

capital, — is full of enthusiasm for the early history of the country. Appended is the address of Sir William Wilde to the Anthropological Section of the British Association, delivered at Belfast, 1874.

Alden's Manifold Cyclopædia of Knowledge and Language. Vols. I.-V. New York, Alden. 12°. 50 cents per vol.

THE most striking features of the present cyclopædia are the handiness of its volumes and its cheapness, which will make it accessible to the general public. Another remarkable feature of this work is the combination of the characteristics of a cyclopædia and of a dictionary, including in its vocabulary every word which has a claim to a place in the English language. The sources from which it draws are the standard cyclopædias and dictionaries, and therefore the contents of the various titles are probably accurate. A considerable number of illustrations have been inserted in the text for illustrating the subjects treated. Considering the marvellously low price of the volumes, the printing is very satisfactory, the type being clear and sufficiently large. In selecting the titles, and in their treatment, special attention has been paid to the wants of the American public; and those who are unable to procure one of the expensive large cyclopædias will find this work useful. So far, five volumes have been issued, bringing the cyclopædia up to the word 'brave.' The work, when completed, will consist of about thirty volumes.

Practical Hints for Draughtsmen. By CHARLES WILLIAM MACCORD, New York, Wiley. 4°. \$2.50.

"THE leading object of this treatise is to explain various modes of representation, which are in many cases better than the precise ones of projection." These words of the preface define clearly the scope and object of the present volume, which is of the greatest value to the student of mechanical drawing. The author is particular in emphasizing the fact that the object of the draughtsman is not to make such drawings as are correct from a theoretical point of view, but working drawings that will serve the purposes of the workman, and that the method will be best which reaches this object with the least outlay of time and labor. These principles are so sound, and their application is set forth so clearly, that the book must be recommended to all students of mechanics. The author, recognizing the difficulty of laying down the rules in which it is advisable to deviate from the laws of projection, shows in a great number of examples in which way the working drawing ought to differ from a correct projection, and emphasizes especially the necessity to omit details which are of no use to the workman. The maxim, which he advocates most strongly, that each view should be made to tell all it can, but that nothing should be put in it which does not tell something worth knowing, ought to be kept in mind by every mechanical draughtsman. A special chapter is devoted to the representation of bolts, nuts, screws, and rivets. His hints for sketching will be found eminently practical. In an appendix a description is given of drawing-instruments, intended as a guide for selecting a good set. Although we agree with the author's opinion in a general way, we cannot concur in his wholesale condemnation of instruments adapted for special purposes.

Memoranda on Poisons. By THOMAS HAWKES TANNER. 6th ed. Rev. by Henry Leffmann, M.D. Philadelphia, Blakiston. 24°. 75 cents.

TANNER'S 'Memoranda on Poisons' is so well known, that it is only necessary to call attention to the differences which exist between this and former editions. The principal changes that we notice are the substitution of modern chemical nomenclature for the older style, and the revision of the toxicology of poisonous food. Although this book is specially intended for those engaged in actual medical practice, it will be found to be a valuable addition to every library, containing as it does, in a very condensed form, the symptoms and treatment of poisoning in its many forms.

NOTES AND NEWS.

THE value of the work now doing by the United States Geological Survey will be appreciated when it is known that the engineer of the Denver and Rio Grande Railroad located its line through the passes of the Wasatch Mountains from the government maps with-

out sending out parties to determine the best route. The engineer of the projected line from Los Angeles to Salt Lake City made similar use of the National Survey maps; and, wherever engineering-work is to be done in territory which has been covered by the survey, it has been found to be of the highest practical usefulness.

—Eight field-parties left Washington on Sunday to begin the work of the National Survey for the season on the Pacific coast. Three have gone to the gold-belt of California, under the direction of Mr. H. N. Wilson; two to the Cascade Mountains in south-western Oregon, under Mr. W. T. Griswold; and three to Montana, under Mr. J. M. Douglass. The charts they are making of California are on a scale of two miles to an inch, and those of Oregon and Montana four miles to an inch. The California parties will cover an area of about two thousand miles each during the season, and those in Oregon and Montana from three thousand to four thousand miles each. The parties that are going to south-western Oregon are to work in a region which it is believed will develop into a great gold-bearing country. It has already yielded a large amount of placer gold, but the gold-bearing quartz has not yet been developed. The survey will probably direct attention to it, and cause its rapid development. The work of the Montana parties will be about the head waters of the Missouri River, where the floods originate which cause so much damage along the lower Mississippi; and in addition to mapping the country and noting its topography, etc., they will make a special examination of the watershed, to determine where dams can be built to hold back the destructive floods. Attention will also be given to the use of the water thus stored in irrigation. All triangulation upon the Pacific coast has to be completed early in July, before the summer haze sets in. This strange phenomenon has never been satisfactorily explained. It seems to be a mixture of smoke and dust, filling all the valleys, and rising thousands of feet into the air. It obstructs the view so that no point over five miles distant can be distinguished.

—May 1, the local committee of the American Association for the Advancement of Science, together with a number of the leading citizens of Cleveland, met in the Board of Education rooms in the Public Library Building to make arrangements for the meeting to be held in Cleveland next August. Prof. C. F. Mabery of the Case School of Applied Science took the stand as temporary chairman, and in a few preliminary remarks introduced Prof. F. W. Putnam, the permanent secretary of the association, who gave a most interesting history of the association and its objects. The officers of the local committee are: president, Cady Staley; vice-presidents, Hon. John Sherman, Hon. H. B. Payne, Pres. H. C. Haydn, Gov. J. B. Foraker, Col. John Hay, Mayor B. D. Babcock, Hon. Samuel E. Williamson, Mr. W. J. Gordon, Gen. M. D. Leggett, Mr. L. E. Holden; secretary, Elroy M. Avery, Ph.D. Committee on post-office, telegraph, and express: Prof. A. H. Tuttle, chairman; Capt. F. A. Kendall, secretary. Committee on the press: Prof. Bernadotte Perrin, chairman; Prof. A. H. Thompson, secretary. Committee on printing: C. G. Force, chairman; Dr. Elroy M. Avery, secretary. Committee on membership: Hon. C. C. Baldwin, chairman; Rev. Jabez Hall, secretary. Committee on invitations, receptions, and excursions: Mr. W. R. Warner, chairman; Newton M. Anderson, secretary. Finance committee: Mr. Solon Severance, chairman; Mr. Charles A. Post, secretary. Committee on rooms: Prof. Edward W. Morley, chairman; Prof. Herbert C. Foote, secretary. Committee on hotels and lodgings: Mr. Edward H. Fitch, chairman; Mr. Harry P. Cushing, secretary. Committee on transportation: A. J. Smith, chairman; Elroy M. Avery, secretary.

—The Texas State Geological and Scientific Association, which has for a number of years endeavored to arouse a general interest in the geological exploration of Texas, has memorialized the State Legislature, asking that it be made the agent of the State for carrying on geological work, and that a director be appointed to supervise such work. The ground which the association takes is so clear and reasonable, that it must recommend itself to the legislators. It is proposed to explore principally the deposits of minerals of economic value, and thus to give the citizens of the State that knowledge of the real value of the land they hold which they

lack at present, and at the same time to develop the resources of the country. In order to make the work of such a survey as useful as possible, it is proposed to make the results known through the agency of the daily press and other publications, to be issued as rapidly as possible. It is to be hoped that the practical and wise measures proposed by the association will be carried out, as they cannot fail to benefit the people of the State.

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.

Is the Rainfall increasing on the Plains?

IN view of the recent discussion on this subject which has appeared in this periodical, perhaps it will not be amiss to add a few remarks to those of Mr. Curtis concerning the errors which may arise in climatic studies from errors in rainfall records. Rainfall records have probably been kept as long in New England as in any other part of the United States, and a number of them give indications of a secular change in the amount of rainfall. But Mr. E. B. Weston, Desmond Fitzgerald, and others who have had occasion to study some of these records, state that in certain cases the apparent change in the amount of rainfall was clearly due to the different methods pursued by different observers in measuring snow, and converting it to its equivalent in rain; and they think but little reliance can be put in the results obtained from a comparison of earlier with more recent records. Mr. Weston has also shown that gauges with different kinds of rims give persistently different results. If these early volunteer records are of uncertain value for studying climatic changes, are those which are now being gathered by our national Signal Service to prove more so? These latter records are in almost every case obtained from rain-gauges exposed on the roofs of houses; and hence the amount of rain caught becomes a function of the wind-velocity, a function of the wind-direction, and a function of other variants and variables, not least among which is a not uncommon change in the position of the gauge itself. Numerous experimental observations have shown that gauges exposed on roofs catch more rain when exposed on the side opposite to the direction from which the wind blows, and less rain when exposed on the same side from which the wind blows. The writer thought that the large errors which may arise from this source were fully recognized by the Signal Service officers and by the scientific public, so that it was unnecessary to call attention to them. But recently he has listened to two papers by well-known writers, dealing with changes in the amount of rain, especially in the West; and both these writers referred to the valuable records now being obtained by the Signal Service as furnishing a basis for future studies of this kind. The present writer inferred from these papers that the errors arising from exposure are not so fully known as they ought to be, and hence presents a brief study of the Boston rainfall record, which is only one of several similar cases which have come under his notice. For several years in succession the annual rainfall at the Boston Signal Service station has been reported below the normal. According to the Bulletin of the New England Meteorological Society, in 1885 it was nearly three inches below the normal, in 1886 nearly five inches, and in 1887 nearly thirteen inches below. This seemed rather strange, since none of the numerous gauges around Boston showed such marked deficiencies. Thus, in 1887, when the Boston Signal Service station reported the annual rainfall thirteen inches below normal, the Harvard College Observatory, only three miles west of Boston, reported an annual rainfall twelve inches greater than that reported from Boston, and one inch greater than the average of twenty years' observations at the observatory. The observer at Lynn, Mass., ten miles north of Boston, reported an annual rainfall fifteen inches greater than Boston, and six inches above the average of thirteen years' observations at Lynn. According to the records of several gauges in Milton, ten miles south of Boston, the annual rainfall was from nine to twelve inches greater than at the Boston station. These stations are all so close to

Boston, that it is rendered entirely improbable that there was in reality any great deficiency in the Boston rainfall; and the apparent deficiency seems clearly due to a change in the position of the Boston gauge about 1883 or 1884. Previous to this the gauge had been exposed on the roof of the Equitable Building in Boston, and these records were used in forming a series of averages or normals. Then the gauge was removed to a high tower on the Post-Office Building, and since then there has been almost a persistent deficiency of precipitation as compared with former records, or with the records of stations surrounding Boston. Moreover, the amount of rainfall caught is evidently a function of the wind-velocity, and decreases with increased velocity of the wind. Thus, during a gale on April 2, 1887, the amount of precipitation reported from the Boston Signal Service station was 0.22 of an inch; while measurements by a number of observers in and around Boston showed that snow fell to a depth of over a foot, and when melted gave an inch of precipitation as ordinarily recorded. Again, during the storm of March 11 to 14, 1888, the Boston Signal Office reported 1.24 inches of precipitation, while surrounding stations reported three inches or more.

It seems a pity that our Signal Service gauges should be so badly exposed, for these are looked to as the standards throughout the country; and there is no doubt that in the future, as in the past, there will be attempts to prove climatic changes from their records; but the writer feels that any one who has had experience with rainfall observations will look dubiously on any conclusions based on such records as exist at present.

H. HELM CLAYTON.

Blue Hill Observatory, May 2.

Significance of Sex.

SOME recent publications on the subject of the significance of sexual reproduction, especially those of Dr. Weissmann (*Nature*, xxxiv. p. 629, 1886, and xxxvi. p. 607, 1887) and a short abstract of a lecture by Hatschek (*Annals and Magazine of Natural History*, i. p. 163, 1888), have induced me to draw brief attention to some speculations of my own on this subject, published several years ago.

1. Dr. Weissmann, in his admirable paper on the significance of polar globules (*Nature*, xxxvi. p. 607, 1887), after showing that there must be some very great benefits resulting from the introduction of sexual reproduction, says, "Such beneficial results will be found in the fact that sexual propagation may be regarded as *the source of individual variability, furnishing material for natural selection.*" Now, in an article on genesis of sex, published in the *Popular Science Monthly*, December, 1879 (xvi. p. 167), and republished in the *Revue Scientifique* for Feb. 14, 1880 (xviii. p. 220), the same thought is distinctly implied, though not distinctly expressed. The whole contention of the article is to show that the object of sex is the funding of individual differences in a common offspring, thereby improving the offspring; and, further, to show how much pains nature has taken to make individual sexual differences greater and greater in the history of evolution. In the last paragraph I say, "Such mixing produces more *plastic nature*, more generalized, and therefore more progressive form."

This was written nearly nine years ago. Meanwhile the thought continued to develop in my mind. In a book ('*Evolution and its Relation to Religious Thought*') just now published, but most of which, and especially all on this subject, was written three years ago, the same thought is much more distinctly expressed. On p. 220 I say, "Why was sex introduced at all? There are doubtless sufficient reasons of many kinds, but the *fundamental reason connected with evolution is the funding of individual differences in a common offspring, thereby giving to the offspring a tendency to divergent variation.*" Again on p. 223: "*Complexity of inheritance, like complexity of composition in chemical substances, gives instability to the embryo and liability to variation to the offspring; and this in its turn furnishes material for selection of the fittest.*" This was written in the fall of 1884; but, being much pressed with other work at that time, I laid aside the manuscript, and only took it up again, finished it, and sent it to the publisher, about a year ago. I do not bring this forward now by way of reclamation, — for even if I had any right to make such, which I have not, I care little who brings out a truth, — but partly because I would not seem to borrow an