provision of the agreement has been violated, and the result is a pavement such as shown in transverse section in fig. 2. The road-bed, or subgrade of earth, was not excavated to the proper depth, leaving the surface of the pavement at the centre of the street three inches higher than the established grade, making a steepness of crown or arch between curbs detrimental to traffic as compared with a flatter surface, and actually dangerous in icy weather. The surface of the road-bed was not tamped; the concrete ranges in thickness from the stipulated six inches down to three, and in some places even two inches; it was not properly mixed, laid, or tamped; and the materials of which it is composed are inferior in quality. The granite blocks vary greatly in size, and are bedded in a mixture of sand and gravel. They are laid with the broadest edge upward, instead of the reverse; the filling between them is a mixture of sand and gravel; and the paving cement, instead of filling the interstices to the bottom of the block, extends only an inch or two below the surface. In fact, so imperfect are both material and workmanship, that, after a short period of heavy traffic, the pavement will present the appearance shown in fig. 3. All sand and gravel used should have been free from moisture, artificially dried if necessary, and the joints between the blocks should be water-tight. These conditions were violated, and the collection of water at *W* in fig. 4 shows the effect of damp bedding and leaking joints. As a result, the tremendous pressure due to the expansive force of the freezing of this water in cold weather may be expected to rupture the pavement at the point where the water collects.

ST. PETERSBURG LETTER.

RUSSIAN science has sustained a heavy loss by the death of A. M. Butlerow, the celebrated chemist, in August last: it is the greater, as he was yet in the prime of life. His chemical work is well known abroad, but it may not be known that he had a second specialty: he was an eminent apiculturist. The progress in bee-keeping made in the last years in Russia owes much to his untiring efforts, especially to his manuals and papers. By his death the second chemical seat is made vacant in the Academy of sciences; and various surmises are made as to whether this learned corporation will persist in its opposition to the election of the greatest of Russian chemists, Professor Mindeleff.

Professor Mindeleff has twice visited the petroleum district near Baku, on a mission of the Ministry of finance, principally with a view to ascertaining if the wells were rapidly giving out or not. He has not yet returned from his last journey. Great progress is said to have been made in the distillation of petroleum oils by G. W. Alexeyew.

It being now early in the season, news about geographical expeditions is yet scarce. Prjevalsky is still at his country-seat, working at the report of his last journey, which is to be ready in August next. The special reports on botany, different parts of zoölogy, and probably also geology, it will take a long time to complete. The only special report which is to appear sooner is that on meteorology. The observations during the last expedition will be printed *in extenso*, together with those made during the Lob-Nor and the second Tibet expeditions of the same traveller, and the itineraries of the same. The work is to be supervised by Prof. A. Woeikof, who will add to it a work on the climate of the countries traversed, and High Asia in general.

The Russian polar commission has printed the observations of the first year (1882–83) of the Lena expeditions, which comprise meteorology only. The work of the second year, as well as the calculation of the magnetical observations, is in preparation. The work of the Lena expedition is of the highest character, and does the greater honor to its members, as it was done under the most serious difficulties.

Great progress in meteorological work in the south of Russia has been made. Professor Klossowsky, in Odessa, has succeeded in establishing quite a number of rainfall and thunder-storm stations in the government of Kherson, one of the most extensive in the south, and will issue a monthly report. This year was remarkable for heavy rains, especially in the southern part of the government. The rains have also extended to the central and eastern parts of Russia, and seldom have so heavy rainfalls been experienced on one day in this country. Till this year, over one hundred millimetres fell on one day at but two places in the plains of European Russia, — 145 in the southern part of the government of Tula, July 12, 1882; and over 120 at Yelisavetgrad. This summer we had 132 at Kharkow, June 24; 102 at Lgow (government of Koorsk), July 30–31 (of these, 51 in one hour); 99 at Moscow, Aug. 9–10; 93 at Kamishin, July 28. The rain of Aug. 9–10 was very heavy over a great district, and caused high water in the right tributaries of the Moskwa and Oka. The railroad-bridge over the Lopassnja was washed away.

Captain Makarow, I.R.N., has published an important work, "On the interchange of waters of the Black and Mediterranean seas." By the use of an instrument called a 'fluctometer,'

and invented by him, he could determine the velocity of currents irrespective of their direction. This instrument showed him that in the Bosphorus and Dardanelles the velocity decreased from a little below the surface, became 0 at a certain depth, and then increased again. As the surface current is from the Black Sea to the Sea of Marmora, and from the latter to the Mediterranean, the lower currents must be in the opposite direction; i.e., bringing the salter and warmer water of the Mediterranean to the Black Sea. This was also proved by determinations of specific gravity of the water, which considerably increased once the lower current was reached: for example, five miles from the Black Sea, in the Bosphorus, at 20 fathoms depth, the specific gravity was 1.0146; at 22 fathoms, 1.0225. In the Black Sea, in the vicinity of the Bosphorus, he found water with a temperature above 11° C., even at the depth of 140 fathoms; and 10.5° at 260 fathoms. The observations of Professor Lapschine off the east coast of the Black Sea (latitude 43°–44½°) give a temperature of 10° at 200 fathoms, and 8° at 490 fathoms. O. E.

St. Petersburg, Sept. 25.

NOTES AND NEWS.

THE Alert returned to Halifax Oct. 10, after an absence of nearly four months. This was the final trip of the Alert to the Hudson's Bay region, all the observing stations being dismantled, and the observers, their instruments, and other property brought back to Halifax. She sailed from Halifax on June 24, and proceeded direct to Nachvak station. On arrival off the station, the ice was so thick that the steamer could not get in to the coast. She then pushed on to the entrance to the straits, and, after encountering much trouble from ice, a clear entrance was found near the north side. No ice was encountered again until North Bluff was reached, and in making from that point to Diggs seven or eight days were occupied. At Diggs the Alert remained a couple of days, making repairs and receiving a general overhauling. During this time the propeller, from which a blade had been lost in the ice, was fixed. On the fourth day the expedition was continued to Churchill, that point being reached at the end of July. Churchill harbor was surveyed, and was found to be a splendid harboring-place, with not less than twenty-four feet of water at dead low spring tide. York Factory was reached two days after leaving Churchill, the length of the trip being occasioned by delays by a thick fog. Here a reconnaissance survey was made of the estuary of the Nelson River. The water was so shoal at such a distance from land, that a vessel could be in only five fathoms of water, and at the same time land could not be sighted from her deck. The roadstead affords a very unsafe anchorage, and the channel of the river is narrow and tortuous. From this place the steamer returned to Churchill, and then proceeded over to the west coast of the bay and Marble Mountain, arriving at the latter place in the middle of August. After observations on the west side of the bay and island, a determination was made of the position of Cape Southampton, and it was found that the cape is placed on the charts six or seven miles too far south and east. On arriving back at Diggs Island, an inner channel, apparently affording a mode of access clear through to the bay, was discovered. From Diggs Island the Alert went to Nottingham, and thence to North Bluff and Stupart's Bay. At the latter a party was sent to make a general observation of Prince of Wales Sound. Observer Payne, who was stationed here, reported finding some relics of very ancient guns. There were four altogether, two of them about the size of nine-pounders of the present day, the other two the size of the four or six pounders. They are of cast iron which is covered with rust; and so old are they, that the year-marks have rusted out, and it is impossible to estimate their age. The two smaller guns were brought home, the others being left behind. Inquiries concerning the guns were made among the Eskimo, but they could tell nothing whatever about them. They were undoubtedly some of the very earliest attempts at cast-iron ordnance. The steamer left Stupart's Bay in the middle of September for Port Burwell. On the way north from Port Burwell, soundings were taken, and the water to the east and south of Cape Chidley found to be very shoal. One bank, where there is less than one hundred fathoms all over it, extends seventy-five miles into the sea; while in the centre of the straits, between the Buttons and Cape Best, there is a depth of over two hundred and fifty fathoms. Returning to Nachvak, the station that could not be reached before, the observers were taken on board, and the Alert was headed homeward. The returned observers are all in excellent health, and all save one fared excellently during their exile. At most places game of various kinds was so plentiful that the men rarely tasted the salted or preserved beef.

— Trübner & Co. announce for the coming season, 'Luck or cunning, as the main means of organic modification,' by Samuel Butler; 'The life and works of Giordano Bruno;' 'The prehistory of the north,' by the late J. J. A. Worsaae (translated, with a brief memoir of the author, by