It has been inferred by some from these experiments that rivers can be relied upon to purify themselves or free themselves from disease-producing organisms by the natural flow of a few miles. I do not, however, think that this is a safe assumption. The difficulty in conducting such experiments is so great, and the knowledge that we possess of the conditions of life for pathogenic bacteria in running water is so scanty, that we are not justified in considering that water can be thus purified. Moreover there are many observations which show that rivers are not so purified.

Thus at Providence an epidemic of typhoid fever was traced to a very slight pollution of a large and rather rapid stream three and a quarter miles above the intake of the city supply.

The city of Philadelphia suffers continually from a high typhoid death rate, and this is due unquestionably to the pollution of the Schuylkill River by sewage, much of which contamination takes place many miles above the intake.

The Merrimac River is polluted by sewage at many points along its course, especially at the cities of Concord, Nashua, Lowell and Lawrence. Typhoid fever has for many years been exceedingly prevalent at Lowell and Lawrence, which take their water supply from the river, although Lowell is fourteen miles below Nashua and Lawrence nine miles further down than Lowell. Moreover, when Lowell has suffered from an exceptionally severe outbreak, Lawrence has had the same experience soon afterwards. Newburyport is seventeen miles below Lawrence and takes its water from springs, but two years ago, this supply being low, a pipe was extended into the Merrimac, and soon after an epidemic of typhoid occurred. These failures in self-purification are very instructive from the fact that the river flows so many miles without being freed from disease germs, and secondly because the river is very large as compared to the amount of sewage which enters it.

From theoretical and experimental considerations, and still more from the experiences first related, we must believe that a river once infected with disease-producing bacteria undergoes only a moderate degree of self-purification. What there is, is because the bacteria either settle to the bottom or die. Complete subsidence probably cannot take place in a flowing river, and as from one to two weeks are required to destroy the vitality of certain kinds of pathogenic organisms it can be only very rarely that conditions necessary for entire purification are found. As sewage is always likely to contain disease-producing organisms it follows that a river which receives sewage should be considered unfit to serve as a public water supply. Certainly if in rare cases it may be safe so to use it, we are not yet able to predicate the necessary conditions.

LETTERS TO THE EDITOR.

*** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as a proof of good faith.

On request in advance, one hundred copies of the number containing his communication will be furnished free to any correspondent.

The Editor will be glad to publish any queries consonant with the character of the journal.

Palæolithic Pottery.

As bearing upon the discussion about the so-called *hiatus* between palæolithic and neolithic times, Dr. Brinton has made a statement in his "Notes on Anthropology" (*Science*, March 9, 1894), to which I must decidedly demur. He says, "All must now concede that palæolithic man made pottery, which was long denied him." I suppose that Dr. Brinton relies for this statement mainly upon the authority of the Marquis de Nadaillac, in various works, and especially in his "Manners and Monuments of Prehistoric Peoples," p. 100. But that gentleman is a closet archæologist and not an explorer, and he bases his opinion upon antecedent probability, and not upon personal knowledge, citing certain authorities of at least questionable value. In the single instance in which he makes an assertion upon his own authority he is certainly wrong. After stating that "Evans and Geikie in their turn assert the absence in England of palæolithic pottery, and Sir J. Lubbock energetically maintains this opinion," he adds in a note "But what is the value of categorical assertions of this kind in presence of the fragments of pottery found at different levels in Kent's Hole?" Now, as I have had occasion to say elsewhere, if this statement were correct, it might be regarded as settling the question, for never were investigations conducted more carefully and more scientifically than were those carried on for fourteen years by Mr. Pengelly, at Kent's Hole, near Torquay, on behalf of the British Association. This is what he says in his report made to that body in 1873, p. 213: "The men of the black mould had a great variety of bone instruments; they used spindle-whorls, and made pottery, and smelted and compounded metals. The older men of the cave earth made few bone tools; they used needles and probably stitched skins together; but they had neither spindle-whorls, nor pottery, nor metals." There could not be a plainer assertion than this of the absence of pottery from the more ancient deposits in Kent's Hole.

So, too, Prof. Boyd Dawkins, whose researches in the bone-caves of England are known to men of science the world over, says in "Early Man in Britain," p. 209: "There is no reason to suppose that the cave men used vessels of pottery, since no potsherds have been discovered in any of the refuse-heaps which have been carefully explored in France, Germany, Switzerland and Britain. The round-bottomed vase from the Trou du Frontal, considered by M. Dupont to imply that the art of pottery was known at this time, is of the same fashion as those of the neolithic age from the pile dwellings of Switzerland, and probably belongs to that age. . . . Had the cave men been acquainted with the potter's art, there is every reason to believe that traces of it would be abundant in every refuse-heap, as they were subsequently in those of all pottery-using peoples, a fragment of pottery or of burnt clay being as little liable to destruction as a fragment of bone or of antler."

It is upon these discoveries of M. Dupont that De Nadaillac rests his belief that in Belgium, at any rate, the cave men made a rude pottery, while the mammoth and the cave bear were still their neighbors. But it is a fact that among the fragments of pottery discovered by Dupont in the Belgian caverns were some that had been made upon the potter's wheel; and it is certainly remarkable that "the round-bottomed vase from the Trou du Frontal" was quietly withdrawn from the glass cases of the Brussels Museum ("Matériaux," x., 332; xvi., 124).

Within the past ten years some discoveries made by M. Fraipont, and his co-laborers, in certain Belgian caverns at Spy, Engis and Petit-Modone, have been supposed by some persons to lend confirmation to Dupont's views. But the thorough discussion of these finds by M. Cartailhac in "Matériaux," xxii., 63–78, shows upon how slight a foundation they are based. The most they can be held to establish, if they are proved, is that during the age of the mammoth pottery was invented by one tribe of savage hunters, living in Belgium; that the knowledge of it never spread, and was finally lost, without having been transmitted to the men of the age of the reindeer.

M. Salomon Reinach, in his masterly "Description

Raisonnée du Musée de Saint Germain-en-Laye," p. 157, sums up the present state of opinion in France on this question in this thoroughly impartial fashion: "The knowledge of pottery (of the cave men) is doubtful; at the most it was the privilege of some few tribes. The fragments of pottery discovered in the quaternary beds can almost always have been introduced there through fissures or by the action of burrowing animals;" and in a note, giving a bibliography of authorities, upon this difficult question of quaternary pottery one can always fall back upon later disturbunce of the beds, as do MM. de Mortillet and Cartailhac, who deny formally the existence of pottery in the age of the reindeer."

I think these citations are ample to show that all do not concede that palæolithic man made pottery.

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Boston.

Mr. MacDougal and Poisoning from Cypripedium spectabile.

In Bulletin No. 9, Minnesota Botanical Studies, are several interesting papers; and Mr. D. T. MacDougal's paper "On the Poisonous Influence of Cypripedium spectabile and Cypripedium pubescens" is of special interest because there is conclusive evidence that at least one of these plants is poisonous to some people. Both of these species are common in parts of Minnesota and Wisconsin, and I remember at least one case of supposed poisoning from the Large White Lady's Slipper. Some twenty years ago this species was common in rich moist woods in the coulés and ravines near springs and in the marshes of western Wisconsin. Children used to collect this species in large quantities, and on one occasion a young man collected a large quantity of the flowers, followed by a swollen face. It is so long ago, however, and as I could scarcely have been more than ten or eleven years old, I do not remember more than the collecting of the flowers and that his swollen face was attributed to this plant. It may have been from Poison Ivy, which is common in this region, but the person insisted he was poisoned by this Lady's Slipper. Mr. MacDougal gives the following interesting experiment, which leaves no doubt as to the poisonous character of the plant to some persons at least: "The author, while in the field at Twin Lakes, near Minneapolis, September 7, 1893, met with several well grown plants of *C. spectabile*, with newly formed seed pods. A robust specimen was broken off near the base of the stem, and the leaves were brushed lightly across the biceps muscle of the bared left arm. A slight tingling sensation was felt at the time, and fourteen hours later the arm was greatly swollen from the shoulder to the finger tips." He finds two kinds of hairs, one glandular, the other pointed. The poisonous effects may be due to the piercing of the skin by the pointed hair and the consequent action of the acid contents, or the surface irritation by the contents of the glandular hairs. Seventeen other plants found in Minnesota are enumerated which are poisonous to the touch, and some of these are common weeds like Cocklebur (*Xanthium canadense*), Horse Weed or Fleabane (*Erigeron canadense*) and White Spurge (*Euphorbia corollata*). The writer of this note is extremely sensitive to the action of Poisonous Ivy (*Rhus vernix*), but *Primula obconica*, which is said to be poisonous to some people, had no effect nor did it have any effect on several students working in the botanical laboratory on whom the experiment was tried. I know of one person who is systematically poisoned when he picks up wild grass. When questioned he stated that Poison Ivy was not seen by him. This matter of poisoning to the touch by different plants is largely a matter of individuality and condition of the system. Previous to 1886 I could pick and cut Poison Ivy with impunity, but in the spring of that year I was poisoned, and ever since I have been sensitive to its action. I may state that at the time I was subject to a slight bilious attack. I was perspiring very freely. I am certain that I touched my eyelids and face; had I not done so I would have been free from its effects.

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A Miniature Water Lily.

I HAVE been shown Mr. H. B. Ayres's note in the last number of *Science*, in which he credits me with having found *Nymphæa odorata var. minor* on the Moose River, near James Bay, in 1885. Though I ascended the Moose River in that year, I neither collected nor saw this plant. In the year 1886, however, in lat. 54, near the head waters of the Severn River, which runs into Hudson Bay, I did collect a *Nymphæa* which I took to be *N. odorata var. minor*. Specimens were sent to Dr. Britton, who identified them as *Castalia pygmæa*, Salisb. (*Nymphæa pygmæa* Oit.=*N. tetragona*, Georgi). Dr. Britton wrote me at that time: "The plant may be at once distinguished from the eastern *N. odorata var. minor*, by the oblong leaves, sometimes nearly twice as long as broad, with narrow, acutish lobes and the flowers still smaller, with seven to eight rayed stigma." The specimens in the herbarium of this department were then examined, and it was found that specimens collected by Dr. Robt. Bell, in 1879, on the Mesinabic River—a branch of the Moose River—and named *N. odorata var. minor*, were also this species.

Mr. Wm. McInnis, of the Geological Survey Department of Canada, reports a small *Nymphæa* as being abundant in some of the small lakes east of the Rainey Lake, almost due north of Red Lake. It seems to me probable that both these and the Red Lake and Turtle Lake plants are *Castalia pygmæa* and not *Nymphæa* (*Castalia*) *odorata var. minor*.

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The Swastika Cross.

THE display of relics in the anthropological building of the Columbian Exposition, collected by Mr. Warren K. Moorehead from a cluster of mounds near Chillicothe, Ohio, contained, among many other very interesting objects, a large number of Swastika crosses made from thin strips of copper. The occurrence of copper ornaments of that shape so perfectly wrought, and in such numbers, occasioned much surprise, and attracted great attention. A communication which I made to the *New York Independent* of Nov. 16, describing these objects, has brought to me two interesting communications from widely separated portions of the globe giving valuable information concerning the wide-spread use of this symbol.

Mr. John Thorgeirson, writing from Bannacks, Montana, tells me that an ancient MS., owned by his grandfather, in which there were many runic characters, represented Thor's hammer as of the form of the Swastika cross. It is interesting to note, also, that before Christianity had wholly subdued the Northmen the sign of the cross and of Thor's hammer, when made before partaking of festive draughts, were sometimes confounded, greatly to the misunderstanding of spectators.

Another communication from Rev. F. H. Chalfant, missionary at Shantung, China, informs me that the same symbol is among the mystic Chinese characters, to wit, "wan" ($\overline{|}+\underline{|}$), and is a favorite ornament with the Chinese.

This occurrence of so peculiar a symbol in countries so widely separated as Scandinavia, China, and the Mississippi Valley is certainly suggestive either of an original con-