

Examinations.

SIR WILLIAM RAMSAY'S outspoken criticism on the value of examinations will be welcomed by many, but it is uncertain whether the general public could tolerate the present educational system in their absence.

When the chemical department becomes the department of chemical research, and the student realises that he is receiving a training in such practice, examinations as conducted in the majority of cases may possibly lose their present-day significance.

While practical training remains based upon text-book instruction, which hardly calls for anything more than observation on the part of the student, examinations are necessary. There is no other method of testing the student's memory.

Observation has been defined as "the performance of what is prescribed." It is the chief factor in a system of empiricism, but it cannot be expected to occupy this position for all time in a programme dealing with experimental investigation. It may be that a correct method of instruction has yet to be devised.

Examinations lose their chief value when they fail to supply the student with an estimate of the value of his personal qualifications, enabling him to confirm his original intention or change the direction of his life's work while there is yet time.

W. P. DREAPER.

September 6.

Habits of Dogs.

I CANNOT answer Miss Everett's questions on this subject, but would like to "ask another." Is it known to be a common thing for dogs to carry hedgehogs in their mouths? I have a fox-terrier who amused himself in our garden by making life a burden to a hedgehog until the latter disappeared. He would not only roll the hedgehog about with his paws, but must have carried it a certain distance in his mouth, for one evening I found him in triumph at the back door of the garden with his lips all marked with pricks and bleeding, and the hedgehog lying in a ball at the top of three rather steep stone steps twenty or thirty yards from the summer-house where he lodged. If this is a usual form of play with dogs, it is a curious one.

WALTER KIDD.

Heatherdown, Alum Bay, I.W., September 5.

Miniature Rainbows.

YOUR correspondent Mr. W. E. Hart may be interested to know that magnificent rainbows, which appear to be within easy reach, may often be observed inside water-cooling towers, the necessary conditions being a fairly heavy shower of the cooled water and an opening at one side of the tower sufficiently high to let the sunlight stream in over the observer's head.

B. P. H.

Newcastle-on-Tyne.

Underpayment of Teachers.

MR. HODGSON'S letter on p. 315 directs attention to a case of underpayment of teachers in collegiate institutions. Possibly the City of Bradford Education Committee would argue that, as universities generally offer about 150l. a year to lecturers, judging by the advertisement columns of NATURE, 60l. a year, with the privilege of earning a little more in the evenings, is sufficiently liberal for the work that they require.

150l. is a good stipend for a youth for the first few years after leaving college, or as a retaining fee for a man who has private means; but is it fair to expect men with high university qualifications, years of teaching experience, and a record of original work, to struggle to make both ends meet for the best part of their lives?

Twenty years ago, a lecturer might reasonably expect to become a professor or to branch out into technical work; but at the present time there are not enough professorships to divide among the many highly specialised men who have taken up university teaching during the past ten years, and a technical career must be commenced on leaving college.

The prospects of secondary teachers, though poor, are better; those of elementary teachers are better still; while

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none of them are so good financially as those of the boy who leaves school at sixteen or seventeen and enters a bank or an insurance office.

Since for university teaching a man needs a long and expensive training, must be a graduate with first-class honours, and must be capable of original work, and since many cannot hope to obtain professorships and the like, the remuneration offered to such men is woefully insufficient, and is likely in the future to cause students of ability to avoid university teaching as a career.

E. R. MARLE.

"Omori," Bitterne, Hants, September 8.

RUBBER.

THE Rubber and Allied Trades Exhibition and the International Rubber Congress, held conjointly and recently concluded, are doubtless responsible for the simultaneous appearance of four books on rubber. One of these is a welcome attempt, as its title implies, to cover the whole range of the subject, and



FIG. 1.—Jelutong Tree, showing improved method of tapping. From "Rubber."

Mr. Philip Schidrowitz is to be congratulated on having produced a volume which should rank as a standard work for some time to come.

The first nine chapters, half the book, are of special interest to the lay reader, and are based, as the author points out in his preface, upon six lectures delivered by him in 1910 at Finsbury Technical College. The historical sketch in chapter i., and the two following chapters on production and consumption, and the general nature of the rubber industry, will be found most useful. The notes on wild, and what the author terms industrial rubbers, such as Guayule, Jelutong, and Madagascar vine rubbers, suffer somewhat from his lack of personal acquaintance with the actual

1 "Rubber." By Dr. P. Schidrowitz. Pp. xv+303. (London: Methuen and Co., Ltd., 1911.) Price 20s. 6d. net.

conditions abroad. For instance, in dealing with bark crushing no distinction is made between the East African scrub vines with semi-fluid latex, and the larger dense forest vines in which the latex is thin and watery; nor are the paragraphs dealing with *Castilloa elastica* and *Funtumia elastica* free from misconceptions.

The chapter on the plantation industry is a book in itself, and will be read with the greatest interest. While laying no claim to being able to treat this truly extensive subject "in encyclopædic fashion," the author is to be congratulated upon the way he has singled out for mention, in few and telling words, the salient points under each of his headings. Under that of "Competition from other Sources," we read: "The first rubber to go will undoubtedly be that which is not prepared in a cleanly fashion. 'Africans' as we know them now will be a thing of the past, and that very shortly. It does not, however, follow that the rubber forests of Africa will no longer furnish their quota to the world's supply. On the contrary, it seems to me that the system of rationally working forest areas on semi-plantation lines . . . is likely to be extended."

Mr. Schidrowitz is very well known as a rubber chemist, and in the second half of the book he finds himself, as it were, on more congenial soil. In dealing with the chemistry of rubber, theory of vulcanisation, manufacture of rubber goods, substitutes and waste-rubber disposal, much new matter is introduced which is likely to be invaluable, not only to the general reader, but to the manufacturer and the chemist. The importance of the waste rubber industry is emphasised, and in this connection the author says: "If we assume that the crude rubber employed in the manufacture of goods in the British market yearly amounts to 12,000 tons, and this reappears in the shape of finished rubber articles, containing on the average perhaps not more than 30 per cent. of rubber, it is plain that there must be something like 30,000 to 40,000 tons of waste rubber annually. Of this, perhaps, one-half is recoverable, the remainder actual waste."

The chemical analysis of both vulcanised and raw rubbers, mechanical tests, and kindred subjects are also dealt with at length, while at the end of the book is an appendix of ten pages dealing with the wording of contracts and specifications which might also be described as interesting reading, which says much for the author's happy style of literary construction.

On p. 149 the reader with planting interests at stake will find: "The manufacture of synthetic rubber on a commercial scale will only be possible if a suitable low-priced raw material, capable of transformation at a low cost and with a high yield, can be found. So far these conditions do not appear to have been fulfilled."

With the Middle East and its *Hevea* plantations just now so prominent in rubber finances one is apt to

forget that the sources of rubber are many and various. Trees, vines, shrubs, tubers, rhizomes, &c., belonging botanically to different classes of plants and growing in different continents, all appear in the list of productions of this commodity. This being so, and without implying that the book under review would have been more successful in any other form, it is



FIG. 2.—Three-year-old rubber trees. From "Rubber."

clear that future publications on rubber will be likely to attain the greatest measure of utility if confined to one or other branch of this already stupendous subject.

Mr. Schidrowitz's book is excellently written, and is illustrated largely from photographs taken by him during a tour in Malaya and Sarawak (Borneo).