ELEMENTS

OF

MATERIA MEDICA.

PROLEGOMENA.

1. *Definitions.*

THERAPEUTICS (*Therapeia*, *Therapeutice*, *Therapeutica*, from Θεραπεύω, *I cure*) is that branch of medicine which has for its object the treatment of diseases.

ACOLOGY (*Acologia*, from Ἄκος, *a remedy*, and Λόγος, *a discourse*) is that department of therapeutics devoted to the consideration of remedies.

REMEDIES (*Remedia*, from *re* and *medeor*, I heal; *Auxilia medica*) are agents used in palliating or curing diseases. They are of two kinds—those acting directly, and those indirectly, on the body.

1. The remedies which act on the body *directly* are—
   a. Physical but imponderable agents, as light, heat, and electricity.
   b. Mechanical and surgical remedies.
   c. Hygienic means, as diet and exercise.
   d. Pharmacological agents or medicines.

2. The remedies which act on the body *indirectly* are those which operate primarily, by the agency of the mind. Certain affections of the mental faculties produce alterations in the condition of the body, and are, therefore, occasionally employed in the treatment of disease. These affections are of two kinds, agreeable or disagreeable.
   a. The *agreeable* mental affections are pleasure, joy, and ecstacy.
   b. The *disagreeable* mental affections are pain, grief, and misery.

PHARMACOLOGY (*Pharmacology*, from Φάρμακον, *a medicine*, and Λόγος, *a discourse*), or *Materia Medica*, is a branch of acology devoted to the consideration of medicines. It is subdivided into *Pharmacognosia*, which treats of simples, or unprepared medicines; *Pharmacy*, which teaches the modes of collecting, preparing, and preserving medicines; and lastly, *Pharmaco-dynamics*, which is devoted to the consideration of the effects and uses of medicines.

2. *Means of ascertaining the Operation of Medicines.*

In order to ascertain the kind of influence which a medicine exerts over the system, we may—
   a. Examine its physical and chemical properties.
   b. Observe the phenomena caused by its contact with the animal body.

a. *Examination of the physical and chemical properties of a medicine.*—The *sensible qualities* (odour, taste, and colour) give very little insight into the action of medicines; since some substances (as strychnia and

quinia), which agree in these properties, disagree in the effects which they produce on the organism.

The *natural-historical properties* (external form and structure) are of little value in ascertaining the operation of either mineral or animal substances. It is well known that two dissimilar bodies may assume the same crystalline shape, and they are said, therefore, to be *isomorphous*. Identity of form in the mineral kingdom depends not on the quality, but on the number, of the constituent molecules.

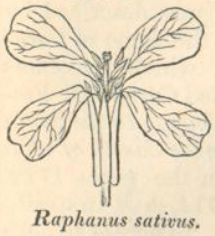
No attempts have been made to trace any relation between the toxicological or edible properties and the anatomical structure of animals. This has probably arisen from the comparatively small number of these beings which possess medicinal or poisonous properties; for we are enabled to employ, as food, animals of every class, from the highest to the lowest. Among quadrupeds and birds no species is poisonous, unless, indeed, the Arctic bear be an exception, whose liver is stated by Captain Scoresby to be deleterious.—(*Fleming's Philosophy of Zoology*, vol. ii. p. 110.) Among fishes, molluscous animals, and insects, however, several species are hurtful; and it is frequently found that where one is deleterious, kindred species are likewise more or less so. Thus all the coleopterous insects belonging to the tribe *Cantharidiæ* (*Latreille*) possess blistering properties.

The relations existing between natural-historical qualities and medicinal effects have been attentively examined with respect to vegetables. It has long been supposed that those plants which resemble each other in their external appearances are endowed with analogous medicinal properties. Cæsalpinus was, according to Dierbach, the founder of this doctrine; though Decandolle regards Camerarius as the first who clearly announced it. Linnæus says, "Plantæ quæ *genere* conveniunt, etiam virtute conveniunt; quæ *ordine* naturali continentur, etiam virtute propius accedunt; quæque *classe* naturali congruunt, etiam viribus quodammodo congruunt."—(*Philosophia Botanica*, ed. 4ta. p. 278.) I may also refer to Isenflamm, Wilcke, Gmelin, Jussieu, and Barton, as other supporters of this opinion. But the most important writer in favour of it is Decandolle, who, in 1804, published his *Essai sur les Propriétés Médicales des Plantes;* a second edition of which appeared in 1816. In the year 1831, we had another interesting treatise on the same subject by Dierbach. (*Abhandlung über die Arzneikräfte des Planzen, vergleichen mit ihrer Structur und ihren chemischen Bestandtheilen.)* There are other writers, however, who deny altogether the possibility of judging of the virtues of plants by their exterior forms and botanical characters. Of these I shall refer to one only, namely, Gleditsch *(De Methodo botanicâ dubio et fallaci virtutum in plantis indice*, 1742.)

It must be admitted that vegetable substances owe their peculiar qualities to the structure and consequent action of the organs producing them; and, therefore, that alterations in the structure of an organ, are attended with corresponding alterations in the qualities of its products. It consequently follows that the medicinal qualities of plants should accord with their classification in natural families. That they do so to a certain extent is fully ascertained by numerous facts. If one vegetable species serve as nutriment for either animal or plant, we frequently observe that other species of the same genus, or even of a different genus but of the same family, are also adapted for a like use; while, on the other hand, if

any particular species be injurious, neighbouring species are likewise more or less so. Experience has fully proved that in a very large number of instances there exists an analogy between the exterior forms and the medicinal properties of plants, so that we can sometimes predict the active principle and mode of operation of a vegetable, merely by knowing to what part of a natural arrangement it properly belongs. *Cruciferæ* (fig. 1), for example, present the greatest uniformity in their botanical, chemical, and medicinal characters. They contain a volatile acrid principle, which renders them stimulant; and having been employed successfully in scurvy, are frequently termed anti-scorbutics. The *Labiatæ* (fig. 2), which constitute, perhaps, the most natural family of the whole vegetable kingdom, contain a bitter resinous, or extractive matter, and an etherial, aromatic, or volatile oil; which two principles, mixed in different proportions, are found in all the species, to which they communicate tonic and carminative properties. Neither *Cruciferæ* nor *Labiatæ* contain a single unwholesome or even suspicious species. In *Coniferæ* (fig. 3) we find the different species pervaded with an oleo-resinous juice, in consequence of which they possess stimulant properties.—Many other families might be quoted to the same effect, and, therefore, we admit as a general rule, that plants of similar structure possess similar medicinal qualities.

Fig. 1.



Raphanus sativus.

Fig. 2.

Glechoma hederacea.

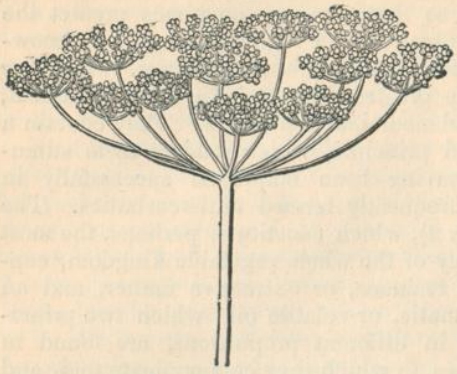
We are obliged, nevertheless, to admit the existence of numerous exceptions. There are many families, the plants of which appear to possess the greatest botanical affinity for each other, but which are endowed with very dissimilar remedial properties. *Umbelliferæ* (fig. 4) is an example of this. The root and leaves of *Daucus Carota* are wholesome and nutritive, but the analogous parts of *Conium maculatum* are highly poisonous. In some cases we even find plants of the same genus differing considerably in their medicinal properties. I need only mention in proof, *Cucumis Melo* and *Cucumis Colocynthis*. If we are to believe the statements of credible writers, even *Gramineæ*, which Decandolle declares to be "la famille la plus naturelle," contains more than one exception to the general statement in question. For the most part the plants of this family are farinaceous and nutritive. "None," says Dr. Lindley (*Natural System*), "are unwholesome in their natural state, with the single exception of *Lolium temulentum* (fig. 5), a common weed in many parts of England, the effects of which are undoubtedly deleterious, although perhaps much exaggerated." I may remark, however, that several other grasses have been asserted to be unwholesome. Loudon (*Encyclopædia of Plants*, p. 64) tells us that the seeds of *Bromus mollis* bring on giddiness in the human species and quadrupeds, and are fatal to poultry. The root of *Bromus purgans* is said to be used in Canada as an

Fig. 3.

Picea vulgaris (Nees ab Esenbeck.)

emetic, in doses of forty grains. *Bromus catharticus*, a Chilian plant, has a thick root, which is said to act as a purgative.—(*Dictionn. de Matière Médic. par F. V. Merat et A. J. De Lens*, tom. i. p. 672.) Humboldt (*Voyage*, t. i.) tells us that *Festuca quadridentata* (fig. 6) is very poisonous, and even fatal to animals. Perhaps this may be the grass described by some under the name of *Carapoucha*, and which by others has been called *Carapullo*. Frezier, in his *Voyage to the South Sea and along the Coasts of Chili and Peru*, in the years 1712, 1713, and 1714, says, in speaking of Lima, "There is an herb called *Carapullo*, which grows like a tuft of grass, and yields an ear, the decoction of which makes such as drink it delirious for some days. The Indians make use of it to discover the natural disposition of their children. All the time when it has its operation, they place by them the tools of all such trades as they may follow,—as by a maiden, a spindle, wool, scissars, cloth, kitchen furniture, &c.; and by a youth, accoutrements for a horse, awls, hammers, &c.: and that tool they take most fancy to in their delirium, is a certain indication of the trade they are fittest for,—as I was assured by a French surgeon, who was an eye-witness of this verity."

Fig. 4.



Fœniculum vulgare.

In the family *Solaneæ* we meet with other exceptions. Compare the fruit of *Capsicum annuum* with that of *Atropa Belladona*. I might select many other instances (as from the family *Leguminosæ*), to the same effect, but shall content myself with the examples already adduced, as sufficiently warranting the assertion that, in the present state of science, botanical affinities cannot be confidently relied on by the medical practitioner for determining the effects of remedial agents. I do not, therefore, agree with Dr. Lindley (*Natural System*, 2nd edit. p. viii.), that "a knowledge of one plant is a guide to the practitioner, which enables him to substitute *with confidence* some other plant that is naturally allied to it." As a *general rule* we may admit, that plants of the same family agree in the *nature* of their medicinal operation, but to this there are many remarkable exceptions, which diminish, though they do not absolutely destroy, its utility in practice. Furthermore, it deserves especial notice that certain vegetable families whose structure is most dissimilar, possess analogous properties: as *Melanthaceæ* and *Ranunculaceæ*.

In some instances the exceptions are perhaps only apparent, and arise from our imperfect acquaintance with the affinities or structure of plants. We can readily imagine, that a slight and almost imperceptible difference in the structure of the nutritive organs of two plants, may be the cause of a trivial difference in the chemical composition of their products. But organic analysis has shown us that a very inconsiderable difference in the combining proportions of the elements of organic substances is sometimes attended with important differences of medicinal activity.

The *chemical properties* of medicines may occasionally assist us in

Fig. 5.

Lolium temulentum, or Bearded Darnel.

determining the influence which these bodies have over the organism. For we sometimes find that substances possessed of similar chemical qualities operate in an analogous manner on the system. Thus sulphuric, nitric, and hydrochloric acids, act very much alike; so also do potash and soda. But these analogies are not common, and we frequently meet with substances whose chemical properties are similar, but whose medicinal qualities are most incongruous, as in the case of baryta and strontia; and of quinia and morphia: while, on the other hand, bodies whose chemical properties are exceedingly unlike, sometimes act in a very analogous manner; for example, manna and bitartrate of potash.

The properties of bodies are so completely altered by chemical combination, that it is in most cases difficult to form a correct opinion as to the action of a compound medicine, merely by knowing the nature and proportion of its constituent parts. Many metals, however, offer exceptions to this statement: thus all compounds into which arsenicum enters as a constituent are poisonous, and act alike on the organism.

b. Observation of the effects caused by the application of medicines to the animal body. On animals generally.—Some have examined the action of medicines on *dead* animal tissues, and drawn inferences therefrom as to the operation on the living organism. This mode of proceeding was adopted by Dr. Adair Crawford—(*An Experimental Inquiry into the effects of Tonics and other Medicinal Substances*, 1816.) But it is admissible only for those remedies whose action is either mechanical or chemical; and, therefore, with respect to the greater number of our remedial means, it is useless.

The examination of the effects of medicines on *living* animals is a much more valuable and important mode of investigation; for it may be asserted, as a general rule, that a substance which is poisonous to one species is more or less so to all classes of animals; and, in a considerable number of instances, its action is of the same nature or quality, though usually very different in degree, and modified by the variations in the developement of the several organs and functions. It has indeed been stated that many substances which are poisonous to man are innocuous to animals, and *vice versâ*. That this statement is wholly untrue, I will not venture to affirm, but I feel convinced it is an exaggerated one; and I

Fig. 6.

Festuca quadridentata (Kunth).

believe, with Dr. Christison (*Treatise on Poisons*, 3rd ed. p. 65,) that "if the subject be studied more deeply, the greater number of the alleged diversities will prove rather apparent than real."

The animals employed for the purpose of ascertaining the operation of medicines are, ordinarily, the dog and the rabbit, and, occasionally, the cat and the horse. The dog and cat are supposed to be "affected by almost all poisons exactly in the same way as ourselves," (*Christison*, p. 64;) yet they offer some peculiarities deserving of notice, especially in the case of narcotics. Their brains being much less developed than the cerebral organ in man, we naturally look for some diversity in the action of substances whose influence is principally directed to this viscus. Charvet, in describing the effects of opium (*De l'action comparée de l'Opium*,

p. 164,) observes, that from this inferior developement, the brain of the dog "is not so liable to sanguineous congestion, and when this condition is observed, it is not very intense—stupor is the only symptom of it; never coma, loss of consciousness, nor profound sleep." I have observed that the root of monkshood does not act precisely alike on rabbits and dogs. In the latter, one of the most remarkable symptoms of its operation is diminution of feeling; in the former, the function of feeling is much less obviously affected, but we observe more evident paralysis of the hind extremities. Differences of this kind are to be expected, since they are connected with unequal developement of the nervous system. As rabbits and horses cannot vomit, irritant poisons when administered to them cannot act as emetics. The skin of horses is more susceptible than the human integument of the action of turpentine. On the other hand, certain agents, whose operation on the human body is most energetic, have, comparatively, very little effect on the horse—as colocynth, briony, and jalap.—(*Moiroud, Pharmacologie Vétérinaire,* pp. 269 and 274.)

On man.—The action of medicines on the *dead* human body, or on parts separated from it, as the blood recently drawn from the veins, has been examined, with the view of learning the operation of these agents on the living body. It may be of assistance to us in ascertaining either the mechanical or chemical action of substances; but as the greater number of medicines act only on the living body, and quite independently of any known mechanical or chemical influences, this mode of investigation is of very limited value.

In ascertaining the action of remedial agents on the *living* body, it is necessary that we examine their influence both in healthy and diseased conditions. For, by the first we learn the positive or actual power of a medicine over the body; while by the second, we see how that power is modified by the presence of disease. Moreover, in the latter condition we sometimes discover remedial influences which our knowledge of the effects of medicines on the healthy body could not have led us to anticipate. The beneficial operation of arsenious acid in agues, or in lepra, could never have been inferred from any experiments made with this substance in health merely; nor could we have formed a correct estimate of the effects and proper dose of opium by employing it in tetanus, nor by using mercurials in fever. The homœopathists assert, and with truth, that the study of the effects of medicines in the healthy state is the only way of ascertaining the *pure* or *pathogenetic* effects of medicines—since when we administer our remedies to invalids "the symptoms of the natural disease, then existing, mingling with those which the medicinal agents are capable of producing, the latter can rarely be distinguished with any clearness or precision."—(*Hahnemann's Organon,* translated by *C. H. Devrient,* p. 190.)

3. *Mode of Action of Medicines.*

The production of effects by the application of medicines to the living body, depends on the existence of two classes of powers or forces; the one in the medicine, the other in the organism.

1. *Active forces of Medicines.*—Bodies act on each other in one or more of three ways, viz.: *mechanically,* by their weight, cohesion, external form, and motion; *chemically,* by their mutual affinities; and *dynami-*