showed 1040 bacteria per c.c. The sewage is passed into the Iowa River, which flows, at a minimum, about 3,250,000 gallons per twenty-four hours and contamination by sewage is at all times serious. Where thus contaminated, its color is dark, its odor offensive and its mean content of bacteria at times as high as about 100,000 per c.c. and probably more. The outcome of litigation directed against the city by residents of the country below, along the banks of the stream, has been the determination of the city to adopt a system of purification of the sewage and it is to this end that the experts of the University were consulted.

It was promptly discovered that the glucose sewage was very different from that of the city, in respect to content of bacteria, as was to have been expected. Its bacteria ranged up to, in one case, nearly ten millions per c.c. While not unwholesome when fresh, it is subject to putrefaction of a seriously objectionable character. The packing-house sewage also contains large quantities of bacteria and has a characteristic composition. The result of intermixture of these various kinds of sewage is a peculiarly offensive and troublesome compound.

In seeking the best remedy for this state of affairs at Marshalltown, the data printed in the report were gathered. The work included a study of the topography of the country, of the character of the soil, the available materials for construction, of filtering and settling tanks and the costs of labor and material. It is stated that the works should be completed before November of the present year.

In the performance of the work of the consulting chemists and bacteriologists, the methods of the Massachusetts Board of Health were usually followed.

R. H. THURSTON.

'ARROWPOINTS, SPEARHEADS AND KNIVES OF PREHISTORIC TIMES.'

UNDER the above title, Professor Thomas Wilson, Curator of the Division of Prehistoric Archæology of the U. S. National Museum, occupies pages 811 to 988, of the Report of the Museum for 1897. Sixty-five plates and two hundred and one text figures accompany the paper. The whole is also run by the Government Printing Office, as a reprint bearing the date 1899.

Much material is brought together in this paper, besides copious references to the literature and sources of information. The chipped objects of the palæolithic period are touched upon, and sections are devoted to the origin, invention and evolution of the bow and arrow; superstitions concerning arrowpoints; flintmines and quarries of Europe and America; caches; material for points and its microscopic examination; the manufacture of points; and scrapers, grinders and straightners used in making shafts for arrows and spears. Fifty-seven pages and a proportional number of plates and figures are devoted to Mr. Wilson's classification of points for arrows and spears which is under the four main divisions, leaf-shaped, triangular, stemmed and peculiar forms. Knives and wounds made by points are also discussed. Flint mines and quarries, caches, large implements and the making of arrowpoints described by explorers and travelers are the subjects included in appendices A, B, C and D.

Some of the illustrations are familiar to readers of archæologic literature, who are glad to have them brought, together with the new illustrations, under one cover.

The manufacture of arrowpoints was seen as late as the summer of 1898 by several members of the Jesup North Pacific Expedition in the Thompson Valley, British Columbia, but in a few years it will be an industry of the past, at least in regions accessible to the body of students of archæology. Dr. Wilson has introduced a number of quaint pictures of a flint knapper engaged in chipping gun flints at Brandon, Suffolk, England.

HARLAN I. SMITH.

DIETARY STUDIES OF UNIVERSITY BOAT CREWS.

PROFESSOR W. O. ATWATER and Mr. A. P. Bryant have prepared an interesting bulletin on the above subject, published through the Office of Experiment Stations, U. S. Department of Agriculture. Their results, together with the comparison of other dietary studies, are summarized in the following table:

TABLE SHOWING NUTRIMENTS IN FOOD ACTUALLY EATEN PER MAN PER DAY.

	Protein.	Fat.	Carbohydrates.	Fuel value.
DIETARY STUDIES OF UNIVERSITY BOAT CREWS.				
	Grams.	*Grams.*	*Grams.*	*Calories.*
Harvard University crew at Cambridge (No. 227)	162	175	449	4,130
Harvard Freshman crew at Cambridge (No. 228)	153	223	468	4,620
Yale University crew at New Haven (No. 229)	145	170	375	3,705
Harvard University crew at Gales Ferry (No. 230)	160	170	448	4,075
Harvard Freshman crew at Gales Ferry (No. 231)	135	152	416	3,675
Yale University crew at Gales Ferry (No. 232)	171	171	434	4,070
Captain of Harvard Freshman crew (No. 233)	155	181	487	4,315
Average	155	177	440	4,085
SUMMARIZED RESULTS OF OTHER DIETARY STUDIES.				
Football team, college students, Connecticut	181	292	557	5,740
Football team, college students, California	270	416	710	7,885
Professional athlete, Sandow	244	151	502	4,460
Prize fighter, England	278	78	83	2,205
Average of 15 college clubs	107	148	459	3,690
Average of 14 mechanics' families	103	150	402	3,465
Average of 10 farmers' families	97	130	467	3,515
Average of 24 mechanics' and farmers' families	100	141	429	3,480
Average of 14 professional men's families	104	125	423	3,325
DIETARY STANDARDS.				
Man with moderate muscular work, Voit	118	56	500	3,055
Man with moderate muscular work, Playfair	119	51	531	3,140
Man with moderate muscular work, Atwater	125	.....	.....	3,500
Man with hard muscular work, Voit	145	100	450	3,370
Man with hard muscular work, Playfair	156	71	568	3,630
Man with hard muscular work, Atwater	150	.....	.....	4,500
Man with severe muscular work, Playfair	185	71	568	3,750
Man with severe muscular work, Atwater	175	.....	.....	5,700

LAKE LABORATORY OF THE OHIO STATE UNIVERSITY.

THE Lake Laboratory of the Ohio State University was established under the direction of the late Professor D. S. Kellicott, for the especial purpose of providing opportunity for investigation of the biology of the lake region, and investigations have been carried on each summer since its establishment except for the summer of 1898, when the death of Professor Kellicott interrupted the work. It has now been determined to add to the original purpose the provision for giving certain courses of instruction and to combine work of the departments of botany and zoology. The following statements concerning the plans for the summer of 1900 are made for the benefit of those who may wish to work at the laboratory, either in independent investigations or in connection with the courses of instruction offered.

The staff includes the regular instructors in the departments of Botany, Zoology and Entomology.

HERBERT OSBORN, Professor of Zoology and Entomology, *Director*.

W. A. KELLERMAN, Professor of Botany.

JAMES S. HINE, Assistant Professor of Entomology.

J. H. SCHAFFNER, Assistant Professor of Botany.

F. L. LANDACRE, Assistant in Zoology.

The laboratory is located close to the waters of Sandusky Bay, which teem with animal and plant life, while extensive marshes, the river, native forest, beach and lake are all within easy reach. Put-in-Bay with the United States Fish Hatchery, Kelley's Island with its glacial grooves, and other points of natural interest are easily reached by excursions and will be visited in collecting or special trips. The fishing industry centering at Sandusky, affords special opportunity for study and investigation in ichthyology.