

the legislature and signed by the governor authorizing the sale. Negotiations are under way for the purchase of additional property so as to make a plot of approximately eight acres.

At the University of Chicago, Dr. Fielding Wilkin-son, of the Mayo Foundation, has been appointed assistant professor of otolaryngology, and Dr. Bela Halpert, of the Johns Hopkins University, assistant professor of pathology. Associate Professor Edward Sapir and Associate Professor Fay-Cooper Cole, of the department of sociology and anthropology, have been made full professors. Assistant Professor Maud Slye, of the department of pathology, has been made an associate professor.

THE trustees of Williams College have made the following appointments for the next college year: Dr. Wilford E. Kaufman, assistant professor of chemistry, to take the place of Professor John F. King, who will be absent on sabbatical leave; Donald E. Richmond, assistant professor, will replace Dr. Malcolm Foster, resigned, in the mathematics department, and Edward H. Cutler, instructor, will fill the vacancy made by the absence on leave of Professor Hardy, of the same department.

DR. C. S. HAMILTON, associate professor of chemistry at the University of Nebraska, has accepted a similar position at Northwestern University. He will have charge of the researches on organic compounds of arsenic.

G. H. ESTABROOK, of Springfield College, Massachusetts, has been appointed assistant professor in psychology at Colgate University.

DR. CYRIL A. NELSON, associate in mathematics at the Johns Hopkins University, will go to Rutgers University next year.

DR. ARNOLD SOMMERFELD, professor of theoretical physics at the University of Munich, has been called to the chair of theoretical physics at the University of Berlin, left vacant by the retirement of Professor Max Planck.

DR. HANS FISCHER, professor of organic chemistry at the Institute of Technology in Munich, has been called to the chair of organic chemistry at the University of Leipzig, to take the place of Professor Hantzsch, who recently retired.

DISCUSSION AND CORRESPONDENCE

THE ARCTIC FLYING OF CAPTAIN WILKINS AND LIEUTENANT EIELSON

WE want to call attention to one of the most heroic and dramatic adventures of polar history, which is

now going on in the Arctic north of Alaska, where Captain George H. Wilkins, Lieutenant Ben Eielson and their associates have already made striking contributions to science and the progress of northern aviation, although their program is only in its beginning.

Last year the city of Detroit, ambitious to become the air capital of the world as it is already the motor capital, got behind the plans of Captain Wilkins and sent out an expedition which on its scientific side was sponsored by the American Geographical Society of New York. They had much bad luck. Two planes were seriously disabled by unfortunate landings and one in an unsuccessful attempt to take off with a heavy load. But the thing to remember about these accidents is that they all took place on a regular landing field in the city of Fairbanks, Alaska, which is in the temperate zone and not in the Arctic. In the Arctic itself the Wilkins expedition of last year had only one accident in 5,000 miles of flying; this was when Wilkins broke his wrist in taking off from a prepared landing place at Barrow.

The Wilkins expedition of last year had no accident in the air or in landing. They crossed five times a range of Arctic mountains so little known that it had been given on maps as 5,000 or 6,000 feet high, while it proved to be around 10,000. One of these flights was from Fairbanks, 550 miles north to Barrow and thence 150 miles out over the ocean and then back to Barrow, a flight on which 10,000 square miles of previously unknown territory were seen. Thus Wilkins proved that flying is distinctly feasible in the most northerly possession of the United States, setting at rest a controversy of importance both in civil and military aviation as to whether Alaska can be used as a flying base for commercial or military operations against Asia, and as to whether Alaska could be flown across by Asiatic airplanes wishing to reach Canada or the United States by that route for purposes either of peace or war.

This year the plans of Captain Wilkins were quietly resumed with the support of the *Detroit News*. He took two Stinson planes to Fairbanks, and he had one Fokker there already. The only accident this year was to one of the skis of the largest machine, which broke under a heavy load when they were trying to take off from the Fairbanks landing field. Thereupon with two of his own planes and one hired at Fairbanks, Wilkins took again the 550-mile flight across the Endicott range and the northern prairies to Point Barrow, once more without accident or any trouble.

Then on March 29, with fuel for 1,400 miles in calm weather, Wilkins and Eielson took off in a Stinson plane, intending, if all went well, to fly 600 miles northwest, then 200 miles south, and thus back to Bar-

row, more than half this distance over territory never seen by human beings, thus making a great inroad into the largest unexplored area north of the equator. They had flown 550 miles and had almost completed the outward flight when engine trouble developed and they had to make a forced landing.

This was a deciding moment in Arctic aviation, for there have been two theories as to the safety of landing on the frozen sea. One school has held that there are scarcely any safe landing places on the moving Arctic pack, and the other school, to which Wilkins himself belonged, that landings are so numerous that there seldom is a five-mile stretch without a fairly good one. (Byrd has not agreed with Wilkins but has taken a position between the two theories—nearer to the first.)

In less than five miles they did find a place that looked good to Wilkins. He gave the instructions and Eielson made a perfect landing on ice which turned out to be about three and a half feet thick when Wilkins, a few minutes later, made the holes in it which were necessary to take a sonic sounding. He took two soundings and found the ocean there to be about three miles deep, which makes it very unlikely that any land can exist in this direction, for their flight, if continued far enough in the same direction, would have taken them near where Nansen years ago in the *Fram* took similar soundings. This sounding was a verdict as decisive in oceanography as the landing had been in aviation. It made it extremely probable that those are wrong who, following Harris, have maintained that there is a great unknown land in the Arctic, and that those are right who, following Nansen, have argued that it is in the main a deep sea.

While Wilkins was doing this sounding, Eielson tinkered with the engine. In two hours they were in the air again, flying back towards land because a strong offshore wind had blown up, making it probable that the gasoline would fail to take them ashore even now.

After about 10 minutes' flight, the engine gave trouble once more. There was a second forced landing and a second test of the question of landing places. Again Wilkins picked out a likely site, and again Eielson made a perfect landing. This time both worked on the engine and made a better job, so that when they took off a second time the machine hummed along smoothly. But clouds gathered and the wind stiffened continually, so that they presently realized that they were unlikely to get ashore. It was after sundown, with heavy clouds in a thick blizzard, when the engine stopped suddenly, out of gas. This time they could not see anything and the landing was pure luck. As a matter of fact, instead of striking a very smooth expanse, as might have happened by chance,

they struck a very rough one, and it was as if by a miracle that they made a landing safe for themselves, although it crippled their plane. But that crippling was of no practical consequence when they were out of gas anyway.

It now developed that Eielson had frozen his fingers severely when tinkering barehanded with metal tools on the metal of the engine at 30° below zero in a strong wind. Wilkins asked him later why he had not taken time off to warm his hands occasionally and keep them from freezing, to which Eielson replied that he "preferred losing a few fingers to losing both arms and legs and what they were fastened to."

Wilkins and Eielson spent five days on the floe where they landed and during that time another strange thing happened, for the ice in this quarter is usually drifting west and Wilkins noted in his diary that they would therefore probably have to land in Wrangel Island, but instead it now drifted rapidly east, and when they had broken up the wooden parts of the plane and made them into sledges, they found themselves 100 miles east of Barrow instead of several hundred miles west (as might easily have been the case had the drift been as usual) and 70 miles from shore, or 30 miles nearer than when they had been forced down.

Wilkins reports laconically about the journey ashore that they slept comfortably at night in the snowhouses which they built, that they saw plenty of game and could have secured seals for food and fuel indefinitely had they needed it, but that they had with them enough biscuits and chocolate to eat and enough engine oil to burn. They were hurrying for two chief reasons—because Eielson's hand had been so severely frozen that an amputation of fingers seemed necessary, and because they wanted to get back to Barrow so they could do more flying with their other planes before the summer fogs commenced. This hurry made them take possibly unnecessary chances on thin ice, and in consequence Wilkins fell through on one occasion, getting wet to the armpits at a temperature of 30° below zero (62° Fahrenheit below freezing). His only comment is that he knew his other garments would dry better on his body than otherwise and that he had no change of clothing anyway, but that he did have a change of socks and boots which he made promptly in the lee of an ice ridge.

After several days' travel the ice became so rough that the improvised sledge could not be pulled over it. Wilkins recognized that this was the shore ice and that it was therefore safe to leave the sledge behind. So they took the more important baggage as packs on their backs and scrambled over ridges of slippery ice where the crevices between the broken pieces were filled with snow so soft that they had to crawl several

miles—in the sense that they would keep their hands on pieces ahead while their knees and feet were on the pieces they were just leaving.

Their astronomical observations proved to have been correct and their course took them directly into the Eskimo settlement at Beechy Point, where there is a trading station. From here they made their way to Barrow, where Eielson's little finger was amputated at the mission hospital. The other fingers were saved.

His deep soundings having made it improbable that there is undiscovered land in the 600,000-mile section to the northwest of Barrow, Wilkins now plans to cross the 300,000-mile section to the northeast, where there is the best remaining chance of land. He expects to fly diagonally through the middle of it from Barrow to 84° N. Lat. and 100° W. Long. and thence to Ellesmere Island, coming down when they have to or possibly flying nearly, if not quite, all the way to Etah.

If the plane comes down anywhere on this route, Wilkins expects his party to live by hunting seals and make their way to the nearest inhabited land. This will be Alaska if they have hard luck and come down soon. It may be any of the Canadian islands, according to how far they succeed in flying; it will be Etah, northwest Greenland, if everything goes like clockwork. The outcome of the adventure can not be known before perhaps midsummer when the Danish trading ships go up to Etah or the Canadian government ships go to Ellesmere Island. If nothing is heard then or before that time, it will mean either a fatal landing or a successful landing at a distance from which the party are returning, building snow-houses in winter, using skin tents in summer and living on sea game. Wilkins estimates the maximum time necessary for such a return on foot will be two years. We wish him luck with his great adventure.

RICHARD E. BYRD,
VILHJALMUR STEFANSSON

EFFECT OF HIGH VOLTAGES ON TANTALUM ANODES

DURING some recent work with high voltages upon metal electrodes I have found that tantalum exhibits some very unusual phenomena when used as a positive electrode in certain electrolytes. Very brilliantly colored films are formed on the metal in the following order: violet, reddish purple, indigo, light blue, green gold, light yellow and finally gray. The colors were produced in succession by increasing the voltage so that any one of the above colors may be obtained by shutting off the current at the proper time. The films form just before the electrode begins to emit light and the highly colored ones disappear when tiny scintillating sparks appear on the

surface of the film. The gray film mentioned above is the final product after the breakdown voltage is exceeded. The films are apparently permanent and the colors give no evidence of being formed by interference. I have been unable to reproduce them by heating or other means and am withholding any possible explanation of the phenomena until further data are available.

EARL M. DUNHAM

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LOSSES IN SPECKLED TROUT FRY AFTER DISTRIBUTION

THE Fisheries Department of Ottawa has recently received from the Biological Board of Canada a memorandum of the losses in four thousand speckled trout fry after distribution in Forbes brook, Prince Edward Island, Canada, for three months (July-October) of 1926. Mr. H. C. White, B.A., was investigator for the Board for 1926 as well as for the three previous summers. The supervising investigator was Dr. A. G. Huntsman.

The plan selected for the experiments provided that a part of the upper stretch of the brook should be subdivided into four equal sections of ten rods each. Each section was separated from the other by transverse wire screens which were fry tight. Each section was seined completely free from enemy and competition fish before an experiment began, except as mentioned below.

The object of three of the experiments was to ascertain whether (1) adult trout (any over one year old) or (2) birds, or (3) stickleback caused the greatest loss among fry after distribution. (4) The object in the fourth experiment was to determine the total loss from all natural causes combined.

Section No. 1 was left in its natural condition and planted with 1,000 fry. At the end of three months, 712 of them were missing. This compares with seventy-three per cent., which was the loss in 1925 near the same place. Of 38 adult trout in this section in the spring, only 19 survived until October.

Section No. 2. The adult trout were removed and it was screened overhead from birds. 209 stickleback were confined with 1,000 fry. Out of the 1,000 fry deposited in it, only 504 survived at the end of three months.

Section No. 3. Birds were screened from this section and all fish seined except 32 adult trout. Here only 361 fry survived out of 1,000.

Section No. 4. Stickleback and adult trout were removed from this section; but it was left exposed to birds. Out of 1,000 fry planted in the spring, only 435 were found alive in autumn.