

vice when we bear in mind that during the past year over 50,000 forecasts and special warnings were distributed in the various States and Territories of the Union.

REPORT OF THE SMITHSONIAN INSTITUTION.

The report of Prof. S. P. Langley, Secretary of the Smithsonian Institution, for the year ending June 30, 1897, has just come to hand. The secretary gives an account of the financial condition of the institution, which shows that the total receipts of last year were \$62,528.71, the disbursements being \$58,061.99. During the year 1896-97 Congress charged the institution with the disbursement of the following appropriations:

International exchanges.....	\$19,000
North American ethnology.....	45,000
United States National Museum:	
Preservation of collections.....	153,225
Furniture and fixtures.....	15,000
Heating and lighting.....	13,000
Postage.....	500
Repairs to buildings.....	4,000
Rent of workshops.....	2,000
Galleries.....	8,000
National Zoological Park.....	67,000
Astrophysical Observatory.....	10,000

The Secretary states that his time must be almost wholly given to administrative affairs, yet, as in years past, he continues his investigations begun prior to his connection with the institution, so he has devoted such time as he could spare to researches on the solar spectrum and to experiments in connection with certain physical data on aerodynamics. He says that both of these investigations have reached a point at which it is possible to give somewhat full statements of the results. He states that since the successful trial of the mechanism built of steel and driven by a steam engine which made two flights each of over half a mile on May 6, 1896, a third and much longer flight was made on November 28, 1896, with another machine built of steel, like the first, and driven, like that, by propellers actuated by a steam engine of between one and two horse power, making a horizontal flight of over three-quarters of a mile and descending in safety. Prof. Langley says: "I have thus brought to the test of actual successful experiment the demonstration of the practicability of mechanical flight which has been so long debated and till lately so discredited. To satisfy a nearly universal interest, I am now engaged in the preparation of a full description of these experiments since 1891, when my first memoir on aerodynamics was published. This memoir, with those on 'Experiments in Aerodynamics' and 'Internal Work of the Wind,' will form volume 27 of the Smithsonian Contributions to Knowledge, which will thus contain a complete record of all experiments carried on thus far under my directions on this subject." This is certainly very important news, and the volume will be looked for with great anxiety by those who are interested in the problem of aerial flight.

The Hodgkins medals of award were received at the institution in July, 1896, and were transmitted to those competitors for the Hodgkins fund prizes who were recommended by the committee to receive medals. In July, 1896, E. C. C. Baly, of University College, London, a Hodgkins competitor, was awarded a grant of \$750 to enable him to prosecute further his investigations on the decomposition of the atmosphere by means of the passage of the electric spark. A report of the research so far as it has progressed has been received. An additional grant has been made to Dr. S. Weir Mitchell and Dr. J. S. Billings for investigations which have been conducted in the laboratory of hygiene of the University of Pennsylvania, upon the effect which a prolonged exposure to vitiated air has upon the power of individuals to resist infectious diseases. From the result obtained it would appear that we have here an important confirmation of the clinical observation that tuberculosis thrives most in vitiated air. The six Hodgkins memoirs have been published by the institution, and a copy of each was sent to all persons who had submitted papers in connection with the competition.

The Smithsonian Institution has renewed the lease of the Smithsonian table at the zoological station at Naples for a second term of three years. Ethnological and natural history explorations have been continued under the direction or with the assistance of the Institution in various parts of the world by the Bureau of Ethnology and the National Museum, resulting in the addition of a large number of objects of interest from various parts of the world to the museum collections, and much valuable information has been acquired regarding the history and the language of the American Indians.

The publications of the Institution and its bureaus during the year comprise two works in quarto form, four in royal octavo and fourteen in octavo, aggregating 9,630 pages, covering, to a greater or less degree, nearly all branches of human knowledge.

Two memoirs in the "Contributions to Knowledge" series were issued during the year, both having been submitted in competition for the Hodgkins fund prizes; one being a memoir by Prof. Rayleigh and Prof. Rain-

say, describing the discovery of argon, for which achievement the authors were awarded the first Hodgkins prize of \$10,000. The second was a memoir of Prof. E. Duclaux, of Paris, entitled "Atmospheric Actinometry and the Actinic Constitution of the Atmosphere." Nine papers of the miscellaneous series were issued, including "Physical Tables" by Prof. T. Gray, "Mountain Observatories" by E. S. Holden and "Recalculations of Atomic Weights" by Prof. F. W. Clarke and others. "The Catalogue of Scientific and Technical Periodicals" by Dr. H. Carrington Bolton is in type and will soon be published. It comprises titles of more than 8,500 scientific and technical periodicals in all languages, adding about 3,500 titles to the first edition published in 1885. There is also completed, ready for the printer, a voluminous supplement to Dr. H. Carrington Bolton's "Select Bibliography of Chemistry."

The "Annual Report" is in two volumes, one of which is devoted to the National Museum. In the general appendix of Part I. are included memoirs of all branches of knowledge, selected chiefly from publications of learned societies of the world which are not readily accessible to the public, the basis of the selection being that the papers are written by a competent person, give an account of some important or at least interesting scientific discovery, are untechnical in language and suitable to nonprofessional readers. The secretary also refers to "A History of the First Half Century of the Smithsonian Institution." We have already reviewed this book at considerable length.

The library continues to grow steadily; the increase in volumes, parts of volumes and charts reaching 35,912 during the past year. The Secretary refers to the committee which met at London, in July, 1896, to direct the preparation of a catalogue of scientific literature. The secretary recommends that an appropriation be made to the Smithsonian Institution of \$10,000 per annum to cover the cost of cataloguing the American publications. The Department of State has agreed to submit an item for this purpose for the year 1898-99. The east stack of the new library of Congress has been assigned for the Smithsonian collection of transactions. The institution's deposits now number over 250,000 titles.

The Secretary also refers to the important divisions of the Smithsonian Institution, the National Museum, the Bureau of American Ethnology, the International Exchange Service, the National Zoological Park and the Astrophysical Observatory. On the whole it is remarkable to see what an amount of good is done by the diffusion of human knowledge directly resulting from the bequest of a single man.

FLAMES IN A TALL BUILDING.

The effects of fire in a tall fireproof building have been anxiously discussed by both firemen and architects. The fire which occurred February 11, in Nassau Street, near Ann Street, New York, gave the first opportunity that has ever occurred in New York for the study of an outside fire working on a tall building. Chief Bonner declares the spot is the most dangerous acre in the city. The block is surrounded by narrow streets, resembling those in London, and the buildings are old and filled with inflammable goods. The Vanderbilt building has a frontage of eight stories on Nassau Street, and the Beekman Street annex rises to fifteen stories, being 40 feet wide. Two rows of offices in it, each 16 feet wide, open on each side of a 6-foot hallway. The building lacks some of the modern improvements, for instance, the outer ledges of the windows are of wood. The fire did not give the most severe possible test, as it was 150 feet away from the south wall.

The building which was destroyed by fire is what is known as Nassau Chambers. It was a small office building filled with combustible material, and when the fire once started there was no hope of saving the building or its contents. It was like a volcano, and, owing to the strong wind which was blowing, particles of paper and cinders were carried to the distance of half a mile, and the square in front of the post office was hardly passable, owing to the shower of burning matter. The scene was spectacular in the extreme, and was visited by many thousands of people. A short time after the flames burst from Nassau Chambers the window ledges and frames of the ninth, tenth and eleventh stories of the annex of the Vanderbilt building began to throw out little jets of flame. This was a little after seven o'clock. It was eight o'clock before the firemen got into the burning floors of the Vanderbilt building. The elevators were not running. This was unfortunate in itself, as with elevators it is possible to take up hose without the slightest loss of time, and many valuable minutes may be saved. The firemen started up the steps with the hose and at the sixth story fell exhausted, and some reporters and a fireman carried the load up the final three stories. By the time the ninth floor had been reached, the fire had broken through the windows and was tossing masses of flame into the four offices in the southwest corner of the annex. The firemen connected the butt of the rear section of the hose with the building water pipes, and

walked in toward the fire. The heavy frescoed cornice fell with a crash, narrowly escaping the head of a fireman. It was the matter of only a few minutes to put out the fire after the water began to flow.

A reporter of The New York Times, who was watching the behavior of the fire on the building, made a trip through the building. At the tenth floor, the glass panels of the doors of three offices nearest the corner were so hot that they burned the hand. On the eleventh floor, the panels were nearly as hot. On the twelfth floor they were only warm. In four or five minutes the panels of the tenth floor were shivered, fire bursting through these openings in an instant, catching the wood cornice in the halls and sweeping along eastward. In a few minutes another squad of firemen were on the floor and additional hose having arrived, the work of putting out the fire was begun. The smoke by this time was so thick that the men were gasping for breath. From one of the north windows it appeared that the men were standing in an oven with the fire above and below them. The walls did not warp, but the kalsomine fell from the ceilings. The wood casings of the floor were burned to the tiles beneath. Desks, shelving, cornices and window ledges and sashes were destroyed. The structure itself did not show the slightest sign of injury, except the crumbling of the face of some of the bricks where they were attacked both by fire and water. Not a drop of water leaked to the floor below; the flames never broke through the ceilings, except in one place where a steam pipe came through. In fact, on the tenth floor the fire was pretty well spent before water was put on it. The wood work had been consumed and the structural part of the building was left intact. The reporter who was on the eleventh floor when the fire burst through the office doors into the hallway walked to the last office on that hallway and back to the head of the steps to prove that anybody in those offices could have gained the stairway with safety. The fire outfit of the building itself also contributed toward controlling the fire, for its tank and pumping engines furnished to the firemen 26,800 gallons of water, according to the meter in the building. This was supplied through the stand pipes of the building, which reach to the top floor and have fire plugs on each floor.

The data thus obtained by the fire in this building throws some light upon the danger to life in a modern high office building. The fire had practically unrestricted play on three stories for an hour, and not a wall or ceiling gave way. The results of the fire show that wood around windows should be avoided and every window which faces a court should have iron shutters, which should be kept closed at night and which could be readily closed in the daytime in case a fire occurred in surrounding buildings. The highest stories of the Vanderbilt building are unprovided with iron shutters.

SUCCESSFUL TEST OF PNEUMATIC POSTAL TUBE.

An important branch of the pneumatic postal tube service which is being installed in this city has been successfully tested by the Post Office authorities. The line runs from the General Post Office to branch station H, in the Grand Central Palace, at Lexington Avenue and Forty-third Street. It is three and a half miles in length, and consists of two parallel lines of 8-inch tubes which are laid from three to eight feet below the surface of the street. The mail is conveyed in "carriers,"—cylinders of plate steel seven inches in diameter and two feet long—which have a capacity of about 600 letters each. The carriers are impelled by a current of air which is driven continuously round the circuit, starting from the compressors at seven pounds to the square inch and exhausting at the end of the system at about atmospheric pressure. The carriers are supported in the tubes by two packing rings, which serve to secure an airtight contact. The average speed of the carriers is about 30 miles per hour, but this may be increased by raising the pressure.

A fully illustrated description of the system will be found in the SCIENTIFIC AMERICAN of December 11, 1897, with a map showing the route of the two lines now in operation and also of those which it is proposed to lay down in the near future. The section which has just been opened is laid along Center Street and Fourth Avenue, and in connection with the section already in operation from the General Post Office to the Produce Exchange, it provides a continuous section about four miles in length.

The test was witnessed by Second Assistant Postmaster-General Shallenberger, Postmaster Van Cott, and several members of the House Committee on Post Offices and Post Roads. The carriers traveled between the two stations, a distance of 3½ miles, in 7½ minutes, and an answer to a dispatch sent from the General Post Office, Park Row, to the Hotel Manhattan, at Forty-second Street and Madison Avenue, was received in exactly 37 minutes by the new route. The proposed extensions of the system include a line across the Brooklyn Bridge and two additional north and south lines from the General Post Office to One Hundred and Twenty-fifth Street, with a cross connection on the latter thoroughfare.