easily worked, but with the working it gains rapidly in hardness, and must be carefully reheated or annealed before it can be further worked. As at high temperatures it is readily oxidized, its heating or fusion is best accomplished in a vacuum and by means of the electric current. Alloys of iron with a very small quantity of tantalum, and of tantalum with a very small quantity of iron seem to have an especial value. Owing to its great cost at present, the use of tantalum is necessarily very restricted, but if it shall ever be obtainable in considerable amounts it will have great value, especially for those parts of machinery which are subject to strong mechanical action, such as the cones and balls for ball bearings, cams, eccentrics and rollers.

TIN, TITANIUM AND COBALT STEELS.

IN a recent number of the *Comptes Rendus*, Guillet describes a study of a number of steels, some of which have already been more or less investigated by others. He finds that tin dissolves readily in iron, and if present to the extent of more than one per cent. renders the steel very hard but brittle. The carbon present never separates out as graphite. The mechanical properties of the titanium steels, when the proportion of titanium is not above nine per cent., are practically those of steel itself. The presence of cobalt, up to sixty per cent., has no effect upon the micro-structure of the steel and very little effect upon its mechanical properties. Guillet concludes from his investigations that none of these steels has any industrial value. This result is not wholly in accord with the work of other previous investigators, who have found that certain of these alloys, notably some of the titanium steels, give promise of industrial usefulness.

COPPER AS AN ANTISEPTIC AGAINST TYPHOID ORGANISMS.

QUITE an extensive paper has recently appeared in the *American Journal of Pharmacy* by Henry Kraemer, entitled 'The Use of Copper in Destroying Typhoid Organisms, and the Effects of Copper on Man.' After discussing the distribution and removal or destruction of typhoid organisms, the effect of copper on lower animals and plants is considered. The effect of water treated with copper on man and the elimination of the copper from water are next taken up, and finally the effect of copper in foods. It is, perhaps, worth while to quote the author's conclusions:

1. It is pretty well established that the typhoid organism is disseminated not only through water, but also through air and food, and may retain its vitality for a considerable period of time.

2. Typhoid organisms in water are eliminated by filtration, boiling and certain biochemical methods. Of the latter, the use of copper, as proposed by Moore and Kellermann, is probably the most efficient and at the same time most practicable.

3. While exceedingly minute quantities of copper in solution are toxic to certain unicellular organisms, as bacteria, it is safe to assume that the higher plants and animals, including man, are unaffected by solutions containing the same or even larger amounts of copper.

4. There being a number of factors which tend to eliminate copper from its solutions, it is hardly likely that there would be any copper in solution by the time the water from a reservoir reached the consumer, if the treatment of the reservoir were in competent hands.

5. Many plants contain relatively large amounts of copper, and when these are used as food some of the copper is taken up by the animal organism, but there are no records of any ill effects from copper so consumed.

In connection with this last paragraph, which is in its conclusion quite contrary to the usually accepted idea, numerous authorities and experiments are quoted, and the conclusion is probably well justified that very little danger is to be apprehended from either acute or chronic copper poisoning from copper present in water or foods.

J. L. H.

RECENT MUSEUM REPORTS.

THAT the annual report of a museum should, as a rule, appear from three months to a year late, doubtless strikes the average reader as extraordinary. But 'the average reader,' or the average man, frequently looks upon a museum as a haven of rest whose collections assemble, arrange and label themselves; as a

place where moth and dust do not corrupt and Dermestes do not break in and steal; where the employees spend their time in studies of interest only to themselves. That such is a not uncommon opinion is evidenced by the character of many who apply, or are recommended, for positions in museums, whose chief qualification seems to be inability to do a good day's work or compete with their fellow men in the daily avocations of life. As a matter of fact, to use Dr. Haddon's expression, the curator who really curates has his hands full to overflowing, and there are always so many things demanding immediate attention that in the matter of reports there is a strong temptation to follow the good old adage and not put off till to-morrow what can conveniently be put off until the day after. These remarks are called forth by the comparatively recent appearance of the belated reports of several of our museums, that of the *U. S. National Museum* for 1902–03, having appeared in June, as nearly as possible two years behind. Nevertheless the report is a good one and indicates the aid extended by this institution to the public in general and investigators in particular, and it is probably fair to say that no other museum in the world is so free with material, publications and information as this.

Where so much ground is covered as is done in this report it is practically impossible to touch on details, but one may note the rapid growth of the botanical and entomological collections and the gradual rearrangement of the zoological exhibits in the interests of the public, by lessening the number of specimens and adding to their attractive features. Just a word of criticism here: the collection of mammals is stated to be at last 'thoroughly and satisfactorily labeled.' It may be thoroughly labeled, but in view of what is now demanded of museums it can hardly be said that a set of labels giving only the name and range of the species is satisfactory. The labels on the reptiles and many of the fishes are very much better than those of the mammals and birds.

As an appendix to the report Mr. Rathbun gives 'An Account of the Buildings occupied by the National Collections' and there is a translation of the memoirs by Dr. A. B. Meyer, of the Royal Museum, Dresden, 'Studies of the Museums and Kindred Institutions of New York City, Albany, Buffalo and Chicago, with Notes on Some European Institutions.' These are both long and important articles. The first shows just how the National Museum is housed and gives a brief sketch, with plans of the new building now in process of construction. The accompanying illustrations give an extremely good idea of the general appearance of the present building and of its exhibition halls.

The publication of the translations of Dr. Meyer's memoirs makes generally accessible for the first time the fullest account of our own museums and libraries that has been written, while the notes on European museums show the most recent work in museum construction and installation.

The *Report of the American Museum of Natural History* for 1904 appeared in July and is, as usual, a somewhat condensed and formal statement of the operations of the museum, the more striking feature of general interest being skillfully emphasized by the introduction of a number of plates. These include the great bird groups, the skeleton of Brontosaurus, the Peary meteorite (which, like fish, lost so much in weighing), and examples of the beautiful glass models of invertebrates made in the museum laboratories under the supervision of Dr. Dahlgren. With all respect to the late Herr Blaschka, these models are superior to the famous Blaschka models. In its lecture courses the American Museum makes a strong appeal to teachers and scholars and the results have been extremely satisfactory.

The *Report of the Carnegie Museum* covers the year ending March 31, 1905, and this appeared with commendable promptness and shows a remarkable increase in the collections of vertebrate and invertebrate paleontology. At present the growth of the exhibition portion of the museum is stopped by the construction of the extensive additions now being made to the building, but the study collections in all departments are increasing rapidly.

The report notes the over-zealous interference of the Game Commission of Pennsylvania with the collecting of native birds. It has repeatedly been shown that it is not the scientific collector who wreaks havoc among birds, but those who destroy for commercial purposes, or for pure love of killing. With some hesitation we question the entire accuracy of the statement that 'This museum was probably the first institution of its kind to put into practical effect the idea of sending out through the schools small collections illustrating the truths of natural science.' Our English friends may have something to say regarding this rather sweeping claim.

The *Report of the Museums of the Brooklyn Institute* for 1904, is seven months after date, but, being the first of its kind, should not be too severely criticized. It notes the restrictions on the work of rearrangement due to the delay in receiving the central section of the building, but as noted in SCIENCE this restriction was removed in March and the section opened in June. There is a somewhat detailed list of the collections of art and ethnology and an account of the libraries of the Central and Children's Museums. The latter now contains over 3,500 volumes and is possibly the most complete of its kind, containing a very large proportion of popular works on natural history and nature study, history and geography, and many selected with special reference to their use by teachers. The number of readers for 1904 was 26,899, including 105 teachers with their classes.

To generalize a little it may be said that these reports emphasize the amount of attention that is properly being given to the display of specimens so that they may be both attractive and of educational value. To a great extent these things go hand in hand, for if specimens are not attractive, the visitor will not look at them closely and their educational influence is lost. The old museum idea was the exhibition of specimens only, now the specimens are used to aid in the teaching of facts.

SCIENTIFIC NOTES AND NEWS.

PROFESSOR E. RAY LANKESTER, director of the British Museum of Natural History, was elected president of the British Association for 1906 at the final meeting of the association held at Johannesburg on September 1. After the adjournment, most of the members of the association left for Kimberly, Bulawayo and Victoria Falls.

THE advisory board of engineers upon plans for the Panama Canal, consisting of American and foreign experts, held their first meeting in Washington on September 1. They will later go to Panama. The members of the board are: Mr. Henry Hunter, nominated by the British government; M. Adolphe Guérard, nominated by the French government; Herr Eugene Tincauser, nominated by the German government; Herr J. W. Welcker, nominated by the government of the Netherlands; M. L. Quellennec, consulting engineer of the Suez Canal; General George W. Davis, U. S. A., retired; Alfred Doble, chief engineer of the Pennsylvania Railroad; William Barclay Parsons, formerly of the New York Rapid Transit Commission; Professor William H. Burr, of Columbia University; Frederick P. Stearns, of Boston; General Henry L. Abbott, U. S. A., retired; Joseph Ripley, engineer of the Sault Ste. Marie Canal, and Isham Randolph, engineer of the Chicago Drainage Canal.

DR. D. E. SALMON, for twenty-one years head of the Bureau of Animal Industry of the Department of Agriculture, handed his resignation to Secretary Wilson on September 6. The secretary accepted it, to take effect on October 1. Dr. Alonzo D. Melvin, assistant chief of the bureau, will be designated acting chief.

PROFESSOR O. LUMMER, director of the physical laboratory at Breslau, has accepted an invitation to lecture at Columbia University during the year 1906–7.

PRESIDENT DAVID STARR JORDAN, of Stanford University, has returned from Europe by way of Canada, and was expected to reach home this week.

IT appears that Professor Ronald Ross did not, as has been stated, accompany Professor Rubert Boyce on his visit to New Orleans in connection with the outbreak of yellow-fever.