

It gives almost at the start a short treatment, much shorter than Daniell's, of simple harmonic motions; and it devotes several pages to the idea and theorems of potential. The subject of air-pumps, and with it much that is wont to make the student miserable, is dismissed after a treatment of four pages. In the chapters devoted to heat we miss the familiar names of Dulong and Petit, and the other pre-Regnault investigators of the phenomena of expansion. The steam-engine occupies one page, without an illustration. Carnot's cycle, with related matters, fills ten pages.

The book is written with great care. Its language is clear and judicious. There are, of course, slight inaccuracies. For instance: the first sentence of article 26 reads as if a point could be located by means of its distance from any one plane. Again: on p. 209 we find it stated as having been demonstrated experimentally by Joule, that, "when a gas expands without performing external work, it is not cooled;" the later experiment of Joule and Thomson, which led to a different conclusion, not being mentioned.

From beginning to end, this volume of Anthony and Brackett grapples with difficult principles boldly and in good faith, as if the authors expected their whole book to be read and mastered. Trigonometry is freely used, and occasionally something that borders on the calculus. The long experience of the authors as teachers encourages the hope that they have not over-estimated the capacity of college classes; but, excellent as is the matter and the manner of the book, one fears that the ordinary student will find portions of it formidable.

Perhaps it should not be otherwise. Certainly the extraordinary student, who craves strong meat, will find it here, and of the best. So small a book cannot teach all there is to learn: it is not intended to do so. It does not show the whole of physics, but it shows physics as a whole.

NOTES AND NEWS.

DURING the opposition of Neptune just passed, Professor Pickering continued the observation of the planet's magnitude with the meridian photometer of the Harvard-college observatory in the same method as previously employed. Nine series of observations extend from Dec. 16, 1884, to Jan. 21, 1885, the final result from which, when corrected for atmospheric absorption, instrumental error, and reduction to mean opposition, becomes 7.63. The residual difference for only one series is as great as two-tenths of a mag-

nitude. The corresponding results for two previous seasons are 7.71 and 7.77. Contrary to the experience of Mr. Maxwell Hall of Jamaica, who found evidence for a rotation-period of Neptune in small variations of the planet's light according to his own observations, Professor Pickering regards it as improbable that there is any variation in the light of Neptune of a strictly periodic character, and further calls attention to the influence, much neglected by observers, upon the observed brightness of objects when seen east and west of the meridian on the same night. This has to be taken account of in the observations of maxima and minima of many variable stars, and may to some extent account for the variations of Neptune's light detected by Mr. Hall.

—Prof. Charles E. Bessey writes to the *American naturalist* that fifteen years ago there were no dandelions in the Ames flora (in central Iowa): now they are very abundant, and have been for half a dozen years. Then there were no mulleins: now there are a few. Then the low and evil-smelling *Dysodia chrysanthemoides* grew by the roadside in great abundance: now it is scarcely to be found, and is replaced by the introduced 'dog-fennel' (*Anthemis cotula*). Then the small fleabane (*Erigeron divaricatum*) abounded on dry soils: now it is rapidly disappearing. Then no squirrel-tail grass (*Hordeum jubatum*) grew in the flora: now it is very abundant, and has been for ten years. Then there was no burr-grass in the flora: now it is frequently found, and appears to be rapidly increasing. Both of these grasses have apparently come in from the west and north-west. Fifteen years ago the low amaranth (*Amarantus blitoides*) was rather rarely found: now it is abundant, and has migrated fully a hundred and fifty miles north-eastward. This plant has certainly come into the Ames flora from the south-west within the last twenty years. Old settlers say that there have been notable migrations of plants within the past twenty or thirty years. The buffalo grasses of various kinds were formerly abundant in the eastern part of the state: now they have retreated a hundred to a hundred and fifty miles, and have been followed up by the blue-stems (*Andropogon* and *Chrysopogon*). The blue-stems now grow in great luxuriance all over great tracts of the plains of eastern Nebraska, where twenty years ago the ground was practically bare, being but thinly covered by buffalo grasses. In Dakota it is the same: the blue-stems are marching across the plains, and turning what were once but little better than deserts into grassy prairies.

—A principle that may generally be wisely adhered to by reviewers is that notices of books appearing in numbers should not be based on the first number issued; but this can be safely departed from in announcing the preparation of a new (fourth) edition of Meyer's 'Konversations lexikon,' of which the first part appears with imprint of 1885. Sixty-four pages carry it to 'Absteigung.' Abyssinia is allowed six and a half pages, which include liberal reference to sources of information, an essential in all good encyclopaedias. Among the illustrations there are

chromolithographed plates of African tribes and of the Alps, both finely executed. The work is to run through two hundred and fifty-six weekly numbers.

— Mr. A. Ainslie Common, well known as the maker of a powerful reflecting-telescope at Ealing, Eng., has been experimenting in the application of photography to the production of stellar maps. A small lens of four inches and a half diameter has been found sufficient to show stars of the ninth magnitude; and one of the photographs of the region about *Altair* (α Aquilae) was found to contain eighteen hundred separate stars which had been identified.

— Messrs. Hachette have just published vol. x. of the 'Nouvelle géographie universelle' of Elisée Reclus, which shows the same amount of care and energy as its predecessors. The maps are as numerous as ever, and the illustrations, nearly all taken from photographs, are excellent. This volume deals with the basin of the Nile, and thus embraces regions in which the public are just now specially interested. Mr. Reclus furnishes full accounts of the physical geography of the country, and of its inhabitants, but very wisely abstains from discussing the political events of the day. The information has been well brought down to date, documents published as recently as November, 1884, having been consulted.

— The *Natal Mercantile advertiser* gives a lengthy account of the expedition of Dr. Aurel Schulz in the interior. One strange tribe discovered by the party on the Kabengo River, was the Makuba tribe. They are strongly aquatic, taking to the water like fish, splendid fishermen, well built, strapping fellows of Zulu type, expert canoeists, and the corn-growers of the country-side, and, in addition to all this, imbued with a horror of shedding human blood, so much so that a man of the outside blood-shedding tribes is always 'open to back himself to give battle to fifty Makubas any day.' Another interesting matter is the account of the chief Kama, who rules at Soshong, the capital of the northern Bechuana. He governs his people well: his great wish is to have them well armed with guns, and provided with ammunition. Alcohol in any shape is not allowed in his dominions. No kafir beer is brewed. Any white trader selling liquor is fined up to a hundred pounds; any subject brewing is expelled from the country. All, from the chief downward, are stanch teetotalers. Kama claims dominions up to the Tyobe River, though those portions do not pay tribute. He gives as much as a hundred and eighty pounds for a horse, and is an expert rider himself. His history is romantic, and will be read with interest when it appears.

— Prof. Silvanus P. Thompson, formerly professor of experimental physics at University college, Bristol, has been made director of the Finsbury technical college of London.

— The Norwegian brig *Coulant* reports, that on March 21, in latitude $13^{\circ} 22'$ north, longitude $45^{\circ} 30'$ west, the ship was going nine knots under full sail, when she struck something, apparently a sand-bank, and continued striking for half a minute. The vessel's speed was reduced to about five knots. The captain had no time to get a lead over, and could see nothing over the sides. At the time a heavy sea was running. It has been suggested that this might have been a submarine earthquake.

— The *Japan gazette* publishes a brief statement from Mr. Gowland, technical adviser to the Imperial



THE CREVASSE ON THE ROAD FROM LOJA TO ALHAMA, SPAIN.
(From *L'Astronomie*.)

mint at Osaka, on his observations during a recent journey through a part of Korea. He spent ten days at Sôul, the capital, and twenty days on the overland route between that place and the port of Fasan. He did not observe any indication of mineral wealth: there were no signs of mines, and nothing beyond doubtful indications of mineral veins in one or two places. There are no mountains exceeding about four thousand feet in highest elevation, and no characteristic volcanic cones.

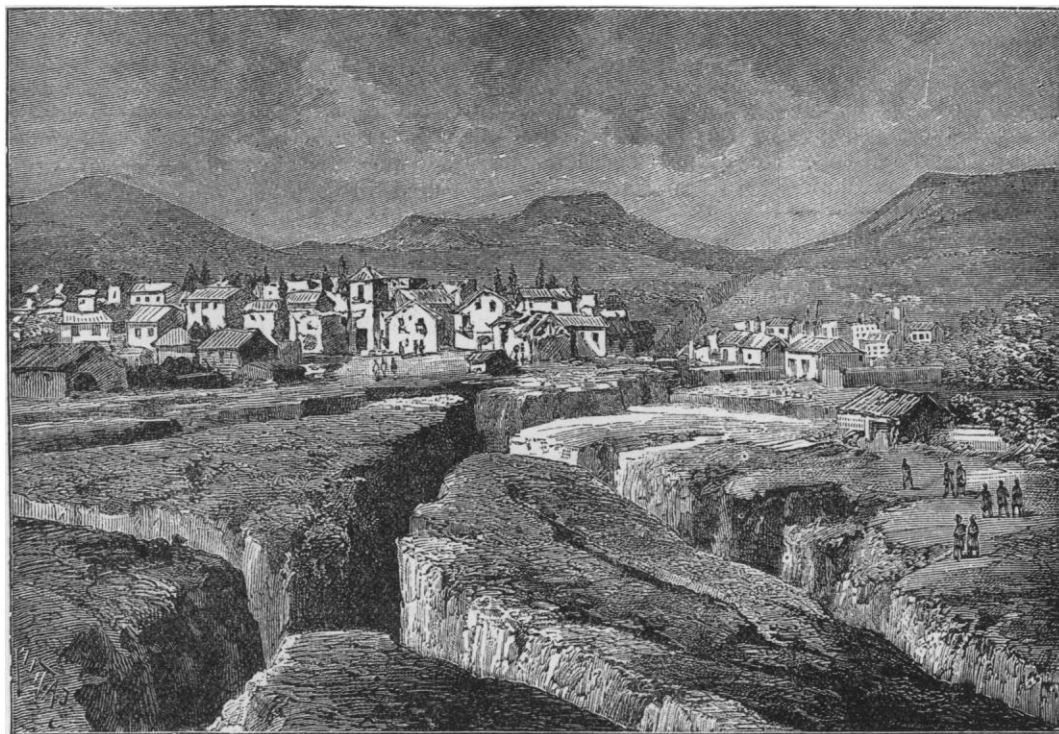
The central range was crossed by a pass twenty-three hundred feet above the sea-level. The forests were of no great extent; but very extensive tracts of cultivated ground, evidently yielding a large surplus production of rice, barley, and beans, were noticeable throughout. There was a marked absence of any manufacturing industry, or of indications that any thing beyond food-products received attention. The traffic on the roads was very limited, — no signs of wealth, no money, and no foreign trade.

— Views of the devastation caused by the recent Spanish earthquakes still afford material for the foreign illustrated papers. The cuts here copied are taken from *La Nature* and *L'Astronomie* of recent dates; and the first one, at least, gives evidence of being drawn after a photograph, or from a careful sketch. The fracture here represented in part is described as being about a mile and a half long, and of considerable but undetermined depth. A church has sunk in it, leaving only the top of its tower above ground. The formation of the crevasses was violent, accompanied by an explosive noise; and, where they traversed villages, escape from engulfment was by no means easy. A muleteer lost one of his mules in a fracture, and the artists of *L'Astronomie* have not hesitated to commemorate this sad occurrence by a

view that must be essentially imaginary, — a method of illustration that is unfortunately too common in works on geography.

— As the result of a series of observations made at seventeen forest meteorological stations in Prussia, Professor Müttrich has arrived at certain definite conclusions respecting the influence of the forest on temperature, which may be stated as follows: 1. The forest exercised a positive influence on the temperature of the air; 2. The daily variations of temperature were lessened by the forest, and in summer more than

given concerning the waste resulting from this process. By actual experiment, Mr. Wray has found, first, that the wet bark which is now allowed to rot in the jungle contains fully 5.7% of its weight of gutta-percha, or, when dried, 11.4%; and secondly, that, by simply pounding and boiling the bark, nearly all this gum may be extracted. From the trunk of a tree, which he estimated to weigh 530 pounds in a wet state, he obtained but twelve ounces of gutta-percha by the ordinary Malay method, whereas, by boiling, 28 pounds more can be obtained; that is,



THE CREVASSE NEAR GUÉVEJAR, OPENED BY THE EARTHQUAKES IN SPAIN LAST DECEMBER. (From *La Nature*.)

in winter; 3. The influence of the leafy forest was in summer greater than that of the pine-forest, while in winter the tempering influence of the pine-forest preponderated over that of the disfoliated forest. An attempt to determine the influence of the forest on the mean annual temperature led to no sure results.

— By the present method of extracting gutta-percha, practised by the native Malaysians, the tree is cut down, and the bark slit at various intervals, and, after the gum which exudes is removed, the tree is allowed to rot in the jungles. From a paper by Mr. J. L. Wray, jun., curator of the Perak museum, published in the Journal of the Straits settlements branch of the Royal Asiatic society, some startling facts are

for every pound collected, 37 pounds are wasted. It is stated that the export of gutta-percha from the Straits settlements and peninsula in 1875 reached the total weight of 10,000,000 pounds. From this it will be seen that there was no less than 300,000,000 pounds actually wasted, which represents £37,500,000 sterling. This estimate only includes the trunk, whereas the branches, and even the leaves, contain the gum. Such a wholesale waste of a material so vastly important to the world should be at once prevented if possible; and the question naturally arises, Can the bark be broken from the trees, and dealt with in the country, or can it be dried and sent to Europe to be worked over so as to be a commercial success?