plants of delicate appearance have tubers or tuberous roots (*Erodium hirtum* and *Erodium arborescens*) sunk deep in the strong ground for the storing of reserves of nutriment adequate to maintain them alive through long months of absolute drought. The same end is gained in other delicate herbs by the possession of an enlarged woody basal portion. Then again, the tendency to general lignification through all the parts of the plants affords a capacity for resistance to many members of the families *Cruciferae* and *Compositae*, families known to us at home by their herbaceous, unprotected representatives. To restrict evaporation due to wind and solar radiation the desert flora exhibits a high degree of reduction in the surface area of its members. This principle is illustrated in numerous instances by poverty of foliage and considerable spininess, whilst in apparent contradiction of this tendency one often finds the surface of the plant clad in a hairy covering or with glands and superficial excretions of wax or resin or strongly aromatic substances. . . . Further we find plants with smooth or shiny, thick and fleshy, leaves. Nature does not work on one plane, but provides for every case special means of protection and fresh weapons to carry on the struggle. Side by side with the thorn-bristling *Zilla spinosa* we find the thick-leaved, wax-coated *Capparis spinosa*, whilst near by are the hedgehog-like *Astragalus* and *Fagonia*, and the soft, fleshy, fiberless *Mesembrianthemum*. In marked contrast, too, are the *Chenopodiaceae*, a similar almost leafless everlasting-woody throughout, and one would think indestructible—and the delicate *Parietaria* with its thin and battist-like foliage. Among the life-destroying agencies of the desert, the omnipresent salt should be mentioned.

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Perennial plants are just about half as numerous as the delicate annuals. Their existence is independent of the fluctuating and variable annual winter rains. They shoot anew and blossom even after a rainless or all but rainless winter. In marked contrast are the annual herbs which depend absolutely upon the rainfall; nor is all rain of equal value in promoting their development. For a rich spring vegetation of annuals, the rain should fall about the end of February and the early part of March, at which time the growing heat of the sun is capable of promoting germination. Trees are hardly met with in the district.

As to the plants themselves, this flora presents some odd features. Thus we find only one true fern (*Adiantum capillus-veneris*), and the only gymnosperms are two species of *Ephedra*. The grasses (*Gramineae*), legumes (*Leguminosae*) and composites (*Compositae*) are the larger families, there being 152 species of the first, and 175 of the second, and 188 of the third. The larger genera in these families are *Panicum* (14 sp.), *Aristida* (14), *Eragrostis* (9), *Bromus* (10), *Trigonella* (12), *Medicago* (16), *Trifolium* (15), *Lotus* (14), *Astragalus* (28), *Anthemis* (10), *Centaurea* (16). Of *Carex* there are only 3 species, and there are no orchids. Of *Rosaceae* there are 5 species, in as many genera. There is but one species of *Ericaceae*. There is no species of *Solidago*, nor even of *Taraxacum*.

The tree-producing genera with which we are familiar are mostly wanting, as *Quercus, Fagus, Acer, Ulmus, Fraxinus*, which are not represented, while *Salix* has 3 species, and *Populus* 1. Yet Egypt is not lacking in tree species, as witness the following list of genera, each represented by one species unless otherwise indicated: *Phoenix, Cocos, Hyphaene, Morus, Ficus* (3), *Acacia* (6), *Melia, Pistacia, Mangifera, Zizyphus* (2), *Rhamnus, Sterculia, Tamarix* (6), *Carica, Elaeagnus, Eucalyptus, Olea, Plumiera, Nerium*. Many readers will be surprised to learn that *Ricinus communis* (the castor bean) is "an evergreen, usually large shrub."

The foregoing will give some idea as to the interesting matter to be found in this important addition to systematic and ecologic botany.

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Gas-Engine Principles. With Explanations of the Operation, Parts, Installation Handling, Care and Maintenance of the Small Stationary and Marine Engine, and Chapters on the Effect, Location, Remedy and Prevention of Engine Troubles. By RODGER B. WHITMAN. Published by D. Appleton and Company, New York and London. 1912.

As stated on the paper cover, "'Gas-Engine Principles' is a guide for the user of the small stationary internal-combustion engine.

The first chapters explain the principle of operation of the gas engine, and describe in detail the various constructions that are employed in the engines on the market. The remainder of the book is given up to practical explanations of the setting up of a new engine, the economical operation of engines, engine care and maintenance, and explanations of the troubles to which engines are subject, together with their remedy and prevention. The book is written with the greatest possible simplicity of expression. The illustrations are especially prepared line drawings made by the author, each one specifically illustrating some particular point of construction."

The book is well written and admirably covers the ground claimed for it, though at times at the expense of scientific accuracy. It should not only prove an excellent guide to the amateur and the operator of small stationary plants, but it will be found extremely useful to those more scientifically inclined, as it supplies numerous details of construction and methods of operation that can not be given space in a scientific work, such as the details of carbureters, ignition systems and spark plugs.

In attempting to explain electrical and thermodynamic phenomena, the author at times uses illustrations that would not stand the test of scientific accuracy and that would be misleading to those who had no further knowledge of the subject. In the first chapter he repeatedly speaks of converting water into a gas and gasoline into a vapor. If the term "vapor" could be understood by the reader in one case there should be no difficulty about it in the other. In comparing the relative efficiency of gas and steam engines, he states on page 6 that: "When a fire is built under a boiler only a small part of the heat is actually applied to heating the water, for most of it passes up the chimney or is otherwise wasted." The author evidently confuses the chimney wastes with the exhaust wastes. Boiler efficiencies of 70 per cent. are not uncommon.

On page 10, the statement, "The compression of the charge turns any liquid gasoline to vapor" might be open to question.

The most serious misconception that the reader might gain is that electricity is a substance like water or air and that there is an unlimited store of electricity in all substances which only has to be set in motion to do work. This is certainly contrary to the ordinary conception of electrical energy and could only be defended by resorting to the electron theory, which would be beyond the scope of the work. The author regards a dynamo as a machine for setting electricity in motion.

In describing the principle of action of the Bosch high-tension magneto, when the current in the primary coil is broken, the author states, on page 145, that "The sudden rush of intense primary current into the secondary winding raises sufficient pressure to enable the current to jump across the spark plug gap," ignoring the real cause for the induced current in the secondary. This action was probably inferred because the diagram shows the secondary winding to be in series with the primary, for in describing other types, where the windlings are separated, he correctly assumes the high-tension current in the secondary to be caused by the rapidly dying magnetism or change of magnetic flux in the iron core.

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SCIENTIFIC JOURNALS AND ARTICLES

THE closing (October) number of volume 13 of the *Transactions of the American Mathematical Society* contains the following papers:

W. A. Hurwitz: "On the pseudo-resolvent to the kernel of an integral equation."

G. A. Miller: "Infinite systems of indivisible groups."

J. K. Lamond: "Improper multiple integrals over iterable fields."

T. H. Gronwall: "On a theorem of Fejér and an analogon to Gibbs's phenomenon."

W. H. Roever: "The southerly and easterly deviations of falling bodies for an unsymmetric gravitational field of force."

Dunham Jackson: "On approximation by trigonometric sums and polynomials."