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IV. *Observations on the Economical Use of the Ranunculus aquatilis; with Introductory Remarks on the acrimonious and poisonous Quality of some of the English Species of that Genus.* By RICHARD PULTENEY, M.D. F.R.S. and L.S.*

BOTH ancient and modern writers on Botany and the *Materia Medica* agree, pretty uniformly, in attributing to many species of the genus *Ranunculus* a corrosive and poisonous quality. In several it abounds in such a degree as, when applied externally, in a recent state, to excite vefications, and ulceration of the parts, frequently of a malignant and gangrenous nature; and, when taken inwardly, to prove poisonous and fatal, by inducing vomiting, inflammation of the stomach, with the usual consequences of *acid* poisons. These qualities are particularly manifest in the recent plant, while in its highest vigour before flowering; and more intensely in the germen of the flower itself, and in the petals of some.

The poisonous species, that are indigenous, and common in England, are, the *Ranunculus Flammula*, or Lesser Spearwort; *R. bulbosus*, bulbous-rooted Crowfoot; *R. acris*, upright Crowfoot; *R. sceleratus*, Marsh Crowfoot; *R. arvensis*, Corn Crowfoot; and the *R. aquatilis*, or Water Crowfoot, according to the report of various authors. Of these the *Flammula*, *bulbosus*, and *sceleratus*, are judged to be the most acrimonious.

Before the introduction of *Cantharides*, the acid *Ranunculi* were, all in their turn, used as veficatories; and Haller tells us †, the *R. Flammula* is still in use as such in some parts of France. Gilibert assures us ‡ that the *R. bulbosus* veficates with less pain than the *flies*, and has no effect on the urinary

* From the *Transactions of the Linnean Society*, Vol. V.

† See the *Enumeratio Stirpium* and *Historia Stirpium Helvetiæ*, in which much satisfactory information is collected respecting the properties of this genus of plants; and for which the author has, with his usual candour and accuracy, quoted all his authorities.

‡ *Plantæ rarioræ Lithuanicæ*, No. 331.

passages. He gives it therefore a decided preference as an epispastic. Other authors allow these qualities in the *Ranunculi*, and that they are quicker than *Cantharides* in their vesicating effect; but say, that all these advantages are more than balanced by the greater uncertainty of their action on the skin, and their frequently leaving ill-conditioned ulcers, of which Murray and other writers have recorded instances*. Nevertheless, the *Ranunculi* were employed in local spasmodic complaints and in fixed pains, and not unfrequently in cataplasms to the wrists in intermitting fevers. *Crowfoot* is known also to have been one of the ingredients in Plunket's epithem for cancers.

The acrimony of these plants is, however, of so volatile a nature, that, even in the most virulent, it is wholly dissipated in drying; so that, in the form of hay, they appear to be harmless, and nutritive to cattle. It is also instantly expelled in decoction, probably in all the species; at least, Murray informs us, that the shepherds of Morlachia eat even the *R. sceleratus*, as a culinary plant, after boiling it: the *R. auricomus*, and, as several authors assure us, the *R. repens*, are so destitute of acrimony as to be wholly inoffensive, and even worthy of a place among oleraceous plants.

The *Ranunculi* give out this quality wholly in distillation: the water of the *R. sceleratus*, by the experiments of Tilebein, as recorded in the second volume of the *Chemical Annals*, is acrimonious in an intense degree, and, when cold, deposits crystals which are scarcely soluble in any menstruum, and are of an inflammable nature†. The distilled water of the *R. Flammula*, or Lesser Spearwort, as we are informed by Dr. Withering, is an emetic more instantaneous, and less offensive during its action, than white vitriol; and, as if Nature had furnished an antidote to poison from among poisons of its own tribe, is to be preferred in promoting the instant expulsion of deleterious substances from the stomach.

In the experiments of the *Pan Suecus*, even in the improved edition by Schreber, after the observations and renewed trials of Kalm, Gadd, Bergius, and Lastbohm, made upon horned cattle, goats, sheep, horses, and swine, all the

* *Apparat. Medicam.* iii. 87.

† Page 313.

species of *Ranunculi*, with which trials were made, except the *R. auricomus*, were rejected by the horned cattle; and it is well known, that while our meadows and pastures are eaten bare of other vegetables, the *R. acris* and *R. bulbosus*, which are but too plentiful, are left untouched: neither do cattle willingly eat the *R. repens*, although it is not wholly rejected by horses, sheep, and goats.

The *R. Flammula*, according to the above experiments, was eaten only by horses, to which animal it is there said to be very grateful; whereas the *R. auricomus*, eaten by all the rest, (except that swine choose only the roots,) was rejected by horses. The *R. sceleratus*, which is supposed to be the *Herba Sardonis* of Dioscorides, was touched by goats alone; the *R. bulbosus* only by the latter, though it is well known in England that hogs are fond of the roots. The *R. acris* was eaten by sheep and goats; but the *R. aquatilis* is recorded as the only one rejected by all the five species of animals on which these trials were made. It does not appear by either edition of the *Pan Suecus*, that any trials were made with *R. arvensis*; and though horned cattle and horses will eat this species greedily, (although not without subsequent injury,) yet it is known to have been highly deleterious to sheep. A notable instance of this occurred in Piedmont in the year 1786, where a number of these animals died, as it was at first supposed, of an epidemical disease; but subsequent examination discovered that this destruction was owing to the *Ranunculus arvensis*. The history of this accident is circumstantially related in the Memoirs of the Royal Academy of Turin, by M. Brugnon*. The herb grows luxuriantly in Piedmont, and the sheep fed with much eagerness upon it. The effects here mentioned were not immediate, but progressive; and M. Brugnon, on further investigation, was convinced they were principally owing to the roots of the plant; since, by experiments purposely made on dogs, these animals were almost instantly killed by them. On the dissection of the sheep, all the four concoctive organs were found affected with erysipelatous and gangrenous spots;

* Memoires de l'Académie Royale des Sciences, Années 1788—1789, à Turin. 4to. 1790.

but

but more particularly the *abomasum*, which he found much more deeply ulcerated than the others; and the mischief had extended into the smaller intestines.

The avidity with which sheep, horses, and cows, eat the *Ranunculus arvensis*, is, as M. Brugnion justly observes, an exception to the commonly received maxim, that herbivorous animals are, by instinct, led to reject whatever is noxious. We see frequently that hunger will impel our domesticated cattle, especially on being first turned to graze in the spring, to eat almost all vegetables promiscuously. Some of our farmers are aware of the effects of *Crowfoot*, of which the *R. acris* and *R. bulbosus* are so common in our pastures, and by which the mouths of their cattle are frequently inflamed and blistered; and doubtless the effects often extend much further, and sometimes prove fatal. There can be little doubt of the same destructive consequences from other poisonous plants, in cases where the cause is little suspected.

M. Krapf, who instituted a set of experiments wholly confined to this genus of plants*, attributes to the *R. aquatilis* the deleterious qualities belonging to the others; observing, that it will vesicate the skin, but is slower in its operation than the *R. bulbosus* and *R. sceleratus*. Bishop Gunnerus also, in his *Flora Norvegica*†, tells us, that this species is not less noxious to cattle than the *R. sceleratus*; that even the goat, an animal less nice in the selection of its food than the others, leaves it wholly untouched.

It is well known to botanists, that the *Ranunculus aquatilis* of Linnæus comprehends four species of the older writers; and even Haller, and some more modern authors, still keep them separate: among whom, the late professor Sibthorp, in his *Flora Oxoniensis*, enumerates them distinctly, under the names of, 1. *R. heterophyllus*, or *R. aquatilis* Ger. em. 829. Ray Syn. 249. 2. *R. aquatilis*, or *R. aquatilis omnino tenuifolius* J. B. iii. 781. Ray Syn. 249. 3. *R. circinatus*, *R. aquaticus albus*, *circinatus tenuissime divisus foliis*, *floribus ex alis longis pediculis innixis* Pluk. alm. 311. t. 55. 2. Ray

* C. Krapf, Experimenta de nonnullorum Ranunculorum venenata qualitate, horum externo et interno usu. Viennæ 1766. 8vo. p. 107.

† No. 646.

Syn. 249. and 4. *R. fluviatilis*, or *Ranunculo five Polyanthemo aquatili albo affine*, *Millefolium maratriphyllum fluviatans*. *J. B.* iii. 782. Without entering here into any disquisition relative to these distinctions of the species, I shall come to the ultimate object of these observations, by remarking, that I was lately witness to a fact, with respect to the *Ranunculus aquatilis fluviatilis*, which, after what I recollected of the character of the plant, somewhat surprised me, while it sufficiently proved, not merely the innoxious quality of this plant, but that it is nutritive to cattle, and capable of being converted to useful purposes in agricultural economy. Unless these varieties of the *R. aquatilis* Linn. be endowed with different properties, it is a proof that the experiments on this plant were not made with sufficient accuracy, or discrimination of the varieties; not sufficiently repeated on different individuals of the same species of animals; or, that in different countries or situations it is divested of its virulence. In the present instance, it is probable, the plant is rendered inert as a poison, by growing in the water; although in certain other instances, moisture is thought to heighten the deleterious property of vegetables, especially in the umbelliferous tribe.

The fact that I have alluded to is, that in the neighbourhood of Ringwood, on the borders of the Avon, which affords this vegetable in great abundance all the year, some of the cottagers sustain their cows, and even horses, almost wholly by this plant; since the remaining part of their food is nothing more than a scanty pittance they get on the adjacent heath, which affords little more than *Ling*, *Lichen*, *Bog-moss* or *Sphagnum*, &c. It is usual to employ a man to collect a quantity for the day every morning, and bring it in the boat to the edge of the water, from which the cows, in the instance I saw, stood eating it with great avidity. I was indeed informed they relished it so highly, that it was unsafe to allow them more than a certain quantity; I think between twenty-five and thirty pounds each, daily; but with variation according to circumstances. The cows I saw were apparently not in a mean condition, and gave a sufficient quantity of good milk. I was told by the person whose cattle

were feeding on it, that he kept five cows and one horse so entirely by this plant, and what the heath afforded, that they had not consumed more than half a ton of hay throughout the whole year; none being used, except when the river is frozen over. I examined the whole parcel, on which four cows were feeding, in the beginning of March, and found the whole consisted, exclusively, of the *Ranunculus fluvialis*, without any mixture of the *Potamogeton*, *Carex*, *Sparganium*, or other aquatic plants. In summer, however, it can scarcely be avoided but that there must be a mixture of some of these: but other plants are not chosen.

This account was confirmed to me by different persons; by whom I was further informed, that hogs are also fed with the same plant, on which they improve so well, that it is not necessary to allow them other sustenance till it is proper to put them up to fatten.

This relation, while it shows how carefully experiments should be conducted before a decisive judgment on the powers of any reputedly poisonous vegetable can be formed, may induce such as were unacquainted with this fact to adopt the use of this plant in similar situations, since it is one of the most frequent in many rivers of this kingdom. The application of it to these useful purposes will also answer a secondary good—of tending to clear the streams of what is otherwise considered as a noxious weed; since, by its abundance in summer, it is frequently seen to choke up the rivers more than any other plant, and, from slight falls of rain, contributes much to the overflowing of meadows in hay-time.

V. Description of the *Mus Bursarius*, from a Drawing communicated by Major-General Thomas Davies, F. R. S. & L. S. By GEORGE SHAW, M. D. F. R. S. V. P. L. S.*

THE *Mus bursarius* belongs to a particular division in the genus, containing such species as are furnished with cheek-pouches for the temporary reception of their food. It seems not to have been yet described, or at least not so

* From the *Transactions of the Linnean Society*, Vol. V.

distinctly