

And this is the reason why a tree, when planted, should not be buried deeply in the soil; but a latitude of a good many inches in the depth at which it is planted has been found to make no difference, because the new roots, on which the life of the tree depends, form most readily at whatever depth is most suited to their development, or if they form at other depths, they soon make their way to the most favourable level.

The fact that roots flourish best at some particular level not far below the surface (the depth varying in different soils) is the explanation of some results which appeared to show the exact contrary. A number of paradise stocks were planted with their roots at various depths from 6 to 24 in. below the surface, and it was found that those which had been buried deepest, although they were the most backward at first, rapidly outstripped the others, and in two years had made twice as much growth as these had done. On lifting the trees the reason of this was apparent; in the case of those which had been planted at the ordinary depth, the root-system of the trees was the same as that which they had possessed when planted, though more developed (Fig. 2), whereas, with the buried trees, the original roots, finding themselves at an unsuitable depth, had not developed, but in their place numerous fresh roots had developed from the stem of the tree itself (Fig. 3), and these, finding ample food-material stored in the stem, had developed strongly, and formed a vigorous root-system, with the natural accompaniment of vigorous branch growth. Such results, depending as they do on the ability of the tree to send out new roots from its stem, would not be obtained if a grafted tree were buried in the same way, for roots do not easily arise from the stem of such a tree; indeed, when the experiment was made with crab-stocks instead of

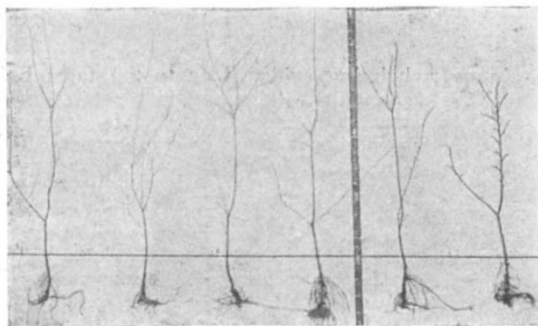
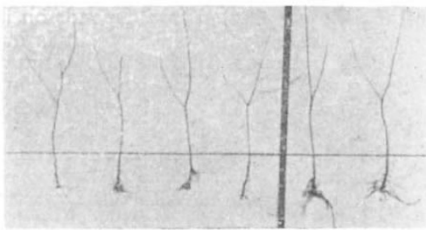


FIG. 2.—Apple stocks planted 6 inches below the surface, and lifted two years afterwards.

paradise-stocks, the results were unfavourable, for the crab-stock does not root so easily from the stem as does the paradise-stock. Thus, these experiments are the reverse of showing that an ordinary fruit-tree should be planted at a great depth.

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It will be seen that all the anomalous results which have been obtained on the subject of planting are easily explained by, and are the natural consequences of, the fact that a tree when transplanted has to form a new root-system before it can begin to grow again,

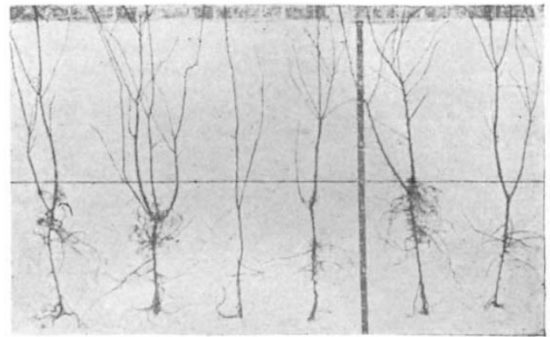
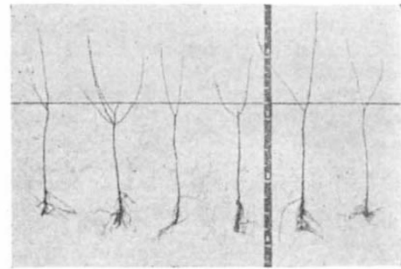


FIG. 3.—Apple stocks planted 24 inches below the surface, and lifted two years afterwards.

and if this is but kept in view, the whole subject becomes simplified, and the reason becomes evident why many of the practices supposed to be essential to the proper planting of a tree do not bear the test of actual experiment.

EXPLORATIONS AND FIELD-WORK OF THE SMITHSONIAN INSTITUTION IN 1912.

FOLLOWING the custom established in 1911, the Smithsonian Institution has issued an illustrated pamphlet dealing with the scientific expeditions conducted under its direction, or in which its representatives participated. The pamphlet describes the work of about twenty different parties.

The institution was represented by two small parties in Borneo—those of Mr. H. C. Raven, who has been collecting mammals and ethnological material in Dutch East Borneo for the past two years, and Mr. Daniel D. Streeter, of Brooklyn, N.Y., who has served as a collaborator for the National Museum in the collecting of mammals, in a trip through Sarawak and Dutch Borneo.

Dr. W. L. Abbott, who financed the Dutch East Borneo Expedition under Mr. Raven, and has presented many large collections to the National Museum, has been carrying on a personal investigation in Cashmere, where he has been trapping and studying the smaller mammals of that country, specimens of which have been sent to the museum.

Through the invitation of Dr. Theodore Lyman, of Harvard University, the institution was enabled to cooperate with the Museum of Comparative Zoology in an expedition to the Altai Mountains of Siberia and Mongolia. Mr. N. Hollister represented the National

Museum. The party spent nearly five months in the field, returning with fine series of mammals and birds from this little-known part of Central Asia. Of especial interest in the series of big-game are four rams of the largest known of the wild sheep, as well as specimens of two forms of ibex, and a gazelle. Out of a total of about 650 mammals in the collection, eleven forms are new to science, and some twenty were not previously represented in the National Museum. Mr. George Mixter also visited Siberia, where he secured certain mammals from the region about Lake Baikal, among them bear and seal.

Of particular interest was a trip made by Dr. Ales Hrdlička to Siberia and Mongolia, to study the physical anthropology of the natives. His main object was a search for data concerning the race which is supposed to have peopled America. He gathered extensive information and collections, from which he draws the conclusion that there exist in several places in Siberia, Mongolia, and Tibet numerous remains of an ancient population which was physically identical with, and in all probability gave rise to, the American Indian.

The hunting trip carried on by Mr. Paul J. Rainey in British East Africa, in which the institution was represented by Mr. Edmund Heller, was very successful; nearly 4000 mammals, 1000 reptiles, and 400 birds were obtained, as well as many land shells and botanical specimens. From the collection, which supplements that of the Smithsonian African Expedition, there have been as many as forty new species and twelve new genera described.

The Astrophysical Observatory of the Smithsonian Institution again sent an expedition to Bassour, Algeria, for the continuation of the observations relative to the heat of the sun, an investigation on which the observatory has been working for the past seven years, with observing stations on Mt. Wilson, California, and during two seasons in Algeria. Mr. Abbot, the director of the observatory, states that the results of the work of 1911 and 1912 thoroughly establish the supposed variability of the sun.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

LONDON.—The scheme for the administration of the East London College, a school of the University of London in the faculties of arts, science, and engineering, was sealed by the Board of Education on August 15. It establishes a governing body of nineteen members, nine of whom are representatives of the Drapers' Company, the body from which the college derives rather more than half its annual income; three representatives of the University, one of whom must be a woman, with the principal of the college *ex officio*, two of the Academic Board, which consists of the principal members of the teaching staff, one of the London County Council, and three coopted members. The representatives of the University are Lady Busk, Principal Sir Henry Miers, F.R.S., and Mr. F. D. Acland, M.P., Under-Secretary for Foreign Affairs, who is a member of the Senate of the University.

MR. HAROLD PEALING, Liverpool, has been appointed lecturer in physics in the South African College, Cape Town.

PROF. W. H. YOUNG, F.R.S., has been appointed Hardinge professor of mathematics in the University of Calcutta, for the purpose of organising a new school of higher mathematical thought and research. Prof. Young is retaining his chair in Liverpool University.

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WE learn from the Allahabad *Pioneer Mail* that at a meeting of the Bombay University Senate on July 26 Sir Alfred Hopkinson, K.C., until recently Vice-Chancellor of the Victoria University of Manchester, was appointed expert adviser on university teaching to the University for a period of six months.

THE calendar for the session 1913-14 of the Merchant Venturers' Technical College, Bristol, is now available. It will be remembered that the faculty of engineering of the University of Bristol is provided and maintained by this college, which, in addition, includes a secondary school for boys and a comprehensive series of evening classes in science, technology, and commercial and other subjects. The evening courses of work in technology have been arranged to meet the special needs of engineers, men engaged in the building trades in general, carpenters and joiners, plumbers, and painters and decorators. Saturday afternoon classes for miners have been arranged by the Gloucestershire and Bristol Education Committees and are given in the college. In addition special courses of instruction for women in domestic subjects are provided.

THE Education Committee of the Staffordshire County Council has published its "Directory for Higher Education, 1913-14." The booklet contains the regulations of the committee and details of schemes of work in operation throughout the county. Instruction in mining is provided by means of lecturers, whose whole time is devoted to the work, and their assistants. For this purpose the county is divided into two portions, comprising the North Staffordshire coalfields and the South Staffordshire coalfields respectively. Classes in metallurgy and iron and steel manufacture are conducted in accordance with the regulations of the Board of Education and the City and Guilds of London Institute. Classes in pottery and porcelain manufacture have been arranged at Burslem, Hanley, Longton, Stoke, and Tunstall. Boot and shoe manufacture, silk manufacture, horticultural and smaller agricultural industries are each to be taught in suitable centres. The directory also gives particulars of the numerous scholarships awarded by the committee, the holiday courses arranged, and the steps taken to provide suitable technological instruction in the rural districts.

PARTICULARS have been issued by the Royal Horticultural Society with reference to the examinations for the national diploma in horticulture, which, so far as possible, will be held in the latter part of June of each year. The scheme, which has been approved by the Board of Agriculture and Fisheries, sets forth that candidates for the diploma must (a) register themselves with the society, and (b) pass two examinations, a preliminary and a final. The examinations are open to both men and women. The preliminary examination will be based upon the general principles of plant-growing, an elementary knowledge of botany, chemistry, and physics, so far as acquaintance with these subjects is essential to an understanding of garden practice. Care will be taken to ascertain that the candidate is able to perform the operation of gardening with proper skill, and also that he understands the reasons for the methods employed. The syllabus for the final examination will be divided into sections each dealing with one particular branch of horticulture. Candidates may enter for the branch in which they feel themselves most proficient. All particulars, forms, &c., may be obtained from the secretary of the Royal Horticultural Society, Vincent Square, S.W.

THE calendar of the Royal Technical College, Glasgow, for the coming session contains details of the scheme affiliating the college to the University of