will continue for a long time yet.

STARS

Observing Made Easy

from our Astronomy Correspondent

A WAY of measuring the radial velocities of stars more quickly than by the conventional method of comparing a photograph of the spectrum with a standard was described at the meeting of the Royal Astronomical Society on December 12 by Dr R. F. Griffin of the University Observatories, Cambridge. Critics tried to whittle down his estimate of a gain of 4,000 for his technique, which he based, with tongue firmly in cheek, on its application to a catalogue of stars with radial velocities known from work by Professor R. O. Redman. Using a 36-inch telescope, Griffin took nine minutes over each observation of eighty-seven seventh-magnitude K stars, compared with ninety minutes taken by Redman using a 72-inch telescope, and claims a better accuracy.

By making the measurement of the Doppler shift of the stellar spectrum a single-step process, Griffin has eliminated the need to obtain a photograph of the spectrum as the intermediate step. Formerly the Doppler shift was read off the photograph by comparing the positions of lines with a standard spectrum. Instead the spectrum is concentrated by a lens onto a photomultiplier tube with a consequent saving in exposure time because the dispersed spectrum is never recorded. Before the condensing lens, however, the spectrum passes through an adjustable diaphragm which is made up of a negative of a typical stellar spectrum. What happens is that the output of the photomultiplier is recorded while the diaphragm is moved across the spectrum, and when the diaphragm coincides with the Doppler-shifted spectrum the output abruptly drops to zero. The Doppler shift and thus the radial velocity are given by the position of the diaphragm at zero light.

The photomultiplier measures the cross correlation function between the spectrum and the diaphragm. The meeting identified two problems of the technique. First, because of non-linearities, only a small part of the available spectrum can be used, and if this could be extended the exposure time would be further reduced. Second, the equipment is calibrated against stars with radial velocities known from the standard method, so that errors in the standard method are carried over.

The meeting began with an account by Professor C. W. Allen, of University College, London, of a problem in the statistics of Fraunhofer lines in the solar spectrum. The problem occurs in the comparison of the number of Fraunhofer lines in different intervals of frequency and of intensity with what is predicted.