

a longer period than was absolutely necessary. The roofs and ironwork of the long range of galleries extending along the Quai d'Orsay, and connecting the Champs de Mars with the Esplanade des Invalides, are now nearly all up. The side walls of these buildings have also been constructed for a considerable portion of their length, so that this part also of the Exhibition will be finished at no very distant date. The tower which will form so conspicuous a feature of the Exhibition has now reached about half its height. The two lower stories are now completed. The first one, forming the base, extends over a considerable area, and resembles in appearance a huge, four-legged table or stand. Its height is about 250 feet, or a quarter of the whole. On the top of this is placed the second story, of about 200 feet high; and from this second story springs the tapering column of between 500 and 600 feet in height. The point now reached is the summit of the second story. Access is obtained by means of an iron staircase built into the framing of the tower; but the guides in which the lifts will work are already in place, and when the tower is finished, the various stages will of course be reached by means of these lifts. The foundations are sunk a great depth into the ground, which at this place — close to the bank of the Seine — is less suited for bearing a weight such as a tower than the limestone rock which underlies the greater part of Paris. Great precautions have been taken to render the tower safe from lightning. It forms, of course, a conductor in itself, but, to insure proper connection with the earth, at each corner a large tube has been sunk a considerable distance into the soil, and these tubes it is proposed to keep full of water. Good electrical connection is made between the tubes and the framework of the tower itself. It remains to be seen whether a building of this enormous height will carry off electricity safely in consequence of its excellent conducting powers, or whether it might not suffer from a shock of more than usual violence. The site is certainly ill-chosen to enable the tower to make the most of its height, since it is on some of the lowest ground in Paris, and in spite of the enormous height of the building itself, at the present time, its top is now only on a level with the summit of the towers of the Trocadero Palace, a building which, though much inferior in size, stands on the high ground on the other side of the Seine. The French executive report favorably as to the exhibits which they expect to receive from foreign countries. Considerable sums have been voted, among others, by various of the South American States, as well as by the United States, and by Belgium. The Spanish government, though not officially represented, has voted a large sum towards the Exhibition, and it is said that the unofficial committees in various of the European States are most of them successful in securing a representation of their several countries.

— Augusta, Ga., the largest cotton manufacturing centre in the South, is prominent among Southern cities this year, as the site of the Augusta National Exposition, to take place Oct. 10 to Nov. 17, 1888. No outside aid has been asked, and no government appropriation been made. The project is a conspicuous and commendable one in this respect. The Exposition aims to be national in scope. Many of the largest manufacturers North and West will be represented, and an extensive government display from all the executive departments and branches of the consular service are already secured. But the most complete representation will be secured of all the Southern industries and of the development of the resources of fields, forests, and mines that has taken place in the last ten years.

— The International Congress of 'Americanists' will hold its seventh session in Berlin from October 2 to 5 next. The organizing committee has just issued the programme. The first day will be devoted to questions relating to the discovery of the New World, to the history of America before the time of Columbus, and to American geology; the second to archæology; the third to anthropology and ethnography; the fourth to philology and palæontology.

— On July 9 the atmosphere in the English Channel became so rarefied that objects could be seen with extraordinary distinctness at a distance of between thirty and forty miles from Dover and Folkestone. *Nature* says that the lighthouse at Cape Grisnez, Calais, and the dome of the Cathedral, and Napoleon's Column at

Boulogne could be distinctly seen with the naked eye, and every prominent object could be picked out along the French coast. The distance from Dover to Boulogne as the crew flies is twenty-eight miles, and the column is about two miles further inland.

— We learn from *Nature* that at the next meeting of the British Association there will be a discussion in Section D on the vexed question of the formation of coral reefs. The discussion will be opened by Dr. Sydney J. Hickson.

— *Nature* states that the meeting which will shortly be held in Paris for the study of tuberculosis, under Professor Chauveau's presidency, promises to be very interesting and successful.

— The German ethnological and geographical expedition to the headwaters of the Xingu under the direction of Dr. Karl von den Steinen was expected in Rio de Janeiro early in July.

— The Sociedade de Geographia de Rio de Janeiro proposes to hold in September an exposition of geographical works relating to South America, for which the co-operation of nearly all the South American States has already been promised.

— Messrs. Ticknor & Co. announce for publication, August 4, 'A History of Presidential Elections,' by Edward Stanwood; new and enlarged edition; and 'Newspaper Libel, a Hand-book for the Press,' by Samuel Merrill, of the staff of the *Boston Globe*, and member of the bar of Massachusetts and of New York. — Lee & Shepard have in preparation 'Chips from Educational Workshops of Europe,' by Prof. L. R. Klemm; and 'Zoölogy Teaching for Beginners,' by W. P. Manton. — G. P. Putnam's Sons have just ready two books for the student of political economy and history. The first of these is entitled 'The Tariff History of the United States,' consisting of various essays by F. W. Taussig, which have already appeared in magazines or in book-form, and thus united present an almost complete history of tariff legislation from 1789 to 1887. The other is 'Industrial Liberty,' by John M. Bonham, who aims to keep in view the principles rather than the statistics of his subject, and makes an analysis of the salient political and industrial evils of our time. — Little, Brown & Co. have now ready 'The Origin of Species by Means of Natural Selection; or, the Preservation of Favored Races in the Struggle for Life,' by Charles Darwin, sixth edition, in new large type with additions and corrections. — E. & F. N. Spon, New York, announce *The Marine Engineer*, a monthly journal of marine engineering, shipbuilding, and river navigation; subscription, \$1.75; also, 'Crystal Models,' by John Gorman. Compared with others, the advantages resulting from this method become most strikingly apparent. The models are built up into form in a few seconds, and it is worthy of notice that, owing to the plating process being well-nigh instinctive, the manipulations after a short trial become almost automatic. The forms require no sticking at the edges.

— The Senate has amended the sundry civil appropriation bill by adding a grant of \$250,000 to pay the expenses of investigating the extent to which the arid region of the United States can be redeemed by irrigation. The proposed scope and extent of this investigation was fully explained in *Science* a few weeks ago.

— The United States Senate has voted to pay to the widow of the late Prof. Spencer F. Baird \$50,000 as compensation for his services as United States Fish Commissioner.

— It is proposed to celebrate in the winter of 1889-90 the sixth centennial of the foundation of the University of Montpellier.

#### LETTERS TO THE EDITOR.

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

Twenty copies of the number containing his communication will be furnished free to any correspondent on request.

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

#### A Standard Thermometric Scale.

AT its session last October the International Committee of Weights and Measures passed a resolution establishing a standard thermometric scale for the use of the International Weights and

Measures Service. As this is the result of the thermometric studies pursued at the International Bureau for several years, it seems desirable to give it a wider publicity than is offered by the publications of that bureau alone, from which these statements have been collected by me.

The standard scale adopted is, by the wording of the resolution "the centigrade scale of the hydrogen thermometer, having for its fixed points the temperature of melting ice ( $0^{\circ}$ ) and that of steam ( $100^{\circ}$ ) of water boiling under a standard atmospheric pressure. The hydrogen being taken under a manometric pressure of 1 metre of mercury, i.e.,  $\frac{1000}{760} = 1.3158$  times the standard atmospheric pressure." The standard atmospheric pressure is that exerted by a column of mercury (density = 13.596) 760 millimetres long at  $0^{\circ}$  C., at the mean sea-level in latitude  $45^{\circ}$ . An increase of pressure of one atmosphere lowers the melting point of ice about  $0^{\circ}.008$ .

All the thermometers used at the bureau are made of the same kind of glass, the composition of which was found by chemical analysis to be—

	Stem.	Bulb.
Silica.....	71.45	71.52
Sulphuric acid (SO <sub>3</sub> ).....	0.74	0.72
Chlorine.....	traces	traces
Aluminium.....	1.26	1.57
Peroxide of iron.....	0.29	0.22
Lime.....	14.52	14.55
Soda.....	11.17	10.81
Potassa.....	0.30	0.37
Magnesia.....	traces	traces
Protoxide of manganese.....	traces	traces
	99.73	99.76

The exclusive use of this glass has several advantages.

1. The changes of the zero point are relatively very small, and its depression due to increase of temperature is practically a rectilinear function of the latter within the limits  $-10^{\circ} + 100^{\circ}$ .

2. The thermometers are comparable among themselves, and it was found practicable to establish a general formula for reducing their indications to the standard hydrogen scale. A table of corrections based on this formula is given below, but of course it is applicable only to thermometers of this kind of glass. The reduction of the indications of mercurial thermometers to a gas thermometer depends on the kind of gas used and on the glass of which the mercurial thermometer is composed.

$T$  hydrogen =  $T$  mercury + correction.

$T$ m	$-20^{\circ}$	$-10^{\circ}$	0	$+10^{\circ}$	$+20^{\circ}$	$+30^{\circ}$	$+40^{\circ}$
Corr.	$+0^{\circ}.172$	$+0^{\circ}.073$	0.000	$-0^{\circ}.052$	$-0^{\circ}.085$	$-0^{\circ}.102$	$-0.107$

  

$T$ m	$+50^{\circ}$	$+60^{\circ}$	$+70^{\circ}$	$+80^{\circ}$	$+90^{\circ}$	$+100^{\circ}$
Corr.	$-0^{\circ}.103$	$-0^{\circ}.090$	$-0^{\circ}.072$	$-0^{\circ}.050$	$-0^{\circ}.026$	0.000

O. H. TITTMANN.

Washington, D.C., July 27.

#### Turner's Explorations in Alaska.

It is with no small degree of satisfaction that naturalists are regarding the publications that are appearing from time to time from the office of the Chief Signal Officer of the Army at Washington, referring, as we do more particularly, to the reports made under the auspices of that office by the Alaskan explorers. The last one of these, very recently issued, is now before us, and presents in an admirable manner the results accomplished in that region by Mr. Lucien M. Turner, during the years 1874 to 1881, who carried on his explorations there under the direction of the Chief Signal Officer, and in connection with the National Museum.

Issued in the usual Government form, this quarto volume of some 225 pages, with its twenty-six plates, makes a very handsome work. It has been entitled 'Contributions to the Natural History of Alaska,' and is the second of the series,—its author dividing its contents into six parts for treatment. Of these, Part I. presents a very short and concise general description of the regions explored, and we learn that Mr. Turner was at various times stationed at Saint

Michael's, Unalashka, the islands of Saint Paul and Atkha, at Attu, and many other points of interest. Part II., occupying about forty pages of the work, is devoted to meteorological observations, and presents in a fairly-well digested manner, the author's labors in this direction, and it is needless to add that the data here collated are not only of interest but of great scientific value. In Parts III.–VI., inclusive, the plants, fishes, birds, and mammals are dealt with, and in a very thorough manner when we consider many of the difficulties the author was obliged to overcome. Perhaps the botany of the region gained the least at Mr. Turner's hands, and it consists simply of his field-notes, added to Rothrock's list of 1867, the author stating "in this connection that of all great difficulties the most troublesome was to preserve the plants after I had collected them. The constant moisture of the climate has frequently ruined my entire collection of a summer's work. All that remained after supposing the plants were sufficiently dried would be a mass of mould and dry edges of paper, this being apparently done in less than forty-eight hours' time."

A frog (*Rana sylvatica*?) was the only reptile collected; and at Fort Yukon, just within the Arctic circle, this species is reported to be quite plentiful. Some excellent work was accomplished in ichthyology, and a number of species added, new to science, and several rare forms collected. Fourteen beautiful plates of fish are given, and one of a lamprey (*A. aureus*), and it would be not easy to overestimate the interesting and valuable field-notes here presented. Habits, uses, geographical ranges, and other matters, are treated with distinguished ability, and in this, much is due to the assistance of Dr. Bean of the Smithsonian Institution.

What we have just said in reference to the ichthyological part, applies with more than equal force to the work done in ornithology; and to state the fact that no less than ten elegantly colored plates of birds by Robert and John L. Ridgway are given, is equivalent to saying to ornithologists and others, who may not yet have seen the work, that a feast for their eyes is still before them. The whiskered auklet (*S. pygmaeus*) is figured in full breeding plumage; Turner's ptarmigan, male and female, are both given; excellent figures of the Lapp and Hawk owls, and others of special interest. Through the published field-notes much has been added to our knowledge of the habits of many of these arctic bird forms.

No mammals, unfortunately, are figured, and this part of the report has evidently not received the attention it so justly deserves, and in speaking of Cooper's shrew, our author evidently confuses that diminutive insectivore with the rodents. The volume is completed by a very full and useful index, and Mr. Turner is to be congratulated, not only upon the appearance of his work, but upon the successful termination of his explorations and labors.

Another volume by the same author is promised soon by the Signal Office, also one from Mr. E. W. Nelson, upon the same region; and finally General Greely's own report upon the Lady Franklin Bay Expedition, which will be looked for with very general interest.

It is to be hoped that the government will appreciate more and more such works and the reports thereon, and be induced to aid and encourage them as much as possible.

R. W. SHUFELDT.

Fort Wingate, N.Mex., July 22.

#### The Use of the Microscope as a Practical Test for Oleomargarine.

THE act passed by Congress entitled "An Act defining butter, also imposing a tax upon and regulating the manufacture, sale, importation, and exportation of oleomargarine," approved August 2, 1886, commonly known as the 'oleomargarine law,' makes it the duty of the Commissioner of Internal Revenue to prescribe all needful regulations for carrying it into effect.

From the 1st of November, 1886, when the law first went into effect, to October, 1887, one hundred and thirty-one samples of substance supposed to be oleomargarine were submitted for the decision of the commissioner under sections 14 and 15 of this act, twenty-one of which proved on analysis to be oleomargarine, and one hundred and ten were found to be butter. Most of these latter were old and rancid. The very prevalent idea that rancidity is the most characteristic property of oleomargarine may account for the