Stieler's Hand-Atlas. Gotha, Justus Perthes. f°.

IT is now six years since the last edition of this great work has been issued. Since that time the commercial development of certain regions, and the additions to our knowledge of others, have been so great, that the atlas did not meet the demands of the day: therefore the new edition, the first instalment of which has just been issued, is highly welcome. It is hardly necessary for us to dwell upon the fact that the technical execution of the maps is artistic and accurate. In the last edition of the atlas a few of the older plates, which were somewhat worn, and not as perfect as the newer ones, were retained; but these are now altogether eliminated. We consider it a great improvement of the maps, that the shading all along the coast which is intended to show the water has been discarded, and that a delicate blue tint has been introduced instead. The first instalment contains two new maps, — one sheet of the new four-sheet map of Italy, and one of the four-sheet map of Austria. The relief of Italy is presented here for the first time in an atlas in a clear form, and, what is more, representing the real configuration of the land instead of the old conventional forms. It is founded upon the surveys of the Italian Department of War, which are rapidly being pushed forward. In order not to disturb the impressiveness of the physical features, the railroads are shown as formerly projected roads were generally shown.

The first sheet of the map of South America may serve as an example of the care with which corrections have been made on the old plates. The sheet embraces north-eastern Brazil and French and Dutch Guiana. The interior of the Province of Pernambuco is entirely new, the northern tributaries of the San Francisco being for the first time shown in their real form. While the old maps showed a series of hills running from north to south, we observe now a well-defined ridge forming the watershed between the provinces of Pernambuco and Ceara. In other places, rivers which were shown in solid lines on the old maps, are shown in broken lines on the new ones, indicating that our knowledge is not so complete as was formerly assumed. We observe this particularly in the province of Grao Pará; and farther up the Amazon we see, to our surprise, the course of the Rio Trombetas entirely changed, although it was thought that its course was well known. The administrative boundaries of the provinces of Brazil have also undergone important changes.

The atlas, when complete, will contain ninety-five sheets; the map of the moon, and a few general maps of the old edition, being left out in order to gain room for new detail maps. The following maps have been added to the atlas: two sheets showing the eastern portion of Austria, a four-sheet map of Italy, a general map of the Balkan Peninsula and four special maps of the same, a map of Africa in six sheets, and western Canada. Besides this, the maps of Germany, Austria, Denmark, and Asia Minor have been replaced by new engravings.

A Synopsis of Elementary Results in Pure Mathematics. By G. S. CARR. London, Francis Hodgson. 8°.

THIS volume of more than nine hundred royal octavo pages is a handbook which must be extremely useful to every one engaged in either teaching or applying mathematics. As its title implies, it is principally a collection of results, more especially of theorems and formulæ. For example, the section devoted to the integral calculus, which comprises more than one hundred pages, contains a complete synopsis of all the ordinary integrals, both definite and indefinite, with brief indications of the method of deriving them. The statements are models of condensation, being at once clear and concise. Especial attention seems to have been devoted to the typographical arrangement, which is extremely clear; the words, numbers, and formulæ which are first to catch the eye, and are principally to be used, being printed in large, bold type, while the indications to be subsequently examined are in finer type.

Notwithstanding the general excellence of the book, it seems susceptible of many improvements, both in its plan and in its details. It cannot displace the text-book, nor is it intended that it should: hence it would have been well to omit all matter for which the student would naturally go to his text-book, as well as that for which no book is needed. This is especially the case with the chapter on elementary geometry, and with large portions of the chapters on trigonometry, which might have been omitted or greatly condensed without diminishing the usefulness of the work. Notwithstanding that the brief demonstrations are concise in the extreme, many more are given than have any appropriateness in the book. In most cases it is only the result, and not the proof, which the person using the book will want, and when he does want the latter he will generally know where to find it. More space might, then, have been devoted to advanced subjects, which are not sufficiently developed.

In detail the defects are very numerous, considering the amount of labor and care which seems to have been devoted to the work. The astronomical and physical constants at the beginning of the book are so far from embodying the latest results as to be worse than useless to any one wanting precise values of constants. In the factor-tables it seems almost ridiculous to see a mathematician give *zero* as the smallest factor of a prime number. It should have been unity, if given at all; but Burckhardt's plan of indicating prime numbers by a dash is much more convenient. Among the subjects insufficiently treated are regular solids (no mention is made of sympolar relations), trigonometric series, and determinants. What is given of the calculus of variations might as well have been omitted entirely.

The term 'eliminant' being almost entirely replaced by 'resultant' in mathematical language, the former should not have been used to the exclusion of the latter. In Section 1628 an invariant is described as multiplied by the modulus of transformation, when in fact the co-efficient may be any power of that modulus. In Section 1637, Cor. 2, it is stated, that, if any quadric is resolvable into two factors, the discriminant vanishes. But this is not true of the binary quadric, which is the most common one.

We should naturally suppose that great care had been taken in the printing: it is therefore surprising to see in equation (4) of Gauss's trigonometric formulæ, p. 190, '$\cos \frac{1}{2} c$,' printed in bold type, instead of '$\sin \frac{1}{2} c$.'

These defects are not to be considered as materially detracting from the value of a most excellent piece of work, which should be welcomed by all teachers of mathematics. S. N.

NOTES AND NEWS.

ONE method of disposing of the surplus water of the Mississippi River that has been proposed has been to construct an outlet for the flood-water through Lake Boyne. Capt. S. S. Leach, Corps of Engineers, formerly secretary of the Mississippi Commission, explained to the Senate Committee on the Improvement of the Mississippi River, last Saturday, why this plan is not feasible; in fact, he characterized it as preposterous. He said that such an outlet would increase the velocity of the river at New Orleans by at least twenty-five per cent. Already it requires the best engineering skill to prevent the banks at that point from being washed into the river. If the velocity of the flow should be increased twenty-five per cent, he said, no expenditure of money would make them retain their place. Captain Leach also explained the plan upon which the Mississippi River Commission is now working. He estimated that a system of levees from the mouth of the river to the head of navigation, protecting all points that need additional protection, will cost three million dollars, and that thirty millions would be needed to establish a ten-foot channel through the same length of the river.

— The Hydrographic Office has received a number of reports of peculiar colorings of the sea, of which the following are the most interesting. The captain of the British steamer 'Kathleen' reports, that April 23, latitude 36° 25′ north, longitude 48° 10′ west, he passed through about five miles of discolored water. It had the appearance of sulphur floating on the surface. The captain of the American bark 'John J. Marsh' says, that April 27, in latitude 35° 34′ north, longitude 74° 50′ west, his ship passed through a patch of water as white as milk, the edge of which was distinctly marked, and which was not phosphorescent. The extent of it was about three miles in longitude and five miles in latitude. He found no bottom by sounding at thirty-five fathoms. The sky was clear, and the stars shone brightly, at the time. The officers of the British steamer 'Lero' report, that April 25, in latitude 35° 04 north, longitude 58° 16′ west, their ship passed through a wide

field of discolored water, in patches, each patch being about one hundred yards long and two hundred yards wide. The water had an appearance similar to that over a shoal. That night the sea was remarkably phosphorescent, and the ship was evidently passing through the same kind of water.

— Capt. H. Parsell of the R. M. S. 'Britannic,' reports, that on April 12, at about 8 h. 17 m. 43 s., A.M., he observed a comet bearing east (true). The altitude of the nucleus was 15° 20′ 20″; eye, 33 feet; latitude 4° 24′ north; longitude, 68° 14′ west. He continued to observe it every night until he arrived at Queenstown. What was also probably the same comet is reported by Capt. E. W. Owens of the British steamship 'Iowa' as having been observed April 9 at 3 o'clock A.M. He was in latitude 40° 30′ north, longitude 36° west. The comet was seen bearing east, with its tail in a southerly direction. Its altitude was 15°. Local time was used.

— The proposed transfer of the Coast Survey from the Treasury Department to the Navy will probably be provided for at the present session of Congress. The Senate committee has already made a favorable report; and the sub-committee of the House Committee on Naval Affairs, to whom the subject has been referred, is understood to be favorable to it.

— The Senate, on Monday, passed a bill appropriating $17,500 for making the west end of the Smithsonian Institution building fire-proof. A citizen of the United States, who has long resided abroad, proposes to give to the Smithsonian Institution a large collection of armor from the middle ages, — some of it connected with most famous historical names, — including horse-armor, helmets, swords, and all the paraphernalia of ancient warfare. These objects, numbering about five thousand, have been collected at great expense, and the collection is one of the most valuable of the kind in the world. The condition of the presentation is that the Smithsonian Institution furnish a fire-proof building for its protection.

— Prof. Alexander Graham Bell will sail for Europe June 2. He has been invited to appear before the British Royal Commission now engaged in making an inquiry into the best methods of caring for and educating deaf-mutes. It may be remembered that several years ago Professor Bell presented a paper, at a meeting of the National Academy of Sciences, on the formation, through the intermarriage of deaf-mutes, of a deaf variety of the human race, and gave some important statistics to show that a much larger percentage of the children of deaf parents are deaf than of those whose parents possess the sense of hearing. This paper attracted wide attention, and gave rise to very interesting discussions both here and abroad. The Royal Commission has requested Professor Bell especially to give to it the results of his subsequent investigations and studies upon this branch of the subject, and he has devoted much time to the preparation of facts and figures in regard to it. He will also give the commission the result of his studies of other divisions of the subject.

— The summer session of the Chautauqua College meets at Chautauqua July 6. The college has two departments, — the summer session, at which only special work is done; and the correspondence department, which has a full college course, and works during the college term. The present session of the latter is just closing with four hundred and twenty students.

— At the meeting of the American Philosophical Society, May 4, Prof. C. V. Riley, the entomologist, called attention to some grave errors in the published minutes of the earlier meetings of the society. He remarked that the public, as well as the most competent authors, had always believed that the Hessian-fly — that pest of wheat-culture — was introduced during the Revolution by Hessian troops. Dr. H. A. Hagen of Cambridge has argued against this belief, and, further, that the species was not imported from Europe; one of his most potent arguments being that based on the early minutes of the Philosophical Society, which, as communicated to him (Hagen) by one of the secretaries, Mr. H. Phillips, jun., and as published, make mention of the Hessian-fly in 1768, or before any Hessian troops landed. The statement of the secretary, as also the published minutes, turn out to be absolutely erroneous on these points, as, upon consulting the original records, Professor Riley found no mention of the Hessian-fly prior to 1791. In all previous cases 'the fly,' or 'the fly in wheat,' or 'the fly-weevil,' are the terms used; and it is susceptible of positive proof that these terms referred to totally distinct insects, belonging to a different order, and still called the weevil, viz., *Sitophilus granaria* and *S. oryzæ*. It is a most interesting illustration of grave and misleading error, resulting from carelessness in what appear to be trifles.

— The thirteenth session of the Sauveur College of Languages will be held at the University of Vermont, Burlington, Vt., commencing July 9, and continuing six weeks. After the close of the last session of the Sauveur Summer College of Languages in Oswego, N.Y., it was resolved to hold the thirteenth session this year at Burlington, where they spent the summers of 1884 and 1885. The want of accommodations, which caused the college to leave there in 1885, has been supplied. Oswego treated the college in the most friendly manner from the first to the last day of their stay there. Yet there was missed something which Oswego, with its commercial bustle and activity, could not give; namely, the quiet, rural character of the former home at the foot of the Green Mountains.

— The Prince of Monaco is about to publish the scientific results of the cruises of the 'Hirondelle' in the Atlantic Ocean in a magnificent illustrated volume in folio. The work will be edited by the prince and Jules de Guerne, zoölogist of the expedition, while specialists have charge of the various departments. The prince invited correspondence with scientific societies and institutes for exchanging periodicals and marine or fresh-water specimens.

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.

Experiments in Vision again.

MR. HYSLOP, in his interesting letter on this subject (*Science*, No. 274, p. 217), asks for verification of his results. In my case, when his two circles are combined by convergence, there is not the least alternation of images, but, on the contrary, a complete combination and a single horizontal ellipse, whatever be the degree of inclination of the planes of the circles to one another, provided the inclination to the median plane be the same. But the binocular ellipse will seem inclined to one side or the other if there be the least want of symmetry in the inclination of the two planes. This is obviously the necessary result of the law of corresponding points.

I cannot think, however, that so good an observer and so skilful an experimenter as Mr. Hyslop could mistake this for alternation of the two images. I therefore suppose that his eyes are more independent of one another than mine. JOSEPH LECONTE.

Berkeley, Cal., May 14.

Composite Portraiture of the Insane.

WITHIN the last year considerable advances have been made in composite photography; and especially Professor Stoddard, by his articles in *The Century*, has done much to give us new types. Most studies in composites have been confined, up to this time, to normal individuals, and, so far as the present writer is aware, no attempts have been made to secure composite types of insanity. The accompanying composites were made by the Notman Photographic Company of Boston, from negatives taken by the writer in November, 1887. The composite of general paresis is made from the portraits of eight patients, — three females, and five males. General paresis, being an organic brain-disease (softening of the brain), furnishes an unusually good field for the study of the decay of the mental faculties; and the patients making up this composite were all in the second stage of the disease, when it was beginning to destroy the finer lines of facial expression. A comparison of the composite of paresis with that of melancholia — eight subjects, all men — will show the characteristic differences between the two diseases. The eyes of the composite of paresis have a fixed and staring look, showing clearly a diminution of intelligence, and differing entirely from the expression of the other composite, where