phenomenon and certain meteorological conditions obtaining at a distance. Looking to the position of Sydney Harbour, it is only natural that we should expect to find the origin of these undulations in the open ocean; but experience of similar phenomena in another part of the world leads me to think that the cause, whether meteorological or not, must be sought nearer at hand.

My attention was first drawn to these curious fluctuations of sea level when golf playing on the low sands at the head of the landlocked harbour of Lemnos in the Greek archipelago, on August 9, 1895. I noticed that the current in the shallow streams communicating with the sea appeared to reverse at intervals of about a quarter of an hour, without any apparent cause. On returning to Malta I inquired if anything similar had been noticed there, and in consequence of information then received, I commenced some observations on my own account.

It is a matter of common knowledge to naval officers and others concerned, that the irregular variations of sea level in the Maltese inlets are at times sufficiently great to completely mask the slight lunar tide; and that the Port Officials are in the habit of insisting on a considerable margin of depth before permitting vessels to pass over the sills of the dry docks. These extra tidal variations of sea level have been ascribed to various causes, such as the direction and strength of prevailing winds, currents setting towards the mouth of the inlet, or to what is vaguely called the natural period of the harbour. My observations showed conclusively that there is at certain times in Malta Grand Harbour a perfectly regular ebb and flow with a period of twenty-three minutes; about the same period obtaining in Sydney Harbour, which Mr. Russell gives as twenty-six minutes.

My observations were made in the neighbourhood of Magazine Point, about two-thirds of the distance from the sea to the head of Valetta Harbour, the width across the harbour at this spot being little more than 300 yards. On May 7, 1896, the to-and-fro movement of the water was very remarkable, being continuous from 8 a.m. till 2 p.m. Between these hours the water in this part of the harbour rose and fell with the utmost regularity, the range being about 15 inches and the interval between successive high waters about twenty-three minutes. This variation of water level at the head of the harbour caused a strong current, which changed its direction every eleven or twelve minutes. The regular reversal of current was indicated in a remarkable manner by the behaviour of the spar buoy moored off Magazine Point. The weather during the morning was normally fine—that is to say, nearly calm inside the harbour, with a light but gradually increasing sea breeze outside.

The similarity in the period of the undulations observed at Sydney and at Malta suggests a common origin.

If, however, as Mr. Russell seems to think, the Sydney waves are due to the combined effect of wind and current influences exerted at a considerable distance, this similarity of period can be little more than a curious coincidence. Long period undulations, such as these under consideration, could hardly be originated by the wind and current systems of the Mediterranean, which, at the given time of the year, at all events, are feeble and comparatively local in their effects.

If, on the other hand, we for a moment suppose that the action of local currents and sea breezes, driving a head of water into the inlet, results in the establishment of regular oscillatory movements, is it probable that the “natural periods” of two harbours, differing so much in area as do those of Sydney and Valetta, would be so nearly equal?

Considerations such as these seem to indicate that the cause of these “short period” tides is one and the same, notwithstanding that they occur on opposite sides of the world and apparently under different conditions; and also that their real origin has not yet been ascertained.

Trustworthy observations in landlocked bays and harbours are still very much wanted, and it may be that until such are available in a greater degree than at present, the whole subject of tidal irregularity will remain more or less obscure.

In conclusion, sir, permit me to express the hope that you will afford space for the discussion of this interesting subject in your columns by those who are able to deal with it. In this way we may hope to ascertain whether any trace of earth movements occurring at short and regular intervals has been noticed near the localities and at the times mentioned; for it is just possible the true cause of these remarkable tides may be one hitherto unsuspected.

ANTHONY S. THOMSON.

Concerning the Thermodynamic Correction for an Air Thermometer.

It seems noteworthy not only that the theoretical investigation on this subject, given in Maxwell's “Theory of Heat” and Tait's “Heat,” is fallacious, as has been pointed out by Mr. Rose-Innes in his letter which appeared in your issue of May 26, but that there is no indication in either of these text-books that the result given is not in accordance with the experimental facts. The investigation in question, which is practically the same as that first given by Lord Kelvin before the experiments were performed, leads to the result that the cooling effect should be proportional to the difference of the logarithms of the pressures before and after passing the plug, instead of proportional to the difference of the pressures themselves, as was actually found to be the case; the discrepancy was, of course, noted by the experimenters. The methods used in all the theoretical discussions in Lord Kelvin's papers on this subject prior to the final one in Part iv. of the papers “On the Thermal Effects of Fluids in Motion,” seem equally open to objection. The numerical results derived by the last method, which seems perfectly sound, were given apparently for the first time in the article “Heat” in the “Encyclopædia Britannica”; the investigation and results are reproduced in Preston's “Theory of Heat,” and substantially in Parker's “Thermodynamics.” The correction obtained to the number representing the temperature of melting ice on the absolute scale by this method was +.70, the previous methods giving in succession +.83, -.03 and +.87; the uncorrected estimate finally used was also different from that taken at first.

W. MCF. ORR.

Royal College of Science, Dublin, November 25.

Science in Elementary Schools.

THE report on the teaching of science in elementary schools, drawn up by the British Association Committee, and published in your issue of November 24, is likely to be unintentionally misleading. The following paragraph leaves out of consideration an important modifying cause:—“It was remarked in the last report that the increased teaching of scientific specific subjects in the higher standards is the natural consequence of the greater attention paid to natural science in the lower part of the schools. The following table shows the correctness of this inference.” [Then follows a table showing the gradual increase in the number of children examined in specific subjects.]

The Directory of the Science and Art Department for 1897 contained a new regulation to the effect that “no student may be registered for a grant for day attendance under the Department of Science and Art—except the grants for elementary drawing and manual instruction—whose name is on the register for day attendance under the English or Scotch Education Departments, or the National Board of Education, Ireland.” The result of this has been that large classes under the Science and Art Department in such subjects as physiography and hygiene, composed of Standard VII. children in elementary schools, were discontinued; and, possibly with a view to replacing part of the grant thereby lost, specific subjects were taken up in connection with the Education Department. A considerable increase in the number of children taking specific subjects may be anticipated for the years 1897-8 and 1898-9, but the reason will scarcely be that put forward by the British Association Committee, but rather the new regulation from South Kensington.

A. T. SIMMONS.

London.

THE new regulation of the Science and Art Department, quoted in Mr. Simmons's letter, was issued only in 1897: it was impossible, therefore, that the effect of it on the day schools could be shown in the tables that form part of our last report. The results may begin to show themselves in the report of next year, but only as an addition to the increase due to the greater attention still being paid to natural science in the lower part of the schools. It is to be hoped that this aggregate increase will be a large one; but it will evidently be very difficult to assign to each cause its proper proportion.

J. H. GLADSTONE.

A Remedy for Bookworms.

IN NATURE, No. 1506, vol. lviii., of September 8, there is a review (p. 435) of a book, “Facts about Bookworms,” by the Rev. J. F. X. O'Connor, S.J., which concludes by lamenting there is no panacea for these book pests.

Here, in tropical Queensland, I was much troubled by various borers, and "silver-fish"; but for the latter, which apparently only devour the glaze on paper, and paste, I found a new remedy in adding alum to paste, and keeping glazed writing paper in tin boxes.

For the former a solution of *corrosive sublimate and thymol in alcohol*, appears to be an effectual remedy, though probably it would require to be re-applied from time to time; but certainly all books dressed by me with this solution inside and outside the covers, have never been touched since.

The newspaper extract (paper and date unknown), from which I obtained the information, read as follows:—"Surgeon-General Bidie, in the *Fishing Gazette*, recommends a solution of corrosive sublimate and thymol as a perfect protection for books from the ravages of bookworms and other insect pests, having tested it in tropical countries where the termite and the larvae of innumerable creatures batten upon everything eatable, from door-posts to bottle corks."

I have certainly found this remedy thoroughly efficacious, and think it deserves to be more widely known.

J. EWEN DAVIDSON.

Branscombe, Mackay, Queensland, October 20.

The Properties of Liquid Mixtures.

IN the abstract of my communication to the Physical Society in connection with Mr. R. A. Lehfeldt's paper on the above subject (*NATURE*, December 1, p. 116), the most probable explanation of the fact that, when American petroleum is distilled, the benzene comes over at about 65° instead of 80°, is stated to be that "benzene and hexane behave, as regards distillation, like *miscible liquids*." This should read "*like partially miscible liquids*."

The two liquids are, in fact, miscible in all proportions, and the point is that, in certain respects, they behave as though they were only partially miscible.

SYDNEY YOUNG.

December 6.

The Mildness of the Season.

As an instance of the mildness of the season, I may state that on Sunday, November 27, I gathered five ripe strawberries out of my kitchen garden; and that a considerable number of strawberry plants still show signs of flower. Moreover, the leaves of several deciduous trees, such as peaches, lilacs, &c., which are planted in sheltered situations, are still perfectly green; whilst many others are only just beginning to assume their autumn tints. I have also gathered several rosebuds this morning.

In this part of England all the leaves have usually fallen by the end of November. In fact, in ordinary seasons, the elms (which shed their leaves late) are quite leafless by the middle of the month.

A. B. BASSET.

Fledborough Hall, Holypot, Berks, November 29.

Iridescent Clouds.

THERE was a fine example of clouds showing iridescence on December 4, from 8.50 to 9.5 a.m., in the south-eastern sky. It occurred on a large white cumulo-maculo cloud, the iridescence being confined to the upper and lower margins, which were much striated.

This was at first the same period *after sunrise* as I have commonly observed the phenomenon to occur *before sunset*, i.e. at about an hour's distance from each event (*vide* my letter on the subject, *NATURE*, vol. lviii., p. 390). I have not seen it before in the morning.

E. ARMITAGE.

Dadnor, Herefordshire, December 5.

The Origin of the Aurora Spectrum.

WITH reference to the question as to whether there is any auroral line in the position of the krypton line about 587, the nearest lines to this that have been observed in the aurora appear to be 5765 and 595 observed by Gyllenskiöld. His observations were only rough, but the question is whether they are near enough to the krypton line for either of them to be the same as it. If there is any auroral line about 556, it is likely that the great brilliancy of that at 557 would account for its not having been seen.

T. W. BACKHOUSE.

West Hendon House, Sunderland, November 30.

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SVEN HEDIN'S "THROUGH ASIA."¹

CAPTAIN FRANK YOUNGHUSBAND prefaced his charming work on Central Asia "In the Heart of a Continent," by a lament that his early education had been wasted on dead languages, so that he started on his travels ignorant of scientific methods of thought or observation (see *NATURE*, June 11, 1896). Dr. Sven Hedin has no such fault to find with his upbringing. Trained in physical geography in the University of Berlin under the great Asiatic traveller Baron von Richthofen, he chose the least-known parts of Asia as a field for exploration, and fitted himself as an explorer by years of preliminary study and Eastern travel. Few men, especially in this country, attracted instinctively to the studies which can make them geographers, have had the opportunity of becoming travellers, although many travellers have been stimulated by their experiences to take up the study of geography. Dr. Hedin writes, as he travelled, like an accomplished geographer. He was no sportsman; and, although a sedulous collector, he was neither botanist, zoologist nor geologist, possessing only that sympathetic general knowledge of natural science which is essential to a geographer, and invaluable to a traveller as a guide to observation. He not only qualified himself in practical astronomy and surveying, so as to collect trustworthy material for maps, but took special pains to master all necessary languages. Besides his native Swedish he was proficient in German, French, Russian and English, and could thus converse easily with every European traveller and official he met; he had already learned Turki, so that in western Central Asia he could question the natives directly, and in the course of the journey he acquired sufficient facility in the use of Mongol and Chinese to enable him to dispense with interpreters.

Being a translation, though a good one, "Through Asia" cannot be compared in style with the best English books of travel; but in substance it is so full, solid and interesting that this is soon forgotten. An awkward phrase, indeed, puzzles one occasionally, such as "diopters" (which may mean the sights for a plane-table); "temporal observations," instead of "observations for time"; and a few others. The word "glen" is very frequently used in a sense which appears to be the same as valley, but may contain some undesigned shade of difference.

King Oscar, whose interest in travel and in all matters Oriental is well known, interested himself in the proposed journey, and assisted in supplying the very modest funds (1900*l.*) required for what has turned out to be one of the cheapest, as well as one of the best, of the great journeys of the century.

Dr. Hedin travelled altogether 14,600 miles, of which 2020 had never before been traversed by a European. He made a continuous map of his route for 6520 miles, which is now being worked up in the great cartographical establishment of Perthes in Gotha, and innumerable observations on the volume of rivers, the depths of lakes and the temperature of air, water and soil, which will all be discussed and published separately. His collections of natural history specimens and archaeological remains will also be made the subject of monographs. Thus although the mass of the scientific data obtained is large, but little of it is considered in this book, which is a compressed narrative of the whole three years' journey, containing, indeed, a fair amount of adventure quietly told, and just enough of the more technical aspect of geography to enable the general reader to understand the explorer's motives and appreciate his results. Enough is stated, however, to show that it is the record of one of the finest scientific journeys ever carried out in trackless Asia.

¹ "Through Asia," by Sven Hedin. With nearly three hundred illustrations from sketches and photographs by the author. Two vols. Pp. xx + 1278. (London: Methuen and Co., 1898.)