

9. *Parts to which medicines are applied.*

Medicines are applied to the skin, to mucous or serous membranes, to wounds, ulcers, or abscesses, or they are injected into the veins.

I. APPLICATIONS TO THE SKIN.—Medicinal applications are frequently made to the skin in order to produce local effects, as in the case of blisters, cataplasms, fomentations, lotions, embrocations, &c.; and occasionally to affect remote parts of the system, as when we use mercury. Most, if not all medicines, which influence distant organs by application to the skin, do so in consequence of their absorption; and as the cuticle offers a mechanical impediment to this process, we generally either remove it or make use of friction.

There are three methods of applying medicines to the skin; namely, the *enepidermic*, the *iatraleptic*, and the *endermic*.

1. The *Enepidermic method* consists in the application of medicines to the skin, unassisted by friction; as when we employ plasters, blisters, poultices, lotions, fomentations, baths, &c.

Baths are made of liquids (as simple water), soft substances (as hot dung, and saline mud), dry bodies (as sand), gases (as hot air), or vapours (as aqueous vapour). Gases or vapours are sometimes applied to the skin, either as local agents, or as means of affecting the constitution. Thus, baths of sulphurous acid gas are employed in itch; chlorine gas is recommended as an application to the skin in liver complaints; vapours of various mercurial preparations have been employed to excite salivation. The vapour of hot water, holding in solution the volatile matters of vegetables, has been employed in the treatment of many diseases, under the name of *medicated vapour baths*; though the greater part of their efficacy is to be ascribed to the influence of the vapour.

2. The *Iatraleptic method* (which has been so called from *ἰατρῆω*, to cure or heal, and *ἄλειψω*, to anoint), consists in the application of medicines to the skin, aided by friction. It has been termed the *epidermic method*—sometimes *anatripsologia* (from *ἄνατριψω*, to rub in, and *λόγος*, a discourse), and also *espoïc medicine*. It was employed by Hippocrates and other old writers, but fell into disuse until attention was again drawn to it by Brera, Chiarenti, Chrestien, and others. Among the substances which have been employed in this way, are camphor, digitalis, squills, cantharides, sulphate of quinia, veratria, colocynth, rhubarb, opium, belladonna, mercury, chloruret of gold, &c.

The mode of employing medicinal agents according to the *iatraleptic method*, is the following:—The substance to be applied being reduced to the finest possible state of division, is to be dissolved or suspended in some appropriate liquid, and in this state rubbed into the skin. The dose is always considerably larger than for the stomach—generally two or three, often as much as ten, and in some cases even twenty times the ordinary dose: but no absolute rule can be laid down on this head. The liquids employed to dissolve or suspend the medicine may be water, spirit, or oily or fatty matter. *Iatraleptic* writers, however, prefer the gastric juice, or saliva, or even bile; but I am not acquainted with any just grounds for this preference. Collard de Martigny (*Dict. de Médec. et de Chirurg. pratiq. art. Iatraléptie*) concludes from his experiments, that the palms of the hands, soles of the feet, neighbourhood of the

joints, the chest, the back, and the inner parts of the limbs, are to be preferred for the application of medicines.

The objections to this mode of employing medicines are the uncertainty of results, the time required to affect the system, the frequently unpleasant nature of the process (as when mercurial inunctions are employed), and the local irritation sometimes produced by the friction. Notwithstanding these, however, it may be resorted to occasionally with advantage, as where the patient cannot or will not swallow, or where the alimentary canal is very irritable, or insensible to the action of the medicine.

3. *The Endermic, or Emplastro-endermic method*, consists in the application of medicinal agents to the denuded dermis. For its introduction into practice we are indebted to M.M. Lambert and Lesieur.—(*Essai sur la Méthode Endermique*, par A. Lambert, 1828.)

The denudation of the dermis is usually effected by a blistering plaster. When the cuticle is elevated, an opening is to be made into it, in order to allow the serum to escape. The medicine is then to be applied to the dermis either with or without removing the cuticle. At the first dressing, the transparent pellicle formed by the dermis is to be carefully removed, as it very much impedes absorption. The medicine is applied to the denuded surface, either in its pure state, in the form of an impalpable powder,—or, if too irritating, it is to be incorporated with gelatine, lard, or cerate. Should any circumstances arise to lead us to fear that the quantity of the medicine applied has been too large, the mode of proceeding is the following:—Cleanse the surface immediately; make compression (as by a cupping-glass) around the denuded part, in order to prevent absorption, and apply any substance that will neutralize the effect of the medicine. Thus Lambert has found that two grains of the acetate of morphia will destroy the tetanic symptoms caused by the application of two grains of strychnia.

Instead of a blistering plaster, Trousseau recommends a vesicating ointment, composed of equal parts of a strong solution of ammonia and lard. Two applications, of five minutes each, are sufficient to raise the cuticle. Boiling water, which has been employed by some persons, is uncertain, painful, and dangerous: it may cause mortification of the dermis, and thus stop absorption.

The advantages of the endermic method are, that substances are not submitted to the influence of the digestive process, and their pure effects can be better ascertained;—their operation is in general very quick, and in some cases more rapid than when they are applied to the stomach. If the gastric membrane be inflamed, or if the patient cannot (or will not) swallow, more especially if the case be urgent, this is an admirable method of putting the system under the influence of a medicine.

The disadvantages of the endermic method are, the pain sometimes experienced by the application of medicinal agents to a denuded surface—some even may occasion mortification of the part; the possibility of the skin being permanently marked; lastly, some substances have no effect when used endermically.

The substances which have been used by this method are morphia and its acetate, muriate and sulphate, in doses of from a quarter of a grain to two grains; strychnia, from a quarter of a grain to a grain; aconitina, one-sixteenth to one-eighth of a grain; extract of belladonna, three or

four grains; sulphate of quinia, two to six grains; musk, six or eight grains; tincture of asafœtida, ten minims. Many other agents have also been employed endermically; as digitalis, extract of squills, aloes, saffron, bichloruret of mercury, tartar emetic, &c. For further information on the endermic method, consult, besides Lember's Essay before quoted, the article "*Endermique Méthode*," by Bouillaud, in the *Dict. de Médec. et Chirurg. pratiques*; also some articles by Dr. Bureaud Riofrey, in the *Continental and British Medical Review*, vol. i. pp. 66, 321, and 385.

Method by inoculation.—In connexion with the endermic method may be mentioned another mode of employing medicines; namely, the method by inoculation proposed by M. Lasargue de St. Emilion. (See the *Continental and British Review*, vol. i. pp. 41 & 388.)

II. APPLICATIONS TO THE MUCOUS MEMBRANES.—We have two mucous membranes, to the different parts of each of which we apply medicines: the first is the gastro-pulmonary membrane, the second the urino-genital.

1. *Gastro-pulmonary membrane.*

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| a. Ocular mucous membrane (conjunctiva). | d. Eustachian membrane. |
| b. Nasal or pituitary membrane. | e. Aërian or tracheo-bronchial membrane. |
| c. Bucco-guttural membrane. | f. Gastro-intestinal membrane. |
| | g. Recto-colic membrane. |

2. *Urino-genital membrane.*

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| a. Urethro-vesical membrane. | b. Vagino-uterine membrane. |
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1. *Gastro-pulmonary membrane: a. Ocular mucous membrane or conjunctiva.*—Medicines are applied to the conjunctiva, to excite local effects only, though we might employ this part for other purposes, since remote organs may be affected by it. Thus a drop of hydrocyanic acid applied to the conjunctiva of a dog produces immediate death. The term *Kollyrium* (Κολύριον) was formerly employed to indicate solid substances applied to the eyes. It now usually means liquid washes for the eyes, and is equivalent to *eye-water*. Cottureau (*Traité Élémentaire de Pharmacologie*, 1835,) calls all medicines (solids, soft substances, liquids, and vapours or gases,) which are applied to the eyes, collyria.

b. Nasal or pituitary membrane.—We seldom apply medicines to the *pituitary* membrane except in affections of the nose or of parts adjacent. Sometimes they are employed to irritate and excite a discharge; they are then called *errhines*; but when used to produce sneezing, as when foreign bodies are in the nasal cavities, they are termed *sternutatories* or *ptarmics*.

c. Bucco-guttural mucous membrane.—Medicines are very rarely applied to the *mouth* and *throat*, except for local purposes. However, it has been proposed to excite salivation by rubbing calomel into the gums. Solids used in the mouth are termed *lozenges* (*trochisci*) or *masticatories*, according as they are allowed to dissolve slowly or are masticated; liquids are called *collutoria* or *gargarismata*.

d. Eustachian membrane.—Aurists now and then apply washes to the *Eustachian tubes* in local affections; but the occasions for this practice are rare, and the operation difficult, except in practised hands.

e. Aërian or tracheo-bronchial membrane.—Accidental observation, as well as experiment, has shewn that medicines produce very powerful effects on the membrane lining the *trachea* and *bronchial tubes*. For the

most part, applications here are made use of for local purposes, as in asthma, chronic bronchitis, phthisis, &c. though occasionally to affect the brain, the blood, the heart, &c. Dr. Myddleton (*A Preliminary Dissertation illustrative of a new System of Pulmonary Pathology*, 1825,) has advocated, in pulmonary diseases, the inhalation of substances (as cinchona, sulphate of iron, myrrh, &c.) reduced to an impalpable powder. The fumes (*suffitus*) of tar, balsam, resins, and other burning bodies, have also been employed in these cases. Sir Alexander Crichton has strongly recommended tar vapour; the method of using which is the following:—The tar employed should be that used in the cordage of ships; to every pound of which half an ounce of carbonate of potash must be added, in order to neutralize the pyroligneous acid generally found mixed with the tar, the presence of which will necessarily excite coughing. The tar thus prepared is to be placed in a suitable vessel over a lamp, and to be kept slowly boiling in the chamber during the night as well as the day. The vessel, however, ought to be cleansed and replenished every twenty-four hours, otherwise the residuum may be burned and decomposed,—a circumstance which will occasion increased cough and oppression on the chest.

The inhalation of aqueous vapour (*halitus*), either alone or with other substances, is oftentimes useful in various affections of the lungs and of the throat, &c. The apparatus for this purpose may be that proposed by Dr. Gairdner (*Edinburgh Medical and Surgical Journal*, vol. xix.) or Dr. Mudge's inhaler, or in the absence of these, a teapot, or basin with an inverted funnel. In many asthmatic cases the difficulty of breathing is so great, that the patient cannot close the mouth around the tube, especially if the latter be small, without exciting a sense of impending suffocation. In such instances I have found the only easy and practicable method of enabling the patient to inhale is, by holding the mouth over hot water contained in a basin or tea-cup. Various narcotic and emollient herbs are sometimes added to the water, but I suspect without contributing in any way to its efficacy. The vapour of hot vinegar, of sulphuric ether, of iodine, of camphor, and of other volatile bodies, is occasionally employed in pulmonary diseases. The vapour of iodine may be conveniently inhaled by means of a double-necked glass bottle

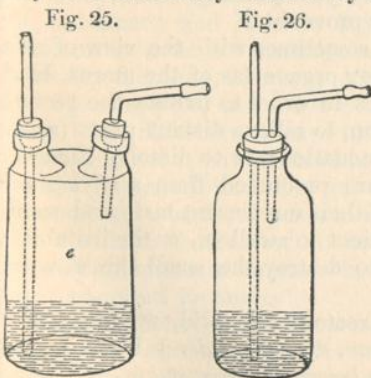


Fig. 25.

Fig. 26.

Inhaling bottles.

(fig. 25,) into which we introduce about an inch of water, to which a few drops of the tincture of iodine have been added. Through one of the necks a straight glass tube passes, and dips under the surface of the water. The other neck has a short curved glass tube passing through it, by which the patient inhales. In the absence of a double-necked bottle we may use a common wide-mouthed bottle (fig. 26,) the cork of which has two perforations, through which pass the glass tubes. Chlorine gas may be inhaled in a similar manner, using

a solution of the gas, or of chloride of lime, instead of the tincture of iodine. If oxygen, or nitrous oxide, be inhaled, the most easy and con-

venient mode of effecting it is from a bladder; but for other and more complete, though more costly methods, I must refer you to the works of the late Dr. Beddoes, and of the celebrated engineer, Mr. James Watt.— (*Considerations on the Medicinal Use, and on the Production of Factitious Airs*, 1796.)

f. Gastro-intestinal membrane.—We employ both extremities of the *alimentary canal* for the exhibition of medicines; the upper, however, more frequently than the lower. This mode of employing medicines is called the *method by ingestion*. Of all parts of the body the gastro-intestinal surface is the most useful for the application of medicines. This arises from the great susceptibility, the active absorbing power, and the numerous relations, which the stomach has with almost every part of the body. In many cases remote effects are more easily produced by this than by any other organ, as in the case of diffusible stimulants. Medicines which act by absorption are more energetic when applied to the serous membranes, the bronchial membrane, the cellular tissue, &c. In some cases it is not only possible, but probable, that the stomach may either partially or wholly digest a medicine.

g. Recto-colic membrane.—Sometimes, though less frequently than the stomach, the *rectum* is employed for the application of medicines. It has been asserted that the general susceptibility of the rectum is only one-fifth of that of the stomach, and that medicines take five times as long to operate by the former as by the latter: hence it has been said that both the dose, and the interval between the doses, should be five times as great as when applied to the stomach. But this assertion is far from being universally correct, though it may be so occasionally. Orfila asserts that those agents which operate by absorption, as opium and tobacco, are more active by the rectum than by the stomach; and he assigns as a reason the greater venous absorption of the rectum, and its less digestive power. But this statement is in direct opposition to the experience of almost every practitioner. Whenever I have had occasion to employ opium by way of enema, I always exhibit twice or three times the ordinary dose, without exciting any remarkable effects. Dr. Christison states that he has given two measured drachms of laudanum by injection, without producing more than usual somnolency, a quantity which, if Orfila's statement were correct, would probably prove fatal.

We apply medicines to the rectum sometimes with the view of alleviating disease of this or of neighbouring organs (as of the uterus, bladder, prostate gland, &c.); at other times in order to irritate the rectum, and, on the principle of counter-irritation, to relieve distant parts (as the head); sometimes to produce alvine evacuations, or to dissolve hardened feces; occasionally, also, when we are precluded from applying our remedies to the stomach, on account of their unpleasant taste and smell, the inability or indisposition of the patient to swallow, or the irritability of the stomach; and, lastly, in order to destroy the small thread-worm (*Ascaris vermicularis*).

When the substances applied to the rectum are solid, we name them *suppositories* (*suppositoria*, from *suppono*, to put under;) but when of a fluid nature, they are termed *clysters*, *lavements*, or *enemata*.

Formerly *suppositories* were conical, or cylindrical, like a candle, and of variable size,—sometimes one or two inches long. They are now usually made globular, and of small size. They are employed to evacuate the

bowels; to irritate the rectum, and thereby to relieve affections of distant organs; but more commonly to act as local agents in affections of the rectum, bladder, uterus, prostate gland, urethra, &c. I have frequently employed with great advantage a mixture of opium and soap, to prevent the pain of priapism during the night, in gonorrhœa.

Clysters or *lavements* require to be considered under several points of view: *first*, in reference to the material of which they are made, and which must vary with the object for which these remedies are employed; *secondly*, with respect to the quantity of liquid used, and which will depend on the age of the patient. The average quantity for an adult is about twelve or sixteen ounces; and I believe that it is rarely proper to use more than this. I am quite sure that the practice of introducing several pints of fluid into the large intestines, with the view of exciting alvine evacuations, is bad. In the first place it often provokes the contraction of the gut, by which the injection is immediately returned; and, *secondly*, repeated distension diminishes the susceptibility of the part, so that the ordinary accumulation of fecal matter no longer acts as a sufficient stimulus. Mr. Salmon (*Practical Essay on Prolapsus of the Rectum*, 1831, p. 24.) has related a case of this kind, where the patient had nearly lost all power of relieving the bowels, except by enemata or purgatives, and had produced dilatation of the rectum, in consequence of having been in the habit of introducing into the intestine two quarts of gruel twice every day. A newly-born infant requires about one fluid ounce; a child of one to five years, from three to four ounces; and a youth from ten to fifteen, from six to eight fluid ounces. *Thirdly*, the impulse with which the fluid ought to be thrown up deserves attention. If too much force be used, the sudden dilatation of the gut may bring on spasmodic action of its lower part, by which the clyster will be returned. *Fourthly*, the instruments by which the injection is effected require notice. The common pipe and bladder are too well known to require description. I am inclined to think that the most convenient, safe, and useful apparatus, is the elastic bottle and tube. Any quantity of liquid, however small, may be thrown up with the greatest ease, and without any danger of the impulse being too great. Its application is exceedingly convenient; a lusty person, by placing one foot on a stool or chair, may easily apply it without assistance; and its price is very moderate. Another form of enema apparatus is a narrow water-proof tube, holding about a pint of liquid, about four feet long, narrower at one end, which is furnished with a common injecting pipe, and about two and a half inches in diameter at the other. The fluid being placed in the tube, the pipe is introduced into the rectum, and the apparatus held in a perpendicular direction, by which the fluid is propelled into the gut by its own gravity. This apparatus, although very simple, appears to me to be less convenient for common use than the elastic bottle, and not to be well adapted for the administration of small quantities of fluids. In the shops are sold syringes of various forms as enema apparatus.

Gaseous matters have been sometimes thrown into the rectum. Thus the injection of common air has been proposed in ileus (*Edinburgh Medical and Surgical Journal*, vol. xvi.) Tobacco smoke has sometimes been employed in hernia: it is injected by a peculiarly constructed pair of bellows. Carbonic acid gas has been used in ulceration of the rectum.

2. *Urino-genital membrane: a. Urethro-vesical membrane.*—Applica-

tions to the *urethra* are made only for local purposes; either in a solid form, as caustic or medicated bougies, or in that of a liquid, as an injection: the latter is easily applied by a common syringe. Syringes of various kinds, for this purpose, are sold by Messrs. Maw, of Aldersgate Street.

Injections are sometimes thrown into the *bladder*, but always for local purposes. The operation is easily performed by attaching a catheter to an elastic bottle.

b. Vagino-uterine membrane.—Medicines are applied to the *vagina* and *uterus* to produce local effects only. Thus injections are made to relieve vaginal discharges, to excite the catamenia, &c. They are usually liquids, but the following case, told me by my friend Dr. Clutterbuck, proves that gases are sometimes employed. A lady, who had suffered a considerable time from some uterine affection, and had derived no relief from the treatment adopted, was advised to consult a physician in Italy. After he had examined the condition of the uterus, he assured her there was no organic disease, but merely a considerable degree of irritation; for which he proposed to apply carbonic acid, as a sedative. This was done by means of a pipe and tube, communicating with a gasometer situated in another room. The patient obtained immediate relief, and although she had been obliged to be carried to the doctor's house, on account of the pain experienced in walking, she left it in perfect ease. On her return to England, she had a relapse of the complaint, and applied to Dr. Clutterbuck to know whether she could have the same remedy applied in London, in order to save her the necessity of returning to Italy.

III. APPLICATIONS TO THE SEROUS MEMBRANES: *a. Tunica vaginalis.*—Irritating injections, such as wine and water, solutions of metallic salts, &c. are thrown into the cavity of the serous membrane of the testicle in hydrocele, in order to excite inflammation and the subsequent adhesion of the sides of the sac.

b. Peritoneum.—Injections have also been made into the peritoneal sac in ascites, and in some cases with success.—(*Philosophical Transactions* for the year 1744.) The practice, however, is very dangerous. Mr. Cooper (*Dictionary of Practical Surgery*, art. *Paracentesis*), has seen two fatal cases of it.

IV. APPLICATIONS TO ULCERS, WOUNDS, AND ABSCESSSES.—These are employed principally to excite local effects, and sometimes, though rarely, to produce a constitutional affection. Thus it has been proposed to apply corrosive sublimate to wounds, with the view of causing salivation.

V. INJECTION OF MEDICINES INTO THE VEINS, (*Chirurgia infusoria; Ars chymatica nova; Infusion of medicines.*)—This history of this operation is inseparably connected with that of *Transfusion*. The first experiments on infusion are said to have been performed in Germany. (See Paul Scheel's work, entitled "*Die Transfusion des Bluts und Einsprützung der Arzneien in die Adern*," Kopenhagen, 1802: Zweiter Band, 1803.) But the first scientific examination of the operation was made by Sir Christopher Wren.—(*Philosophical Transactions* for 1665, vol. i. p. 131.) His example was followed by Boyle, Clarke, Henshaw, Lower, and others. (For further information on the history of this operation, consult Scheel's work, before quoted; also Dieffenbach's essay, "*Ueber die Transfusion des Bluts und die Infusion der Arzneien*," 1833; or Marx's, "*Die Lehre von den Giften*," 1827 and 1829.)

The partisans of this method of treatment assert, that when medicines

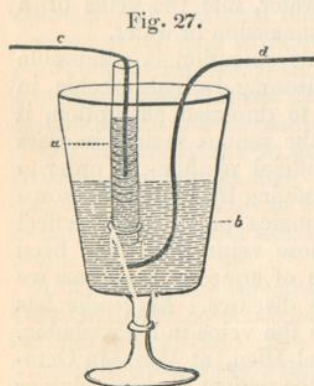
are administered by the stomach, their properties are more or less altered by the digestive powers of this viscus; and that by injecting medicines at once into the veins, we avoid this influence. This statement, however, is not accurate, since Drs. Christison and Coindet have shown that some substances are decomposed even in the blood, or at least that they cannot be recognized in this fluid. Furthermore, it has been proved that the effects are of the same general nature as when medicines are applied to the skin or stomach; thus, tartar emetic vomits, senna purges, opium stupifies, and so on. So that some of the supposed advantages of this operation have no real existence, while several objections to it exist: such as the danger of introducing air into the veins, or of throwing in too large a dose of the remedy (for a slight excess in some cases may prove fatal), or of the occurrence of phlebitis. These, then, are sufficient reasons for not resorting to this practice, except on very urgent occasions; for example, to excite speedy vomiting when the patient is unable to swallow. Köhler (mentioned by Dieffenbach, who notices also several other analogous cases) preserved the life of a soldier, in whose throat a piece of beef tendon was sticking, by throwing a solution of six grains of tartar emetic into a vein of the arm: vomiting was induced, and the meat expelled. Meckel injected two grains of this salt, dissolved in water, into the veins of a woman, to restore suspended animation, from immersion in water.

In some obstinate and dangerous diseases this operation is admissible as a last resource; for example, in cases of poisoning, in hydrophobia, in malignant cholera, &c. As plethora appears to diminish absorption, it has been proposed to throw tepid water into the venous system in cases of narcotic poisoning, and thus to cause artificial plethora, in order to prevent the occurrence of the symptoms of poisoning by stopping absorption. Vernière found three grains of nux vomica produced no effect when applied to a wound in a dog into whose veins water had been thrown; and he asserts, that by the early use of aqueous injections we may prevent the development of contagious diseases. Magendie has tried the effects of injecting tepid water into the veins in hydrophobia. The operation was first performed at the Hôtel-Dieu, at Paris, in October, 1823: the convulsions were stopped, but the patient died in a day or two afterwards. This operation has been several times repeated, and with the same results. In June 1832, I tried it on a patient (afflicted with this terrible disease) under the care of the late Mr. Bennett, of the Commercial Road: the patient was a boy about nine years of age; he was nearly insensible at the time I performed the operation. I threw in about one quart of tepid water without any obvious effect on the pulse: no convulsions were subsequently observed, but the patient died in a few hours. Saline solutions were injected into the veins in malignant cholera, and often with apparent advantage. Purgatives, narcotics, &c. have been thrown into the veins by different physiologists, and in most cases the effects observed were similar to, though more powerful than, those produced when these agents were administered by the stomach. To this statement, however, the oils are an exception; for when injected into the veins in large quantities they interrupt the circulation, and produce a kind of asphyxia.

AGENCY OF GALVANISM.—It has been proposed to assist the introduction of certain medicinal particles into the blood by galvanism. This practice was first adopted with iodine in 1823, by Dr. Coster, (*Archives*

Générales de Médecine, t. ii. p. 432,) and in 1833 by M. Fabré-Palaprat, (*Arch. Gén.* 11^{me} série, t. ii. ; also, *Becquerel, Traité de Electricité*, t. iv. p. 321.) The principle on which galvanic electricity has been employed is, that the poles (electrodes) of a voltaic battery have attractive and repulsive powers for certain substances: thus the positive pole (aneclectrode) attracts oxygen, chlorine, and iodine,—while the negative pole (cathellectrode) attracts hydrogen and the metals. M. Fabré-Palaprat asserts, that by the aid of galvanism he can cause certain chemical agents to traverse the body and appear at some distant part. He bound on one arm a compress, moistened with a solution of ioduret of potassium, and covered by a platinum disk, connected with the negative pole (cathellectrode) of a voltaic battery of thirty pairs of plates. On the other arm was placed a compress, moistened with a solution of starch, and covered by a platinum disk, connected with the positive pole (aneclectrode) of the battery. In a few minutes the starch acquired a blue tinge, shewing that the iodine had been transported from one arm to the other.

But the idea entertained by Davy, that the poles (electrodes) possess attractive or repulsive powers, has been shown by Faraday to be incorrect. It is, indeed, true, that if we place a solution of ioduret of potassium in a glass tube (fig. 27, *a.*) closed at the lower extremity by a piece of bladder,



and immerse the tube in a glass vessel containing a solution of common salt and starch, we may, by connecting the liquid in the tube with the negative pole (cathellectrode) (*c.*) and the outer or starch liquid with the positive pole (aneclectrode) (*d.*) obtain the blue iodide of starch in the outer liquid, shewing that the iodine must have transuded the bladder. But the transudation is effected by exosmosis or imbibition, and not by the action of the battery, since the iodine may be recognised in the external liquid by appropriate tests, when no voltaic apparatus has

been employed. The positive pole (aneclectrode) does not, therefore, attract the iodine through the bladder, but merely sets it free when the ioduret has transuded.

I have twice repeated M. Fabré-Palaprat's experiment,—once on my pupil, Mr. John Smith, and a second time on my assistant, Mr. Scoffern, but though I employed fifty pairs of plates during fifteen minutes, I was unable to obtain the least trace of the passage of iodine through the body.

It is not improbable, however, that electricity may promote absorption, either by increasing endosmosis, or by acting as a stimulus to the blood-vessels and lymphatics.

10. Classification of Medicines.

In some works on Medical Botany, which contain figures of the plants employed in medicine, the authors have not followed any arrangement; in consequence, I presume, of the impossibility of procuring specimens in regular order. This is the case in the following works:—

W. Woodville, M.D. Medical Botany, 3 vols. 4to. London, 1790. A Supplement to the *Medical Botany*, 4to. London, 1794.

J. Bigelow, M.D. American Medical Botany, 3 vols. 8vo. Boston, 1817-18-20.