

To test this hypothesis, a sample of Magma Magnesiae which had been washed down to a p_H of 10.52 was treated with an excess of $MgCO_3$, stirred and allowed to stand over night. Its p_H was then determined to be 10.18.

This lowering is much less than the calculated lowering which would be produced by adding such an excess of Mg ions to a suspension of pure $Mg(OH)_2$. The reason for this appears to be that $MgCO_3$ itself is considerably hydrolyzed, giving hydroxyl ions. A well-washed suspension of magnesium carbonate had a p_H of 10.00 at 25°. When magnesium hydroxide was added, the p_H of the mixture was raised to 10.17, which checks well with the earlier value of 10.18.

It is therefore evident that while magnesium carbonate lowers the p_H of Magma Magnesiae to some extent, it does not do so sufficiently to explain our earlier difficulties.

ABSTRACT OF DISCUSSION.

Dr. I. M. Kolthoff assumed that the authors preferred to determine the p_H of the solution rather than use the titration method; he thought it was rather difficult to determine the p_H with the potentiometer because of the conductivity of the solution, the sharpness of the measurement was not so definite; he preferred to determine the electric conductivity or titrate.

Mr. Giesy feared the conductivity method would not be of great value because there may be sodium sulphate in the preparation; it is easier, in practice, to wash out all of the caustic than all of the sodium sulphate which is formed during the precipitation. As to the time for a p_H determination when everything is in readiness—it only requires about five minutes. His objection, however, to the U. S. P. method was not the time required, but the results were not sufficiently accurate.

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CINARA, CARDUUS AND SCOLYMUS OF THE ANCIENTS.*

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In 1921, in Paris I purchased some artichoke seed. I planted these in the fall. In the spring the plants promptly appeared, flourished through the summer and fall, resisted a good deal of cold, but died down during the winter. I was puzzled, however, as I seemed to have two varieties, differing in the leaves and spines. The next spring the plants with the more dissected leaves bloomed. I ate the scales and calyx of the flowers of this plant with oil and vinegar or drawn butter sauce, after the French custom. The other variety did not bloom until the third year. During this time, I thought it was another but similar plant, which was not the case, as it was the same plant with different leaves. I became interested in the plant and its history.

To identify plants of to-day with those of ancient times is a difficult task and is done frequently without any degree of absolute surety. Until the later and more scientific classification of plants, we guess in our identification mainly by comparisons and descriptions and observations that may have been faulty or merely incomplete. The illustrations of them in the older botanical works are frequently of but little aid.

This plant, useful and ornamental, so highly thought of in Europe is not so well known generally in America. It deserves a place in our gardens as a vegetable. It

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appears that the names given to the artichoke were *Cinara*, *Carduus*, *Scolymus* and even *Cactus*! It was generally agreed that it was a kind of thistle.

Cinara, originally a Greek word, belonged to the thistle family. The description of its top, as given by Columella,¹ agrees, as Nonnius² and others think, with our artichoke.

The *Cinara* had prickles, the kind, having lost them by cultivation, being preferred. It was raised from seed planted in spring; however, in Italy, slips or shoots were planted in autumn for earlier summer use. Continuous watering was recommended.³

By some, *Carduus* and *Cinara* were taken to be the same plant. Palladius and Pliny in regard to *Carduus* give about the same description as Columella and the Greeks give for *Cinara*, *i. e.*, that it lost its prickles through cultivation, the flowers were purple, it was propagated by seeds and shoots, required frequent watering, and grew better with the application of ashes. Athenæus asserts that the *Cinara* was called *Cardus* and *Carduus* by the Latins. Apicus and Pliny state the method of eating the plant, and Pliny gives directions for pickling with vinegar. However, they are not explicit as to the parts used.

The *Scolymus* is also classed among the thistles by Pliny. He states the seeds were covered by a kind of wool, that the plants had a high stem surrounded with leaves which were prickly but wouldn't sting when the plant was withered; that it flowered throughout the summer, often produced flowers and ripe seed at the same time; that the root was thick, black, sweet, containing a milk juice, and that it could be eaten both raw and cooked.

Theophrastus says the calyx of the *Scolymus* was not prickly and remarks that when the plant was in flower, the root was most palatable. Dioscorides states that the flower head *is* prickly (*Capitulum spinosum*). This difference in description has led some to think they are describing different plants. Dioscorides certainly distinguishes between *Scolymus* and *Cinara*. Pliny says *Scolymus* differs from the edible *Carduus*, in that the former has edible roots. Dioscorides says the roots were not eaten, but the young leaves, which he says were dressed like asparagus.

From experiments on the plants here, I can readily see how so much confusion could arise from mere descriptions; as for instance, for sale now, it is the flower before it blooms, that is the scales and base of calyx, that is used. One author will mention this but omit the question as to whether the leaves and roots *can* be eaten, or are, in fact, usually eaten; then the conclusion that different plants must be involved, one with an edible top, the other with an edible root. As I mention later, I ate the young shoots, the midrib of the leaves and the younger part of the root stock, as we do asparagus. The leaves are bitter. The root is edible.

Clusius seemed to think the *Carduus chrysanthemus* of the 17th century, later *Scolymus hispanicus*, the garden thistle, was the *Scolymus* of Theophrastus. This differs too much, however, to be true.

Comparing many descriptions, some perhaps erroneous, others incomplete, making allowances for the apparent contradictions arising here and there, we are reasonably sure that the ancients used the juicy calyx, the tender stalks or shoots,

¹ "Columella," lib x, vers. 235.

² "Lud. Nonni Diateticon."

³ Geopon, 925.

and perhaps the root of some plant classed by them as a thistle. This plant was lost or forgotten and finally reappeared, coming in from the east—from Arabia, most likely—into Italy and Spain to France. About 1466 one of the family of Strozzi brought the first artichokes to Florence from Naples.¹ It is recorded as first seen in a Venetian garden in 1473.² They were introduced into France in the beginning of the 16th century³ and into England in the reign of Henry the Eighth, 1509–1547.

"Artichokes grew sometimes only in the isle of Sicily and since my remembrance they were so dainty in England that usually they were sold for crowns apiece." (Moffat, "Health's Improvement;" see also Hakluyt, Vol. II, "Biographia Britanica," Vol. IV, and "Anderson's History of Commerce.") After its introduction into Europe we have it frequently mentioned.

Often the origin of plant names is valuable in tracing its habitat and introduction; this is true of the artichoke. It is likely the word is from the Arabic alkarshof, harsof, harxof, harchiof, from old Spanish alcarchofa; from the Italian articiocco, among other forms. From the English there were many forms due to popular etymology. That the plant is well known is evidenced by its modern names,—Swedish, Artstocka; Danish, Artischok; Dutch, Artisjok; German, Artischocke; French, Artichaut; Spanish, Artichofa; Italian, Articiocco. The Italian "articiocco" corrupt form of alcarcioffo and the old Spanish alcoarchofa indicate an Arabian origin for the plant.

After comparing the positive statements made by various observers, and not allowing the *omission* of some description as to a part being edible or not edible to be taken as a negative statement when not mentioned, but rather an incomplete observation, I am inclined to think the artichoke I am cultivating is the scolymus of Dioscorides (about A. D. 77). Such a statement that the root is sweet and edible; by others, bitter, or that the leaves are spiny or otherwise, is not a satisfactory reason for considering such plants as different species, as evidenced by my two varieties. For instance, where the qualities of the root are so much discussed, I find the root is neither sweet nor bitter, but having a taste very similar to our so-called Jerusalem artichoke, a plant not an artichoke nor from Jerusalem, but a sun-flower. The *finding of a milk curdling principle in the flowers*, which I have only partially separated as yet, is further evidence that this is the scolymus. Pena and Lobel stated that the Italians used the flowers to curdle milk for making cheese. I can confirm this possibility: two teaspoonfuls of an aqueous infusion, using two flowers to one-half gallon of water, will curdle a glass of milk. This junket is very palatable. This experiment, however, is not conclusive, because other thistles have been reported to have this quality and I have not tried them. Certainly other plants possess this property, particularly the *Galium verum*, or yellow ladies' bedstraw, petty meguet, yellow goose grass, cheese rennet. ("Lin. Gen. Plant." 117. Fuchs 196, Trag. 492, J. Bauhin, III, 170.) "The Encyclopædia or a Dictionary of Arts and Sciences," 1st American edition, 1798, states the flowers of galium "will coagulate boiling milk and the best Cheshire cheese is said to be prepared with them." In the "Kreuterbuch," newly brought up to date, illus-

¹ "Manni de Florentinis," p. 34.

² "Herm. Barbar. ad Dioscor. III," 15.

³ "Ruellius De Nat. Stirpium, Bas." 1543.

trated etc., Adam Lonitzer, Ulm 1737, with additions by Balthazor Ehrhart p. 190, I notice this statement, "the wild thistle or strobildorn is the scolymus of Dioscorides, the *Carduus cinara* and *strobilus* of the Latins, this is the French artichaut and articoça. The last form is its common use in Germany as Artischoca."

Loncier, "Opus Novum Nat. Hist. Francofurti;" 1551 ed. p. 71 has the name as *Carduus horvensis* or *Scolymus aculeata*. John Ray, "Hist. Plantæ" lib. VII p. 299, 1685 ed., describes the *Carduus sive, Scolymus sativus spinosus et non spinosus* (J. Bauhin,) or *Cinara hortensis foliis non aculeatis*, G. Bauhin.

The most satisfactory article on the artichoke and one that further convinces me the artichoke is the scolymus of Dioscorides is from the "Dictionnaire Oeconomique" by de la Marre, Paris, 1767, Vol. I, p. 192, in which he says the plant is *Cinara*, *Cynara* or *Scolymus*—English artichoke. The calyx is scaly, with thick base (placenta), flowers bluish purple, on stalks, large, long, hard, bitter root. Leaves spiny, long and wide, with graylike down, stem straight, thick, firm, branched, grooved; covered with cottonish down, bitter, pulpy. The garden variety without spines, known as the red artichoke, differs from and is more delicate than the violet artichoke. A rapid grower and from shape of head called by the English, globe artichoke. There follows a description of the green artichoke (the *Cinara hortensis, foliis non aculeatis* of G. Bauhin) and modes of culture. A third variety, *Cardon de Tours* (*Cinara spinosa cujus pediculi essilantur* of G. Bauhin). Fourth, *Cardon d'Espagne* or the common cardon with spineless leaves which is the chardonnette or cardonette of southern France (the *Cinara sylvestris, latifolia* of C. Bauhin.) Fifth, another small variety of the gardens, known as the white artichoke, cultivated with difficulty. Sixth, the violet artichoke. Seventh, the sweet artichoke of Genoa, with yellowish flesh, more related to the carline thistle.

His descriptions of forcing by cutting off one-third of the leaves, of leaving one head to the stalk, the need of copious watering, use of ashes, and the attack of insects agree with my experiences here. The medicinal uses were stated as a cordial, sudorific, restorative and appetizer, also as a remedy for difficulty in urination, and was recommended by Ray for jaundice and adds the leaves pounded to a paste were applied to the navels of young children for worms. He mentions the use of the dried flowers of the Spanish or common chardon and other species to coagulate milk.

The following statement agrees largely with the medicinal uses of the thistle family in ancient times.

"Dioscorides saith that this Scolymus is good to expell strong and stinking urine, and to amend the strong or stinking favour of the Armeholes, or of the whole body; if the decoction of the rootes in wine be drunk, the shootes also are eaten like unto Aspharagus; and the young heads also in Spaine before they flower: but they use to raise up the earth over the young shootes untill they bee risen to a good height, which then are not onely white but more tender and delicate, to be eaten raw as their usuall manner is with Oyle, Pepper, and Salt, or boyled or stewed; the flowers are used by the Italians as Lobel and Pena say to curdle milke, whereof they make cheese, as also are persuaded that the sayd flowers are given to women with child, in their broth or to drinke doth hinder absorsment, and cause them to goe out their full time in good plight, and also is very good for those that doe not teeme or are barren, and cause fertilitie. The Cretanes used their wilde Artichoke in the same manner that the Italians, Spaniards and French use their Cardone or

Chardons. Theophrastus also saith that the roote of his Scolymus is most pleasant being boyled or eaten raw, but then chiefly when it is in flower, as also that the inner substance of the heads are eaten. Clusius saith that they of Salamanca use to eate the young plants, rootes and all, being washed eyther raw or boyled with flesh, and that with the milkie juice thereof they doe coagulate or curdle any milke, and with the flowers doe counterfet Saffron, for the like uses as in other places they doe with the flowers of Bastard Saffron."

The following references all have items of interest in regard to the thistles in general.

- Barrelieri, "Plantae per Galliam Hispaniain et Italiam Observatae," Paris 1714, pp. 80-83.
 John Ray, "Hist. Plantarum." Vol I. *De Carlina* pp. 288-9 *De Carduo in genere* pp. 299-318. Lond. 1686.
 Garidel, "Histoire des Plantes," Aix 1715 ed. pp. 81-87.
 "Cardui," Pliny, Book 19, chap 43. 20, 99. 21, 56. 22, 8.
 Parkinson, "Paradisus," 1629.
 Parkinson, "Theatrum Botanicum," Lond. 1640.
 "Histoire Universelle Durègne Végétal," Paris, 1777. *Carduus, le chardon.* pp 37-45.
 "Flora Pedemontana," Carlo Allioni, 1785 Vol. I, pp. 145-156.
 "Histoire des Plantes" (medical plants around Paris) Tournefort and De Jussieu, Paris, 1725. Vol. II. pp 21-22 et seq.
 "Flore du Nord de la France," Roucel, Paris, 1803.
 "Flore Francoise," Lamarck Paris, 1778. Vol II, pp. (15-29) 116.
 Julius Pontedera, "Dissertations," 5, 6, *Scolymus* p. 106-107 *Cnicus*, 128-139, *Carduus* 121.
 R. Dodonaeus, "Patavia," 1720.
 "Stirpium Historiae," Antwerp, 1583.
 "De Carduis" lib. V, pp. 707-728.

In conclusion I wish to emphasize the importance of the artichoke as a food plant, and as an ornamental shrub. Also to call attention to the ferment I have found in it and its uses. Experiments are now being conducted with this ferment and those in the Venus' fly trap, pitcher plants, etc.

HOSPITALS FINDING AID IN FINANCING PROBLEMS.

"There are more than 7000 hospitals and nearly 2000 allied institutions in the United States and Canada. These 9000 institutions have fairly similar problems in organization, construction, equipment, operation and maintenance. It has estimated that more than \$350,000,000 is spent annually for new construction and equipment and that more than \$525,000,000 is spent each year for hospital maintenance—a total closely approaching a billion dollars," declared Ray M. Hudson, chief of the Division of Simplified Practice, Department of Commerce, addressing the American Hospital Association convention in Buffalo.

"Raising a billion dollars in your field is much more difficult than in more commercial fields. With all due regard to the careful con-

trol of expenditures and rigid supervision to avoid all preventable wastes, there is yet a large area of possible saving which you may cultivate with advantage and profit—the field of simplification, in which your Committee on General Furnishings and Supplies has just begun a survey," he continued. "It is not at all impossible to save one per cent. through this avenue of economy—and one per cent. of your annual expenditures is \$10,000,000. If the estimates of current average construction costs are fair, then one per cent. saved through simplification is equivalent to the cost of 28 one hundred bed hospitals. From the angle of maintenance, if the estimates of average maintenance costs of \$4.00 per bed per day are fair, then one per cent.—\$10,000,000 saved through simplification is sufficient to maintain the 750,000 beds in the hospitals of the United States and Canada for nearly four days.