OUR BOOK SHELF.

Inorganic Chemistry for Beginners. By Sir Henry Roscoe, F.R.S., assisted by Joseph Lunt. (London: Macmillan and Co., 1893.)

Everyone recognises the necessity for having works upon elementary science written by men in thorough touch with their subject. It is with some satisfaction, therefore, that we notice this book, in which Sir Henry Roscoe clearly expounds the elementary principles of chemistry, and describes some of the non-metallic elements and their more important compounds. The book differs from the author's well-known "Lessons in Chemistry" in arrangement and in style, and is far better suited to the tyro in chemistry. In fact, it is adapted to suit the requirements of the syllabus of the Department of Science and Art, and both teachers and students under the Department will benefit by its introduction. There are twenty-one lessons in the book, each complete in itself. At the end of each lesson is a brief summary and a set of questions bearing upon the subjects treated. Believing with all educationalists that principles only become apparent when they are reflected by facts, the author illustrates each step with an experiment. One hundred and eight illustrations elucidate the text, and though many of them are of the ordinary stock character (which is, perhaps, unavoidable in a book of this kind) a fair proportion are from new blocks. In every respect the book is a good one, and contains the kind of knowledge that should be imparted to all beginners of science.

The Chemistry of Fire. By M. M. Pattison Muir. (London: Methuen and Co., 1893.)

THE fact that this book belongs to a University Extension Series vouches for the popular character of the contents. Extensionists should welcome Mr. Pattison Muir's contribution to their literature, for it represents the work of a practical teacher, and combines accuracy with simplicity. It is now generally conceded that the best way to teach chemistry is to deal first with common occurrences and things, and finally to generalise. Let a student once obtain a correct notion of the changes of composition that happen in the burning of a candle, and he can comprehend all chemical changes. We therefore commend the book before us to the notice of committees and organisers of technical education, for it contains just the kind of knowledge that should be imparted to all students under their guidance. Like the majority of the volumes in the series to which this one belongs, the illustrations are few and very sketchy. On this account it will be difficult for the home-reader to get a clear conception of many of the experiments.

Solutions of the Exercises in Taylor's Euclid I. to IV. By W. W. Taylor, M.A. (Cambridge: University Press, 1893.)

BY the publication of these solutions, Mr. Taylor has furthered very considerably the usefulness of the book written by his brother. In the book he has worked out very fully all the problems, and has arranged the text in such a form as to be thoroughly intelligible to any student. Where several problems were of a similar character, it has been thought expedient to adopt a different mode of solution, while in some cases duplicate solutions have been given. Extension of theorems have here and there been inserted, and a few additional exercises will also be found to have been interpolated. By the adoption of a simple notation, reference can be directly made to the problems in the "Pitt Press Euclid." Both teachers and taught will find that they have a very useful companion to the above-mentioned book, while the latter will be very much enlightened in the art of solving many problems.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

The Recent Glaciation of Tasmania.

IN a paper read before the Royal Society of Tasmania in June last, Mr. R. M. Johnston, F.L.S., gives a sketch of what is known of the glaciation of the island, or rather of the western portion of it, for no indications of glaciers appear to have been discovered in the eastern half. This difference is supposed to be due to the fact that on the western side of the island the rainfall is from 50 to 76 inches annually, while in the central valley it is but little over 20 inches. Indications of glaciation among the western mountains were noticed by Mr. Charles Gould, Government geologist, about forty years ago, and from information received from him through the late Chief Secretary of Tasmania, the Hon. J. R. Scott, Mr. Johnston took up the inquiry, and for many years has made explorations in the western plateaus and mountains. Mr. C. P. Sprent was another explorer who published some account of the glacial phenomena in 1886, while more recently Mr. T. B. Moore and Mr. Dunn have recorded similar observations. Mr. A. Montgomery, the present Government geologist, has also just published a paper on the same subject.

Mr. Johnston tells us that he has personally explored the whole of the western mountains, from the Picton and Craycroft Rivers, southern branches of the Huon, in the extreme south, along the mountain ranges forming the western border of the central plateau, quite through to Emu Bay on the north coast; and that he has found the clearest evidences of glaciation in almost every valley throughout this great extent of country. From the Arthur Range in the south to Mount Bischoff in the north, are numerous moraines, *roches moutonnées*, tarns and lakes in great abundance, polished and striated rock-surfaces, and numbers of true erratics. Near the sources of the Franklin River, under Mount Hugel, and only six or seven miles west of Lake St. Clair, are Lakes Dixon and Undine, of which Mr. Johnston writes:—"The valley of Lake Dixon is *par excellence*, the ideal of a perfect glacier valley. No one, however ignorant of glacial action, could in this neighbourhood gaze upon these beautiful scooped, or rather abraded lakes or tarns, the snow-white, polished, billowy, and cascade-like *roches moutonnées*, composed of quartzites, on the upper margin of Lake Dixon, together with the tumbled moraines and large erratics on the lower banks—at a level of about 2000 feet—without being impressed with the idea that its singularly characteristic features must have been produced by the slow rasping flow of an ancient river of ice."

Further north, the Murchison, Macintosh and Huskisson rivers, all branches of the Pieman River, contain similar glacial markings; and Mr. Dunn has recently described others of the same character about Lake Dora, nearer to the west coast. The latter observer lays special stress on the rounded planed and scored rocks, on hard quartzite and conglomerate rocks rounded and polished, on numerous tarns in rock-basins, on moraines covering hundreds of acres, and on numerous huge erratics and perched blocks. (See Annual Report of the Secretary for Mines, Victoria, 1893, p. 21.)

Mr. T. B. Moore states that he found the rocks polished and striated within 25 feet of the top of Mount Tyndall, or 3850 feet above the sea, a sufficient indication that the great central plateau at an average elevation of nearly 4000 feet must have been buried in ice or *névé* to a considerable depth, and have formed the feeding ground for the glaciers, whose effects are so visible in the adjacent western valleys. The Tasmanian geologists are united in the belief that the glaciers never reached the coast or descended much below the 2000 feet level, and that the ice did not extend to the central valley or the eastern side of the island. They therefore speak of it as a *glacier*, not a *glacial* period, the conditions being somewhat similar to those of the Alps at the present time; but, owing to the great difference in the rainfall, there was a more marked contrast between the western and eastern districts, while the lofty central plateau afforded a much more extensive snow-field than Switzerland now possesses.

The facts here stated on the authority of Mr. Johnston, sup-

ported by those of three other observers, two of them being the Government geologists, render more singular the statements of Messrs. Officer and Spencer (NATURE, June 29, p. 198) as to their not finding any traces of glaciation in the country around Lake St. Clair, which they explored for a month. Lake Dixon, which Mr. Johnston describes as presenting all the evidences of glaciation in their fullest development, appears to be less than ten miles from the lower end of Lake St. Clair, according to the best map I can refer to; while Lake Petrarch, which Mr. Officer describes as seeing from the top of Mount Olympus, lies between the two in the Cuvier valley, and is also mentioned by Mr. Johnston as being within the highly-glaciated region. It is quite possible that the lakes on the great plateau may be due to damming up, owing to movements of the superficial gravels and clays by the ice or *névé* sheet; but there are evidently an abundance of small valley-lakes and tarns in the western valleys so surrounded by all the marks of extensive glaciation as to render it almost certain that they are true ice-eroded rock basins. It is much to be wished that a more detailed account of this interesting district, with a good map showing all the mountains, lakes, and valleys referred to, would be given us by one of the local geologists. ALFRED R. WALLACE.

The Supposed Glaciation of Brazil.

MR. WALLACE observes in his letter on this subject, published in NATURE (vol. xlviii. p. 589), that "no authoritative disproof has yet been given of the exceedingly strong and positive statement of Agassiz and Hartt."

I confess to my mind the matter had seemed disposed of by the interesting discussion of the subject to be found in the "Notes of a Naturalist in South America" (1887), by the late Mr. John Ball, F.R.S. This experienced and accurate observer arrived at the conclusion from a study of the phenomena on the spot, that they could be sufficiently accounted for by subaërial denudation (see, in particular, pp. 313-8).

In the following passage he rejects the agency of glacial action as definitely as his habitual caution and modesty would allow:—

"I was unfortunately not acquainted at that time with the observations made near Tijuca by Prof. Alexander Agassiz, which appear to him to give evidence of glacial action in this part of Brazil. It would be rash, especially for one who has not been able to examine the deposits referred to, to controvert conclusions resting on such high authority; but I may remark that the evidence is confessedly very imperfect, and that the characteristic striations, either on the live rock or on the transported blocks, which are commonly seen in the theatre of glacial action, have not been observed. I lean to the opinion that the deposits seen near Tijuca are of the same character as those described by M. Liais[1] as frequent in Brazil. The crystalline rocks are of very unequal hardness, and while some portions are rapidly disintegrated, the harder part resist. The disintegrated matter is washed away, and the result is to leave a pile of blocks of unequal dimensions lying in a confused mass." (P. 342.) W. T. THISELTON-DYER.

Royal Gardens, Kew, October 23.

[1] See his valuable work, "Climats, Géologie, Faune et Géographie Botanique de Brésil."

The Nativity of Rama.

I HAVE been much interested in the letter of "Kanhaiyalal," which appears in your issue of August 31. I fully agree with him in the view taken in regard to the verification of dates by astronomical methods, and it really does seem somewhat singular that the example of Sir William Jones, the pioneer of Orientalism in Europe, should have been entirely neglected by his learned colleagues and successors in this department of research. From many considerations it must be obvious that wherever mention of planetary "yogams" or conjunctions, siderial and lunar positions, &c., are given in the text of any classical work, they are to be preferred to any arguments drawn merely from literary style and other empirical data—so much relied upon by Orientalists and scholars generally—when the question is one of a calendaric date.

I have endeavoured to work out the calculation of Rama's birth figure. In *Ramayana* is the following slokam, or stanza, referring to Rama's birth:—"*Chaitre navamike tithau Nakshatre aditi daivatye sewochha samstheshu panchasu Griheshu karkate lagne.*" From this we learn that Rama was born in the ninth day of the Moon's age, and that five planets were in their exaltation signs, the rising sign (*lagnam*) being Cancer (of the Hindu Zodiac). The planets' places are given in Section 18 of the English translation of *Ramayana*, by Manmatha Nath Dutt, M.A., in the following words:—

"And then, when six seasons had rolled away after the comp'etion of the Sacrifice, in the twelfth month, on the ninth lunar day, under the influence of the Punarvasu asterism, when the Sun, Moon, Saturn, Jupiter, and Venus were at Aries, Capricorn,[1] Libra, Cancer, and Pisces, and when Jupiter had arisen with the Moon at Cancer, Kaushalya gave birth to that lord of the universe, bowed unto by all the worlds, Rama, &c."

It may be well to state for the benefit of those not acquainted with the Hindu zodiac, that an asterism includes 13° 20′ of the ecliptic circle, and consequently there are twenty-seven asterisms in all. Of these, Punarvasu is the seventh. The zodiac commences with the asterism *Aswini*, and the fixed star *Revati* is the point from which enumeration of longitude begins. This star is said to have been coincident with the equinoctial point ♈ in the year 3600 of the Kali Yuga, *i.e.* 498 A.D.

The last conjunction of Saturn and Jupiter in the sign Libra was in K.Y. 4224, and the one previous in K.Y. 1344; and from this we must subtract three Signs to bring Jupiter into Cancer (its exaltation). This equation referred to the "period" of Jupiter, *i.e.* twelve years, gives three years to be subtracted. The year K.Y. 1341, therefore, would see Saturn in Libra, and Jupiter in Cancer as required.

The Moon being nine days old at the birth of Rama, and its motion in respect to the Sun being 12° per day, its distance from the place of conjunction must be taken as over 96°. But it is stated in the *Slokam* that the Moon is in Punarvasu, and as this asterism ends at 93° 20′ from the star Revati, it is evident that the conjunction of the luminaries took place in the twenty-sixth degree of *Minam* or Pisces; and that on the ninth day the Moon was in the first degrees of Cancer (Hindu *Kartaka*) and the Sun in the fifth degree of Aries (Hindu *Mesham*).

To determine the date of this planetary epoch we must have recourse to the Ayauámsha, the distance between the fixed star Revati and the Vernal Equinox. The Hindus compute this to be 54″ per year, and in accordance therewith their month of Mesham (Aries) begins on April 11. At the present time Revati is behind the Equinox, but in K.Y. 1341 it was in front of it, regarded by the order of the Signs. The calculation for K.Y. 1341, according to Suryasiddhauta, is:—

$$(3600 - 1341) \times 54'' = 33^\circ\, 53'\, 6''.$$

Referring this to the Equinox, it gives a point corresponding to the twenty-seventh degree of Aquarius in *our* zodiac, which was the point at which the Hindu zodiac began in the year K.Y. 1341; and from this we must take 4° to bring us to the 26th of *Minam*, wherein the Sun and Moon were conjoined at the birth of Rama. The result is the twenty-third degree of Aquarius in our zodiac.

We have already obtained the year K.Y. 1341 from the positions of the planets Jupiter and Saturn, and we may now apply this luni-solar position as a test.

On February 11, 1888, the Sun and Moon were conjoined in the twenty-third degree of Aquarius. This date corresponds to the beginning of the tenth month of the K.Y. year 4989. Applying the Metonic cycle, we find that a conjunction of the luminaries also took place in the twenty-third degree of Aquarius (Hindu twenty-sixth *Minam*) in K.Y. 1341, thus:—

$(4989-1341) \div 19 = 192$ *exactly*. I have not yet made reference to the position of Venus as given in the above *Slokam*, but I think there is strong evidence of this being the correct epoch, and I think it not unlikely that Venus had less than 30° west longitude of the Sun, in which case it would be in the Hindu sign corresponding to our Pisces, *i.e. Minam*, as required by the *Slokam*.

This epoch corresponds to noon (local time) February 10, 1761 B.C., disregarding the change of Style; and, if correct, may be the time of the birth of Rama; but on this point I should not care to judge too hastily, for in view of the recurrence of these positions at some earlier or later date, we have no evidence which should lead us to select one rather than another epoch.

One thing strikes me as sufficiently curious to record in

[1] This should be *Cancer*, not Capricorn, as is seen from the fact of the Moon's rising with Jupiter.