preliminary program, but were omitted from the regular program because no abstracts were furnished.

Erwin F. Smith,
Secretary.

SURVEYS OF THE GATEWAYS TO ALASKA.

A beginning has at last been made in the accurate mapping of the delta of the Yukon, one of the great rivers of the world. Through the courtesy of Superintendent Pritchett we are enabled to give a preliminary account of the work done in that locality during this year and to advert to further operations of the Coast Survey at the head of Lynn Canal, another of the gateways to the interior of Alaska and the British Yukon district.

On June 30th the U. S. Coast and Geodetic Survey party arrived in St. Michael, Alaska, and immediately began preparations for the survey of that part of the delta of the Yukon River bordering on the seacoast.

The prime object of this expedition was to examine the delta of the Yukon River with the purpose of finding out what depth of water exists on the bars in front of the delta and to locate such channels as were found flowing from the mouths of the river into Bering Sea. This problem necessitated the execution of a scheme of triangulation upon which to base the required topography and hydrography.

While the two small steamers required for hydrographic work off the delta were being fitted out by a section of the party at St. Michael the other members were engaged in triangulating and mapping the coast from St. Michael southward to the the Aphoon (pronounce Ap-hoon) mouth of the Yukon, and in making a detailed survey of the towns of St. Michael, Healy and immediate vicinity. This detail map proved of much value to the military authorities of St. Michael Military Reservation in settling the matter of boundary lines between the commercial companies located there.

The channel and bar of the Aphoon mouth of the Yukon River were surveyed and developed. This is the channel that has always been used by steamboats for getting into the river from St. Michael.

While this work at the Aphoon mouth was in progress another small party had gone on one of the small steamers to the Kusilvak mouth of the river, establishing a latitude and longitude station well inside of the coast line. From this station it proceeded seaward with a topographic and hydrographic survey.

From all reports of the natives and others it seems reasonably certain that the Kusilvak mouth is the deepest of the mouths of the river, and this survey shows that it has much the greatest volume of water.

From the latter part of August to the end of the season the whole party was at work on the Kusilvak mouth of the river and southward along the coast, including and beyond the mouth of the Krypniak River. The Kusilvak mouth was found to be about twenty-five miles farther northwest than given on the most recent charts. All that can now be said of this mouth of the river is that eight feet of water can be carried into it at low tide, whereas there is only two feet at low tide on the bar at the entrance to the Aphoon mouth, the one now used by steamboats plying on the Yukon River.

From the investigations made of the Kusilvak mouth the shallowest water on the bar is from three to six miles off shore and the eight-foot channel is very crooked and difficult to follow with a vessel. It cannot be followed at all except by the constant use of a sounding lead. The use of buoys appears impracticable on account of the outflow of ice each year, which would not only carry the buoys away, but no

doubt change the channel itself in places. It appears that no feasible channel exists in the Kusilvak mouth for vessels of over ten feet draught.

Magnetic and gravity determinations were also made by the party while at St. Michael. The party eft the Yukon delta and returned to St. Michael on September 13th, in order to haul out the vessels before the freezing up of the river, which occurs some time in the atter part of September.

The astronomical observations were obtained only after long waiting because of the continued cloudy weather, while the frequent storms of wind and rain interfered much with the other work in hand.

The hundreds of square miles of mud lying between high and low water of the delta, which was found navigable for neither boats nor boots, presented a problem not usually encountered in surveying. After the low grass flat which lies above the ordinary high water of the delta was finally reached, the surveyors were greeted by myriads of mosquitoes, whose vexatious assaults are the crowning difficulty to be encountered in charting the Alaskan coasts.

Another Coast Survey party charged with the topographic reconnaissance of the headwaters and passes of the Lynn Canal, Alaska, arrived at Haines' Mission on May 7th, where the party separated, one part going up the Chilkat River and the other taking up the work in the Khatschin Valley. Each party was composed of a chief and five men.

The rivers forming the head waters of Lynn Canal have very swift currents and they were ascended under great difficulty and with much loss of time, as the loaded boats had to be tracked the entire distance, the men generally wading in the ice-cold water, overhanging alders precluding shore-tracking, excepting such stretches where gravel and sand-bars are deposited along the river shores. The water level fluctuates with the weather, rising rapidly after a day or two of clear weather, when the snow and ice of the adjoining mountains undergo a rapid melting. The main channels of these rivers change with every freshet, new bars being formed while old ones are washed away. This fact, together with numerous snags scattered about between islands and on sand bars, makes navigation, even with small boats, difficult and risky. The Khatschin party, while descending that river in June, lost one boat and a part of the outfit and records by being wrecked on a snag, the men barely escaping with their lives.

The parties suffered little from rainy weather, but the fogs and mists rarely left the higher altitudes for more than a day at a time, hiding from view the mountains which were to be located cartographically. Owing to the small number of clear days that are generally met with in the mountains of this region, it had been decided to use the photo-topographic surveying method, as it had given good results for the topographic reconnaissance of southeastern Alaska made under the direction of the Alaskan Boundary Commission.

Both parties were supplied with plane-tables for mapping the valleys and photo-topographic outfits. They have returned with instrumental and photographic records, which, when mapped, will cover an area of about 500 square miles, distributed over the valleys of the Chilkat, Tsicku, Tlahini, Khatschin, Skagway and Dyea Rivers, including the tributaries near their heads.

NOTES ON INORGANIC CHEMISTRY.

THE *Chemical News* contains a paper by Robert Meldrum on the action of water and saline solutions on metallic iron. In each experiment six feet of piano wire were exposed in the solutions in a four-ounce bottle. In many of the experiments with