absorption of water, the chief changes in the contents of the large intestine are due to bacterial action. In the large intestine bacteria flourish abundantly. The ileo-cæcal valve possesses a peculiar function as a barrier against bacteria, the *modus operandi* of which is entirely unknown to us. As an experimental fact it is well known, however, that the large intestine swarms with bacteria, while they are absent on the upper surface of the ileo-cæcal value. The proteid matter is attacked below the valve by putrefactive bacteria; these set free those volatile bodies which give the fæcal odor to the contents, and they also form stable organic sulphates, which are absorbed and excreted practically unchanged in the urine. Cellulose and other insoluble forms of carbohydrate are also attacked here by bacteria, giving rise to marsh gas and hydrogen which escape by the rectum.

The fæces constitute a very complex residue, which consists in part of undigested débris of food, such as shreds of cellulose, connective tissue, and elastic tissue, and, when the food has been excessive or mastication imperfect, there will be lumps of unattacked food which have escaped the digestive action of the secretions. In addition to this there is a considerable amount of matter not derived from the food, such as detritus from the columnar epithelium, mucin secreted from the intestine, and excretory matter from the bile. The color of the fæces varies greatly and is derived from many sources; it changes with the character of the food, being black or brown, in the case of a flesh diet, from sulphide of iron formed from the hæmoglobin by reduction in the intestine; and light yellow in color, in the case of a vegetable diet, in which the color is due chiefly to bile pigments.

The gases of the intestine indicate that strongly marked reduction processes go on therein; thus, for example, oxygen is entirely absent, and the usual gases are marsh gas, hydrogen, and sulphureted hydrogen. The reducing processes going on are further evidenced by the formation of suphide of iron, as mentioned above, and by the reduction of the bile pigments to hydrobilirubin.

Benjamin Moore.

DIGESTION, DISORDERS OF. See *Stomach, Diseases of*, and *Enteritis*.

DIGITALIS.—Foxglove. The leaves of *Digitalis purpurea* L. (fam. *Scrophulariaceæ*) collected from plants of the second year's growth" (U. S. P.). The British Pharmacopœia specifies "from plants beginning to flower." The German Pharmacopœia requires them to be collected from wild plants in bloom. Other definitions have specified "in full bloom" or even the entire herb in some specified stage of maturity. At present, all these definitions agree in the one important point that the leaves only are employed, the constituents of the flowers and seeds differing in character and properties, and being thus properly excluded. They all agree, moreover, in requiring leaves of the second year's growth, inasmuch as the plant does not flower during the first year. All things considered, the specification of the flowering stage as the time for collection is wise, as the allowance of a very much earlier or very much later period gives no guarantee of the desired quality. There is also little doubt that the wild-grown leaves are usually more active than those of cultivation, though the difference is commonly overestimated.

The plant is very abundant, except in the coldest parts, throughout Europe, besides which it is largely cultivated. It reaches its greatest physical perfection in our northwestern coast States, where it is extensively naturalized along roadsides, attaining a height of ten and even twelve feet. Ordinarily it reaches a height of from two and one-half to four feet, one or more usually simple, erect stems arising from a rosette of radical leaves which replace a similar rosette produced, with the stout conical or fusiform root, during the first year. Upon the stems, the leaves become smaller toward the top, and are finally reduced to large floral bracts. The handsome, drooping, bell-shaped, purple flowers, spotted within with darker purple, are racemed along one side of their stems, generally for more than half their length.

The drug usually comes in bales, sometimes pressed into hard cakes or blocks of different sizes. Some very finely selected leaves are powdered abroad and are imported in small expensive packages, specially for administration in powdered form. The drug is thus described by the Pharmacopœia:

From 10 to 30 cm. long; ovate or ovate-oblong, narrowed into a petiole; crenate; dull green, densely and finely pubescent; wrinkled above; paler and reticulate beneath; midrib near the base broad; odor slight, somewhat tea-like; taste bitter, nauseous.

An infusion prepared with 1 part of digitalis and 10 parts of boiling water, and allowed to cool, has a peculiar

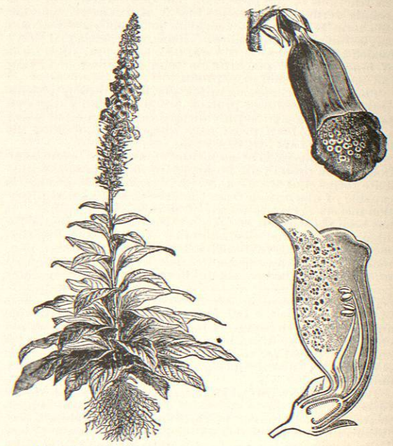

Fig. 1596.—Digitalis Purpurea Linn., Foxglove. Plant in blossom, flower slightly reduced in size, and section of flower natural size. (Baillon.)

odor, turns blue litmus paper red, and, upon the addition of a few drops of ferric chloride T. S., acquires a darker tint, a brown precipitate appearing after a few hours.

The infusion diluted with 3 parts of water becomes turbid on the addition of a few drops of tannic acid T. S.

No other leaf probably offers greater difficulties in the matter of quality selection, and little assistance can be gained from written instructions, success coming only from long experience. This is the more unfortunate, as there is no satisfactory method of assay.

Composition.—The active constituents of digitalis are crystalline glucosides. With them, there occur resin, tannin, gum, pectin, a little sugar and digitaleic acid. Concerning the nature and occurrence of the glucosides, the discrepancy between the statements made by different investigators is so great as to preclude instructive discussion here.

"*Digitalin*," as dispensed, is very uncertain. Not only is it usually a mixture, but the supposedly chemical body, so called, is not of a uniform character, as supplied by different manufacturers; hence, the only successful way of employing it is to use exclusively the product of the same manufacturer, and learn its therapeutic limitations. It is said by some investigators that true digitalin does not occur in the leaves, but only in the seeds; however, a

substance practically identical with it does occur, and we need not consider this point. Of the formula, Merck says "$(C_3H_5O_3)N$ (?)," and he lists a "German" and a "French" product, both from *Digitalis purpurea*, but the part of the plant not stated. The former is a yellowish-white powder, soluble in water and alcohol. The dose is given as 0.001 to 0.002 gm. (gr. $\frac{1}{60}$–$\frac{1}{30}$), three or four times a day, and not to exceed gr. $\frac{1}{4}$ daily. The French article is similar, soluble in alcohol, but only in 2,000 parts of water. The dose is gr. $\frac{1}{10}$, which may be increased to a maximum of gr. $\frac{1}{4}$ daily. Both these solutions have the characteristic action of digitalis upon the heart.

Digitoxin ($C_{21}H_{32}O_7$?) is the most abundant, as well as the most active constituent. It is a white crystalline powder, soluble in alcohol, but not in water, although, by virtue of the associated bodies in the leaves, it is extracted by the infusion. The dose is gr. $\frac{1}{20}$–$\frac{1}{12}$, three times a day, and it is recommended that chloroform ♏ij., alcohol fl. ʒi., and water ʒ iss., be taken with it. The maximum amount for the day is gr. $\frac{1}{8}$. As an enema, gr. $\frac{1}{10}$, with alcohol ♏x. and water fl. ʒ iv., is recommended.

Digitonin ($C_{21}H_{32}O_{17}$?). The presence of this in the leaves is denied. However, it is similar to saponin, and in the doses of digitalis its action is not appreciable. The same is true of digitin ($C_4H_5O_2$)N. *Digitalein* is a mixture.

In accordance with, or in spite of any, recognized facts regarding the constituents of digitalis, it is true that an alcoholic preparation, while markedly diuretic, does not exert so great a direct stimulant or irritant action upon the kidney as does the infusion.

Action.—The different ways in which digitalis acts upon the organs may first be considered.

1. It stimulates the muscular fibres in the cardiac and arterial walls, thus increasing cardiac force and in a double way raising blood pressure.

2. It stimulates the nerve tissues in the heart (at least the nerve endings, the action upon the ganglia being doubtful) and in the arteries, thus increasing the above-mentioned effects, but at the same time beginning to slow the heart by stimulating the ends of the vagus.

3. It stimulates the centres in the brain and cord, thus greatly increasing the slowing of the heart and still further increasing its force.

As the effects of the drug are such as I have just enumerated, it follows that well-regulated doses will restore rhythm to an irregular heart. It is probably due to this stimulation of the vagus that digitalis relieves cardiac irritability resulting from over-exertion. When high fever exists, this slowing of the heart is less apt to take place. The effects of the above-described actions have to be very carefully considered in determining the use of the drug. Its action is characteristically slow in coming on, requiring usually several hours, and the effects are similarly slow in passing off, so that when great promptness is required, digitalis is not available. One feature of the slow heart beat produced by this drug is an extension of the space required in the diastolic condition; hence when there are great accumulations of fluid encroaching upon the heart space, we must be cautious in our use of digitalis.

A more important consideration is the difference of digitalis from other cardiants in its powerful stimulation of the arterial walls. This prevents the heart strengthening from resulting in a clear gain (especially in view of its slowness), for resistance is at the same time increased. Since the increased heart action depends upon the muscular cardiac walls, it cannot so well take place when these are weakened by dilatation or fatty degeneration, or when there is aortic regurgitation, for here we simply increase resistance more than we do heart strength and thus favor backing up of the blood into the heart. Unless we can then relax the vessels in some way, it is better to substitute some other cardiant. Recent experiments made on pigs by Hare go to show that by administering digitalis carefully, increasing the dose gradually until large amounts are taken, we may bring about a great and permanent increase in the size and quality of the muscle of the healthy heart. If it shall be found, upon further trial, that this same effect can be produced in the case of a dilated heart, it can readily be appreciated how far this result will exceed all our past anticipations with regard to the usefulness of digitalis. The next most important effect of the drug is upon the kidney. It is a recognized principle that increased blood pressure favors increased renal secretion, which alone would account for the diuretic properties of digitalis; but in addition, there is a direct renal stimulation effected by irritation and by locally contracting the vessels, thus inducing an even greater local increase of blood pressure. This occurs the more easily because the substance is almost wholly excreted through the kidney. This presentation of the modus operandi of the drug is subject to certain modifications. The excessively stimulating effect upon the kidney often results in an over-contraction of the renal vessels, which checks secretion. As this state passes off, a profuse secretion comes on very suddenly. If this change does not promptly take place, the digitalis checks its own excretion and continues in the circulation, becoming cumulative in a way very different from its cumulative action upon the heart muscle already considered, and is liable to become poisonous. In a state of health, the diuretic effect of digitalis is not usually pronounced, unless the blood pressure is unusually low (Brunton).

The other actions of digitalis are not important, except that it is very likely to irritate the stomach and intestines; this is especially true when the drug is given in the form of the infusion. Such irritation may add to the nausea or vomiting which is often caused by disturbance of the cerebral circulation; it may also produce a laxative, or even a purging effect. The cerebral disturbance may also cause dizziness, headache, disordered sight, and hearing. The uterus is stimulated. The slight antipyretic effects which digitalis produces are probably dependent upon the lessened circulation induced by slowing of the heart.

Uses.—We cannot do better than to reprint Beaumont Small's account of the uses of digitalis, as given in the supplement to the last edition of this work.

"Digitalis maintains its position at the head of heart tonics. In England and America authorities are as one on this point. On the continent they are the same. Dujardin-Beaumetz assigns it the first rank and calls it 'the type of heart tonics'; Professor Nothnagel places it above all other heart tonics, and Herr Fürbringer says, 'the sovereign diuretic in cardiac disease has been, and still is, digitalis.' Continued use has confirmed the confidence placed in it, and the innumerable rivals that appear serve only to bring its superior qualities into bolder relief. Not much has been added to the uses of this remedy, but we know more definitely its proper sphere, and apply it with more precision to the conditions in which it will prove of value.

"In organic disease of the heart the guide for its use is the state of the compensatory action of that organ. It is not given as a remedy for the defective valves, nor with the expectation of benefiting any diseased condition of the organ; it is simply a stimulant and tonic to the muscular tissue. So long as the heart is able to overcome the impediment to the circulation and maintain a free flow of blood, nothing is to be gained by the use of the drug, but, with the earliest symptoms of failing power, its administration must be commenced. The system responds quickly to the first indication of this loss of compensation, the heart beats more feebly and quicker, the pulse becomes irregular, a slight degree of dyspnœa is noticed, and œdema of the feet and ankles begins. In such conditions the beneficial action of digitalis is most marked. The heart beats more slowly and forcibly and propels the blood onward, the arteries become filled, the engorged veins relieved, and the equilibrium of the circulation is re-established. This slower action of the heart allows of a prolonged period of diastole, during which it is at rest and recuperating; the succeeding contraction is rapid and strong, due to the renewed strength and stimulating action of the remedy.

"No form of organic disease contraindicates the use of digitalis when the compensatory action is failing. Its typical action is produced in mitral disease, in which it acts rapidly and for a prolonged period. In mitral stenosis it has been thought to produce a peculiarly important effect, as the prolonged dilatation of the ventricle permits a greater flow of blood from the auricle through the narrowed channel. In aortic disease it may also be given with confidence. The old idea that the prolonged diastole would allow the ventricle to become overfilled appears to be but little regarded now, as its beneficial effect outweighs any such danger. The following conclusions furnish the indications in accordance with which digitalis may be used not only in aortic, but in all forms of valvular disease: (1) In all cases of valvular disease the most important matter for consideration in regard to the heart itself is the condition of its walls in respect to dilatation and hypertrophy; (2) it must be remembered that the presence, in cardiac disease, of symptoms indicating a disturbance of the circulation always means failure of compensation; (3) it is important to ascertain, before administering the drug, that the condition of over-hypertrophy or over-compensation does not exist; (4) it must not be forgotten that the dangers in aortic disease arise from the same cause as the dangers in mitral disease, —that is, from a failure of the ventricular muscle to perform the ever-increasing work put upon it; (5) it must be admitted that if digitalis is safe and beneficial in mitral disease it is equally so in aortic disease.

"The one condition in which digitalis is contraindicated is fatty degeneration of the heart. In advanced stages of this disease, where the walls are thin and the cavities are much dilated, it must be used with extreme caution, as its action may be too violent for the feeble organ, and paralysis or rupture may follow. In the lesser degrees of degeneration, where the evidences of such a condition are indistinct, a want of action on the part of the remedy is a sign that must not be disregarded. Dujardin-Beaumetz furnishes the following rule: 'When in a patient, digitalis, administered methodically, managed with care, produces no amelioration on the part of the heart and pulse; when, above all, the quantity of urine is not augmented, be persuaded that there is a fatty degeneration of the heart and immediately cease the employment of the remedy.'

"A cumulative action, in the sense of an accumulation of the drug in the system followed by an outburst of increased action, is no longer feared. No such condition occurs. Toxic symptoms arise only from an overdose or from its prolonged administration, and the condition of poisoning is preceded by its regular train of symptoms. The first effect of digitalis is to stimulate the vagus and the vaso-motor centres, which improves the action of the heart and increases the blood pressure; this is followed by a relaxation of the vaso-motor apparatus, which is first evident in the renal vessels. Up to this point the drug produces its therapeutic action, the relaxed vessels in the kidneys, with a high arterial tension and powerful heart, furnishing all the conditions requisite for a free secretion of fluid. When the drug is pushed beyond this it produces the toxic symptoms: the renal vessels are relaxed, the reduced blood pressure extends to the general circulation, the heart becomes weaker, and the circulation fails. When a fatal termination ensues it follows a continuance of this condition and ends with a failure of the heart, which is arrested in diastole. To avoid any ill effects it is safer to discontinue the drug for a few days, as soon as its action has been established; it may be administered again when required. Where the proper conditions for its use are observed there should be no danger of any toxic action; it is only when it is employed indiscriminately that any such effect arises. A case is reported where no bad result followed its use for nearly three years, thirty-five drops being given three times a day.

"The infusion appears to remain the popular preparation, particularly when its diuretic action is required. Among the French, a maceration in cold water is the favorite form in which the drug is administered, and it is considered superior to the infusion. Five grains of powdered digitalis are macerated in four ounces of cold water for from eight to twelve hours, and then filtered. The dose is one tablespoonful every two hours. The tincture is preferred by some as a diuretic: it is probably the most useful preparation when a simple tonic action is required. Osler considers that either preparation is efficient if the drug is of good quality and given in full doses—fifteen minims of the tincture, or half an ounce of the infusion, every three hours for two days, and then in reduced quantities. The subcutaneous employment of the infusion has been recommended. In this way it has been found that very small doses will act when larger doses, given in the ordinary manner, have failed. The advantage of this method over the administration by the stomach is that usually the gastro-intestinal mucous membrane is in a catarhal and œdematous state and consequently absorption is prevented. It is also thought that the action is retarded and altered by the passage of the remedy through the liver. An infusion of three parts of the leaf in one hundred of water is prepared, and fifteen minims of this infusion are to be injected twice or three times a day. Good results, it is said, have followed this method of administering the drug.

"Digitalis, to be given early and in large doses, has been recommended as a means of aborting pneumonia. This treatment has been followed by Professor Petresco, of Bucharest, in a large number of cases. He uses an infusion of from one to three drachms of the leaves in eight ounces of water, and gives a tablespoonful every hour. As much as gr. cxx. of the leaves has been given in twenty-four hours. He states that these large doses abort the pulmonary process, shorten the attack, and hasten convalescence. The temperature in some instances drops from 105° to 96° F., and the pulse from 120 to 35 per minute. He thinks that this treatment would act almost as a specific if it could be commenced with the attack. In no instance were there any bad results, and the more severe the attack the better the action of the large doses. The good effects are due to the increased force of the circulation in the pulmonary tissue and the prevention of stasis and congestion. This can follow only when large doses are administered as early and as energetically as possible.

"Professor R. Lepine has also employed digitalin in pneumonia with success; gr. $\frac{1}{50}$ was given in the morning and often gr. $\frac{1}{25}$ or $\frac{1}{30}$ in the evening. He does not think that it has any specific action, but finds it of great value in supporting the action of a weak and feeble heart during the course of the disease."

The following are the official preparations, and their doses:—The powdered leaves are given in doses of 0.03 to 0.2 gm. (gr. ss.–iij.), and the fluid extract in the same number of minims; the extract, dose 0.02 to 0.06 gm. (gr. ⅓–ij.); the fifteen-per-cent. tincture, dose 0.03 to 2.0 c.c. (mv. to xxx.); the one-and-one-half-per-cent. infusion, dose 4 to 15 c.c. (fl ʒ i. to iv.). *Henry H. Rusby.*

DIGITALIS. (TOXICOLOGICAL.)—In the following brief account I shall use the term *digitalis* as signifying the leaves of the plant or its United States Pharmacopœia preparations.

I find records of but two cases of criminal poisoning by digitalis: one, that of a quack who caused the death of a boy by administering seven ounces of a strong decoction of digitalis; the other, the celebrated case of a homœopathic physician, La Pomerais, who was convicted of the murder of Madame de Pauw in Paris in 1864.

Fatal and non-fatal medicinal poisonings are more frequent; they are due to the cumulative action of the drug, to the great variations in the strength of its preparations, and to the fact that slight circumstances, such as rising from a bed, may provoke a fatal termination in persons who are under its influence. For these reasons it is impossible to name the minimum lethal dose.

The duration of fatal cases is usually several days. Two cases are reported in which death occurred in less

than twenty-four hours, and in one case death took place in forty-five minutes.

SYMPTOMS.—Within half an hour after a toxic dose has been taken there is a feeling of stiffness, fatigue, sleepiness, and pain in the head, followed by violent vomiting, with pain in the stomach, nausea, vertigo, and syncope, the headache becoming more intense. The heart beats rapidly and violently and a sense of suffocation is felt. The pulse diminishes in frequency, and becomes irregular and difficult to count. Visual disturbances accompany the other symptoms; among them may be mentioned dimness, oscillation and inclination of surrounding objects, and even color-blindness. The pupils are usually dilated, especially if the preparation contained much digitoxin. Sometimes there are delirium and convulsions. Although the drug generally acts as a diuretic, suppression of the urine has been observed. Death may occur in coma or convulsions, but it usually takes place suddenly from syncope provoked by some slight movement.

TREATMENT.—If the patient is seen in the early stages induce vomiting by large draughts of tepid water. In a more advanced stage, if vomiting is persistent, avoid giving too much drink, and administer ice fragments, opium, or cocaine. Whiskey or nitroglycerin internally, and inhalation of amyl nitrite are to be resorted to for the purpose of checking the tendency to syncope. It is very important that the patient be kept quiet in bed, avoiding all movements.

Post-mortem appearances are negative in character.

Detection.—In several cases the glucosides of digitalis have been recovered from mixtures with animal matter which had been undergoing putrefaction for four months. Digitalis can be extracted from an acid aqueous solution by benzene and chloroform.

The various substances, digitalin, digitoxin, digitonin, etc., extracted from digitalis give different color reactions. The French "digitalines," which appear to be largely digitoxin, and the leaves of the plant itself when extracted by benzene or chloroform, yield a substance which responds to the following test:

1. The substance dissolves in concentrated sulphuric acid, forming a green solution, which turns purple-red on the addition of bromine water, and upon dilution with water becomes emerald or dull green.

2. When French "digitalines" or digitoxin are added to a mixture of equal parts concentrated sulphuric acid and ethylic alcohol, and heated until the mixture turns yellow, the latter will assume a bluish-green color upon the addition of a drop of dilute ferric chloride solution.

3. The physiological reaction should be tried with frogs—or, if the quantity be sufficient, a small dog may be utilized, but not rabbits. When frogs are used, the heart is exposed and the solution injected. If digitalis be present, the frequency of the heart beats will be much diminished. Three frogs of about equal size should be prepared for purposes of comparison, one to receive an injection of known digitalis, the second the substance to be tested, and the third no injection.

In dogs digitalis produces vomiting, purging, dilatation of the pupils, slowness and irregularity of the heart's action, and, when given in sufficient quantity, death. (*Résumé.*) *Louis Warner Riggs.*

DI-HYDRO-RESORCIN is prepared by the action of carbon dioxide and sodium amalgam on resorcin dissolved in boiling water. It congeals on standing, and on recrystallization forms glossy prisms. It is very soluble in water, alcohol, or chloroform, and is recommended as an efficient antiseptic. *W. A. Bastedo.*

DI-IODO-BETA-NAPHTOL. — $C_{10}H_5I_2O_2$ — *Naphtol-aristol.* This is manufactured in the same way as aristol, beta-naphtol being substituted for thymol. The beta-naphtol is dissolved in a solution of sodium carbonate and sodium hypochlorite, and added to a solution of iodine and potassium iodide. The resulting precipitate is a yellowish-green powder without odor or taste, insoluble in water, slightly soluble in alcohol and ether, and freely soluble in chloroform. It is decomposed by heat with violet fumes. It contains 61.5 per cent. of iodine and is used like aristol as a substitute for iodoform. *W. A. Bastedo.*

DI-IODO-CARBAZOL ($C_{12}H_6I_2$:NH) is prepared by adding iodine to a hot solution of carbazol (diphenyl-imide). It occurs in yellow plates without odor, and is readily soluble in alcohol and chloroform but not in water. It is used as an antiseptic. *W. A. Bastedo.*

DI-IODOFORM.—C_2I_4—Ethylene tetra-iodide or per-iodide. This is obtained in fine, bright-yellow needles by acting with excess of iodine on a solution of acetylene iodide in carbon bisulphide. It is odorless, insoluble in water, very slightly soluble in alcohol and ether, and readily so in chloroform or benzol. It contains a very large amount of iodine (95.28 per cent.), part of which is set free on exposure to light, giving a characteristic odor and color to the drug. It is a succedaneum for iodoform, which contains 96.54 per cent. of iodine. *W. A. Bastedo.*

DI-IODO-SALICYLIC ACID.—($C_6H_2I_2$.OH.COOH) is a white crystalline powder of sweet taste prepared from salicylic acid by the action of iodine and iodic acid. It is almost insoluble in cold water, slightly soluble in hot water, and very soluble in alcohol and ether; its salts are soluble in water. Used in the same way as the salicylates, this acid and its sodium salt act as analgesics and antipyretics, especially in rheumatic conditions. The dose is 0.5–1 gm. (gr. viij.–xv.) three or four times a day. *W. A. Bastedo.*

DI-IODO-SALOL. — $C_6H_2I_2.OH.COOC_6H_5$ — Di-iodo-phenyl salicylate. This salt is obtained by the action of iodine on salol in alcoholic solution. It occurs in acicular crystals which are colorless, odorless, tasteless, and soluble in alcohol. It contains sixty-five per cent. of iodine and externally is used to replace iodoform. Internally it is said to be an efficient intestinal antiseptic, and is used for the same purpose and in the same dose as salol. *W. A. Bastedo.*

DILL OR DILL FRUIT.—*Anethum.* "Dill-seed". The fruit of *Anethum graveolens* L. (fam. *Umbelliferæ*), a European annual, with a slender, low, branching stem and dissected leaves, and with flowers and fruits in compound non-involucrate umbels. Dill is raised in gardens as a household aromatic, and is official in Great Britain as the source of *Aqua Anethi* and *Oleum Anethi* of that Pharmacopœia. The description of its fruit is as follows: "Broadly oval, about one-sixth of an inch long, flat, and surrounded by a broad membranous border. It has a brown color, the membranous border being paler. The half fruits, or mericarps, are usually distinct in the fruits of commerce. Odor and taste agreeably aromatic."

Dill contains an agreeable *essential oil*, composed of a hydrocarbon and carvol (Nietzki). Its action and use are exactly those of anise, caraway, and the other umbelliferous carminatives, from which it differs only very slightly in taste and odor. *W. P. Bolles.*

DI-METHYL-ACETAL. — $CH_3CH(OCH_3)_2$ — Ethylidene-di-methyl ether. This is a colorless, inflammable, ethereal liquid prepared by acting on methyl alcohol with glacial acetic acid and aldehyde. Its specific gravity is 0.867, it boils at 62.7° to 64° C. (145°–147.2° F.), and is a local anæsthetic. Mixed with half its volume of chloroform it has been used as a general anæsthetic, but clinical reports are wanting. *W. A. Bastedo.*

DI-OXYNAPHTHALENE.—$C_{10}H_6(OH)_2$—Hydro-naphtho-quinone. The alpha and beta modifications of this chemical in amounts up to 0.2 gm. (gr. iij.) a day have been found by Lepine to act as powerful tonics increas-