

weighing all matter passing through it. There are nearly 80,000 offices, and in each one of these this weighing will be kept up for thirty-five consecutive days. At the end of this time each office will forward to Washington its complete report and from this enormous mass of statistics will be compiled, by a special staff, yet to be selected, a wealth of information that cannot fail to benefit the service greatly.

It is likely that this general stock taking, if so it may be called, will reveal many opportunities for economy and kindred improvements in the railway postal service. It will assuredly set at rest the moot question as to whether bulk mail is being hauled back and forth, charged for both ways, by certain railways. It will also, we believe, show that both letter and newspaper postage, under proper restrictions, can be still further cheapened, and that manuscript designed for publication, proofs, and authors' revises and notes can all be treated more leniently in the interest of the wider dissemination of information and education by the press. The country is, also, to be congratulated that it now has at the head of this department a man of affairs, a newspaper man of long training, whose comprehension of the needs of the service under his charge is unusually broad and thorough.

THE AMERICAN ASSOCIATION FOR THE
ADVANCEMENT OF SCIENCE.

BY HORACE C. HOVEY.

The forty-eighth annual meeting of the American Association for the Advancement of Science was held in Columbus, O., from August 19 to August 26, 1899, and was marked by many features of scientific and social interest. Preliminary arrangements were made with unusual care by a large and representative Local Committee, whose executive officers were Hon. Henry C. Taylor, Chairman, Prof. B. F. Thomas, Secretary, and Mr. F. L. Kiesewetter, Treasurer. Special committees on reception, finance, excursions, railroads, hotels, printing, etc., did everything well and contributed largely to the success of the meeting. The hotel headquarters were at the Chittenden, whose spacious and elegant rooms were admirably adapted for the occasion. Evening meetings were held in the auditorium of the Board of Trade building. The daily meetings were in the various and commodious buildings of the Ohio State University, accessible by street cars or carriages. A noon-day lunch provided at the Armory, and free to the guests, enabled them to spend the day on the grounds. The general session met regularly at 10 A. M., followed by sectional meetings, with a noon intermission, and closed at about 5 P. M. Placards placed conveniently on rocks or trees guided the scientists to the different buildings where the opening addresses were made by the sectional vice-presidents. After the first day, however, most of the meetings were held in Townsend Hall. Eight rooms were connected by telephone, and in each was a bulletin board whereon was indicated whatever was going on in the other seven rooms. All the telephone girls were students in the University and did their best to keep us apprised of the progress of affairs. Simple and practical as this plan appears, it has only been adopted once before, at a former meeting in Boston. The American Association for the Advancement of Science is created expressly for the diffusion of knowledge among the people, and is in no sense an exclusive society for the enjoyment or glory of a few favored ones. The ancient fiat "Let there be light" might well be its motto. Besides the regularly elected fellows and members, the privileges of the meetings were extended to their families and their hosts, and indeed to all who took enough interest in scientific research to induce attendance.

The retiring President, Prof. F. W. Putnam, called the association to order at its opening meeting, and introduced the newly chosen President, Dr. Edward Orton, who replied to the greetings of the State and municipal officials. Aply he set forth the aims and claims of the American Association for the Advancement of Science on public regard, showing that it represents the broad continent, already including the Canadian Dominion, and willing to include Cuba, Mexico and Central America on the same terms. An inventory of epoch-making discoveries and inventions previous to this century shows only fifteen items of the highest rank, for instance, the alphabet, Arabic numerals, the mariner's compass, the printing-press, the telescope and microscope, the barometer and thermometer, the calculus, gravitation, planetary motion, the circulation of the blood, the steam-engine, the foundation of modern chemistry and electrical science, and the measurement of the velocity of light. We might add certain medical discoveries, as those by Jenner. Something like this is the record prior to the year A. D. 1800. Counting on the same basis, Wallace finds no less than twenty-four first-class discoveries and inventions in the nineteenth century, as over against the fifteen or sixteen of all past time. These the speaker proceeded to enumerate and described as warranting our styling this as above all others the Age of Science. And it is for the further "advancement of science"

that this association exists. Its very title indicates that its work is yet incomplete, and we still labor to discover new forms of truth and new arts for human welfare. His address was all the more impressive by reason of the discoveries that have made the name of Dr. Orton famous throughout America.

After the opening exercises the sections organized for business. The vice-presidential addresses were given Monday afternoon. The subject of Prof. Benjamin's address before the Section of Social and Economic Science was "The Past Presidents of the Association." Prof. Whiteaves, of Canada, spoke to the Section of Geology and Geography on "The Devonian in Canada." "The Fundamental Principles of Algebra" was Prof. Macfarlane's topic for the Section of Mathematics and Astronomy. The Section of Physics was addressed by Prof. Thomson on the "Field of Experimental Research." Prof. Storm Bull spoke before the Section of Mechanical Science and Engineering on "Engineering Education as a Preliminary Training for Scientific Research Work." The Zoologists heard Prof. Gage speak as to "The Importance and the Promise in the Study of the Domestic Animals." (An abstract of this address will be found in SCIENTIFIC AMERICAN SUPPLEMENT, No. 1235.) To Chemists Prof. Venable spoke on "The Definition of the Element." Botanists were told by Prof. Barnes as to "The Progress and Problems of Plant Physiology." The Section of Anthropology was addressed by Prof. Wilson on "The Beginnings of the Science of Prehistoric Anthropology." Most of these addresses may appear in the successive numbers of the SUPPLEMENT, and hence are only mentioned by title now.

Prof. F. W. Putnam, whose labors in every way, but especially as permanent Secretary of the American Association for the Advancement of Science, have so largely contributed to its success in former years, addressed a large and highly appreciative audience in the evening on "A Problem in American Anthropology." He introduced his remarks by an announcement of the recent death of the eminent anthropologist and Past-President of the Association, Dr. D. G. Brinton, and paid a glowing tribute to his merit and success. Yet Prof. Putnam differed from him on certain radical points, particularly as to his theory of an all-prevailing psychological influence guiding men's development, and his claim that American art and culture were autochthonous, foreign resemblances being but correspondential analogies. Prof. Putnam briefly reviewed the various theories held by other authorities as to American anthropology. In advancing his own views he said, in part, as follows:

"Some mounds cover large collections of human bones; others are monuments over graves of noted chiefs; others are in the form of effigies of animals and of man; and in the South mounds were in use in early historic times as the sites of ceremonial or important buildings. Thus, it will be seen that earth mounds, like shell mounds, were made by many people at various times."

He also said there was another class of earthworks that had to be considered by themselves, such as the Newark, Liberty, Highland, and Marietta groups. So far as these have been investigated they proved to be of very considerable antiquity, shown by the formation of over a foot of humus or vegetable matter upon their sides.

In studying the art of these builders, Prof. Putnam said we found the meaning only by turning to ancient Mexico. The famous Cincinnati tablet which has been under discussion for half a century can be interpreted by its dual serpent characters, understood by comparing it with the great double image known in Mexico as the Goddess of Death and the God of War. In speaking of the builders themselves, he said the fortified hills have their counterpart in Mexico.

Our Northern and Eastern tribes came in contact with this people when they pushed their way southward and westward, and many arts and customs were doubtless adopted by invaders, as shown by customs still among the Indian tribes. Prof. Putnam is of the opinion that man was on the American continent in quaternary times and possibly still earlier. Recent investigation has shown the occupation of the Delaware Valley during the closing centuries of the glacial period.

In speaking of the epoch of exploration, he said it was no longer considered sacrilegious to exhibit skulls and skeletons and mummies in connection with the works of ancient or modern people. He said the public need no longer be deceived by accounts of giants and wonderful discoveries, as there is too much authentic material now for comparison.

After the address, the members of the association returned to the Chittenden Hotel, where they were received by President and Mrs. Thompson, of the University.

COPPER COINS MELTED UP.

Nearly ten thousand bags or about two hundred and fifty tons of copper coins have been brought from India. These coins are shipped as scrap copper and

are worth more at the present price of copper than their coin value. The Brass Foundry Company, of New Haven, Conn., received five tons of this supply, and they have favored us with some interesting samples of the coins they are melting. The copper is worth 19 cents a pound in this country, but for 19 cents in American silver several pounds of copper coins can be obtained in Bombay or Calcutta. Of course, the coins are in common use there, but are so bulky that the natives are glad to dispose of them for silver and gold. The coins are bigger than a quarter of a dollar and are much thicker than any of our copper coins. They very much resemble the old American copper cent. There is no English inscription on the coins, and they are believed to be coined by the Indian native government in the early part of the present century, when the price of copper was very low.

THE ALLEGHENY OBSERVATORY OBJECTIVE.

We have been favored by Mr. J. A. Brashear with some particulars regarding the new Allegheny Observatory, and the glass which he is to make for them. He says: "The old observatory, in which Profs. Langley and Kuhn did such good work, became unfitted for modern research. First, on account of its rather meager equipment, but what was far more important, the city has so encroached upon it that the atmosphere is usually vitiated by the smoke from houses, mills, etc. As chairman of the observatory committee, I first had the good fortune to secure a splendid site in the very center of the new park given to Allegheny City by its generous citizens, which is situated beyond the smoke environments. The place set apart for the observatory is a hill in the center of the park 552 feet above low water mark of the Ohio River and about 1,200 feet above sea level, and it is so situated with reference to the two cities of Pittsburg and Allegheny that the prevailing winds give us a practically clear atmosphere. It is a fact, however, that a small amount of smoke diffused through the atmosphere contributes to steady definition in solar work, to which, I think, we shall devote most of the time of the new observatory."

Plans for the new observatory are now nearly complete, Prof. F. L. O. Wadworth, the new director, having devoted many months to a careful and critical study of the detail of the building and instrumental equipment; and if the plans are carried out to the fullest extent we shall have an observatory for astro-physical research second to none in the world. Not the largest telescope, we are not after that, but a complete equipment for work in the domain of the new astronomy.

Our plans now are to have a 30-inch clear aperture telescope; the disks for the objective of which have already been ordered from Mantois, of Paris, and will be ready for us about the first of the year. A large reflecting telescope, perhaps of not less than a 36-inch aperture, will be constructed for spectroscopic work. A 13-inch refractor will be erected and equipped solely for the use of the citizens, or, in other words, a free observatory for the use of the higher classes in the public schools, and any and every one desiring to see the "beauties of the skies." This has always been a hobby with me, for well I know, when a boy, how I would have given all the little I had to have a look in a telescope. But I am getting off the track. In addition to the telescopic equipment we expect to have an immense siderostat, by which we can use the great objective for projecting the sun's image on the slit of the large spectroheliograph, which will, by this arrangement, not have to be carried by the eye end of the large telescope, but will remain stationary in a specially constructed underground apartment. The entire basement of the observatory will be fitted up for correlated research, i. e. especially in the domain of solar physics, and the beam of light from the great siderostat will be brought down to the basement and by suitable mirrors made available in every department of the observatory. The building will be provided with a 60-foot dome, a 30-foot and a 26-foot dome. The architectural design of Mr. T. E. Billquit has been accepted. It is classic in style, and will look very beautiful on the hill in the park. It will be visible over an area of perhaps 50 square miles.

Mrs. William Thaw, Jr., a lady of Allegheny, has given the money for the great objective as a memorial to her husband, who always had a great interest in the work of the observatory, having contributed to its success during his life time. The family of that staunch friend of the observatory, Mr. William Thaw, Sr., have provided for the great telescope. Mr. Andrew Carnegie has given \$20,000 toward the project, and a number of Pittsburg's and Allegheny's best citizens have contributed handsomely to the fund for the new observatory. Mr. George Westinghouse has given the complete electric plant, and there is no doubt of the successful issue of this "Temple of the Skies."

I have devoted nearly all my time for nearly two years to raising the fund for the building and equipment, and as an old-time reader of the SCIENTIFIC AMERICAN, I am glad to give you these notes.