

Land in the Arctic.

THE study of the Arctic tides attracted wide attention when Harris concluded from his stationary wave-theory in 1911 that an extensive area of land existed within the unexplored area of the Arctic regions. Nansen, on the contrary, inferred the existence of a deep Polar basin from his observations in the *Fram* between 1893 and 1896.

Harris's hypothetical land gave a stimulus to explorers, but their search was fruitless. Stefansson, on his remarkable journeys over the sea-ice north of Alaska, and McMillan on this Crocker Island expedition, both touched the outskirts of the unknown region without finding anything but broken sea-ice. Amundsen in 1926 passed over the central part of the unexplored region in the dirigible *Norge* without seeing any land. Between 1918 and 1925 the Maud expedition made numerous tidal observations in the area north of Siberia. These observations, combined with earlier data, have been critically examined by Sverdrup and indicate in this area a tidal wave of the progressive type, differing from the stationary type deduced by Harris; nor do they indicate the existence of any extensive masses of land within the unexplored region.

The illustration here reproduced (Fig. 1) from Sverdrup's papers¹ shows the cotidal lines (the times of high water, in terms of Greenwich lunar time at full and new moon), and indicates that the progressive tidal wave from the north Atlantic enters the opening between Greenland and Spitsbergen and crosses the Arctic Sea without meeting any obstruction caused by extensive land masses. The figure reveals that the tidal wave reaches De Long's Island five hours before

it reaches Point Barrow, although the direct distance from the Spitsbergen opening to the Island and to Point Barrow is nearly the same. This suggests a shallow sea in the unexplored region north of Wrangell Island and Point Barrow, with perhaps islands in places.

The tidal streams met with were of the rotary type usual in open ocean areas, but they present a striking peculiarity. Below the ice to a depth of some twenty fathoms water of the same density is present, while below this there is a sudden increase in density and

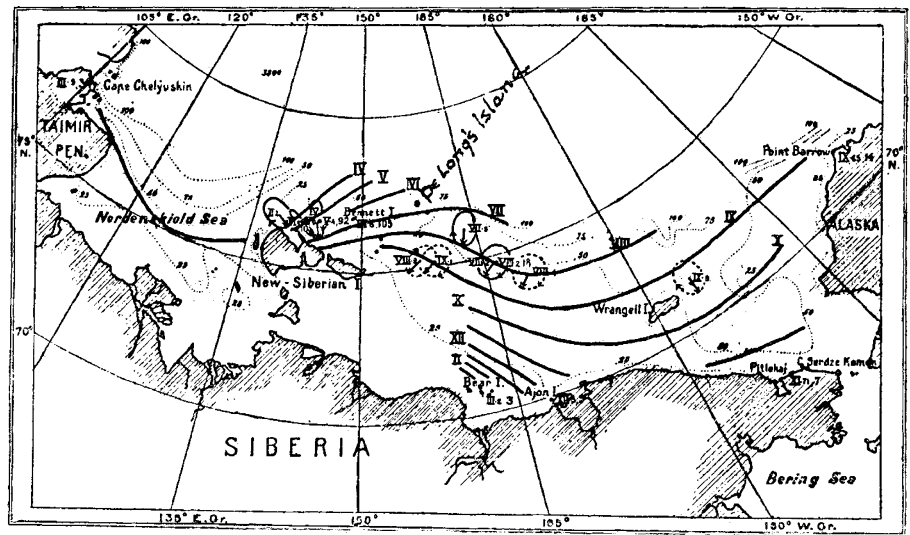


FIG. 1.—Tidal observations and co-tidal lines at spring tide on the north Siberian shelf.

later a slow increase on approaching the bottom. In the water layer of equal density the tidal streams ran slow, but in the layer where density increased rapidly with depth the tidal streams were at a maximum, dying away towards the bottom.

The water can be considered as composed of three layers of different eddy-viscosity. In the upper layer of equal density vertical eddies are free to be developed and the eddy-viscosity or 'virtual' viscosity is great. In the intermediate layer of rapidly changing density vertical motion is restrained and the eddy-viscosity is low, while below this, where there is a slower increase in density, the eddy-viscosity is of an intermediate value.

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¹ "The Tides on the North Siberian Shelf: their Bearing on the Existence of Land in the Arctic Sea and their Dynamics," H. U. Sverdrup, *Journal of the Washington Academy of Sciences*, vol. 16, pp. 529-540 (Washington, Dec. 1926).

The Initial Phase in Gaseous Explosions.

WHILE an atmosphere of controversy is not perhaps the best for the calm interpretation of scientific facts, there is no doubt that the clash of opinions gives a zest to research and sometimes speeds up discovery. The slow uniform movement of flame in the initial phase of the explosion of gases—first studied by Le Chatelier—has given rise to such a controversy between Prof. W. A. Bone and his colleagues at the Imperial College of Science and Technology, South Kensington, and Prof. R. V. Wheeler and his colleagues at the Safety in Mines Research Laboratories at Sheffield.

There is no doubt that many explosive mixtures, when lighted at the open end of a long tube, burn with a slow uniform movement for a certain distance, and as a rule this uniformity is more marked the slower the propagation of the flame. When 'limit' mixtures of various saturated hydrocarbons with

air, *i.e.* mixtures which would just propagate flame, were ignited at the open end of a tube, Prof. Wheeler and his colleagues found that the flame had an initial uniform movement which was the same for each mixture; and, moreover, when any two of these mixtures were mingled together, the complex was also a 'limit' mixture and burnt at the same rate. So far, we understand, the speed-law is unquestioned. But when the law is extended to non-limit mixtures and to all gaseous mixtures of the same type (*i.e.* with either excess of combustible or excess of oxygen), which have the same uniform speed of flame, the two schools are in disagreement. Prof. Bone (with Messrs. Fraser and Winter) has just published in the *Proceedings of the Royal Society* photographs of the flames initiated in ethylene-oxygen, acetylene-oxygen, and in hydrogen-oxygen mixtures. He finds that such fast-burning mixtures do not always show any

uniform movement, and sometimes give in successive experiments uniform movements of different speeds. No doubt such mixtures are very sensitive to slight changes in the application of the igniting flame and the possible setting up of turbulence, and the length of the tube might affect the result.

Experiments to test the speed-law with blends of an ethylene-oxygen and a methane-oxygen mixture respectively with an hydrogen-oxygen mixture gave results which fell progressively below the predicted rates according as the hydrogen mixture was increased in the blend. It has been pointed out, on the other hand, that the rate of chemical change (and therefore the spread of the flame) is subject to the law of mass-action; the curve predicted by the speed-law diverging from the experimental speeds as the combustible gas approaches the upper limit of propagation. The speed-law has some exceptions, evidently: do they prove the rule?

In Part 3, Prof. Bone (with Messrs. Fraser and Witt) shows photographs of the initiation of the explosion of an equal mixture of methane and oxygen in the centre of a closed tube under the influence of sparks varying in character and intensity. With the feeblest sparks there seems to be a short period of 'induction' with no visible flame; then a 'ghost-like' flame spreads with acceleration until it is checked before it reaches the ends of the tube, and finally there is the intense illumination traversing the whole column of gas in waves from end to end. With the intenser sparks the flame spreads at once and luminous striæ describe wavy paths within the ghost-like flame. The very luminous waves are caused by reflections from the closed ends: they are not shown when the ends of the tube are opened before firing. The powerful sparks evidently provoke rapid combustion in their neighbourhood.

A University Centre in London.

A MOST important announcement in relation to the future of university education in London was made at the Graduation Dinner of the University on May 11. Aided by a grant from the Government and a generous gift from the Rockefeller Foundation, the university has been able to arrange for the purchase of the Bloomsbury site of 11 acres, including roads, or 8½ acres excluding roads, north of the British Museum. This site was purchased by the Government in 1920 and offered to the University under conditions which the University was unable to accept, with the result that after five years the site was re-sold to the vendor, the Duke of Bedford, in accordance with the terms of the conveyances.

The Vice-Chancellor, Sir William Beveridge, indicated some of the purposes for which the site will be used, including University offices, Senate House, Library, Ceremonial Hall, Examination Hall, the Institute of Historical Research, a Faculty Club for Teachers, a Students' Union, O.T.C. Headquarters, perhaps one or two colleges, and finally, the beginning of residential quarters for teachers and students. He described in eloquent terms his vision of the future University of London, and appealed for the inspired artist who would embody it in stone and steel, "who will bring into the very heart of London a group of buildings that, raising their towers and pinnacles to the sky, will form a shrine of youth and learning in Bloomsbury to rank with the shrine of our history and our liberties by the Thames at Westminster." Lord Eustace Percy, President of the Board of Education, who was the guest of honour at the dinner, said that the announcement marked a great and historic moment in the history of the

University. It will be generally hoped that the change of home will mean a change of heart, and that the feuds and wrangles of the past will soon become a fading memory. "The final decision," the Vice-Chancellor said, "was unanimous and is a pledge of unity for the future."

As to new developments for scientific research, no information was forthcoming. The general policy of university research institutes is still an open question, the discussion of which should now, however, take a new orientation; and a claim to part of the site will no doubt be advanced on behalf of sciences for which at present research facilities are inadequate. Provision should also be made for public university lectures. Referring to the financial position, the Vice-Chancellor said that, after purchasing the site, there was money in hand for the Central Offices. "The rest must wait for further help." The amount of the munificent contribution from the Rockefeller Foundation was not divulged.

University and Educational Intelligence.

CAMBRIDGE.—By the will of the late Prof. A. W. Scott, of Lampeter College, the University is to receive £7000 and a third of the residue of his estate, approximately a further £4000, for the furtherance of physical science.

Sir Josiah Stamp will deliver the Rede Lecture on June 8 on "Stimulus in the Economic Life." Prof. A. E. Taylor, of Edinburgh, will deliver the Leslie Stephen Lecture on June 3, on "David Hume and the Miraculous."

Mr. J. E. Purvis, Corpus Christi College, has been re-appointed University lecturer in chemistry and physics in their application to hygiene, and Mr. A. Hopkinson, Emmanuel College, has been re-appointed demonstrator of anatomy.

LONDON.—Applications are invited for the University studentship in physiology, value £50, which is open to a student qualified to undertake research in physiology. The latest date for the receipt of applications by the Academic Registrar, South Kensington, S.W.7, is May 31.

MANCHESTER.—An anonymous donor has given about £5000 for the endowment of two post-graduate scholarships for research in plant and animal biology.

OXFORD.—The University statutes have been modified to enable the committee for advanced studies to make grants of money for equipment needed by students for the degree of B.Sc.

The great and rapid development of the School of Rural Economy and of the various agricultural institutes affiliated to it from 1908, when it began with a modest grant of £800, to the present time when it has received a total grant of £44,000, has determined the passing of a new statute to redefine and strengthen the functions and powers of the Committee for Rural Economy. The Committee will have general control of the available funds, and will appoint directors and research officers for the two institutes for research in agricultural economics and agricultural engineering and for the advisory institute.

A new medical travelling studentship has been founded in memory of Dr. George H. Hunt. The value will be somewhat less than £100 every other year. Candidates must be graduates in medicine who shall have not exceeded five years from the date of passing their final M.B. examination; they will be expected to travel abroad for a period of not less than three months for clinical study or medical research, and eventually to engage in practice as surgeons or as general practitioners.