ercles in the dolphin *Neomæris* and the porpoise represent the last stages of degeneration of a former body armor, that in the ancestral dolphins the skin may have been largely overlaid by horny plaques, supported by bony scutes; and this hypothesis is strengthened by the finding of bony scutes in association with the fossilized bones of certain dolphins, so that armor-clad whales may have been as characteristic of certain former geological epochs, as unarmored whales are of the present. Furthermore, it has been suggested that since whales are undoubtedly descended from land mammals, the earliest whales must have lived along the seashore, and that an armored skin would be useful in protecting the animal from the pounding of the surf. But this is, of course, mere hypothesis.

HOT-WATER SUPPLIES TO TOWNS.

BY THOMAS PARKER.

Fortunately for some of the inland towns of Queensland, good supplies of potable water from artesian wells have been obtained within the municipal areas, and the towns have been reticulated with pipes to convey the water throughout. When the temperature of the water is not too high, the water mains are connected direct to the bore pipe at the surface, and the water is used, at its original pressure, for domestic and fire-extinguishing purposes. These waterworks have been a great boon to up-country towns, where hitherto the only water supply was derived from stagnant surface tanks, and obtained, in most cases, very irregularly, and at the expense of a long haulage. As wooden buildings are the rule in these towns, the value of the water supply for fire purposes is very great indeed.

When, however, the heat of the artesian water is abnormal, or, say, over 120 deg. Fah., it has been customary to cool the water by spraying it into a cool water tank of iron elevated 60 feet, thus losing part of the pressure of the water, or by conducting a portion of the supply into an earthen water tank containing coils of pipes, through which the hot water from the well is passed before entering the town mains. Otherwise, the expansion of the mains, due to the heat of the water coming into them direct from the artesian well, would cause breaks at the lead joints of the pipes in the streets.

Recently, however, a scheme has been designed by the writer, and carried out successfully in two towns, for conveying the water hot, and direct from the bore well to the town. As this method has been found to be much less expensive than the usual cooling schemes, and as it retains the full pressure of the bore supply, so valuable for fire purposes, it has been considered a great improvement on the old method of cooling the water before conveying it to the consumers. The heat of the water is also found to be valuable for baths and laundry purposes.

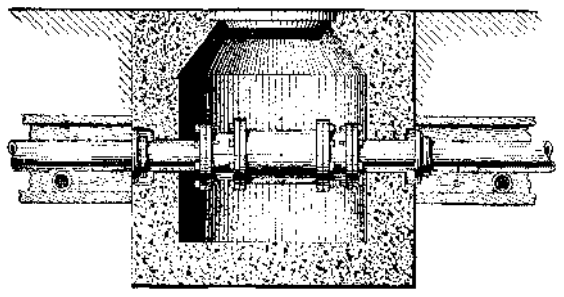
A description of the reticulation of the town of Muttaburra, in Central Queensland, on this new method will give a good idea of the system. The site of the bore which supplies the water is about half a mile from the center of the town. The depth of the artesian well is 2,707 feet, and the flow is about 750,000 gallons per day. The temperature of the water is 138 deg. Fah.

Before entering the town mains, the water passes through a stone trap, the gratings in this trap serving to keep back from the mains the gravel or stones which are sometimes thrown up by these underground water springs. The trap has a large base, and is set upon a concrete foundation, about 4 feet below the street level, and the whole is surrounded by a concrete-walled chamber, and a cover at the ground surface.

From this stone trap the mains are carried about 3 feet below the surface of the streets, and incased in wooden boxing. A reference to the drawing will show the mode of inclosing the pipes. The pipes rest upon rollers, formed of short lengths of one-inch galvanized iron piping, laid crosswise on the bottom of the wooden boxing. At intervals of about 200 feet, expansion joints are inserted in the mains, which are so set as to allow the lengthening and shortening of the sections of the mains between the fixed points, which will be afterward described. When the hot water is turned into the mains, the system works in the following way: The heat of the water causes the pipes to expand and increase in length, and each end of the section of main, which enters the expansion joint at opposite ends, moves toward the center of the expansion joint, like the piston in a steam cylinder. Here, between the ends, a space of three inches is left to allow for the lengthening of the section of main, without allowing them to touch each other. The expansion and lengthening of a section of main, about 200 feet in length, does not amount to over half an inch, so that the 3-inch expansion space at the ends of the lengths of pipes allows ample margin of expansion space. The reverse process and movement, of course, takes place when the water is—on rare occasions—shut out from the mains, and the pipes cool. The section of main affected by cooling shortens, and the ends draw back within the expansion joints, like the back stroke of the piston in a steam cylinder. The wooden boxing in which the street mains are inclosed is formed of 1½-inch planks of cypress pine of the locality, a timber which has been found, by repeated tests, to be proof against the ravages of white ants, which are very prevalent, and destructive of timber constructions, in the district, and, indeed, in the State of Queensland generally. At each intersection of the streets, a fixed point is constructed. This consists of a cast-iron cross piece, with four ways, bedded firmly in a large block of concrete. The cross streets are about 700 feet apart; this being the interval between the fixed points, the expansion and contraction of each section of main takes place within these limits. The four ways of the cross piece are made with socket ends to receive the main pipes.

In each section of the mains a sluice valve of the usual type is placed to control the section. Fire plugs are also provided at intervals of about 250 feet apart, to which a hose can be attached for fire extinction. At the lowest point of the town a pressure valve is placed, which can be set to open at any pressure, and is intended to act as a safety or escape valve, to relieve the mains from any accidental shock, or occasional undue pressure, from the too quick opening or shutting of valves, or undulation of the original pressure of the water at the bore pipe. This latter pressure is about 60 pounds per square inch, and the pipes and other castings of the system were all tested with a hydraulic pressure up to 100 pounds per square inch. The cost of the bore was about £2,707, and of the reticulation of the town about £2,013, making a total expenditure of about £4,720.

One of the hitherto undeveloped resources of artesian wells in Queensland is the available power due to the pressure and flow of the water. At one Queensland town it is estimated the flow from the bore will



EXPANSION JOINT FOR HOT-WATER MAINS.

develop nearly 30 horse-power, and it is intended by the municipal authorities to utilize this power for electric lighting purposes.

Official Meteorological Summary, New York, N. Y., August, 1906.

Atmospheric pressure: Highest, 30.31; date, 2; lowest, 29.75; date, 27; mean, 30.01. Temperature: Highest, 93; date, 6; lowest, 63; date, 25; mean of warmest day, 84; date, 6; coldest day, 68; date, 25; mean of maximum for the month, 81.2; mean of minimum, 69.4; absolute mean, 75.3; normal is 72.7; average daily excess compared with mean of 36 years, +2.6. Warmest mean temperature for August, 77 in 1900; coldest mean, 69 in 1903. Absolute maximum and minimum for this month for 36 years, 96 and 51. Precipitation: 3.68; greatest in 24 hours, 1.37; date, 7 and 8; average for this month for 36 years, 4.59; deficiency, —0.91; greatest precipitation, 10.42, in 1875; least, 1.18, in 1886. Wind: Prevailing direction, south; total movement, 6,443 miles; average hourly velocity, 8.7 miles; maximum velocity, 36 miles per hour. Weather: Clear days, 6; partly cloudy, 11; cloudy, 14. Thunderstorms: Date, 4, 7, 11, 21 and 23. The temperature of June was 2.5, July 0.9 and August 2.6 in excess, making the summer of 1906 2 degrees above the normal. These months were each below normal in rainfall, the total summer deficiency being 3.72.

New Island in Bering Sea.

A well authenticated story comes from the far North to the effect that an island has very recently been created in the Bering Sea. This new island has evidently been thrown up by a submarine eruption. Advices have been received from Seward, Alaska, which state that the new land is located not far from the island of Boroslow, which was upheaved in the same manner about a century ago.

News of the formation of this new land reached Seward from Unalaska, being carried to the latter port by Bering Sea fishermen. Vast quantities of rock were thrown up with the earth, thus forming acres of bluff, rugged headlands, according to the accounts given by these fishermen. That this upheaval was due to volcanic displacement seems very evident from what the fishermen say. They assert positively that the waters of the sea were very warm for a wide radius around the newly created island, and the atmospheric heat was so fierce that they were unable to approach near the land. This reported new island will be the subject of scientific investigation in the near future.

Science Notes.

Sponge fishing in Florida waters until about a year ago was all done by the use of poles with three-pronged hooks attached at an end, and the sponging operations were necessarily confined to shallowish water, the depth varying from fifteen to thirty feet. About a year ago, a Greek workman, who had been employed in one of the sponge-packing houses, tried the experiment of diving for sponges, and this method of securing them was attended with such good results that diving for them has now become a common method of sponge-fishing. Most of the sponge-divers are Greeks, and they are looked upon as trespassers upon the premises of the native spongers, and as likely to seriously damage future sponge-crop prospects. A bill prohibiting aliens from sponge-fishing in Florida waters, and another making it unlawful to deliver at any point in the United States any sponges taken from the Gulf of Mexico or Straits of Florida by diving, have passed both houses of Congress and will soon become laws; and a State law prohibits the taking of sponges by diving, and affixes a heavy penalty for a violation of the law. It is claimed that gathering sponges by diving, accompanied as it is by considerable tramping among them, will injure the beds seriously, and eventually deplete them.

It seems likely that we are to have some improvement over the present methods of obtaining hydrogen for balloons. Not content with the process of compressing hydrogen into steel bottles for use on the field and especially for military ballooning, inventors are looking for a chemical product resembling carbide of calcium or the new product "oxylithe," which will give off hydrogen when placed in contact with water. M. Güntz, of Nancy, has brought out a process for manufacturing the hydride of barium and which may no doubt be applied to the hydride of calcium as well. This latter body has the property of giving off hydrogen when treated with water. In the above process, electrolysis is carried out, using a mercury bath and a solution of barium chloride. A barium amalgam is formed here, and the mercury is driven off from it by distillation *in vacuo*, then the barium which remains is treated in a current of hydrogen so as to form the hydride. An industrial hydride of calcium has lately been brought out by M. George F. Jaubert, a prominent chemist of Paris and the inventor of "oxylithe," which latter product gives off oxygen when placed in water. The new product, known as "hydrolythe," produces hydrogen in the same way, and one pound of it in a pure state, when treated with water, will give about 10 cubic feet of hydrogen. To fill out a military balloon of 600 cubic yards it suffices to transport about 1,200 pounds of the product, while at present we need some 5 tons of steel cylinders and suitable vehicles must be provided for these, besides, the empty tubes must be taken back for refilling. For military work we thus have a great advantage which more than balances the higher price. The latter will bring the cubic yard of hydrogen to $1.00 or $1.50. At present, the cost of the product will no doubt prevent its use for ordinary ballooning, but by improvements in the method we may see the price lowered.

According to the latest official returns of the British government, great activity is being shown in ascertaining the extent of the thorium-bearing minerals in Ceylon which were first discovered during the mineralogical survey of 1904. Of these the most important is thorianite, a mineral new to science, and containing 70 to 80 per cent of the rare earth thoria, which is used in the manufacture of incandescent gas mantles. In England thorianite containing from 70 to 72 per cent of thoria realizes $150 per 112 pounds. With a view to encouraging further search for this valuable mineral a notice was published by the Ceylon government giving the above particulars and also stating the places where thorianite and thorite had been found. Intending prospectors were informed that the government would for three years undertake to levy no royalty on this mineral, except in those cases where extraction was made on crown lands, where the permission to wash is by agreement on liberal terms. There is a large area including all the province of Sabaragamuwa, and part of the central, western, and southern provinces, where the mineral may be looked for. Search is now being made in many localities. It is not possible to say at present how far a regular supply can be anticipated. About 140 pounds of thorianite, which were received from Mr. W. D. Holland, who first discovered this mineral, were sent to the crown agents in November, and sold by Prof. Dunstan of the Imperial Institute in London for $475. Prof. Dunstan is taking further steps to obtain reports on the commercial value of the sample sent to him and for supplying such further information as may lead to more discoveries. The mineralogical survey is further engaged in examining the gemming districts in Sabaragamuwa, and the southern province, in investigating discoveries of corundum and of heavy minerals containing rare elements, as for example allanite and several minerals belonging to the samarskite group.