transit. In the latter case Professor Holden points out the necessity (*Astr. nachr.*, 2690) of changing the illumination of the field with the change of screen, so that each magnitude may show against its customary degree of color, or brilliancy of background. Such screens may also be used for photometric purposes when once their co-efficients of transmission have been determined. Those having occasion to use them in this way will do well to consult a paper by Professor Langley (*Amer. journ. sc.*, xxx. 210) on this subject. In this it is shown that the effective transmission co-efficients are decidedly different according as the luminous image is an extended surface, or practically a point like a star. In the latter case there is a central image surrounded by a system of diffraction images, into which a large part of the light goes; so much so, that Professor Langley found that a screen (of which one and two thicknesses transmitted .47 and .21 respectively of the full light upon a surface) gave only .18 and .02 for one and two thicknesses respectively, when measured by the brilliancy of the central image of a small pinhole as a source of light.

Comparison stars. — M. Folie, director of the observatory of Bruxelles, Belgium, announces that he also is ready (see *Science*, vi. 427) to determine the apparent places of comparison stars for comets and asteroids, if those desiring such determinations will communicate the approximate star-places to him.

Rhodope rediscovered. — On Oct. 3 Palisa found and observed (166) Rhodope, the search for which we before noted (*Science*, vi. 333) as the occasion of the discovery of (250).

The coast-survey system of longitudes. — In Appendix 11 to the coast-survey report for 1884, Assistant Schott rediscusses all the telegraphic longitude work thus far done by the survey, including the three transatlantic cable-determinations of 1866, 1870, and 1872. The whole work now includes 158 individual determinations of $\Delta\lambda$. Of these, 53 belong to a network covering 33 stations extending from Paris to Omaha, thus furnishing 21 rigorous conditions to be fulfilled by the longitudes of the 33 stations, a much stronger system than that discussed in the report for 1880. The average probable-error of single determination of $\Delta\lambda$, including every thing since the origin in 1846, comes out $0^s.038$, as determined *a priori* from the observations themselves, or only $0^s.016$ as the average since 1878, when improved methods were introduced. From the residual corrections, however, which result from the discussion, as necessary to make the 53 values of $\Delta\lambda$ satisfy the 21 rigorous conditions, the probable-error of a single $\Delta\lambda$ comes out $0^s.048$, indicating, as compared with $0^s.038$, that there are still some outstanding errors, probably of observers' personal-equation, which the *a priori* probable-errors do not cover. There is only one resulting correction to an observed value which reaches $0^s.1$, while in the latest adjusted system of European longitudes, which involves 59 measures with 26 conditions, although the average probable-error of a $\Delta\lambda$ comes out only $0^s.035$, yet there are six corrections to observed values which exceed $0^s.1$. It will be seen that the American work compares very favorably with the European, while it includes the three difficult transatlantic-cable links. Mr. Schott has accepted the decision of the Meridian conference, and in his final table prints longitudes east of Greenwich as +, and west as —. He has also gone through the tedious process of computing the probable-error of a function of adjusted values for the longitudes of Cambridge and Washington, which come out —

Cambridge, $\lambda = -4^h\ 44^m\ 30^s.993 \pm 0^s.041$,

Washington, $\lambda = -5^h\ 8^m\ 12^s.038 \pm 0^s.042$.

An interesting paragraph at the end shows that the rather remarkable agreement in the three transatlantic determinations of the longitude of the Harvard college observatory, as given in the report for 1874, was more an agreement of adjustment than of observation, and that the observed values have really a range of $0^s.13$. This is the most complete discussion of a network of longitude determinations yet made, and it well sustains the high reputation which the scientific work of the coast survey bears at home and abroad, very much of which is due to the thorough work of Assistant Schott and his efficient computing division.

NOTES AND NEWS.

WHAT is in some points a remarkable circular is prefixed to the current number of the *Zeitschrift für philosophie und philosophische kritik*, the most conservative and old-fashioned of periodicals. The management of the *zeitschrift* announces a new policy in view of the tendency of the best thought of the day, which is "to strive for a revival of the idealistic view of the universe, it being compelled thereto not less by practical than by scientific considerations." Therefore the polemical character of the *zeitschrift* will cease, the reason for it having been removed. In the second place, the vast amount of criticism will give way to explanatory sketches and sympathetic notices of new books and results, so that no investigation may have injustice done it at the hands of a reviewer of an opposite school. More attention is to be paid to the historical aspect of philosophy and the social sciences, and in especial will the work of countries other than Germany receive its share

of attention. This liberal programme is a cheering sign, and only shows that even the ultra-conservatism of this old-established journal has had to yield to the spirit of modern progress.

— Dr. Currier of New York has invented an apparatus by which the large class of deaf persons who have some small amount of latent hearing can learn to speak with greater uniformity and exactness. The difficulty is that the person affected hears only the voice of the teacher or the speaker through the tube, but does not hear his own tones. To accomplish this, a tube goes first from the mouth to the ear of the deaf person, and from there to the mouth or ear of the speaker.

— A stalactite cavern has been discovered in a hill called Kalksberg, near Wolmsdorf. The workmen were quarrying for marble, when they unexpectedly broke into the cavern, which they explored for about a mile and a half. In some places there were deep ponds, and an inner cavern was found that could only be entered by means of a ladder; they have only explored the cavern very imperfectly as yet.

— M. Duclaux, a disciple of M. Pasteur, has been studying the effect of sunlight on germs of parasitic life. For three years he has been watching tubes containing cultures of Tyrothrix scaber. This organism grows very well in milk, or in Liebig's infusion, by destroying albuminoid matter as pathogenic bacteria do. Drops of milk containing the organism were taken at the moment of spore formation, and enclosed in glass tubes plugged with cotton wool, so as to exclude external germs. The milk having been evaporated, some of the tubes containing the remaining spores were exposed to various degrees of sunlight for various periods, — a few days, a month, two months, a whole summer. Others were placed in a stove at a temperature equal to the maximum of tropical regions, in the dark or in diffused light. Eventually small quantities of milk were introduced into the tubes, so that the spores might be provided with the means of growth. None of the tubes subjected to warmth, but sheltered from the sun, have proved sterile, — a fact which shows that the spores of the microbe in question, even after being retained in a dry state and subjected to tropical heat for three years, do not lose their vitality if sheltered from the sun's light. Fifteen days' exposure to the light produces no observable effect, but after a month's exposure germination becomes obviously slower, while 50 per cent of the tubes exposed for two months have proved sterile. Spores subjected to sunlight proved much more feeble in Liebig's infusion than in milk; that is, a much larger proportion of the tubes remained sterile after a given exposure, if development in the former beverage was attempted, than if the latter was the medium of culture. Hence we must infer that not only is sunlight a powerful hygienic agent, but that much depends upon the character of the liquid to which a disease germ obtains access. M. Arloing has tried similar experiments with the formidable Bacillus anthracis, the organism associated with that malady so destructive to sheep, which, when transmitted to man, is known as the terrible wool-sorter's disease. He finds not only that sunlight has an attenuating influence, so that by its aid the germs can be converted into a vaccine, but that the influence can be transmitted and intensified through several generations. A spore born of a 'solarized' bacillus is more susceptible to the reforming influence than its parent was.

— The Henry Shaw school of botany, in Washington university, St. Louis, was opened on the 6th of November by an inaugural address given by the professor, Dr. Trelease, which has been printed. While the school bears the name of its founder, and will in due time take its full development in connection with the Missouri botanic garden at Tower Grove, the first professorship, as we are delighted to learn, commemorates in its title the late Dr. Engelmann. By this address the earnest and judicious young professor begins to open the eyes of the St. Louis people to the breadth, the interest, and both the educational and practical importance, of the subject which he is to teach.

— Felix Plateau has recently published (*Bull. soc. zool. France*) a series of interesting experiments on the palpi of insects, the results of which are quite opposed to the current idea that these oral appendages are essential both to the recognition and the seizure of food. He found that beetles, cockroaches, etc., may be deprived of either the labial or maxillary palpi, or both, and still retain the power of identifying and masticating their food. It is very curious that the function of such well-developed organs should so entirely elude us.

— The Congress of German anthropologists will meet at Stettin next summer. Prof. Hugo Lemcke, president of the City college, as chairman of the local board of managers, tenders an invitation to be present to all American students of anthropology desirous of attending the congress at Stettin, where they will meet Virchow, Schliemann, Schaffhausen, and others, and where their presence will be especially appreciated by the cordial hospitality of the Stettiners. Mr. E. Lemcke, of B. Westermann & Co., New York, will undertake to forward applications.

— Prof. W. D. Holmes, of the photographic laboratory, Lehigh university, offers a prize of fifty dollars for the best instantaneous shutter for out-door work presented before Feb. 1, 1886. Further information can be obtained of C. W. Canfield, 1321 Broadway, New York.

— The secretary of the treasury has appointed Mr. Artemas Martin of Erie, Penn., librarian of the coast and geodetic survey, having first consolidated the archives with the library. This will be gratifying news to the many readers of *Science* who have long held Artemas Martin in high esteem as a mathematician and a man.

— The December number of the *Botanical gazette* is to be a laboratory number, but will contain, in addition, a full description of the memorial vase presented to Dr. Gray, with illustrations of both sides.

— The fourth series of the 'Johns Hopkins university studies in historical and political science' (beginning in January, 1886) will be chiefly devoted to American city government, state constitutional history, and agrarian topics. Among the monthly monographs will be the following: Dutch village communities on the Hudson River, by Irving Elting; Rhode Island town governments, by William E. Foster; The Narragansett planters, by Edward Channing; Pennsylvania boroughs, by William P. Holcomb: Introduction to state constitutional history, by J. F. Jameson; City government of Baltimore, by John C. Rose; City government of Philadelphia, by Edwin P. Allinson; City government of Chicago, by F. H. Hodder; City government of St. Louis, by Marshall Snow; City government of San Francisco, by Bernard Moses; City government of New York.

— A unique institution is the Anthropological school of Paris. A good idea of its comprehensiveness is gained from its programme for the coming year. There are no less than six courses of lectures. M. Mathias Duval lectures on zoölogical anthropology, including comparative embryology and kindred topics. General anthropology is in the able hands of Dr. Paul Topinard, whose lectures will centre about the discussion of races and types. M. Manouvrier lectures on ethnology, giving special attention to normal and abnormal craniology. Medical geography, by which is understood the action of the environment, is the subject of a course by M. Bordier. The remaining courses are on Prehistoric anthropology, by M. Gabriel de Mortillet; and on the History of civilizations, by M. Letourneau. The lectures are held weekly, and, in addition, conferences are held from time to time. The course of lectures was begun on Nov. 9.

— Dr. Topinard has published a revised series of anthropometric instructions for travellers. The traveller, he says, need not trouble himself with questions of race, but should merely observe varieties of type. For this purpose he should take measures of as large a number of individuals as practicable, ten different measurements of one hundred individuals being more valuable than fifty of twenty-five persons. The measurements must be so simple as to reduce the personal equation as low as possible. They should also be so arranged as not to keep the subject in one attitude any longer than necessary. Men should be selected for measurement rather than women. All the instruments required may be collected into a small anthropometric box, the slide being the most useful. Dr. Topinard furnishes a form for recording results and remarks.

— M. Mercadier recently described before the Paris academy of sciences experiments undertaken in order to show that the elasticity of the metal diaphragms at the extremity of telephonic wires counts for nothing in the transmission of sonorous vibrations, or rather that it merely gives to the voice the nasal tone associated with telephonic conversation. M. Mercadier successively substituted for such diaphragms plates of greater and greater thickness, pieces of cardboard, and finally iron-filings. The intensity of the vibrations was diminished, but the tone of the voice became normal, and the most delicate inflections were transmitted with perfect exactitude.

BOSTON LETTER.

VISITORS to Boston many years ago were struck by the then novel sight of large labels attached to the stately trees on the Common, designating their scientific and common names and the country of their origin. This simple device for the instruction of the public was almost entirely the work of a single public-spirited man, the late Dr. A. A. Gould, the naturalist, whom more than one generation of Bostonians held in the highest esteem. Snatching the early hours from a laborious practice, he could be seen by early risers tacking his tins upon one tree after another for a whole season. After his death, I think it was, when these had grown dilapidated, some city forester, who, like many others since appointed, had no other than political claim to the place, instead of restoring, removed them. All efforts since made to renew the work have failed until now, when, thanks to the energy of a few interested persons, and the personal attention of Mr. John Robinson of Salem, the Common has again become a good botanical object-lesson.