

servations already made on the latter are equally applicable to the former.

The special use of paullinia is in the treatment of sick-headache or *migraine*. It is adapted to the so-called nervous form of sick-headache, and is less efficient when the attacks are due to stomachal troubles. As it possesses, directly or indirectly, restorative powers, it may be employed to promote constructive metamorphosis. Administered with this view, it may be given with advantage in the *convalescence from acute maladies*, in *incipient phthisis*, and in the *wasting diseases generally*.

The most agreeable form in which to administer paullinia is the elixir, but, as this preparation varies according to the taste, honesty, and skill of the apothecary, the physician needs to be assured of its quality before prescribing.

Authorities referred to :

- AMORY, DR. R. *Boston Medical and Surgical Journal*, 1868, p. 17.  
 AUBERT, M. *Physiological Action of Caffeine*. *Centralblatt*, 1873, p. 124.  
 BENNETT, DR. ALEXANDER. *Physiological Actions of Theine, Caffeine, Guaranine, Cocaine, and Theobromine*. Pamphlet, 1873.  
 HUGHARD, DR. HENRI. *De la Caféine dans les Affections du Cœur*. *Journal de Thérapeutique*, September 10, 1882.  
 LEVEN, M. *Archiv de Physiologie*, 1868, pp. 179, 470.  
 PRATT, DR. *Boston Medical and Surgical Journal*, vol. ii, 1868, p. 6.  
 SCHMIEDEBERG, PROF. O. *Ueber die Verschiedenheit der Caffeinwirkung an Rana temporaria L. und Rana esculenta L.* *Arch. f. exper. Path. u. Phar.*, 1874, p. 63.

REMEDIES WHICH DIMINISH OR SUSPEND THE  
 FUNCTIONS OF THE CEREBRUM AFTER A PRE-  
 LIMINARY STAGE OF EXCITEMENT.

To this group belong the so-called narcotics, the anæsthetics, and some of those usually classed as antispasmodics. They all agree in these respects : their effects are expended, chiefly, on the nervous system ; they first stimulate the functions of the brain, but this stage of excitement, which may be of shorter or longer duration, is followed by sopor, coma, and complete insensibility.

**Alcohol.**—Alcohol. A liquid composed of 91 per cent by weight (94 per cent by volume) of ethyl alcohol, and 9 per cent by weight (6 per cent by volume) of water. Specific gravity, 0.820 at 60° Fahr. A transparent, colorless, mobile, and volatile liquid of a characteristic, pungent, and agreeable odor, and a burning taste. (U. S. P.)

**Alcohol Dilutum.**—Diluted alcohol. A liquid composed of 45.5 per cent by weight (53 per cent by volume) of ethyl alcohol, and 54.5 per cent by weight (47 per cent by volume) of water. Specific gravity,

0.928 at 60° Fahr. Alcohol, 50 parts ; distilled water, 50 parts. (U. S. P.)

**Alcohol Amylicum.**—Amylic alcohol. Fusel-oil.

A peculiar alcohol, obtained from fermented grain or potatoes, by continuing the process of distillation after the ordinary spirit has ceased to come over. An oily, nearly colorless liquid, having a strong, offensive odor, and an acrid, burning taste. Its specific gravity is 0.818, and its boiling-point between 268° and 272°. It is sparingly soluble in water, but unites in all proportions with alcohol and ether. It does not take fire by contact with flame, and, when dropped on paper, does not leave a permanent greasy stain. Exposed to the air in contact with platinum-black, it is slowly oxidized and yields valeric acid. (U. S. P., 1870.)

**Spiritus Frumenti.**—Whisky. An alcoholic liquid, obtained by the distillation of fermented grain (usually corn, wheat, or rye), and at least two years old.

Whisky has an amber color, a distinctive taste and odor, and a specific gravity not above 0.930 nor below 0.917, corresponding approximately with an alcoholic strength of 44 to 50 per cent by weight, or 50 to 58 per cent by volume.

**Spiritus Vini Gallici.**—Brandy. An alcoholic liquid obtained by the distillation of fermented grapes, and at least four years old.

Brandy has a pale, amber color, a distinctive taste and odor, and a specific gravity not above 0.941 nor below 0.925, corresponding approximately with an alcoholic strength of 39 to 47 per cent by weight, or 45 to 55 per cent by volume. (U. S. P.)

**COMPOSITION.**—A large number of bodies have been classed under the generic term of alcohols. A list of the most important of these is subjoined :

Methylic alcohol.....	CH <sub>4</sub> O.
Ethylic " .....	C <sub>2</sub> H <sub>6</sub> O or CH <sub>4</sub> O+(CH <sub>2</sub> ).
Propylic " .....	C <sub>3</sub> H <sub>8</sub> O or CH <sub>4</sub> O+2(CH <sub>2</sub> ).
Butylic " .....	C <sub>4</sub> H <sub>10</sub> O or CH <sub>4</sub> O+3(CH <sub>2</sub> ).
Amylic " .....	C <sub>5</sub> H <sub>12</sub> O or CH <sub>4</sub> O+4(CH <sub>2</sub> ).
Caproic " .....	C <sub>6</sub> H <sub>14</sub> O or CH <sub>4</sub> O+5(CH <sub>2</sub> ).

These alcohols are called "homologous," because they are closely related to each other, and differ by the common multiple CH<sub>2</sub>. Ethylic is the common or ordinary alcohol, and amylic is an impurity existing in certain alcoholic beverages—for example, whisky, in which it occurs in consequence of the cupidty of distillers in carrying on the process after all the ethylic alcohol has distilled over. Absolute alcohol should be entirely free from any odor except its native ethereal odor, and no products but carbonic acid and water should result from its combustion.

Whisky is a solution of alcohol in water (48 to 56 per cent), but

contains various odorous principles and ethers which impart to it its peculiar physical properties. The best specimens, doubtless, contain traces of fusel-oil, and acetic, butyric, and sometimes valerianic acids are present in it. The reactions of these acids with the alcohol result in the formation of various ethers, and hence old whisky is more fragrant, and therefore more highly prized, than the recent product of the still.

Brandy is also a solution of alcohol in water (48 to 56 per cent). It has a wine-like odor, and a hot, astringent taste. It contains a volatile oil, an ether peculiar to wines (œnanthic ether), coloring-matters, tannic acid, aldehyde, and acetic ether. The color is usually factitious: in *pale brandy*, the color is derived from the cask; in *dark brandy*, from caramel. Brandy is made artificially from high-wines by the addition of an ether (cognac, acetic or nitric), of coloring-matter (burnt sugar), and an astringent to give it the necessary roughness of taste (logwood, catechu, etc.).

**PHYSIOLOGICAL ACTIONS.**—Alcohol in prolonged contact with the skin, evaporation being prevented, excites a sense of heat and superficial inflammation. It coagulates albumen and hardens the animal textures. The epithelium of the mouth is corrugated by it—a result due to the abstraction of water and condensation of the albumen. In the stomach alcohol causes a sense of warmth, which diffuses over the abdomen, and is quickly followed by a general glow of the body. In moderate quantity it induces a superficial congestion of the mucous membrane—a dilatation of the arterioles—and this increased blood-supply enables the mucous follicles and the gastric glands to produce a more abundant secretion. The increased formation of the stomach-juices is doubtless somewhat determined by the stimulation of the mouths of the glands, in accordance with a well-known physiological law. The excitation of the gastric mucous membrane, when habitual, results in important changes; a gastric catarrh is established—for the mucous follicles, under the influence of repeated stimulation, pour forth a pathological secretion. The gastric glands at first simply produce an increased amount of gastric juice, but abnormal stimulation results in pathological changes in this secretion. The increased blood-supply to the mucous membrane sets up an irritation of the connective tissue, which undergoes hyperplasia; the proper secreting structure is encroached upon, and the glands suffer atrophic changes which result in still more important modifications of the gastric juice. Alcohol also affects directly the constitution of the gastric juice by precipitating the pepsin from its solution and by arresting the activity of this ferment.

In small doses, not too frequently repeated, alcohol increases the digestive power by stimulating the flow of blood and soliciting a greater supply of the stomach-juices. Large doses impair digestion

directly by precipitating the pepsin, an albuminoid ferment. That a small quantity does not produce the same results in a comparative degree, is simply due to the fact that it is too far diluted, by the quantity of fluid present in the stomach, to act on the pepsin.

The structural alterations induced by the habitual use of alcohol, and the action of this agent on the pepsin, seriously impair the digestive power. Hence it is that those who are habitual consumers of alcoholic fluids suffer from disorders of digestion—gastric catarrh. The abnormal mucus which is elaborated in great quantity, acts the part of a ferment, and the starchy, saccharine, and fatty elements of the food undergo the acetic, lactic, and butyric fermentations. Acidity, heart-burn, pyrosis, regurgitation of food, and a peculiar retching in the morning (morning vomiting of drunkards), are produced.

As alcohol is a very diffusible substance, it enters the blood with great facility, and probably almost all of that taken into the stomach passes into the blood from this organ, and does not reach the small intestine. The liver is consequently the first organ, after the stomach, to be influenced by the ingested alcohol. The blood of the portal vein, rendered more highly stimulating by the presence of alcohol, increases for the time being the functional activity of the liver-cells, and, as is the case with the stomach, a more abundant glandular secretion follows. Frequent stimulation and consequent over-action result in impairment or loss of the proper function of the part, as is the universal law. The hepatic cells, over-stimulated, produce an imperfect product; they are affected by fatty and atrophic changes, and shrink in size; and the connective tissue of the liver undergoes hyperplasia. The first result of the structural alterations is an increase in the size of the organ; but with the shrinking of the hepatic cells, and the contraction of the newly-formed connective tissue, the liver becomes smaller, nodulated, and hardened. To this change the term *cirrhosis* has been applied. It is essentially a slowly-developing and chronic malady, and long indulgence in alcoholic liquids is necessary to its production.

In small doses, alcohol increases the action of the heart and the cutaneous circulation; a slight general rise of temperature is observed; and all of the functions are, for the time being, more energetically performed. If a considerable dose be taken, the phenomena of exhilaration, of excitement, of slight intoxication ensue. A still larger quantity causes loss of muscular power, impaired co-ordination of voluntary movements, and rambling incoherence. When a toxic dose is taken, the stage of excitement is of short duration; profound insensibility, with stertorous breathing and complete muscular resolution, quickly follow.

As respects the action of alcohol on the nervous system, it is obvious that its first effect is to increase the functional activity of the brain; the ideas flow more easily, the senses are more acute, the muscu-

lar movements are more active. These effects are coincident with the increased action of the heart, the slight rise of temperature, and the greater activity of the functions of the organism in general. With the increased action of the alcohol on the cerebrum the excitement becomes disorderly, the ideas incoherent and rambling, the muscular movements uncontrolled and inco-ordinate (over-stimulation of the cells of the gray matter). With an excessive quantity, the functions of the cerebrum are suspended, and complete unconsciousness ensues; the reflex movements cease; the functions of organic life are performed feebly; and, by an extension of the toxic influence to the centers presiding over these movements, respiration and circulation are finally arrested.

That these effects on the intra-cranial organs are due to the direct action of the alcohol has been shown. Alcohol has been discovered in the fluid contained in the ventricles, and has been distilled from the cerebral matter; and Hammond has demonstrated that it has a special affinity for nervous matter, being found in the cerebro-spinal axis and in the nerves, in greater quantity than in other tissues of the body. As a result of the direct contact, chiefly, but in part also from the variations in the intra-cranial blood-current, important structural alterations are gradually wrought in the cerebral matter. The cells of the gray matter become more or less fatty and shrunken, the neuroglia undergoes hyperplasia, shrinking and condensation of the whole cerebrum ensue (sclerosis), and the cerebro-spinal fluid relatively increases. The objective evidences of these pathological changes are seen in the impaired mental power, the muscular trembling, the shambling gait, of the drunkard.

In some subjects from sudden excess of a periodical kind, in others from a failure of the stomach to dispose, not only of aliment, but of the accustomed stimulus, a peculiar morbid state, known as *delirium tremens*, is produced. Peculiarity of the nervous system—idiosyncrasy—is an important factor in the causation of this condition, and probably also the use of alcoholic beverages rich in fusel-oil—for Richardson has shown, and the author has repeatedly confirmed the observation, that amylic alcohol causes tremors and muscular twitching “identical with the tremors observed in the human subject during the alcoholic disease known as *delirium tremens*.”

The long-continued action of alcohol on the nervous system produces other disorders besides *delirium tremens*. Hemi-anæsthesia, epilepsy, paraplegia, amaurosis, etc., have been observed to result from alcoholic excess, and mental alienation, as the asylum statistics prove, has in the same agent its most influential cause.

It is necessary now to consider what becomes of the alcohol after its introduction into the human body, and the influence which it exerts, if any, in the metamorphosis of tissue. The results of experiment on

these points have been remarkably contradictory; and the questions involved are by no means settled. It would require a volume to make a satisfactory analysis of the various memoirs and papers which have been published on the actions of alcohol. The author, therefore, merely presents the conclusions to which he himself has come, after a careful consideration of all the more important contributions to the literature of the subject.

A small quantity of alcohol, in a subject not accustomed to its use, causes, as has been already stated, increased activity in all the bodily functions, and slight elevation of temperature. Habit, as is the case with a great many drugs, modifies in a remarkable manner the physiological activity of alcohol, and hence these results are not perceived in the habitual consumers of this substance. Considerable doses of alcohol cause a decline in the temperature of the body, which is even more marked in pyrexia than in the normal state. As respects this effect, the influence of habit is equally great, for in old toppers a decline in temperature does not follow the use of alcohol in doses short of lethal. In animals the reduction of the body-heat is more marked than in man. To what cause is the decline in temperature, produced by alcohol, attributable? This is, doubtless, referable to the diminished rate of tissue metamorphosis—for it has been ascertained that the excretion both of urea and of carbonic acid is lessened by alcohol. The combustion of the nitrogen and carbon foods is, therefore, retarded. This action is represented, objectively, by an increase in the body-weight and the *embonpoint* of those who take stimulants moderately.

The disposition of alcohol in the organism is a subject which has gone through several revolutions of opinion. At present the weight of authority and the deductions of experiment are in favor of that view which maintains that, within certain limits (one ounce to one and a half ounce of absolute alcohol to a healthy man), alcohol is oxidized and destroyed in the organism, and yields up force which is applied as nervous, muscular, and gland force. The amount of alcohol ingested, in excess of this oxidizing power of the organism, is eliminated as alcohol by the various channels of excretion—by the lungs, skin, kidneys, etc. As alcohol checks tissue metamorphosis, and thus diminishes the evolution of heat and force, it might be expected that the products of its own oxidation would supply the deficiency, but this is not the case. Alcohol is a useful food in the small quantity which increases but does not impair digestion, which quickens the circulation and gland secretion but does not over-stimulate, and which is within the limit of the power of the organism to dispose of by the oxidation processes. This amount has been pretty accurately shown, as stated above, to be one ounce to one ounce and a half of absolute alcohol for a healthy adult in twenty-four hours. All excess is injurious. North-pole voyages, military expeditions (experiences in India and the Ashantee

march), and the diminished power of resistance to cold shown by drunkards, have conclusively demonstrated that alcohol does not supply the place of other foods; and that those habituated to its use, damaged as they are in their vital organs, do not possess the same endurance of fatigue and the same power of resistance to external morbid influences as do the healthy. Furthermore, clinical experience has amply proved that toppers do not bear chloroform well, that they succumb more quickly to injuries and surgical operations, and that they possess much less power of resistance than the temperate to the inroads of acute diseases. While these facts rest upon the soundest basis, it is equally true that alcohol is, within certain limits, a food, and that the organism may subsist, for a variable period, on it exclusively.

It is an important clinical fact that the physiological effects of alcohol differ in different conditions of the system. In convalescence from acute diseases, in the sudden depression of the powers of life caused by the bites of venomous snakes, or from loss of blood, or from serious injury, quantities which would, in the state of health, cause profound intoxication, are taken with impunity. The extremes of life—infancy and old age—bear considerable quantities of alcohol well, and are often remarkably benefited by them. Habitual use modifies still more decidedly the immediate influence of this agent on the functions of calorification, of circulation, and of the nervous system.

The differential diagnosis of acute alcoholism (lethal dose), of opium narcosis, concussion of the brain, cerebral hæmorrhage, and hæmorrhage into the pons or medulla, is by no means easy. In the absence of the history, in any given case, it may be impossible to determine. The odor of the breath (of opium or alcohol); the state of the pupil (contracted from opium, unequal, or contracted or dilated from intracranial hæmorrhage, contracted or dilated from alcoholic intoxication); the muscular resolution (common to all these states); the slow, sighing, irregular, or stertorous respiration (may occur in either); the abolition of reflex movements (a final symptom in all), are in the nature of things fallacious. A man who has received a concussion of the brain, or had an intra-cranial hæmorrhage, may have taken opium or alcoholic stimulants in quantity sufficient to impart a distinct odor to his breath, without otherwise being distinctly affected by it. The other signs are not sufficient in themselves to enable a decision to be reached. Hence the importance of an attentive examination of the surrounding circumstances. In the absence of a trustworthy history, it were better to suspend opinion until the further developments of the case enable an exact diagnosis to be made. The numerous examples of errors fallen into by most competent observers should make the physician hesitate before pronouncing an opinion of "drunk" or "dying," in the sensational language by which some of these cases of mistake have been characterized.

The treatment of acute alcoholism consists in the evacuation of the stomach by the stomach-pump of any unabsorbed alcohol; the cautious inhalation of ammoniacal gas; cold affusion to the head; faradism of the muscles of respiration, external warmth, etc.

As respects the *post-mortem* appearances the following have been observed: intense hyperæmia of the gastric mucous membrane; distention of the right cavities of the heart, and of the great venous trunks; hyperæmia of the cerebral meninges, and serous effusion into the ventricles and subarachnoid spaces.

THE THERAPY.—Alcohol in small doses is a useful *stomachic tonic*. It is best taken for this purpose after or with meals. It is specially serviceable in the *feeble digestion of old people*, the *atonic dyspepsia of the sedentary*, and in the *slow and inefficient digestion of convalescence from acute diseases*. It should be prescribed with caution in these cases, especially in the atonic dyspepsia of women and of sedentary men, because of the danger that an alcohol habit may be formed. When it is prescribed in the convalescence of acute diseases, the stimulant should be withdrawn at the earliest period.

Excellent results are obtained from the use of brandy in the *apepsia of infants*. The *summer diarrhoea*, both of children and adults, may be arrested by a full dose of brandy. Irritating matters and undigested food should be removed before the brandy is administered. The vomiting of *cholera-morbus* and of *cholera* may, frequently, be arrested by small doses of iced brandy (a teaspoonful in pounded ice every half-hour), or tablespoonful doses of iced champagne. *Other forms of vomiting*, when due to irritation or inflammation of the stomach—as, for example, the vomiting of pregnancy—can sometimes be promptly cured by the same remedy. It not unfrequently happens that, in *delirium tremens*, nothing is retained by the stomach, and the life of the patient is put into imminent danger, by reason of the failure of the food-supply to the blood. A little brandy and ice will sometimes settle the stomach under these circumstances, and enable the patient to take and digest the much-needed aliment.

Notwithstanding the theoretical objections which may be urged against this practice, clinical experience is strongly in favor of the use of alcoholic stimulants to counteract the depressing influence of certain agents on the action of the heart—as, for example, *aconite*, *veratrum viride*, *conium*, *digitalis*, and the *poison of venomous snakes*. Before commencing the inhalation of chloroform, an ounce or two of whisky or brandy should be given the patient. This serves a double purpose: it sustains the heart and prolongs the chloroform narcosis.

Alcohol in some form is constantly prescribed in low conditions in *fevers*, *acute inflammations*, and *depressing maladies of all kinds*. It is serviceable in these diseases when it lessens the pulse rate, but increases the contractile power of the heart and elevates the arterial

tension. It does harm when the pulse becomes more rapid and the blood-pressure is lowered by it. It does good when the tongue, before dry, becomes moister under its use, and harm when the dryness of the tongue is increased. It does good when the temperature is reduced, the delirium and subsultus lessened, and the sleep becomes more continuous and refreshing; and does harm when it increases fever, exaggerates the delirium, and induces coma vigil. The chief utility of alcohol in these forms of disease is not as a stimulant, but as a food. It furnishes material, easily oxidizable, which can be applied as nervous, muscular, and gland force. Furthermore it stimulates digestion, and enables more food to be taken and disposed of, and thus contributes indirectly to the maintenance of the powers of life. It follows from these considerations, that alcohol should be given in these low conditions of the organism, with milk, eggs, broth, and other suitable aliment.

Undoubtedly the stimulant treatment of *adynamic states* is often carried to great excess. The large doses of alcoholic substances administered, disorder the stomach and suspend digestion; and thus the condition of things which they are intended to relieve is only made worse. Furthermore, stimulants are excessively used in these disorders, from a wrong notion of their therapeutic action, and a conviction that diseases characterized by depression are best treated by arterial stimulants. The reaction which has set in against the antiphlogistic methods is in part answerable for the great freedom with which alcohol is now used in fevers and inflammations.

As respects its action on the nervous system, alcohol is a narcotic. It may be used to *relieve pain*, to *promote sleep*, and to *quiet delirium*. The various *neuralgiæ* may be temporarily alleviated by intoxicating doses of alcohol, but such a prescription is dangerous to the moral health of the patient. The subjects of neuralgia, or those who possess the neurotic temperament, have as a rule an inherited or acquired weakness of constitution, and a mobility of the nervous system, which render the effects of alcoholic stimulants peculiarly grateful.

When *wakefulness* is due to a condition of *cerebral anæmia*, a full dose of some alcoholic fluid, whisky or brandy, will procure sound and refreshing sleep. In some subjects a glass of ale or beer answers better. Some cases of *delirium tremens* are greatly benefited by alcoholic stimulants. When the delirium is the result of sudden excess and of the direct action of the alcohol on the cells of the gray matter, the use of this agent will only add to the existing disorder; but when, as is so frequently the case, the attack is determined by the failure of the stomach to appropriate not only the stimulant but the food also, the careful administration of alcoholic stimulants with suitable aliment renders an incontestable service.

As alcohol stops waste, promotes constructive metamorphosis by increasing the appetite and the digestive power, and favors the deposition of fat, it is directly indicated in *chronic wasting diseases*, especially in *phthisis*. Clinical experience is in accord with physiological data: alcohol is an important remedy in the various forms of *pulmonary phthisis*. It is frequently given with cod-liver oil, or an ounce or two of whisky may be taken with some bitter or aromatic immediately after meals. If alcohol disagrees, if it does not improve but lessens the appetite, it will do harm in *phthisis*. It is an interesting fact that an intractable form of *phthisis* is induced by alcoholic excess.

EXTERNAL APPLICATIONS OF ALCOHOL.—Equal parts of alcohol and water is an excellent evaporating lotion for the relief of superficial inflammations—*bruises, inflamed joints, orchitis*, etc. Alcohol is an excellent *hæmostatic* for restraining oozing from a large surface. For *suppurating wounds* alcohol is an efficient *antiseptic dressing*—it destroys germs, removes fetor, and stimulates the tissues to more healthy growth. It favors the cicatrization of open wounds by coagulating the albumen and thus making an impermeable covering. It is a useful practice to wash the parts threatened with bed-sores with whisky or alcohol; it hardens the cuticle, and prevents ulceration. *Sore nipples* may be prevented by washing them with brandy after the child nurses, and then dusting them with bismuth carbonate. Brandy-and-water is an excellent lotion for *mercurial* and other forms of *stomatitis* requiring stimulant applications. Brandy-and-water is one of the thousand injections used in *gonorrhœa*.

#### Authorities referred to :

- ANSTIE, DR. FRANCIS E. *Stimulants and Narcotics*, and various papers in *The Practitioner*.
- BAER, DR. A. *Der Alcoholismus, seine Verbreitung und seine Wirkung*, etc. Berlin, 1878, A. Hirschwald, pp. 621.
- BINZ, PROF. DR. C. *Virchow's Archiv*, vol. li, p. 153.
- IBID. *The Practitioner*, vol. iii, 1869, and vol. v, 1870.
- DUPRÉ, A., PH. D. *The Practitioner*, vol. viii, pp. 148, 224. *The Elimination of Alcohol*.
- JONES, DR. C. HANDFIELD. *The Practitioner*, vol. vii, p. 331.
- LALLEMAND, PERRIN ET DUROY. *Du Rôle de l'Alcool et des Anesthésiques dans l'Organisme*, Paris, 1860.
- LOMBARD, DR. J. S. *New York Medical Journal*, June, 1865.
- MURCHISON, DR. CHARLES. *A Treatise on Fevers*, second edition, p. 230.
- NICOL, DR. PATRICK. *The British and Foreign Medico-Chirurgical Review*, vol. 1, p. 203.
- PARKES, DR. E. A., AND COUNT CIP. WOLLOWICZ. *Experiments on the Effects of Alcohol (ethyl alcohol) on the Human Body*.
- RABOW, DR. S. *Berliner klinische Wochenschrift. Beobachtungen über die Wirkung des Alkohol auf die Körpertemperatur*, 1871, p. 257, et seq.
- RICHARDSON, DR. B. W. *The Medical Times and Gazette*, December 18, 1869, p. 703.
- RINGER AND RIKARD. *The Lancet*, August 26, 1866, p. 208.

**Vinum.—Wine.**

*Vinum Album.*—White wine. A pale, amber-colored or straw-colored alcoholic liquid, made by fermenting the unmodified juice of the grape, freed from seeds, stems, and skins. . . . White wine should contain not less than *ten per cent* nor more than *twelve per cent* by weight of absolute alcohol. (U. S. P.)

*Vinum Album Fortius.*—Stronger white wine. (White wine, seven parts; alcohol, one part.) (U. S. P.)

These are the only wines recognized by the United States Pharmacopœia. In medical practice a great variety are employed, in accordance with special indications. It would occupy too much space, and be foreign to the purpose of this work, to enter into details in regard to particular wines, but some attention should be given to the different groups.

*Sparkling Wines.* (Champagne, sparkling catawba, etc.)—These are wines which have been bottled before the stage of fermentation has been completed, hence they are lively, or sparkling, in consequence of being charged with carbonic acid. A considerable portion of the grape-sugar has not been converted into alcohol; they are sweet wines, therefore, and the quantity of absolute alcohol which they contain is relatively low (eight to twelve per cent). Sparkling hock is a lighter wine than champagne, and contains less sugar. Sparkling catawba more nearly resembles hock than champagne.

A sophistication now much practiced consists in adding to still wines carbonic-acid gas, by pressure, in the same manner that carbonic-acid water is manufactured.

*Dry Acid Wines.*—The best specimens of this group are the German Rhine and Moselle wines, California hock, and Ohio and Kelly-Island catawba. The German varieties are very numerous, and are remarkable for their flavor, for the completeness of the fermentation (absence of sugar), and for their permanence. The most important of the varieties are the following: Dürkheimer, Ungsteiner, Hochheimer, Deidesheimer, Förster, Rudesheimer, Johannisberger, Liebfrauenmilch, etc. The French wines are, as a rule, rather acid. The best known are the clarets, but these are more properly classed with the red wines.

*Sweet Wines.*—In this group are contained burgundy, still champagne, muscatel, malaga, Hungarian tokay, and angelica, madeira, etc. The alcoholic strength of these wines, unless fortified, is relatively low, because the sugar has not been consumed by the fermentation.

*Light Red Wines.*—The French clarets, the red Rhine wines, the American Ives's seedling, and Concord and Hungarian, are members of this group. They contain a large proportion of the coloring-matter of the grape, and considerable tannic acid.

*Heavy Red Wines.*—Port is the principal representative of this group, but it is not a natural wine; during the process of manufacture spirit is added, and its alcoholic strength is raised to thirty or forty per cent. California port when fortified, as it probably frequently is, should be classed in this division.

*Dry Spirituous Wines.*—The most important member of this group is sherry.

**COMPOSITION AND PROPERTIES.**—The composition of wine is extremely complex. The constituents ascertainable by chemical analysis do not represent all of the peculiar qualities which render various wines desirable. Bouquet and flavor can not be determined by the most expert chemist, and elude all other means of investigation but the tongue and nose of the "wine-taster."

A wine is a solution of alcohol in water, mixed with various constituents of the grape. The proportion of alcohol ranges from six to forty per cent—the largest quantity being found in the artificial wines, such as port and sherry. The proportion of sugar varies greatly—from three to twenty-five per cent. The acids are fixed (tartaric) and volatile (acetic). The relation between these several constituents is nearly as follows: Port contains about fifty-three parts by weight of alcohol to one part of acid, and twelve parts of sugar to one part of acid. The average of sherry is thirty-nine of alcohol and 1.5 of sugar to one of acid. In the sweet wines, the average is about thirty parts of sugar to one part of acid and fifteen parts of alcohol. In the acid wines, the average proportion of alcohol to acid is as eighteen to one, while the sugar is almost absent, and in some of the best is entirely so. Those are *dry wines* which are free from sugar. Besides tartaric and acetic acids, wines contain, in much smaller quantity, malic, tannic, and carbonic acids. Wines containing less than three hundred grains of acid to the gallon are wanting in flavor; on the other hand, an excess of acid over five hundred grains to the gallon is too sour to be agreeable. The coloring-matter of wine varies greatly, and the distinction between "white" and "red" depends on the quantity present in these different varieties. The red wines are more astringent, due to the larger proportion of tannin which they contain, and they are also rougher to the taste.

Wine contains a great many mineral constituents; tartrates of potassa and lime, chlorides of sodium, potassium, and calcium, and sulphates of potassa and lime. The percentage of ash ranges from 0.18 to 0.40.

**NOTE.**—Among the best wines for medicinal use are the Hungarian wines of Mr. L. Reich, of New York. The tokay has fine bouquet and flavor and good body, and the red wine is a claret of excellent quality. These wines are to be commended because they present satisfactory evidence of being the product of the fermentation of pure grape-juice.