of Naumann's "Elemente der Mineralogie"[1] has just appeared. The work has been newly revised and brought up to date by Dr. Ferdinand Zirkel, who has undertaken this duty since the death of Naumann in 1873. The new edition contains about fifty pages and thirty-three wood-cuts, more than the eleventh (1881). The chemical formulæ used have all been recalculated and the recent advances in the field of optical and physical mineralogy have been incorporated in the body of the work, so that the new book is the most complete and satisfactory treatise on general mineralogy published in any language.——An abstract from the forthcoming "Mineral Resources of the United States, Calendar Years 1883 and 1884," has just been received. It is entitled "Precious Stones."[2] The author is G. F. Kuntz. The paper treats of the production of precious stones in the United States in 1883 and 1884 and their importation. The total value of precious stones found during 1884 was $82,975, including $800 worth of diamonds. The gold quartz sold as specimens during this year is valued at $40,000, and that cut for gems or ornamental uses at $100,000. The value of the importations is estimated at $9,253,376. The most important finds during the year were as follows: At Auburn, Me., colorless, pink, blue and golden tourmalines to the value of $1500, and at Mt. Mica, in the same State, tourmalines, beryls and aquamarines to the amount of $4145. At Florissant, Cal., about $1000 worth of topaz was taken out. The reports in the newspapers of remarkable finds have all been investigated and have proven to be unreliable. The great "Georgia Marvel" or "Blue Ridge Sapphire," for instance, which was supposed to be a sapphire worth $50,000, turned out to be nothing but a "piece of rolled blue bottle-glass." The paper is interesting as showing just how far we can rely upon our own resources to supply us with ornamental stones. The author also mentions several uses to which domestic material can be applied with fine effect.

BOTANY.[3]

CAN VARIETIES OF APPLES BE DISTINGUISHED BY THEIR FLOWERS.—To a botanist this may seem like a queer question, capable only of an answer in the affirmative, but pomologists have quite universally held to the opposite view. Quotations, like the following, could be made from our most eminent writers of pomological books:

"Peaches are partially classified by the size and color of the petals, but in all the other fruits, as in apples, pears, plums, cherries, etc., the flowers vary but slightly in form and color."

Another says: "Little difference exists in the flowers."

[1] Elemente der Mineralogie. 951 ills., 782 pp., Leipzig, Wilhelm Engelmann.
[2] Washington, Government Printing Office, 1885.
[3] Edited by Professor CHARLES E. BESSEY, Lincoln, Nebraska.

At a meeting of the Michigan State Pomological (now Horticultural) Society, held in 1873, the writer presented a paper on this subject in which he accurately described quite a number of kinds of apples by the flowers.

To the pomologist the term "flower" means the showy petals; to the botanist it means calyx, corolla, stamens and pistils. These floral characters are as constant and reliable for distinguishing varieties as are those characters of the fruit which are usually employed.

In apples the points of the calyx vary in breadth, size and in other particulars. The petals vary in size and shape in different varieties, and some in color. Not very much was made of the stamens, but the styles and stipe furnish excellent characters.

Dr. Hogg, of England, pointed out the value of the shape of the calyx-tube and the position of the stamens on the inside of the tube, but in our American apples, at any rate, these points are not so reliable as are those pertaining to the stipe and styles.

In 1879, at the Rochester meeting of the American Pomological Society, I presented an illustrated paper on the classification of apples, in which the peculiarities of the flowers formed an important part. Many flowers were examined from different trees in various localities. Over a hundred varieties have been examined.

I have since that time frequently called the attention of my students to this subject, and last spring (in 1885) suggested it to one of our graduates, Mr. W. L. Snyder. I have had some of his drawings carefully copied for your use.

Unfortunately in these cases the petals were not drawn, but a glance at the lobes of the calyx, and especially a close examination and comparison of the stipes and styles will show a great difference in the length, breadth, hairiness and other points of the styles.

At the Boston meeting of the American Pomological Society, in 1881, I showed that a similar difference exists in the lobes of the calyx, the shape and size of the petals of pears, but in these flowers the stipe is very short or wanting. The styles vary as do those of apples.

Mr. Snyder also made some notes and drawings of the flowers and inflorescence of some of our cultivated varieties of strawberries. These are quite as marked as those here shown for the flowers of apples.

In case of apples probably 3000 or more varieties have been described by the fruit alone. It is needless to say that with a variety of soils and climates it is next to impossible to define so many in a manner which shall be at all satisfactory.

A similar difficulty exists in our sorts of pears, peaches, plums, grapes, strawberries, raspberries and a myriad of cultivated grains and vegetables; exactly how many I do not know.

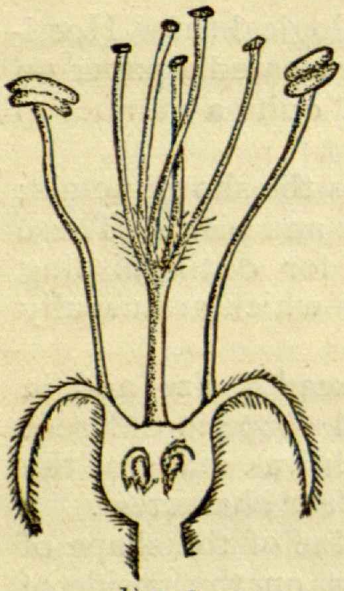

Fig. 1.

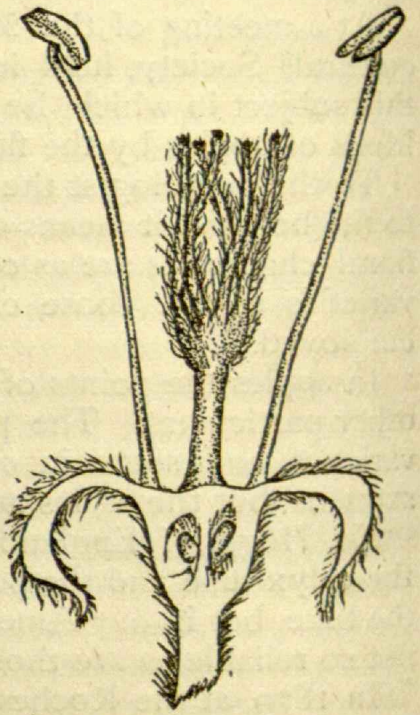

Fig. 2.

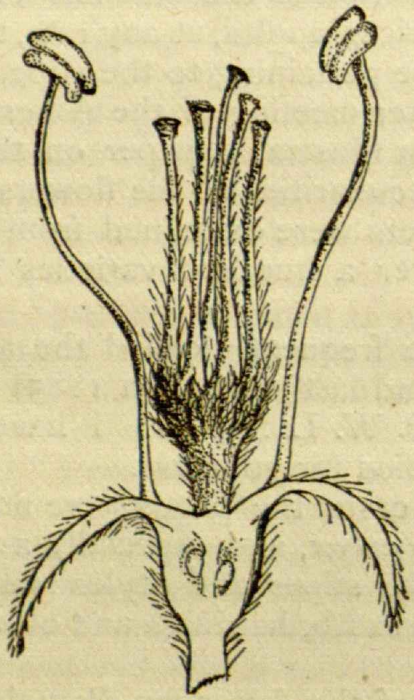

Fig. 3.

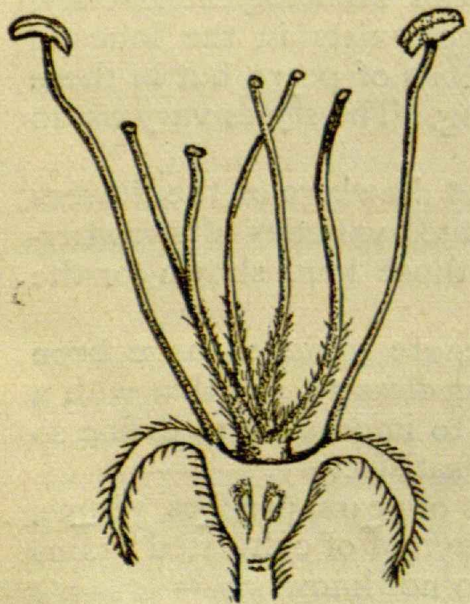

Fig. 4.

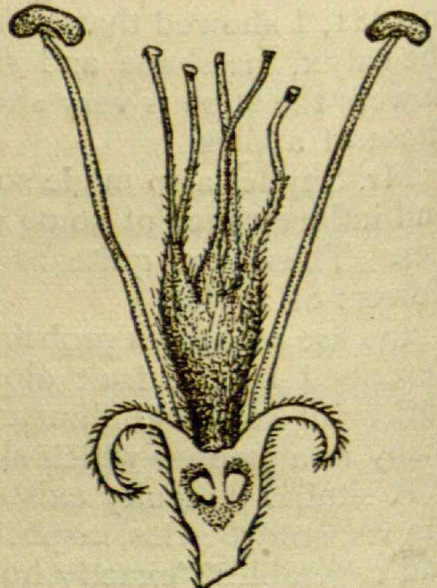

Fig. 5.

FIG. 1.—Variety "Red Canada." FIG. 2.—"Talman Sweet." FIG. 3.—"Sweet Bough." FIG. 4.—"Rambo." Fig. 5.—"Wagner." All × 3.

A friend has just sent me 160 named lots of cultivated beans. How are they usually described? Mainly by the time of fruiting, size and color of pod and the peculiarities of the seeds.

We are living in a time when there is much said about the difficulty of describing so many varieties of cultivated plants. It seems to me the correct solution of this problem is here suggested. Instead of describing lettuce and turnips and onions by the shape of leaf and head, color and shape of root, or the color and shape of bulb respectively, let the inflorescence and flowers be carefully examined and a clear record made of *all* the characters which prove to be most reliable. The time has come for more careful work in this direction. The skill of a good botanist should be joined to that of a good horticulturist.—*W. J. Beal, Agricultural College, Mich.*

Formation of Starch in the Leaves of the Vine.—Sig. Cuboni has made a series of observations (Rivista di Viticoltura ed Enologia Italiana, 1885) on the formation of starch in leaves of the vine. In March and April, when the leaves are first formed, starch was never found, even in bright sunshine. It first made its appearance in May, and the quantity increased continually till July. This is not solely dependent on difference in temperature, since starch is still formed in the leaves at the end of October and November; while even in the height of summer the young leaves and shoots are not able to form starch until they are at least a month old. It depends, however, to a certain extent on the maturity of the chlorophyll-grains.

In a leaf containing no starch at the outset, abundance was found after an hour's exposure to the direct action of the sunlight; and the maximum quantity was obtained by two hours' intense sunshine. Four hours of complete darkness is sufficient to cause the whole of the starch to become absorbed.

Although the youngest leaves are unable to form starch, the maximum development is not obtained by the lowest leaves on a branch, but by those on the middlemost nodes; on a branch containing sixteen leaves, by those from the seventh to the eleventh, the lowest showing less than half the maximum power of production.

If an annular incision is made above and below a leaf, separating the elements of the soft bast, the starch in the leaf is not absorbed and transformed in the dark; but if a similar incision is made only below, or only above the leaf, the ordinary process is not disturbed; and this is also the case if a leaf separated by an incision on both sides has a panicle of fruit or flowers opposite it on the same node. No starch is formed if the leaves are etiolated, or attacked by *Peronospora viticola.*— *Jour. Royal Mic. Society.*