ALCOHOL:

Its Effects on Body and Mind.

ELI F. BROWN, M. D.

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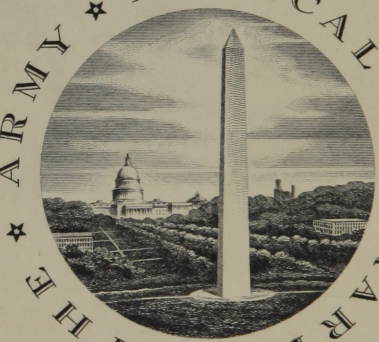

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ALCOHOL:

ITS EFFECTS ON BODY AND MIND.

BY

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Respectfully inscribed
to the Teachers of the
Common Schools.

PREFACE.

THE following lessons have been prepared to present in brief form definite information concerning alcohol and other stimulants and narcotics.

Much space is given to the effects of alcohol on the blood and nervous matter of the body, since it is by the deterioration of these tissues that it is so intimately and directly concerned in producing diseased conditions of the vital organs, and in affecting the mental powers.

Much is presented also concerning the relation of the use of alcohol to insanity and crime. Sufficient is given in this connection to show how closely alcoholic influence connects itself with these mental and moral evils.

An appendix is added, containing many extracts and statistics, which present much matter that could not be introduced in the body of the lessons. The author has deemed it well for his statements to be accompanied

by these corroborative opinions from eminent sources.

In the preparation of the matter presented in the text of the lessons free use has been made of the works of others.

The author has had sufficient experience and observation to justify his issuing these lessons for teachers and students as a work of the heart as well as of the head. If it shall prove to be an aid to the faithful, and a friend to the needy, its mission will be fulfilled.

CONTENTS.

INTRODUCTION.

In the following chapters the effects of alcohol and other stimulants and narcotics upon the human system are set forth quite fully in order that the teacher, the student, and the parent, may thereby be provided with the information necessary to enable them to speak and act with intelligence in respect to these important substances. The following remarks are addressed personally to the teacher of the public school, but are quite as appropriate for the consideration of any one who wishes to realize his own best interests, as well as to secure the greatest well-being of his fellows. Surely a matter that exists so widely in the human family, and affects all of its interests so profoundly, cannot fail to engage the thoughtful attention of every conscientious and earnest teacher who prepares for his life work that he may perform the greatest possible service to society.

To the teacher are given such opportunities for excellent work, such seasons for practical and enduring instruction in the right as

are not afforded to any other individual in the community in which he lives. The parents, however good, can reach but few beyond the members of their own family; the minister usually reaches only those who are already quite within the folds of protection; the lawyer looks more to the punishment of the lawbreaker than to the prevention of evil; the physician usually looks to the healing of the sick rather than to the preventing of disease. To the teacher of the public school pre-ĕminently is it given to educate all classes, by reaching through his wholesome and persistent influence the growing minds of the whole community. The children of the high and the low, of the good and the evil, assemble daily in his home, the school, to receive all that can be given of excellent import from the lips and character of him, the teacher, whom the law has chosen to stand in the place of the intelligent and good parent to them all.

That the teacher may realize the fruitfulness of the opportunities thus open to him, he needs to enrich his mind and endow his professional spirit with the force that comes from a careful study of the nature and management of the great evils that beset mankind, against whose dominion education must erect efficient barriers. It is not sufficient that he know the arithmetic, the reader, and the wri-

ting, and that he teach these skillfully. He must teach the children how to live, and so interest them in all things that they may live well. In order to do this the teacher must be a conscientious example of excellency, and a forcible mouthpiece of correct precept.

The teacher cannot do his full duty without exercising his influence in behalf of temperance, that he may protect the children under his care from the dangers and misfortunes of all who unwisely yield to the use of alcohol. How he may best perform this service is a question to be settled chiefly by his good sense, the character of his school, and all the circumstances that attend his peculiar position. In any case, at such times as may properly be taken therefor, in the opening, closing, and general exercises, definite instruction may be given concerning the nature of alcohol, the forms in which it is employed, the character of its influence upon the human system, with the consequences attending its use. In these matters positive instruction may be presented that is equal in importance to any other that can be given in any respect, and for which it is right and proper that sufficient time be taken. Such lessons may be forcibly impressed and illustrated by means of a few well chosen examples of the misfortunes that follow the use of alcohol. In no case need the

teacher give offense to any one in his school, and he certainly would be careful not to offend any whose children were under his charge.

It is not to be expected that parents who are addicted to the use of alcoholic beverages shall be changed in their habits. It is almost a hopeless undertaking to eradicate such practices. It is quite as difficult to impress them with any sense of impropriety in their course. When one has thoroughly formed the alcoholic or narcotic appetite, he feels in his inmost parts that "a little alcohol is a good thing," for it gratifies his craving, it makes him "feel better." He knows it has not already killed him, and he will attribute every pain and affliction that he experiences to something else than to his favorite beverage. He will seek in its torpor producing power, relief from every ill.

The teacher will find that some very good and well meaning people use alcoholic beverages freely; physicians, too, who prescribe it. These persons may be careless or may be ignorant of the consequences. However this may be, the teacher is not to reform the adult population, but the children of these people are to be taught better things and safer practices. They are certainly to be taught the dangers that lie concealed in the seemingly harmless moderate employment of spirituous

liquors, and the positive evils that ensue from their general and unenlightened use. The teacher needs to reach all classes. The children of the temperate are with him, whose parents will gladly have him enhance their influence for good; the children of the intemperate may be with him, as objects upon whom he should exercise the most tender and judicious influence, that he may offset parental example, and turn the whole current of their lives into other and better channels; the children of parents who think it a good thing to take a little alcohol, who habitually drink wine and beer, and who openly advocate it, are with him; these, too, are to be reached and guarded. In all cases the teacher is to realize that he has before him the need to make such forcible impression as shall direct and protect the child through all the years to come. This must determine for him that the instruction shall be adapted to the children, and of such a character as shall fix their attention sharply. The teacher must employ skillful and rational methods in such efforts, else his labors cannot prove very successful.

When men learn that the general tendency of alcohol is only to produce diseased conditions of the nervous system and of the vital organs, they will look upon it with less favor, and find less excuse for even its moderate use.

When it is known that its stimulating effects are but the first stage, to be followed necessarily by a season of depression and inflammation, its use by physicians will be more guarded.

When the mistaken and misleading notion that it can act as "accessory food" shall be seen in the true light of obstruction to vital processes, and incipient paralysis, it will cease to be used so extensively upon invalids, or to bloat an otherwise healthy man by the retention of his own imperfectly oxidized effete matter in the vital organs of his system.

When it shall be known that the most painful of human afflictions — insanity and idiocy—follow in its shadow, grow with it strength, and flourish in its devastation, and that crime prepares itself for riot and murde by its inflaming the passions and dethroning the intellect and will, those true physicians who would prevent disease, and those tre benefactors who would prevent the infractio of law by rational means will seek to control its use both by proper legal enactment, and y the dissemination of needful knowledge concerning its character. It will become a prominent feature of the problem of educationto control the use of alcohol.

When the teacher shall know how far ne depraved appetites engendered by it in ne

human body determine a weakened state of the mental and moral part, he will do all that he can to remove this physical obstruction to the dominion of reason, and he will seek to establish in all of his teachings, both in intellect and in morals, that proper physical basis which is found in a healthy body.

The teacher can have no fellowship with alcohol. He cannot afford to use it, nor to be seen in the company of such persons as do. His professional skirts must be clean. He needs only to teach the plain facts of the subject, and to do this in the same positive manner in which he teaches other subjects of importance. His success will be determined by the good sense of his conduct, and the force of his character and precept.

CHAPTER I.

General Character of Alcohol.

LESSON I.

Definition and History of Alcohol.—For th past two centuries the popular term, alcoho has been applied to a liquid produced alor with carbonic acid by the fermentation f sugar. It is the peculiar component of al fermented liquors, and gives to them thr intoxicating properties.

The mention made of wine and other fr-mented drinks in the oldest historic writins, and the injunction against intoxication in ie most ancient system of morals, show thathe substance now known as alcohol was ro-duced thousands of years ago in much he same manner that it is at present, and thi its influence was of the same nature that is to-day. All races of people have some rm of alcoholic beverage, differing in quality nd variety in the same degree as the enlig en-ment of the people.

In a scientific sense the term alcohol applies to a large class of substances of the same general character, differing slightly in origin, physical properties, and chemical composition, all of which may be viewed as constituting the alcohol family. Ordinary alcohol, of which this manual treats, is one member of this group, and is technically known as Ethyl Hydrate, a name derived from its chemical composition. The term alcohol as herein employed means Ethyl Hydrate.

Origin of Alcohol.—There is but one source yet known for alcohol, namely, the decomposition of some form of saccharine matter, by means of fermentation. Sugar is a vegetable product; so also is starch, which is readily modified in composition so that sugar is produced from it. Sugar and starch may be viewed together as the source of alcohol. They are derived abundantly from various fruits, grains, and tubers, such as the apple and grape, corn and rye, potato and beet. These common food-products of farm, orchard and vineyard are ordinarily employed as the raw material from which to manufacture alcohol in its various forms. Alcohol is produced in limited quantity by the decomposition of vegetable matter, and being very volatile it escapes into the atmosphere, in which it exists in extremely minute quantities. In the form

in which it is employed by man it is an article of artificial production.

Fermentation.—The process by which the sugar is decomposed, and alcohol and carbonic acid gas produced, consists in a chemical change by which the organic substance, sugar, turns to the two mineral substances just named. It is a process similar in character to that of the decomposition of any organic body, in which the vital forces give place to the dominion of chemical action. Sugar and starch do not of themselves readily putrify, but in the presence of some other organic substances which do readily decompose, they too undergo speedy change. Fermentation is promoted by the proper degree of temperature and the presence of some active decomposing agent.

As is well known, sweet cider (sweet by reason of its free sugar) if kept at the ordinary summer temperature, 20° C. or 70° F., undergoes a rapid transformation, in which bubbles of gas rise to the surface and a change in odor and taste ensue. The sugar of the cider is changed to alcohol and carbonic acid.

If a limited quantity of sugar or syrup be dissolved in warm water, and some common yeast be added, a result precisely similar to the change in the cider will occur. The yeast is a vegetable organism, and its growth under

the favorable conditions afforded in the warm sweet fluid produces the fermentation of the sugar in the liquid.

If any kind of grain, such as wheat, rye, barley, corn, etc., is moistened and kept in a warm place it begins to grow, as seen in the sprouting of the grains. By chewing the grain at this stage they will be found to be sweet. The starch of their composition having in part been changed to sugar. If now warm water and yeast be added, the sugar thus formed will be fermented, and alcohol be produced. This process is destructive of these grains as food, for the elements decomposed to form the alcohol are among those that give value to them as bread makers.

In the fermentation of cider and other fruit juices it is supposed that germs from the air enter the fluid and aid in its decomposition, as does the yeast in the other cases here mentioned.

By the several processes described the various fermented liquors are formed.

Cider is fermented apple-juice, and contains from 1 to 15 per cent. alcohol.

Wine is fermented grape- or berry-juice, and contains from 7 to 23 per cent. alcohol.

Beer is fermented grains, and contains from 3 to 10 per cent. alcohol.

Ale is one kind of beer, and contains from 6 to 8 per cent. alcohol.

QUESTIONS.

1. What is alcohol?
2. What evidence that it has long been produced?
3. What is its technical name?
4. What is the origin of alcohol?
5. What is fermentation?
6. How are sugar and starch caused to decompose?
7. What is cider, and what change does it undergo?
8. How may alcohol be made from syrup?
9. How may grains be fermented?
10. What is wine, and how much alcohol in it?
11. What is beer, and how much alcohol in it?
12. What grains are usually employed in making beer?
13. Since beets are rich in sugar, may alcohol be made from them?
14. How does fermentation compare with decomposition?

Lesson II.

Physical Properties of Alcohol.—The alcohol produced as described in the preceding lesson is a colorless liquid having a mild, agreeable odor, and a hot, pungent taste. It is lighter than water, boils at 173° F., and has not yet been frozen. It is highly volatile, and burns readily with a pale, blue flame, producing great heat. It is an important solvent for oils, gums and resins. It is a remarkable preservative of organic substances that are submerged in it. It has a decided affinity for water, the two uniting in any proportion. So great is the attraction with which they are held in solution in each other, that it is impossible to obtain alcohol absolutely free from water.

Distillation consists in the separation of any two fluids that boil at different degrees of temperature. Since alcohol boils at 173° F., and water at 212° F., if a mixture of the two substances be kept at a temperature above the former and below the latter the alcohol will pass off in volatile form with some vapor of water, while the greater portion of the water will be left behind without the alcohol. The volatile products thus driven off may be condensed by conducting them into a cool chamber. They will consist of all the alcohol

and some of the water. By repeated distillation it is practicable to approach absolutely pure alcohol.

Spirituous Liquors are produced by subjecting the various fermented liquors to the process of distillation. They contain the alcohol, some of the water, and the volatile oils of the original liquors.

Brandy is distilled from wine.

Whiskey is distilled from fermented grains.

Rum is distilled from waste sugars and molasses.

Commercial alcohol is produced by a higher distillation than that employed in obtaining whiskey.

Absolute alcohol is obtained by the highest distillation of alcohol, after which it is rectified by the use of lime which removes almost all of the remaining water.

Classification of Liquors:

1. Fermented.
   a. Natural.
   (1) Cider, from 5 to 10 per cent. alcohol.
   (2) Beer, " 3 to 10 " "
   (3) Ale, " 6 to 10 " "
   (4) Rhenish, 7 to 9 " "
   (5) Claret, 7 to 9 " "
   (6) Champagne, 5 to 13 " "

(7) Hock, 6 to 16 per cent. alcohol.
(8) Perry, 7 to 8 " "
(9) Stout, 6 to 8 " "
(10) Tokay, 9 to 12 " "

b. Fortified.

(1) Madeira, 16 to 25 per cent. alcohol.
(2) Sherry, 16 to 25 " "
(3) Port, 16 to 25 " "

2. Distilled.

a. Spirituous.

(1) Rum, 60 to 70 per cent. alcohol.
(2) Gin, 50 to 60 " "
(3) Whiskey, 50 to 60 " "
(4) Brandy, 50 to 60 " "

b. Rectified.

(1) Alcohol, (commercial), 75 per cent.
(2) Alcohol, (absolute), 95 "

QUESTIONS.

1. What properties does alcohol present to the senses?
2. Why is it difficult to separate from water?
3. What is distillation?
4. How may fresh water be obtained from salty water?
5. How may alcohol be driven out of water?

6. Why will alcohol escape from a vessel if open?
7. What are spirituous liquors?
8. How are spirituous liquors obtained?
9. What is brandy?
10. What is whiskey?
11. What is rum?
12. What is commercial alcohol?
13. What is absolute alcohol?
14. How much alcohol in cider, beer, ale?
15. How much alcohol in champagne?
16. How much alcohol in madeira?
17. How much alcohol in whiskey?
18. How much alcohol in brandy?
19. In a quart of beer how much alcohol?
20. In a glass of wine how much alcohol?

Lesson III.

Chemical Composition of Alcohol.—Alcohol, in all of its forms, is composed of carbon, hydrogen and oxygen. It is in the different ratio of combination of these three elements that the various alcohols are chemically dissimilar. The following are the members of the alcohol family that are best known to chemistry:

Name.	Symbol.	
Methyl hydrate, -	$C H_4 O$.	
Ethyl hydrate, -	$C_2 H_6 O$.	(Ordinary alco-
Propyl hydrate, -	$C_3 H_8 O$.	[hol.)
Butyl hydrate, - -	$C_4 H_{10} O$.	
Amyl hydrate, -	$C_5 H_{12} O$.	

Methyl hydrate results from the destructive distillation of wood; ethyl hydrate is produced by vinous fermentation; propyl hydrate results from the continued distillation after ordinary brandy has been removed from wines; butyl hydrate is a heavy oily distillate from fermented beet roots; amyl hydrate is formed in the later distillates from corn and potato ferments.

These alcohols vary in their physical character from the first two, which are liquids lighter than water, to the last two that are solids, resembling fats in appearance.

By oxidation the alcohols yield alde hydes, and these by further oxidation produce various acids. A familiar illustration of this change is seen in the oxidation of common alcohol to produce vinegar.

Chloroform is produced from any of the alcohols by distilling them with chloride of lime.

Chloral is produced from absolute alcohol by treating it with chlorine gas.

Ether (sulphuric) is obtained by the ac-

tion of sulphuric acid on alcohol at a certain temperature.

By the chemical composition of alcohol it is closely related to the various hydro-carbons employed for producing light and heat. By burning it forms water and carbonic acid gas.

QUESTIONS.

1. What are the elements of alcohol?
2. How do the different alcohols differ?
3. What are the different alcohols by name?
4. From what is each formed?
5. What is vinegar?
6. What is chloroform?
7. What is chloral?
8. What is ether?
9. What does alcohol produce when burned?
10. How does it resemble oil, fat, and wood?

LESSON IV.

The Use of Alcohol in the Arts.—The chief use of alcohol in the various arts is dependent upon its power of dissolving many substances, such as gums, resins, oils, etc. This is illustrated in common varnish, in which a resinous substance is dissolved in alcohol and oils,

making a fluid for coating a surface. This fluid may be applied to wood or other matter to form a thin coating; the alcohol evaporates and leaves the resin behind as a hard, glossy surface of varnish.

By reason of its inflammability alcohol is employed in special cases as a means of making a very hot, smokeless flame.

Since alcohol does not freeze, it is used in spirit levels, and in thermometers for very low temperatures.

The antiseptic properties of alcohol lead to its use in preserving specimens of organic matter. Animal matter immersed in it will not decompose. In this respect it is equaled only by arsenic, creosote, and carbolic acid.

The Use of Alcohol in the Preparation of Drugs.—Alcohol is one of the most common substances employed in the preparation of drugs and medicines. Because of its power of dissolving gums and oils, it is used in extracting these substances from various leaves, barks, seeds and roots, so that a large class of alcoholic tinctures are thus formed, which contain the essential oils or other medicinal components of vegetable bodies dissolved in alcohol.

The large class of drugs sold as medicines (usually patented) known as "tonics," "stimulants, "bitters," etc., are usually composed of

dilute alcohol of low grade holding in solution some mineral compound, or some vegetable oil or salt.

The adulteration of alcohol as employed in the preparation of drugs is extensively practised. The low grade spirits are disguised by adding ethers, essential oils, tinctures, essences, syrups, sugars, acids, etc., to flavor and color, while water is added to decrease the strength.

The Use of Alcohol as Beverages.—The employment of alcohol in the preparation of artificial beverage constitutes by far the greatest use made of it. All beverages that tend to intoxicate owe that property to the alcohol they contain, and are properly designated alcoholic beverages. It is the alcohol in all forms of wine, beer, and whiskeys, that gives them their characteristic stimulating and noxious effects. It is the alcohol they contain that gives them their peculiar value in the estimate of those who use them. If it were absent, or were driven off by heat, the remaining mass would be wholly unattractive to any one.

Wine contains some free sugar, essential oils, and coloring matter from the fruits. Beer contains sugar, carbonic acid, dextrine, etc. Whiskey has in it some volatile oils. These components, however, are trifling, the alcohol

constitutes the active, powerful element of all fermented or distilled beverages.

Adulteration of Alcoholic Beverages.—As the use of alcohol in the form of beverages constitutes its chief and almost universal demand, so the adulterations of these articles is of the most extensive and shameful character.

It is a notorious fact that conscientious physicians experience great difficulty in procuring pure wines and liquors for medicinal uses. Adulteration is the rule, purity, the exception. It is estimated that in Southern Europe one-half the wines contain no other poison than the alcohol, while in the northern countries of Europe less than one-fourth are uncorrupted. In America not one bottle in ten is free from gross adulteration. It is estimated upon good authority that from every pipe of pure wine that comes from the vineyards of France and Germany, no less than ten are produced by adulteration. While adulteration of alcoholic beverages is so extensive, the subject is more alarming from the character of the substances so shamefully employed, and from their effects upon the human system. However questionable the effects of alcohol itself, there can be no doubt as to the evil consequences to follow from the violent poisons employed in its adulteration. The Vintners' Guide, Brewers' Manual, and other works of

like character, give minute directions for modifying wines, beers and liquors by the use of such substances as white lead, red lead, copperas, sugar of lead, logwood, alum, henbane, opium, aloes, tobacco, nux vomica, sulphuric acid, arsenic and strichnia.

QUESTIONS.

1. What property of alcohol gives it great use in the arts?
2. What is varnish?
3. How are tinctures made?
4. What is the chief form in which alcohol is used?
5. What gives the chief value to wines?
6. What produces the intoxicating effects of wine?
7. What is meant by adulteration?
8. What is true of the impurity of alcoholic beverages?
9. What kinds of substances are often used in adulterating alcohols?
10. Name some of the substances thus used?
11. What is true of the effect of these substances upon the human system?

CHAPTER II.

Action of Alcohol on Living Animal Tissue.

LESSON V.

Alcohol as Drink.—In considering alcohol as a beverage several questions arise:

1. What are the purposes of drink?
2. Does alcohol fulfill these ends?
3. What tissues are most affected by its action?

In all living bodies it is necessary that all parts shall be bathed constantly by the ever-moving fluid, the blood. This flow of blood to and from the parts is the essential condition of life, since this fluid is the proper solvent of food particles, and is the agency by whose action they are borne to every tissue. In the animal body it is also the carrier of waste and noxious substances from the tissues to be cast out of the body. This circulatory fluid is essentially water, holding in solution

certain salts, and floating certain organized bodies the corpuscles; the latter are generally confined to the vessels of circulation, while the watery portion of the blood passes freely through all the tissues. Taking all the free fluid of the body as blood it forms a large portion of the whole mass. Water also enters largely into the structure of the tissues—the blood proper is four-fifths water, the brain and muscles are three-fourths water, and the various juices are nine-tenths water. The water of the body contributes to give it rotundity of form, flexibility, and capacity for motion.

A true beverage is such an article as supplies this large amount of water, without introducing any noxious element with it. For mammals after weaning, and for all other animals, the universal beverage is water, all added constituents are foreign to the purposes of the drink. Water, in some form, to the amount of from one to three pounds daily, is necessary for the health of the human body. The urgent demand for it is felt in thirst, which, if long continued, results in violent craving, and which, if unrelieved, will in a few days result in death. Water relieves the craving, and sustains the circulation.

If substances which have a great affinity for water are introduced into the body they will extract the water from the tissues, and if

there is a sufficiently strong attraction for the water they will decompose the tissues. Substances known as caustics destroy flesh by their intense affinity for its water. Such is the action of caustic soda, potassa, lime, silver, and the corrosive effects of sulphuric and carbolic acids. Other substances of milder affinity for water do not decompose the tissues, but extract the free water, tending thereby to cause shrinkage, hardening, and stiffening of such parts as come in contact with them. Such substances when taken as drink or food produce thirst; common salt and dilute alcohol act in this manner. If absolute alcohol is taken into the mouth or stomach it will blister the mucous membrane, and decompose the structure of the parts, so great is its affinity for the water they contain. If any form of dilute alcohol be introduced the same kind of action ensues in less degree of violence. Thirst is an unfailing sequel to the drinking of any kind of alcohol. A true beverage tends always to slake thirst. The large amount of water in some drinks, with the small portion of alcohol they contain, enables them to allay thirst; such is the action of beer. It is the water, however, and not the alcohol that gratifies the thirst. The water of the beer would quench the thirst more readily if the alcohol were not present. Anatomical examinations

prove that the tissues of those who are addicted to the use of alcoholic beverages are hardened by the exhaustion of their water. This is especially true of the nervous tissue of those who die from the evil effects of alcohol.

It is a function of the circulatory fluid to aid in the digestion of food, and to hold the food particles in solution. Alcohol, when introduced in other than very small quantities, manifests decided results in arresting the digestion of food, and in rendering the albuminoids incapable of solution. By its anæsthetic properties it tends to render the nervous and muscular action of the stomach less vigorous. This action of alcohol is the reverse of a true beverage.

QUESTIONS.

1. What is true of all living tissues as to moisture?
2. What is the circulating fluid of plants?
3. What is the circulating fluid of animals?
4. What are the functions of the blood?
5. What portion of the whole body is fluid?
6. What important tissues are largely water?
7. What is the purpose of beverage?

8. What is the universal drink for animals?

9. What is thirst?

10. What will allay thirst, and why?

11. When do certain substances cause thirst?

12. What kinds of substances destroy because of their affinity for water?

13. What is true of alcohol in this respect?

14. Since alcohol produces thirst, and will not allay it, is it a true beverage?

15. Why does beer allay thirst?

16. What change in the beer would cause it to better relieve thirst?

17. How is the water we take related to digestion?

18. How does alcohol affect digestion?

19. How does alcohol weaken the action of the stomach?

20. How much water is needed daily?

21. Would the addition of alcohol require us to drink more or less water?

22. Why does one who has been drinking freely of alcoholic liquors experience great thirst?

Lesson VI.

Alcohol as Food.—All parts of the body experience constant waste of tissue, and require incessant repair. Food is necessary to supply this continuous demand for nourishment. The need of food is manifested in the familiar craving known as hunger. It is appeased by taking such substances into the alimentary canal as will by proper preparation be absorbed into the blood, and when circulated to the tissues will contribute directly to their support. Food gratifies hunger and maintains the strength, warmth and vigor of the body.

Alcohol when taken into the alimentary canal, tends to arrest the digestion of other food, undergoes no essential change in itself, is readily absorbed by the blood, and is carried by it to all parts of the body. It holds greedily to the water of various parts, affecting most forcibly those tissues that are largely composed of water — the blood, nerves, and muscles. To the tissues it gives no nourishment. It adds no abiding strength, and does not appease hunger. It is finally eliminated from the body with little or no change by the excretions of the lungs, skin and kidneys. Every where it has acted as an intruder; no where has it given support. When taken in very small quantities its action is less opposed

to the process of nutrition, and in certain cases of exhaustion, and of wasting disease it may by its peculiar properties aid in the assimilation of food, or may itself be appropriated by the tissues. This action, however, is one that is not well understood, and is not to be viewed as the action of a regular article of diet—the most skillful physicians are divided in opinion upon the food-action of alcohol in any case.

Alcohol as Heat Producer—Alcohol is similar in chemical composition to the carbonaceous substances employed in food as the heat producers in the body, such as sugar, starch, fats, etc. It is by the action of the inhaled oxygen upon the substances that the general warmth of the body is in great part sustained. Carbonic acid gas and vapor of water are formed by this chemical action, and heat is liberated to the tissues. The amount of heat evolved is commensurate with the quantity of carbonic acid formed. The amount of force derived from such foods and transmitted to the tissues, which force manifests itself in vigor and warmth, is in proportion to the amount of carbonic acid exhaled from the lungs. All heat producing foods manifest their essential character by increasing the temperature of the living body, and by in-

creasing the amount of carbonic acid thrown off.

Alcohol contains fifty-two per cent. of carbon, and would by oxidation produce the results stated above. The facts are, however, that alcohol undergoes little or no change in its passage through the circulation and the tissues. The quantity of carbonic acid exhaled from the lungs of a man under the influence of alcohol is much less than the amount from the same lungs when the man has no alcohol in his system. The temperature of the living body is lowered, rather than raised, by the action of alcohol.

"For a few minutes after alcohol is administered, to the amount of a gill of wine or brandy, the temperature rises slightly, after which it falls several degrees below the standard of health, and remains so for hours."—W. B. CARPENTER.

The power of resistence to cold, and the ability to endure great muscular or nervous strain are weakened by the action of alcohol. The truth of these statements is abundantly shown in the reports of the army, of arctic exploring parties, and the statistics of working men.

The following contrast summarizes the action of alcohol as food, drink, and heat producer:

1. A true beverage slakes the thirst, furnishes water to the tissues, and aids in dissolving and digesting the food.	1. Alcohol produces thirst, takes water from the tissues, and hinders the solution and digestion of food.
2. Food is nutritious substance; it enters the blood in a new guise; it satisfies hunger, it is built into the tissues, and furnishes energy to them in the form of matter and force.	2. Alcohol is innutritious; it enters the blood unchanged; it fails to relieve hunger; it is not built into the tissues, and gives no supply of energy to them.
3. Heat and strength producing articles of food materially increase the temperature of the body, the amount of carbonic acid exhaled, and the general vigor of the tissues.	3. Alcohol lowers the temperature, diminishes the amount of carbonic acid exhaled, and lessens the general vigor.

4. Truly nutritious food matter, of whatever kind, does not generate for itself a peculiar, abnormal and devastating appetite. It gratifies hunger and thirst. It may be substituted by other food without inconvenience, and it does not ultimate in physical and mental degeneracy.

4. Alcohol, in whatever form it is taken, does generate for itself a peculiar, abnormal, and devastating appetite. It does not satisfy hunger and thirst. It will not submit to substitution. It does ultimate in physical and mental degeneracy.

QUESTIONS.

1. What is food?
2. What is hunger?
3. What is the test of a nutritious food?
4. How does the action of alcohol differ from that of food?
5. What substances produce heat when taken as food?
6. How do they affect the quantity of carbonic acid gas exhaled?
7. How does alcohol affect the temperature?
8. How does alcohol affect the amount of energy in the tissues?
9. How does alcohol affect the power to re-

sist cold and exposure, and to endure great strain?

10. How does alcohol act in producing a peculiar appetite for itself?

Lesson VII.

Effects of Alcohol on the Blood.—The blood circulates to the different parts of the body, and constantly bathes all the tissues, bearing to them nutritious substances to be built into their structure, and also oxygen gas from the air of the lungs, designed to act as the great oxidizer and "sweeper of the living body." The blood is constantly bearing away from the tissues the waste matter resulting from their transformation.

The blood bears the food matter and various salts in its plasma or watery portion. It bears the oxygen gas to the tissues and the carbonic acid gas back to the lungs by means of the corpuscles.

The plasma of the blood contains fibrine in solution, which gives to the blood its proper consistency, and its disposition to coagulate on being exposed to the air.

The action of alcohol upon the blood is very decided, since the blood is so largely composed of water, for which the alcohol has

such great affinity. The alcohol causes the corpuscles to shrink by reason of a loss of a part of their water, and if much exposed to its action they become shriveled and ragged along the edges. The most important effect is, that the corpuscles lose much of their power for holding and bearing oxygen and carbonic acid, it is for this reason that oxidation throughout the body is partially arrested. This may in part account for the reduction of temperature during the presence of alcohol in the blood, and also for the lessened quantity of carbonic acid gas exhaled. By this suppressing influence upon the corpuscles the direct action of alcohol in the blood is to arrest that ready interchange of substances which tends to invigorate, and to prevent that prompt and complete elimination of waste matter so essential to the proper health of all the parts.

The habitual presence of alcohol produces permanent deterioration in the blood, and thereby causes direct tendencies toward diseased conditions, especially manifested in the centres of circulation—the heart, liver, kidneys, and lungs.

It appears that the fibrine of the blood is affected by the alcohol as follows: If it is exposed to strong alcohol it is coagulated in the blood vessels, and thus tends to clog the

circulation in the capillaries. If it is exposed to very dilute alcohol for any considerable length of time, as in the case with habitual drinkers, it loses its power of coagulation, so that the blood wastes freely from breaks or cuts of these vessels. This action of alcohol upon the blood is well known to surgeons, who, because of these conditions, hesitate to perform such operations upon alcoholic patients as may with certainty be performed upon those whose blood is not contaminated by alcohol.

QUESTIONS.

1. What are the purposes of the blood?
2. What is the "sweeper" of the living body?
3. How does the blood convey nutritious matter?
4. How are gases borne by the blood?
5. What is the fibrine of the blood for?
6. How does the alcohol affect the corpuscles?
7. Why does alcohol lessen oxidation in the body?
8. How account for a reduction in temperature?
9. What effect has alcohol on the elimination of waste water?
10. How does the effects of alcohol on the

blood tend to produce permanent conditions of disease?

11. What organs are affected most by its action?

12. How does alcohol affect the fibrine of the blood?

13. Why do surgeons hesitate to perform critical operations on alcoholic patients?

Lesson VIII.

Effects of Alcohol on Nerves.—The nervous system presides over sensation and motion, governs all those processes essential to the life and growth of the body, serves the higher purposes of arousing the mind to consciousness of external things and furnishes the mind with the instrumental part of the body by which to control the whole.

The nervous system is composed of thread-like nerves which ramify all parts of the body and which have their outer or distant ends distributed to the surface of the body, and to the muscles and vital organs. The inner ends of these nerves converge to and join with masses of cellular nervous matter, called centers—the chief of which is the brain.

The purpose of the nerves distributed to the surface is to transmit to the centers the

excitement received by their outer ends, and to produce upon the centers such impressions as shall result in sense of feeling. If, for example, the surface of the finger touches a hot substance the irritation of the extremities of the nerves thus affected is conveyed to the proper centers and the sensation of pain is aroused.

It is the purpose of the nerves connecting the centers with the muscles to convey such nervous stimulus to the muscles as shall cause contraction and hence produce motion. In the example just given the hand is removed from the hot object by such action.

Whatever affects the character of the nervous tissue affects the power to feel and to judge correctly of external conditions, together with the power to control the motions of the body. Feeling, motion, and mental activity are directly determined by the conditions of the nervous system. The substance, of which nervous matter is formed, is of a delicate, soft, white, pulp-like character, of cellular structure, largely composed of water.

When alcohol is introduced into the body and distributed by the blood it comes in contact with nerve substance and is forcibly drawn to it by the water contained in it. The alcohol draws some of the water from the nerve cells, causing them to contract and

grow more hard. This effect upon nerve substance is produced when the brain or other such matter is treated with it after removal from the body, and the same hardened condition is noticeably true of the nerve matter of those who are addicted to the use of alcohol, or who die from its effects.

By the action of alcohol just stated the nerve extremities in the living body are paralyzed and rendered unfit for their purpose, so that the part of the body thus affected becomes less sensitive to irritation, and fails to report to the centers the true external conditions. This is illustrated in the manner in which alcohol renders the parts to which it is applied partially insensible; if alcohol be held in the mouth for a short time the acuteness of the sense of taste is diminished; if alcohol is held in the mouth about a tooth the tooth may be extracted with little pain because of the blunted sensibility of the parts; alcohol administered internally in cases of acute pain in the stomach or other organs frequently gives relief, it "cures the pain" by rendering the parts less sensitive to irritation.

This relief from pain is readily mistaken for permanent cure, whereas it is but a temporary insensibility. The deadening effects of alcohol upon the extremities of sensory nerves is also shown in the blunted feelings

of those who are under its influence ; such persons are quite insensible to blows, bruises, burns and such other injuries as would prove extremely painful to them under other conditions.

The primary effect of alcohol is therefore that of paralysis of nerve extremities. It lays hold of the nerves and suspends for a time the power to feel. The nerves distributed to the small blood vessels and capillaries are in like manner affected, so that these minute tubes become relaxed and fill with blood. This is shown in the flushed skin and rise of temperature upon the surface after taking alcohol into the system.

This action on the nerve extremities is accompanied by undue excitement of the nerve centers, the effect of which is to cause a temporary exhilaration of mind so that the individual feels brightened and cheered. The nerves connected with the muscles are excited so that for a brief season there is an increased sense of strength and vigor. The heart beats faster and the whole circulation is quickened. This initiatory condition is most marked and prolonged in cases in which the alcohol that is taken is limited in quantity and is greatly diluted.

QUESTIONS.

1. What are the purposes of the nervous system?

2. How are the nerves arranged?

3. How is feeling performed, and how does motion take place?

4. Upon what does proper feeling and power to move the body depend?

5. How does alcohol affect nerve substance?

6. How does it affect the nerves in a living body?

7. How does it render any part of the body insensible?

8. How may it relieve internal pain?

9. What wrong conclusion may arise from the fact that alcohol relieves pain?

10. Why are persons under the influence of alcohol insensible to blows and other injuries?

11. Why do such persons have red faces and move with unsteady steps?

12. Why does alcohol produce excitement?

LESSON IX.

Stages of the Effect of Alcohol. — FIRST STAGE.—The action of alcohol described in the preceding lesson constitutes what may be

called the first stage— stage of *stimulation.* It is temporary ; it is marked by loss of acute feeling, by increased circulation and flow of blood to the surface and extremities, by slight rise of temperature, muscular excitement and mental exhilaration.

SECOND STAGE.—The undue excitement of the primary action is early followed by the second stage—stage of *depression*, varying in degree of intensity. In this stage there is slight chilliness, a fall of temperature below the normal degree, which decline in warmth continues for several hours, indisposition to muscular exertion, irritability of temper, and lack of control over words and thoughts. This condition is the natural consequence of reaction from the stimulated state of the first stage. If the amount of alcohol taken is small, and the individual is healthy and strong, this condition may not be very noticeable. If, however, the person is weak, or the amount of alcohol taken is great, the effects become decided and alarming. It is the approach of this season of depression that incites the victim of stimulating drinks to renew the amount, hoping thereby to regain the agreeable conditions of the first action, regardless of the inevitable consequences that must in the end follow. It is the occurrence of this period of depression and reaction that

causes one of the great dangers in medication by alcohol, in which case the weak invalid suffers fatal relapse from the over stimulation and excitement of the first stage.

THIRD STAGE.—If the amount of alcohol be sufficiently great, farther developments of abnormal condition will be produced, and what is recognized as the third stage—stage of *intoxication*—will appear. In it the effects manifested in the second are exaggerated, the organs become filled with blood, and the nervous system becomes more alarmingly deranged. The proper action of the brain is obscured and the animal instincts, uncontrolled by reason, assume dominion. The vital organs become enfeebled as seen in the inefficient respiration, and the lessened power and frequency of action of the heart. The temperature is decidedly lowered. All the conditions show a great departure from health in both body and mind.

FOURTH STAGE.—If the consequences are still farther developed, the fourth stage—stage of *unconsciousness*—appears, in which the individual loses all power of control, and the activity of the nervous system seems almost wholly arrested. He can not see, or hear, or feel. He lies helpless. His limbs drop heavily if lifted. The action of the heart is extremely irregular, spasmodic and inefficient,

while the slow, clogged breathing shows that the activity of the respiratory process (the most tenacious of vitality of all the vital processes) is almost paralyzed. The individual is in the last stages of temporary paralysis of the whole nervous system, and borders closely upon death from the narcotic effects of alcohol.

Stimulant and Narcotic.—In the stages of alcoholic action as given above there are two conditions of marked difference representing the two phases of action known as stimulation and narcotism. In order to study further the action of alcohol it is desirable that the terms stimulant and narcotic be defined:

A stimulant is such a substance as is capable of expressing itself in the system by increasing the action of the parts upon which it operates, by causing them to put forth their own forces more energetically without their receiving contributions of matter or force from the substance causing the excitement. This spurring effect of a stimulant is its primary and characteristic action. Such an effect can only be temporary, and is followed sooner or latter by corresponding depression of greater or less degree, caused by the undue excitement of energy by the parts affected. The number of substances producing this ef-

fect is great. It is strictly the action of a poison, and all poisons act as stimulants.

A narcotic is a substance which expresses its influence by causing or tending to cause paralysis of the nervous system, either temporary or permanent. It depresses that upon which it acts. Some elevation may attend its early manifestations, but its final characteristic is depression, stupor, paralysis, and death.

QUESTIONS.

1. What is the character of the first stage?
2. By what other name is it known?
3. What is the nature of the second stage?
4. What other name is applied to the second stage?
5. What relation does it bear to the first?
6. Under what circumstances are its effects not very noticeable?
7. What danger attends the second stage in the use of alcohol as medicine?
8. What is the character of the third stage?
9. What common term is used to name the third condition?
10. What is the fourth stage?

11. What indicates the extreme dangers of the third and fourth stages?
12. What is a stimulant?
13. What is a narcotic?

Lesson X.

Alcohol as a Stimulant.—The views of physiologists are somewhat conflicting concerning the influence of moderate quantities of alcohol on the nervous system. It is true also that its influence is not uniform with different persons. There is little doubt, however, that usually it does temporarily give additional tone and vigor, and acts as a stimulant to both the nervous and muscular systems; that it probably does this by no addition of matter or force from itself, but rather produces this excitement by whipping into action forces already existing; that temporary muscular and mental vigor attend its action; that there is for a short time increased circulation and added warmth of the surface; that it exercises a decided influence upon the nutritive processes, and a marked effect on the disassimilation of tissues.

To an individual in health there can be no doubt that the stimulating effects as here indicated are needless, and that they cannot in the end prove beneficial.

Its influence as a stimulant is indicated only with invalids in such cases as those in which there is temporary nervous shock or exhaustion to be relieved, or acute and depleting waste of tissue to be arrested. Its use is questionable even in these cases by reason of the reaction that may follow, and the inflammation of the nervous system that may ensue. Surely no one, save a very skillful and conscientious physician, is competent to administer it in any case.

Whether in health or in disease its action is *deceptive,* in that, the person subject to its influence thinks he is cured of his pain because insensible to it, that he is stronger by reason of his borrowed stimulation, that he is happier and brighter by the inflammation of his nerve centers.

"Whosoever is deceived thereby is not wise."

Alcohol as a Narcotic.—The stimulating effects of alcohol as just described are essentially the primary action of the substance, and are limited to its use in small quantities. Following stimulation there are narcotic influences of greater or less degree. The use of alcohol in large quantity, or in small portions frequently repeated is invariably succeeded by narcotic depression, tending to produce inflamed nervous condition, mental and

physical torpor, low temperature, organic disease, and death. The degree of such depression is determined by the amount of alcohol administered, and the susceptibility of the individual to alcoholic action.

The use of alcohol in which the narcotic effect is in the least degree appreciable is unquestionably evil. There is no difference of opinion among physiologists on this point.

SUMMARY OF THE ACTION OF ALCOHOL ON HUMAN TISSUES.

1. In very dilute form and in limited quantity it usually acts as a temporary nervous and muscular stimulant.

2. In other than small quantities it speedily acts as a narcotic poison.

3. It fails to act as proper food or beverage.

4. It holds tenaciously to the fluids of the body and affects most those tissues that are in large part of water.

5. It causes separation of the components of the plasma, and renders the corpuscles of the blood less efficient in conveying oxygen and carconic acid, thus reducing directly the oxidation throughout the body, and the prompt elimination of waste matter.

6. It primarily increases the flow of the blood to the surface and extremities and

causes a slight rise in temperature, followed by long continued reduction in temperature.

7. Its use in health is at all times needless and non-beneficial. Its use in ill-health is rarely indicated, and is at all times highly questionable.

8. Its general effects are those of deterioration of blood, arrest of vital changes, obscuration of nervous and muscular action, and the establishment of positive morbid appetite.

QUESTIONS.

1. What is true of the views of physiologists concerning small quantities of alcohol?
2. How does it act in limited quantities?
3. How does it cause stimulation?
4. Do those persons who are in health need it?
5. When may an invalid need it?
6. Who should decide, and who administer it?
7. In what respects are its actions deceptive?
8. When does it act as a narcotic?
9. What do physiologists think of using it so that narcotic effects are produced?
10. In summarizing its effects on the tissues when does it act as a stimulant?

11. When is its action that of a narcotic?
12. What parts of the body suffer from its effects?
13. How does it affect the blood?
14. How does it affect the temperature?
15. What is its general influence?

Chapter III.

Action of Alcohol on the Mind.

Lesson XI.

The Inter-Relation of the Nervous System and the Mind.—The relation of the nervous system to the activity of the mind is such that whatever affects the condition of one will produce corresponding manifestations in the other. In general it is true that when the nervous system is in its highest condition of healthfulness and vigor, then is mental action most clear and forcible; it is then that right judgment and self-control exercise most nearly complete dominion.

On the other hand, when the nervous system is deranged by disease, inflammation, or congestion, it fails to perform its delicate and complex functions, as a result of which mental activity is undecided, confused and unreliable, while the power of right understanding and of self-direction are limited and inadequate.

The deranged physical conditions of the nervous system produced by the effects of alcohol, as set forth in preceding lessons, manifest themselves in well-marked mental obliquities, varying much in their peculiar form of expression in different persons, but agreeing in them all in the fact of general deformation.

The stimulating effects heretofore mentioned are due to an inflammation of the nervous centers, which produces mental excitement of undue and unreliable character. Under this exhilaration the individual may be buoyant and jovial; he may imagine himself strong or wealthy; he may fancy himself agreeable, generous and honorable. It is usually painfully evident to all observers that he does not judge of himself correctly—that he is full of self-conceit. With some persons the primary effects are such as to render them extremely silly; with others to cause them to grow stupid; while still others become furious and violent. In all cases there are unmistakable evidences of confusion of intellect and loss of understanding. The degree of departure is necessarily dependent upon the peculiar constitution of the individual, and the amount and frequency of stimulation.

The narcotic effects of alcohol usually show a corresponding mental depression and

loss of control, productive of excitement or stupor.

The Mind Affected in all of its Faculties.— Whatever may be the exact nature of alcoholic action upon the nervous system, or whatever may be the relation of the nervous system to the mind, the general effects of alcohol are such as are sooner or later seen in (1) a confused and faulty perception of sensation, and the inability to think rightly; (2) the memory becomes less clear and retentive; (3) the imagination is unrestrained; (4) the grasp of the intellect and the power to reason are enfeebled; (5) the finer sensibilities are blunted, (6) and there is less power of self-control, together with less expression of respect for self or for others.

Under alcoholic influence complete inversion of mental action frequently occurs, so that those who, when free from its effects, are kind and gentle, become cruel and destructive; the tender and thoughtful turn cross and desperate; the refined and delicate grow coarse and vulgar. The mental activity is invariably abnormal in some degree or form, it is without exception ultimately weakened in force, and its manifestations are less refined.

That the sensibilities of the mind are blunted is quite as evident and important as that the intellect is clouded and weakened.

As the sensory fibers of the nervous system are partially or wholly paralyzed, so the finer sensibilities of the mind are dulled, so that the individual fails to perceive the more delicate and refining influences that control him while free from the presence of alcohol, and in the degree that these lose their dominion he is given over to the sway of his animal instincts and passions. The finer feelings of body and mind are paralyzed together.

The sensibilities first to be obscured are the last acquired by education and culture. The individual first ceases to be refined, polite, considerate and chaste. He then descends into selfishness, vulgarity and brutality, until he is fully exhibited in his uncultivated and savage form. This descending scale of degradation of feeling is evident to any one who will observe the steps of transformation as they are exhibited in a single case of intoxication in another. Watch how such a person passes from the kind friend or genteel acquaintance through the stages of silliness, rudeness, selfishness into the disgusting conditions of brutal gratification and drunken insensibility. The same degradation is more widely illustrated in the changes that are shown in the transformation of the character of the habitually temperate and re-

fined gentleman to the habitual and unrestrained drunkard.

The deadening effects upon the sensibilities are likewise manifested in the conduct of the habitual, though "moderate" drinker, in his carelessness of consequences, his depreciation of personal example, his growing selfishness and disregard of family, his unrefined associations, his constant repetition of the act in seeking gratification of appetite behind screened doors and windows, his gradual loss of self-respect and confidence, and his extreme irritability at criticism and advice.

QUESTIONS.

1. In what respect are the nervous system and the mind closely dependent and responsive?
2. What are some of the causes that render the nervous system unable to perform its functions?
3. How does stimulation by alcohol affect the mind?
4. What are some of the evidences of its influence?
5. Upon what does the degree of effect depend?
6. How do the narcotic effects of alcohol result?

7. How fully and deeply is the mind affected?

8. What are some of the radical changes that occur?

9. How are the sensibilities affected?

10. What forces are first to give way?

11. How is the individual finally exhibited?

12. How may one observe these changes?

13. What changes of similar character are seen in the growing habits of the drunkard?

14. How does the "moderate" drinker show lack of proper sensibility?

15. Why does alcohol affect the whole mind?

Lesson XII.

The Use of Alcohol Especially Affects the Will.—The most positive and alarming consequences of the demoralizing influences of alcohol on body and mind are manifested in the dethronement of the will, and the direct tendency to establish a morbid and ungovernable narcotic appetite. As already stated, the judgment and understanding are impaired, and the sensibilities are blunted by the action of alcohol. These influences determine that the will to direct and control must be weakened. In all moral action a clear knowledge

of what is right, and a keen sense of propriety and duty, have much to do in determining decisive action of the will. That the power of the will is diminished is indicated in the inability to control the voluntary muscles, in the ungoverned thoughts and words, in the unrestrained feelings, and the lack of strength to resist additional drinking.

In connection with this tendency to weaken the mental powers, there is the tendency of alcohol, as with every other narcotic, to establish for itself an irresistible physical craving—the narcotic appetite. The constitution of the body is such that it tends to adapt itself to the conditions imposed upon it, and the nervous system, once excited and narcotized, tends to seek such influence again. Repetition establishes such demand. Nothing is more certainly determined either in body or mind than the tendency to habit—the disposition to act again as it has acted before under similar circumstances. Tendency to habit is in opposition always to the dominion and independence of the will, so that the user of alcoholic beverages, by successive drinking, more and more surely loses the power to control himself through the activity of the will, and more certainly prostrates himself before a morbid and ungovernable appetite that is rapacious in its demands and marvelous in its

growth. Every narcotizer will realize this thraldom sooner or later and find his will hopelessly inadequate to express itself.

The Cumulative Habit.—That the habit should be cumulative in character is evident from the nature of alcoholic action. That depression follows exhilaration, creates the temptation for the repetition of the stimulating draught, while the benumbed condition of the nervous system demands that the second and subsequent amounts shall be greater and greater in order that the desired effects of stimulation shall be produced. The basis of cumulative habit is consequently discovered in the paralyzing influence of alcohol on the nerve extremities and centers. By degrees the nerves thus affected become degenerated in structure and inefficient in action, so that ultimately a permanent abnormal condition is induced. It is a well established law of the organism that it shall manifest this state by a physical craving for the usual lethal dose, which dose must be increased in quantity as the nervous structures grow less sensitive to its influence.

It is by such action as is here indicated that the thoughtless drinker is unintentionally led from the first mild glass to the depths of a senseless drunken spree. It is by the growth of such habit that the moderate

drinker usually goes on drinking oftener, drinking more, until he becomes hopelessly powerless to control the appetite that leads him to certain ruin.

When to this physical degeneracy the corresponding mental dethronement is added, which is seen in the impaired judgment, the unrestrained imagination, the blunted sensibilities and weakened will, the growth of the narcotic appetite as so familiarly manifested ceases to be marvelous and becomes a natural consequence of the most certain character.

SUMMARY.

1. Alcohol acts as a foreign agent while circulating in the blood, paralyzing nervous sensibility, imparing muscular control, lowering temperature and diminishing atomic and molecular changes in the tissues.

2. It produces temporary mental exhilaration followed by depression.

3. It causes, without exception, loss of self-control, blunted sensibility, and weakened will.

4. If its effects are often induced it produces a morbid or diseased organic condition, especially manifested in the nervous system connecting the stomach and the brain, so that by this derangement a narcotic appetite is en-

gendered, which by its demands often overpowers the strongest and most cultivated intellects and the most sacred and determined pledges.

5. Its derangement of the physical organization and its dethronement of mind, result in the rapid development of the cumulative habit.

QUESTIONS.

1. What are the most alarming effects of alcohol on the mind?
2. What indicates its effects upon the will?
3. What tendency has every narcotic?
4. What tendency have the body and mind as regards former actions?
5. What is meant by narcotic appetite?
6. What is meant by cumulative habit?
7. What is the basis for cumulative habit?
8. What causes the increased appetite with the "moderate" drinker?
9. Why is not this increase in appetite strange?
10. What is the summary of the action of alcohol on the mind?

CHAPTER IV.

Heredity and "Moderate Use."

LESSON XIII.

Dangers of Hereditary Transmission of Alcoholic Tendencies.—From the most extended observation it is evident that alcohol produces a diseased condition in the system of any person who frequently induces its stimulating and narcotic effects. This condition involves the nervous system in particular, the vital organs, the character of the blood, the process of tissue building, and the elimination of waste matter. These results, if frequently repeated, become chronic or permanent, and perpetuate themselves by reason of the craving that attends their existence.

Intimately connected with these deeply seated physical derangements on the part of him who uses the narcotic, there is the extreme liability, if not the necessary tendency,

to transmission of such conditions from parent to offspring. The potent forces which in this manner warp the whole being of the parent can not prove exceptional in the action of the immutable pathological laws of generation. It would seem of necessity to follow that the same tendency to reproduce its kinds, which through the selections governing the reproduction of the human family preserves the physical and mental characteristics that perpetuate race distinctions; which continue the marks of tribes and families; that determine that the child shall be like its parents in form, complexion, tastes, mental traits, and characteristic tendencies to health or disease as notably seen in the hereditary tendency to scrofula, consumption, syphilis and other profound physical and mental deformities, *must reproduce in the offspring of the habitual narcotizer the hereditary tendency to narcotize.* There is no possible escape from the universal law of generation of like kind, which determines the structure and character of every organism in existence, from the lowest vegetable to the highest animal form, and expresses with certainty the conditions and nature of its origin. There can be no doubt that a physical state in the parent so marked as that induced by alcohol is sufficient to manifest itself in the offspring through the action of such law.

The well-observed phenomena attending the production of children from parents diseased by alcohol are sufficient to prove the correctness of the conclusions stated above. It is an unquestioned fact that they do more frequently than other children manifest a disposition to use narcotics; that while this tendency may lie dormant or latent for a generation or more it may break out with violence in subsequent generations; that while it may not manifest itself in immediate inclination to the use of alcoholic drinks, it may alternate with consumption and insanity, which have their pathology determined by like condition of disease of nervous and vital centers; that at times it shows itself in proneness to crime by reason of inactive sensibilities, and in still other cases it takes the form of the most hopeless conditions of idiocy. Every experienced physician will confirm the statements here made, and can furnish cases which have come under his notice sufficient to establish their truthfulness. The statistics of reform schools and of institutions for feeble-minded children contribute evidence which goes far to establish the same truth by showing a large portion of their number to be the offspring of the intemperate. A single astonishing instance is here presented: In the examination of the parentage of three hundred idiotic

children in Massachusetts a few years since, one-half the number were found to be the offsprings of parents, one or both of whom were intemperate. Of the other one-half the lineage was not certain. In one case there were seven idiotic children in a family in which both parents were habitually intemperate.

It is not possible to recognize definite results of transmission in every particular case. It must be true that every variety and degree of definition of expression will result from the infinitely different circumstances attending the origin and subsequent development of such offsprings, and yet enough is derived in the aggregate to determine that such dangerous consequences are general, and that he who habitually narcotizes himself shall without exception shadow forth his habit both in his own physical and mental condition and in the constitution of his offspring.

This transmission of evil consequences is not limited to the use of alcohol, the law is general and must prove true of every such substance as affects profoundly the constitution of the body and mind. That the law, or tendency, is quite decidedly demonstrated in cases of other narcotics adds materially to the force of the conclusions as regards alcohol.

The fact that the increased number and violence of nervous diseases that seem to be

working the physical degeneracy of the race keep pace with the increasing general use of stimulants and narcotics of all kinds, lends added force and importance to the connection which the narcosis of parents bears to the production of enfeebled constitutions of offsprings.

QUESTIONS.

1. What is meant by hereditary transmission?
2. Why is it likely that diseased conditions by alcohol may affect the next generation?
3. What does observation show to be true?
4. In what various forms may the evils of transmission be presented?
5. What do the statistics of reform schools and institutions for feeble-minded children show.
6. What astounding truth was shown concerning idiocy?
7. Why is it not possible to recognize the effects of transmission in every case in which parents are intemperate?
8. What is stated as true of other narcotics?
9. How is the increase of nervous diseases related to the use of narcotics and stimulants?
10. Other things being equally favorable

would you expect the children of intemperate parents to excel in healthfulness and mental power those of the perfectly temperate parents?

Lesson XIV.

Objections to the Moderate Use of Alcohol.— The greatest number of those who employ alcoholic beverages do so in what is popularly termed "the moderate use" of alcohol, that is in such limited quantities that the decided evidences of intoxication do not appear. These persons drink wine and beer, in which forms the alcohol is greatly diluted. It is nevertheless for the sake of the alcohol that these beverages are used, and because, too, of the direct influence of this article on the nervous system. The evidences of morbid appetite and habit are manifested by the moderate drinker of spiritous liquors and the devotees of wine and beer. With many such persons, as are here indicated, the opinion prevails that a "little alcohol is a good thing." To him who has established the alcoholic habit in his system, even to a very limited degree, this notion is very forcible, since the alcohol gratifies his craving and produces the temporary pleasures he seeks. However impressive this idea may be to the mind of the moderate

user, and however loth he may be to grant the possibility of its incorrectness, it is one against which the determinations of science are directly opposed.

The physiological objections to the habitual employment of alcohol in small quantities have already been given. They are here explicitly re-stated that there may be no doubt as to their nature and their application.

First.—Alcohol is universally classed as a poison, the effects of which are, invariably, decidedly marked when it is used in large quantities. The "moderate use" is but the limited application of that which is poisonous. A poison is such a substance as will, when introduced into the system, produce, or tend to produce, conditions ultimating in disease or death. The well-known tendency of alcohol to produce morbid condition of the vital organs, and especially to arrest the functions of the nervous system in every degree from incipient paralysis to death, places alcohol in the list of poisons.

Secondly.—By its disposition to cause morbid state of vital organs, notably in the structure of the brain, heart, arteries, kidneys and liver, the "moderate use" of alcohol contributes directly to the establishment of various chronic diseases that owe their existence to the physical degeneracy of one or more of

these great organs. So intimately are inflammation and organic derangement associated with the action of small quantities of alcohol upon these organs that it is an exceptional case in which the moderate drinker is a perfectly healthy person.

Not only are those who use alcohol regularly more subject to painful chronic diseases, but they are from the same physiological causes more subject to such diseases as prevail in epidemics. Zymotic diseases make their chief ravages among those whose systems are under the influence of alcohol, even if the amount used be very moderate. The disorganization of the blood, faulty oxidation throughout the body, the weakened vital organs, the suppressed eliminations of waste matter, determine that such constitutions are less able to resist diseases than are those whose vital organs and processes are vigorous and effective.

THIRDLY.—The mental faculties are not permanently augumented by alcohol, but are in the end enfeebled, so that by the moderate use both the physical and mental powers of endurance and resistance are diminished.

FOURTHLY.—The "moderate use" of alcohol is but the first stage of morbid and cumulative habit.

FIFTHLY.—From these consequences the

moderate user may apparently escape injury to himself yet his offspring suffers the dangers of hereditary transmission of narcotic appetite, nervous weakness and organic disease.

Added to these objections there is the plain truth that the "moderate" use if not injurious is needless, and the example is evil, since thereby others less prudent, or whose powers of resistance are less strong, may be caused to suffer.

When to the dangers of cumulative habit, and liability to transmission to offspring, the moderate drinker adds his endorsement and example, the habitual use is inexcusable.

QUESTIONS.

1. What is meant by "the moderate use" of alcohol?
2. Why does the moderate user drink wine or beer?
3. Why does the moderate drinker think "a little alcohol is a good thing?"
4. What is a poison?
5. Why is alcohol classed as a poison?
6. Is it likely that the moderate use of a poison can be beneficial?
7. How does the moderate use of alcohol lead to chronic diseases?
8. Are the users of alcohol generally healthy persons?

9. How does the use of alcohol prepare the body for the inroad of zymotic disease?

10. What objection to the moderate use of alcohol on account of the mental powers?

11. Who usually have the strongest, clearest minds?

12. What is liable to follow the moderate use?

13. What is true of the example of the moderate drinker?

14. Whose children are safest?

Chapter V.

Alcohol as Related to Insanity, Crime and Pauperism.

Lesson XV.

The Use of Alcohol as Related to Insanity and other Nervous Diseases.—That alcohol acts in all cases as a brain poison, affecting the constitution of the matter of the brain, and producing diseased conditions of its tissues, relates its use closely with such physical derangements and mental aberrations as constitute insanity. It is now generally believed by physiologists that insanity is in all cases due to diseased nervous conditions, or to faulty cerebral nutrition, and that all nervous affliction exhibits corresponding mental derangement. The mental defects heretofore stated as produced by the action of alcohol, namely, loss of understanding, perversion of sensibility, and most of all a weakening of the power

of self-control, are immediately in the direction of insanity. There can be no doubt that persons whose nerves are partially paralyzed by its action, and whose vital processes are deranged by its presence, and whose minds exhibit the departures just stated as the result of its force, are far more liable than others to be strongly affected by the causes, moral or physical, that serve as the immediate agents in producing insanity.

Intoxication is, itself, temporary insanity, and so closely are the conditions of the origin and manner of manifestation of this temporary and voluntary insanity akin to those of a permanent and involuntary character that it is not surprising that a confirmed state of mania frequently results from the repetition of the causes that produce intoxication.

The statistics of the causes of insanity as exhibited by various asylums in England and America indicate that intemperance is one among the greatest. An examination recently made by a Commission of Lunacy, in England, extending over a period of sixteen years, resulted in the judgment that sixty per cent. of the cases of insanity in that country are due to the intemperate use of alcohol. Examinations made by various superintendents of asylums in the United States warrant the estimate that at least one-half of all the cases

of insanity have their origin or predisposing cause in the influence of alcohol and other irritants upon the nervous system.

In addition to the tendency of intemperance to serve as a cause of insanity, it is held by some of the most eminent students of nervous diseases that intemperance, insanity, and consumption may alternate with one another by transmission in the successive generations of a family; the two first in such cases are due to inherited cerebral diseases, and the last to constitutional and organic weakness.

It is also held to be true that insanity and consumption abound most greatly in those sections of country in which alcoholic beverages are most extensively used.

It is certainly true from the vital statistics of the last half-century in the United States that the alarming increase of nervous and organic diseases of every character, and their accompanying mental disorders of which insanity is one of the chief, is in direct ratio with the increased and more general use of the various stimulants and narcotics, of which alcohol is the most powerful.

QUESTIONS.

1. Why is alcohol classed as a brain poison?
2. What is insanity?

3. What is the opinion of physiologists as to the cause of insanity?

4. Why does alcohol act as a predisposing cause of insanity?

5. How does intoxication resemble insanity?

6. What condition frequently follows repeated intoxication? Why?

7. What do the statistics of England show?

8. What is the estimate for the United States?

9. What diseases are related to insanity by transmission?

10. What diseases are shown to be on the increase in the United States?

11. How is this increase in certain diseases related to the increased use of stimulants and narcotics?

Lesson XVI.

The Use of Alcohol as Related to Crime.—Every right action involves (1) a proper knowledge of what is required; (2) a feeling of obligation to perform; (3) an exercise of the will in choosing and causing to do. These three elements are not necessarily consciously manifested, but close analysis may discover them in every right act.

In all acts that are criminal the absence of one of these elements is evident: (1) either he who commits the crime lacks proper intelligence of the relation that his action bears to others or to himself, or is willfully negligent in obtaining and exercising such knowledge, or, (2) he is wanting in the sense of duty to do what he knows is right; or, (3) he fails in the essential force of will, necessary to his self-control and direction. This condition constitutes the negative basis of wrong action—that of ignorance, neglect, blunted sensibility, or impotency of will. The positive foundation of crime is found (1) in a knowledge that the act is wrong; (2) in a desire to commit evil; or, (3) in the choice and exercise of will to do it; in this case there is the decided *intention* to do wrong.

In the light of this exposition of the nature of crime it is not difficult to ascertain how the influence of alcohol upon the human system leads, or tends to lead, directly to the commission of evil, and to account for the lamentable truth that by its general and unenlightened use it constitutes the greatest of all causes of crime.

It is particularly noticeable that under its influence an individual loses his powers of judgment and understanding, so that he no longer appreciates the rightfulness or wrong-

fulness of his actions, nor the consequences that follow from his deeds. Although such a person may seemingly know what is right he ceases to care for it, and is indifferent to all appeals from others in this respect.

The tendency of alcohol to paralyze the nervous system so that pain is no longer readily perceived, and to obscure the more delicate and refining sensibilities of the mental part, on the one hand, together with the inflaming character of alcoholic beverages upon the animal passions, on the other hand, put the individual in the very condition that favors evil action. Nothing is more potent to inflame the passions than wine and other alcoholic beverages, so that it is not an uncommon thing for one who is kind when sober to be dangerous and vicious when intoxicated. On the other hand the rough and brutal person is never transformed by their influence into a more gentle and amiable being. In the ways just indicated alcohol helps men to be wicked. When to the obstructed intellect and excited baser propensities, there is added the serious consequences upon the will as seen in the inability for self-control, it seems to follow as a necessity, in the very nature of the case, that one who is under alcoholic influence would be more disposed to wrong than right action.

This theoretical consideration is abundantly illustrated in the universally observed disposition of the intoxicated man to commit evil, so that others need to be on their guard against his actions; and in the generally conceded opinions of disapprobation and shame that attach to such indulgences. In the legal, as well as in the moral mind, drunkenness is itself a crime.

Opposed to this general tendency to evil there are no exceptional cases of inclination to goodness. Men never ascribe their excellencies and virtues to alcoholic influences. Alcohol is never employed with the ends of virtue in view.

While, as has been stated, the influence of alcohol is held by all experienced judges to be one of the chief causes of crime, the law recognizes intoxication as *no excuse* for crime, for if it did all crime might thereby prepare for its commission, and fortify for its defense. Hence the law holds the criminal responsible for his acts, though they are often committed without proper judgment as to the consequences, while under alcoholic influence. The crime is committed in the act of drinking, by which means the individual voluntarily sets aside the humanity of his nature and lets himself loose uncontrolled upon society with his intellect blunted and his passions inflamed.

QUESTIONS.

1. What are the elements of right action?
2. What is the nature of a wrong act?
3. What constitutes the positive phase of wrong doing?
4. How does the influence of alcohol rank among the causes of crime?
5. How do the effects of alcohol upon the system prepare men to do evil?
6. What is true of the effect of alcohol on the base propensities?
7. What changes does intoxication invariably produce in a person?
8. Why do others need to be on their guard concerning the behavior of one who is under alcoholic influence?
9. How does intoxication stand before the law?
10. Why not excuse the intoxicated man for his criminal actions?
11. In what does the real crime of the intoxicated person consist?

LESSON XVII.

Practical Illustrations of the Relation of Alcoholic Influence to Crime.—It is not necessary to enumerate many of the practical illustrations of the nature of alcoholic influence as

related to crime, for they are usually painfully familiar to persons of even limited observation.

It is well known that those communities in which alcoholic liquors are freely consumed are comparatively riotous and disorderly, and that in them the institutions designed to exercise an elevating and refining influence on society are powerless and ineffective. Wherever and whenever intemperance prevails crime is most abundant.

The most dangerous parts of a city are those portions in which alcoholic liquors are most used. In such parts life is not safe, nor is virtue esteemed.

All police reports indicate that rows and riots are usually incited and perpetuated by intoxication.

That the sale of alcoholic beverages is regulated by license, and made subject to certain regulations, and that they are banished from orderly public assemblages, characterizes their nature as dangerous.

There are no comprehensive statistics showing the proportion of cases of crime that are due to alcoholic influence, the following statistics, obtained from various sources, are, however, sufficiently suggestive:

Of 14,315 inmates of the Massachusetts

prisons 12,396 are reported as intemperate, or 84 per cent.

At Deer Island House of Industry (Boston), of 3,514 committals 3,097 were for drunkenness, or 88 per cent.

In the New Hampshire State Prison sixty-five out of ninety-one were intemperate, or 72 per cent.

The warden of the Rhode Island State Penitentiary estimates 90 per cent. of the inmates of his cells to be drinkers.

The Philadelphia County Prison Report for 1871 states that of the 13,171 committals 9,038 were for intemperance, or 75 per cent.

In the city of Philadelphia for the year 1870 there were thirty-four murders, each traceable to intoxication, and 121 assaults to murder, proceeding from the same cause. Of 38,000 arrests in the city for the same year 75 per cent. were for the same reason.

The Citizens Association, of Pennsylvania, estimate two-thirds the cost of crime to be due to intoxication.

The grand jury, of Philadelphia, after careful examination for one month, showed that nine-tenths of all the cases entered were due to the use of alcoholic beverages.

For the nine years extending from 1860 to 1869 there were 1,500 convicts sent to the Western Penitentiary of Pennsylvania, of

which number 911 were users of alcoholic beverages.

In the city of New York, for the year 1868, there were 98,861 arrests, of which number 50,844 were for intoxication and disorderly conduct. In 1871, out of 75,692 arrests, 34,694 were for the same cause.

An extended summary, lately made by competent persons, covering all the states of the United States, places the cases of crime caused by the influence of alcohol at certainly not less than 70 per cent. of all cases entered for prosecution.

In cases of murder the effect of alcohol is judged to apply directly in no less than nine-tenths of the cases.

In the case of six murderers recently confined in jail, at Indianapolis, waiting trial, all were either habitually intemperate, or were under the influence of alcohol at the time of the commission of their crime.

In the Indiana Reformatory for Women a majority of the persons sentenced to the institutions for crime have used alcoholic liquors, and of the girls admitted a majority are from families in which one or both of the parents are addicted to the use of intoxicating liquors.

In the Indiana Reform School, for juvenile offenders, a majority of the boys are from

homes in which one or both parents are intemperate.

The items given in this lesson justify the statement that fully three-fourths of all the crime at present committed is due to the direct influence of alcohol on the human system. Many judges of long experience in criminal courts place the estimate at nine-tenths.

QUESTIONS.

1. How generally does alcoholic intoxication appear to be associated with commission of crime?

2. Why are certain parts of a city more dangerous than other portions?

3. Where does disorder abound?

4. What do police reports indicate?

5. Why is the sale of alcoholic liquors regulated by license?

6. Why is their sale limited by certain restrictions?

7. Why is the free sale and use of such beverages not permitted in public assemblies, on election days, and like occasions of public gathering?

8. What do prison reports show?

9. What do reform schools show to be true?

10. What conclusion is warranted by the statements given in the lesson?

Lesson XVIII.

The Classes that Use Alcohol.—Connected with this undoubted relation which the use of alcohol bears to crime there are other considerations of importance. By examination it will be found that far the greater portion of the crime indicated as due to excessive use of alcohol, is committed by those who are illiterate, and whose associations are evil. Crime is not generally committed by the educated, nor by persons whose lives are cast in pleasant places. The intelligent persons who use alcoholic beverages are not so greatly disposed to the excesses that result in intoxication and violent disorder. A few years since an investigation was made under the direction of the National Teachers' Association to determine the efficiency of education as a preventive of crime. The report states that in Pennsylvania one-sixth of the crime is committed by the wholly illiterate, who constitute one-thirtieth of the population; and that one-third of the crime is by the practically illiterate; that the proportion of criminals among the wholly ignorant is ten times as great as among the classes who have been instructed in the elements of a common school education and beyond.

While alcohol must bear its great burden of criminal offense, it is evident that it is the

use of it by the ignorant and uncultured that leads to its great production of crime.

There is a large class of consumers of alcohol who are intelligent and "well-to-do." They more frequently avoid the evils that ensue from the use of excessive quantities; they are less often habitual drunkards; with them insanity does not so frequently follow; they are not in so many cases led by its clouding and inflaming influence to commit crime. Their greater intelligence guides them in their pleasures and guards them against excess. At the same time their sufficiency of income usually enables them to sustain the expense of indulgence without suffering.

There is another class of alcoholic consumers who are less enlightened, and whose lot it is to endure hard labor as the means of making a living. With some of these want and habitual drinking go hand in hand—their poverty a result of their intemperance and their immoderate habits, a result of the lack of those physical comforts and social pleasure that the more fortunate and cultivated class enjoys. With some of this class the truth is illustrated that when men fall below a certain point of physical comforts they grow more and more desperate, and as they find less of refining pleasures they seek chiefly sensual enjoyments; to them alcoholic stimulation

affords a temporary season of exhilaration and excitement, so that habits of intemperance are frequently formed in seasons of want and distress, which the individual would not acquire under more favorable circumstances, and which by reason of their wastefulness and degradation the more surely bind him down in misfortune.

It is not unfrequently the case that the intemperate person is one who is closely shut in for hours in the dark mine, or who wears out his nerve and muscle in the long day of the factory or shop, or who serves in the drudgery of unattractive day-labor. He finds alcoholic stimulation pleasant. It gives temporary relief to his worn system, and illumines his mind with fancy. It is not remarkable that some of these laborers are frequently disposed to spend their evenings or their holidays in the bright lights and convivial associations of the saloon and the bar-room. The undue strain of brain and muscle caused by hard labor, and the lack of proper means of social enjoyment and rational amusement, impel them to seek relief under circumstances that too often induce intemperate habits. This class of persons are usually less intelligent in their use of alcohol. They are by the nature of the case more often led into excess. Disorder more often results among them. The

waste of their hard-earned daily income keeps them ground down to relentless labor, with no hope of rising into the ranks wherein more sober and enlightened enjoyments minister to the desires.

There is still another class of consumers. They are not intelligent; they do not work; they mingle the evils of ignorance, idleness, want, disease, intemperance and crime into such an inseparable association of dependence that it is impossible to recognize any one of these conditions as the cause of an other. It is with this class that society has most to do as paupers and criminals. They are the frequenters of the dens of vice, they are the loafers, thieves, and rioters of the street. They are the miserable beings whose ordinary abiding places are the saloons, the gutters, and the station house. By all of these unfortunate beings alcoholic drinks are sought for as the most desirable of all enjoyments, and they will spend their last cent for a glass of whisky or beer, while wife and children beg for bread or die of neglect.

Some of the Remedies that May be Applied.— It may not be out of place to suggest some of the remedies that may be employed. For the last class of consumers the surest and most speedy relief for all parties concerned would come by legal prohibition and restraint from

the use of alcohol, and the supply of reasonably profitable labor to such as can not otherwise obtain it.

The children among such classes unquestionably deserve the protecting hand of the law to take them from such surroundings and influences, and to secure to them their right to the wholesome care of the enlightened and earnest teacher.

Other places of entertainment and attraction ought to be provided for them who are worn in body and mind, and who will leave their homes to seek amusement and relief, and who find the saloon and the "drinking garden" the most inviting places open to them for the evening or holiday. For this purpose the city or town needs the—

Public library and reading room.
Public night school and lecture.
Public concert and drama.
Public coffee-house.
Public gymnasium and games.
Public baths and parks.

Places such as these ought to be open at the least possible expense, and at all times of evening and on holidays. They ought to be kept in the most inviting condition, and be administered in the most liberal and cheerful spirit. When public charities and temperance reform learn to adapt their efforts and

forces to the demands and tastes of the classes they would benefit, efficient means of prevention, substitution and gratification will be devised.

For the rising generation among all these classes the things needed are protection of rights and an abundance of useful information. They need to be incited to live above evil, and especially need such instruction as shall guard them against the dangers of alcohol. The hope of the future is in the education of the children of the present. If it is true that crime is committed in ten times as great a ratio among the illiterate as among persons having even elementary education, it would seem that the best way to rid society of criminals would be to cease to raise them. The most important problems of society are the ways and means of effective education of the masses. In the darkness of ignorance hide the most dangerous foes to human welfare.

QUESTIONS.

1. How is illiteracy related to crime?
2. What ratio of criminals are illiterate?
3. With intelligent persons what is generally true of the effects of alcohol? Why?
4. Why is it different with the less intelligent?

5. What seems to impel the worn laborer to seek pleasure in alcohol?

6. Does he thereby make his lot better, or make it worse?

7. What is the lowest class of persons who are addicted to the use of alcohol?

8. How is alcohol esteemed by them?

9. What is probably the best remedy for the last mentioned class? Why?

10. What right have the children of this class?

11. What might be done to substitute more wholesome attractions to the second class mentioned?

12. What attractions can you suggest that are not given in the text?

13. What is the best thing to do for the rising generation?

14. How is the best way to rid the world of criminals?

15. What institutions beside the school are engaged in educating the masses?

16. What plan have you for the suppression of the evils growing out of the use of alcohol?

Chapter VI.

Other Stimulants and Narcotics.

Lesson XIX.

The effects of tea, coffee, tobacco, opium, and chloral upon the body and mind are in their true character so closely allied to the action of alcohol that it seems necessary to append to the foregoing discussion a brief statement of their nature. This examination seems needful since their use is so very common, and so little attention is given to their influence other than to suppose that their effects, if not beneficial, are at most so benign that they may be tolerated.

All of these substances tend to produce a narcotic appetite showing that their true nature is not that of a proper food. To persons addicted to the use of alcohol any and all of these substances are grateful, and in them is found a partial substitute for alcohol. There

is little doubt that in their general and extravagant employment may be found one of the principal causes of dyspepsia, organic disease, irritability and mania. The alarming increase of apoplexy, paralysis, epilepsy, insanity, consumption, heart disease, and other grave disorders is in keeping with the increased general use of these substances, together with alcohol. In the appendix may be found a condensed statement of these parallel increases.

Tea.—When taken in the mild form in which it is usually employed as a diet-drink, tea disturbs most readily those systems which are much reduced below the healthy condition by fatigue or disease. Its immediate effects are usually to produce pleasant exhilaration and a sense of restfulness. This primary stage is due to the stimulating influences of the active principle, *thein*, and the astringent property of the tannic acid, of which tea contains much. The action of each of these is that of a medicine, and not that of a food or drink. The first stage is followed by corresponding depression of the nervous system, and affliction of the mucous membrane of the alimentary canal.

If an exceedingly strong solution of tea be employed it produces decided discomfort in the stomach, with intense craving and sense

of sinking and emptiness in that organ; palpitation of the heart is engendered; the action of the diaphragm is enfeebled, causing a sense of suffocation; the face is flushed; the eyes grow singularly brilliant; and the mental powers are confused. The whole condition shows an intoxication not unlike that produced by alcohol. In the later stages the extremities become cold and wet with clammy sweat, resisting all attempts to warm them, while chilliness invades the spinal region. Continued use of tea in strong solution causes violent headache, weakness of vision, unsteady gait, tendency to convulsions, craving and indigestion, with enfeebled action of the heart. The temper of the mind, in sympathy with the physical condition, becomes peevish and irritable.

In ordinary doses tea has no appreciable effect on the amount of carbonic acid exhaled, nor on the frequency of respiration and the pulse. When the diet is insufficient it limits the loss by weight. Tea diminishes the loss in urea, in foeces and in perspiration.

Coffee.—The primary effects produced by coffee are very similar to the action caused by tea—increased exaltation of the nervous sensibilities and increased circulation. After continued use of excessive quantities the

effects are sleeplessness, headache, coldness of extremities, indigestion and constipation.

That coffee is a powerful narcotic is evident by its universal use as an antidote to the whole list of vegetable poisons, including belladonna, opium and tobacco. A strong solution of black coffee is resorted to in all such cases.

"The effects of coffee," says an eminent authority, "are such as to raise the action of the nervous and vascular systems, and at the same time to arrest the decomposition of tissue. Its stimulating effects and protraction of metamorphic destruction of tissue are due to the active principle *caffein*, and the essential oils of the beans. Caffein in excessive quantities produces rigors, derangement of the urinary organs, and a peculiar inebriation and delirium."

"In the use of tea and coffee," says another, "we get the chief cause of the greater prevalence of the nervous diathesis, soured and peevish nature, and incompatability. Here, too, we see the parentage of organic headache, gastralgia, functional and organic heart disease, the continued fear and fact of paralysis so frequently met with, and the inception of the tobacco and major appetites."

Physiologists are agreed that it is needless to use either tea or coffee. They are gener-

ally uniform in their opinion that their use is injurious.

QUESTIONS.

1. What substances of common use are in their nature allied to alcohol?

2. What shows that they are not proper foods?

3. What afflictions are probably traceable to their action?

4. How does tea affect the individual when it is taken in ordinary strength?

5. How does very strong tea act?

6. What are the effects produced by coffee?

7. What is a sufficient evidence of the power of coffee?

8. What is the opinion of physiologists as to the use of tea and coffee?

9. Is it probable that substances possessing their properties can be beneficial as foods?

10. Is it not probable that such substances by their general use will produce disease?

11. May not the use of such substances prepare the way for stronger narcotics?

Lesson XX.

Tobacco.—Medical writers without exception designate tobacco as a poison. Its poisonous property is due to the active principle, *nicotia*, which in its free state is capable of producing death sooner than any other poison excepting prussic acid. Animals to which it is administered die of spasms in a few minutes. Their blood after death is not coagulable, the same condition exists after death from other poisons.

When tobacco is taken into the mouth the nicotia is absorbed by the mucous membrane and enters the blood, producing nausea, vomiting, prostration, fainting, and cold clammy sweats. If it is smoked the same result ensues. If it is moistened and applied to the skin it produces like effects. Children have been killed by its application to the head in diseases of the scalp, and by injection. By all physicians it is regarded in any of its forms as too dangerous a narcotic for common use. It is employed only in lock-jaw and a few other extreme afflictions.

By its use in any of the ordinary forms in which it is so generally consumed the following evil effects are produced:

1. The alimentary canal suffers by the tobacco that is swallowed with saliva, producing debility and loss of tone in the stomach, fail-

ure of appetite, indigestion and constipation.

2. The heart, by its close relationship to the stomach and nervous system, is affected. Irregularity and palpitation are frequently produced. Twenty-four per cent of inveterate tobacco users show irregularity of heart action. The tendency with tobacco, as with alcohol, is to produce fatty degeneration of the heart. Tobacco is undoubtedly an active agent in causing the increase in heart and artery disease. These cases are generally incurable and inevitably fatal.

3. The blood shows the effects of tobacco in its increased fluidity and resistance to coagulation. In this result the tobacco acts directly toward killing the blood.

4. The brain and nerves are necessarily affected, when it is remembered that the constant flow of one-fifth the blood to the brain is required for its proper support. The vitiating effects of so violent a poison as tobacco in the blood, together with the disorganized condition of the blood must be evident. By such injury to the healthful action of the brain the tobacco causes nervousness, languor, uneasy sleep, depression and debasement of intellect and moral energy.

5. Like alcohol it generates a narcotic appetite, before which the strongest wills give way and yield an absolute slavery, equalled

only by that which drinkers yield to alcohol.

Tobacco has the following therapeutic properties: "A powerful nervous and arterial sedative, rapidly producing in those unaccustomed to its use great nausea and vomiting, great muscular relaxation, feeble pulse, vertigo, stupor, cold clammy skins, convulsions, and death from syncope. A very dangerous remedy."

QUESTIONS.

1. How is tobacco classed by all medical writers?
2. How does it rank among poisons?
3. How does it affect the alimentary canal?
4. What is its influence on the heart's action?
5. How does it change the blood?
6. What effect has it upon the brain and mind?
7. What is true of the tobacco appetite?
8. Can there be any doubt of the evils of its use?

LESSON XXI.

Opium.—Opium has been used for hundreds of years to produce its peculiar intoxication. The great increase in recent years in

the habitual use of it by the people of this country, and the threatening character of its greater prevalence and alarming injury warrant a brief examination of the article in this connection.

Opium is the dried juice of the capsules of the white poppy. It is chiefly raised along the Ganges river, along whose banks, alone, a region estimated at 600,000 acres is devoted to poppy culture. In 1872 the value of the crude drug imported into the United States per annum was $2,000,000. During the following ten years the importation increased, so that in 1882 it was near $4,000,000, while the population increased in that time only about thirty-five per cent. This shows a decided increase in the general consumption of the article. The quantity necessary to supply the demand in 1882 was about 400,000 pounds. This amount is employed in two ways: (1) in preparation of medicines, some of which are almost invaluable, and (2) in the habitual use by chewing and smoking.

Opium owes its intoxicating property to the active principles in its chemical composition, the chief of which is the alkaloid—*morphia.* This element constitutes about ten per cent of the imported drug. The most common medicinal forms of opium are:

Tinct. of opium or laudanum,	13 mins.	= 1	gr. of opium.
Elixir, or deodorized tinc.	11 "	= 1	"
Wine of opium,	8 "	= 1	"
Vinegar-opium, or black drop,	6½ "	= 1	"
Camphor'd tinc. of opium, or Paragoric elixir,	272 "	= 1	"

The physiological and therapeutical effects of opium are represented by morphia. Its action on the system presents two stages:

First.—Excitement and stimulation.

Second.—Narcotism.

Small doses produce slight mental exhilaration, usually of a quiet and dreamy character, with increase of pulse and slight rise in temperature. This stage may last for several hours and pass into quiet sleep. The awaking is usually accompanied with headache, nausea and lassitude, varying with the dose and the individual. By increase of the dose the first stage is shortened and the subsequent sleep is more heavy, and it finally deepens into coma. The pulse and respiration grow slow and feeble, the face becomes pale, and the skin is wet with cold perspiration. If the dose is sufficient the sleep ends in death.

It is impossible to state the fatal dose with accuracy, so wide are the limits fixed by age, habit and peculiarity of constitution. Children are particularly sensitive to the poisonous effects of the drug.

It is employed in medicine as a cerebral

stimulant. Its paralyzing effects cause it to relieve pain. Neuralgia and spasmodic pain disappear by its influence even under very moderate intoxication. Its great value lies in its power to render the sufferer insensible to pain and to give such repose as may permit the recuperation of the body from intense inflammation, or permit the performance of critical surgery. In the hand of the conscientious and skillful physician or surgeon it becomes one of the greatest of blessings.

The great evils and dangers that attend its use are found in its habitual employment by persons who seek its stimulating and narcotic effects as do the tobacco and alcohol devotees the influence of their articles. Its peculiar effects exercise such a seductive potency over the individual as to bind his will in the same abject slavery that marks the use of tobacco and alcohol.

It fixes a narcotic appetite by rapid growth. So great is the danger of establishing the taste and habit that skillful physicians are careful with opium, as with alcohol, to disguise the drug and to limit its use to the least possible quantity.

The evils that ensue from its habitual use are manifested upon the nervous system and the digestive apparatus. The symptoms of its poisonous effects are loss of appetite, vomit-

ing, pain in stomach, obstinate constipation and diarrhea, loss of strength, unsteady gait, pain of limbs, sluggishness of mental action hallucinations, and inebriation resembling delirium tremens.

As a cerebral poison opium ranks next below alcohol. The scale stands in the following order: tea, coffee, tobacco, chloral, opium, alcohol.

QUESTIONS.

1. What is opium?
2. How great is its use in the United States?
3. In what ways is it employed?
4. How does opium affect the body and mind?
5. If the dose be large what is the result?
6. What gives it its value in medicine?
7. What constitutes its great danger?
8. What is true of the opium appetite?
9. How does it rank as a cerebral poison?
10. Why do physicians disguise it?

LESSON XXII.

Chloral.—Chloral is derived from alcohol. It is produced either from alcohol or ether by oxidizing these substances so as to form alde-

hyde, which is then treated with chlorine gas to form chloral. Pure chloral is obtained by treating absolute alcohol with chlorine. Chloral consists chemically of two atoms of carbon, one of hydrogen, three of chlorine and one of oxygen. Its symbol is C_2 H Cl_3 O. In the form of the hydrate, as used in medicine, it is a white, transparent, crystalline, solid, very soluble in water. When it is added to an alkaline solution it is converted into chloroform, and a formiate of the alkaline metal present. Such is the chemical change that it is supposed occurs when chloral is introduced into the blood, by which hypnotic action is produced.

The most marked physiological property of chloral is its power to produce sleep, hence it is eagerly sought for by the sleepless, and the debauchees of narcotics fly to it for their desired nepenthe. It is quickly absorbed upon being introduced into the system, causing profound sleep, which is often prolonged for hours. Like the narcotic effects of alcohol its influences are directed immediately toward suppressing the vital organs—the nervous system is paralyzed, the respiration and circulation are retarded and the temperature is lowered, Under its influence victims may pass for dead and yet recover; the application of external warmth appears to be the chief care

to be exercised for the recovery of those who are prostrated by its influence. In common with all narcotics it kills when it has full play.

The same craving for it is readily engendered that marks the habitual use of the other narcotics and intoxicants.

The classes who are the most disposed to form the habit are (1) persons who begin by taking it to relieve pain; (2) such as seek its effects to produce sleep; (3) individuals who are extremely nervous. The growing practice of its use on the part of these and other classes is proving injurious to their mental, moral and physical life. Its use leads to confirmed disease as follows: the digestion is impaired; the natural tendency to sleep is lost; the blood loses its plastic properties and its capacity for oxidation is reduced; the secretions are depraved; the nervous system loses its regulating power; the muscles become unsteady; the heart grows intermittant; and the mind excited, uncertain and unstable. So seductive are its influences, and so uncertain the fatal dose that suicide not unfrequently unintentionally occurs from its use. Certain it is that its influences are so decided and powerful that its habitual use is very dangerous. It is only a medicine, and has no safe use other than in the hands of a wise physician

at whose command it may prove to be a blessing, whereas otherwise it may prove to be a curse.

QUESTIONS.

1. What is chloral?
2. How formed?
3. What is its action on the body and mind?
4. What danger in its use?
5. How are persons led to form the habit?
6. How does it resemble other narcotics and intoxicants?
7. How does it produce confirmed disease?

APPENDIX.

1. Dr. Austin Flint, Jr., of Bellevue Hospital Medical College of New York, says: "Alcohol notably diminishes the exhalation of carbonic acid and the discharge of the excrementitious principles, particularly urea. It diminishes the activity of nutrition, and if long continued, the assimilative power of the system becomes so weakened that the proper quantity of food cannot be appropriated and alcohol is craved to supply a self-generated want. The organism may in many instances be restored to its physiological condition by discontinuing the use of alcohol. . . . . These effects are too well known to the physician, especially in hospital practice, to need farther comment, ... It is not proved that alcohol enables men to endure a very low temperature for a great length of time. This end can be accomplished only by an increased quantity of food."

2. Dr. Wm. B. Carpenter, Examiner in Physiology and comparative Anatomy in the University of London, says: "The use of alcohol in combination with water and with organic and saline compounds, in the various forms of fermented liquors, deserves particular notice, on account of the numerous fallacies which are in vogue respecting it. In the *first* place, it may be safely affirmed that alcohol cannot answer any one of those important purposes for which the use of water is required in the system; and that, on the other hand, it tends to antagonize many of those purposes, by its power of precipitating most of the organic compounds, where solution in water is essential to their appropriation by the living body. *Secondly*, the ingestion of alcoholic liquors cannot supply any thing which is

essential to the due nutrition of the system; since we find not only individuals, but whole nations, maintaining the highest vigor and activity, both of body and of mind, without even employing them as an article of diet. *Thirdly*, there is no reason to believe that alcohol, in any of its forms, can be directly subservient to the nutrition of the tissues, for it may be certainly affirmed that, in common with non-azotized substances in general, it is incapable of transformation into albuminous compounds; and there is no sufficient evidence that even fatty matter can be generated in the body at its expense. It is quite true that some persons who consume large quantities of fermented liquors become very fat; but the material for this fat is probably derived in part from the disintegration of the tissues; the hydro carbonaceous matter in the system being prevented from undergoing the combustive process to which it would otherwise be subject, by the superior affinity for oxygen, which alcohol possesses. Much of the fatty deposit in intemperate persons has the character of fatty degeneration; the tendency to which is very marked in persons of this class. *Fourthly*, the alimentary value of alcohol consists merely in its power of contributing to the production of heat, by affording a pabulum for the respiratory process ;but for this purpose it would be pronounced on chemical grounds to be inferior to fat; and the results of the experience of Arctic voyagers and travelers is most decided in regard to the comparative low value of alcohol as a heat producing material. *Fifthly*, the operation of alcohol upon the living body is essentially that of a stimulant; increasing for a time, like other stimuli, the vital activity, and especially that of the nervo-muscular apparatus, so that a greater effort may often be produced in a given time under its use, than can be obtained without it; but being followed by a corresponding depression of power, in proportion as the previous excitement has been greater. Nothing therefore is in the end gained by its use; which is only justifiable where some temporary emergencies can only be met by a temporary augmentation of power, even at the expense of an increased amount of subsequent

depresssion; or where it affords aid in the introduction of aliment into the system which nothing else can so well supply. These exceptional cases, however, will be less numerous, in proportion as due attention is paid to those other means of promoting health, which are more in accordance with nature."

3. Dr. W. B. Carpenter states further: "The physiological objections to the habitual use of even small quantities of alcoholic liquors, rest upon the following grounds: *First*, they are universally admitted to possess a poisonous character, when administered in large doses; death being the speedy result, through the suspension of nervous power, which their introduction into the circulation in sufficient quantity is certain to induce. *Secondly*, when habitually used in excessive quantities, universal experience shows that alcoholic liquors tend to induce a morbid condition of the body at large, and especially of the nervous system. . . . . *Thirdly*, the frequent occurrence of chronic diseases of the same character, among persons advanced in life, who have habitually made use of alcoholic liquors in 'moderate' quantities, affords a strong probability that they result from a gradual perversion of the nutritive processes, of which that habit is the cause. Thi perversion manifests itself particularly in the tendency to 'fatty degeneration' of the muscular substance of the heart, of the walls of the arteries, of the glandular substance of the kidneys and liver, and of many other parts; and this gives rise to a great variety of forms of disease. . . . . *Fourthly*, the special liability of the intemperate to zymotic diseases, seems an indication that the habitual ingestion of alcoholic liquors tends to prevent the due elimination of the azotized products of the disintegration of the system, and thus to induce a fermentable condition of the blood. *Fifthly*, extended experience has shown that notwithstanding the temporary augmentation of power which may result from the occasional use of fermented liquors, the capacity for prolonged endurance of mental or bodily labor, and for resisting the extremes of heat and cold, as

well as other depressing agencies, is diminished rather than increased by their habitual employment. On these grounds the author has felt himself fully justified in the conclusion, that, for physiological reasons alone, habitual abstinence from alcoholic liquors is the best rule that can be laid down for the great majority of healthy individuals; the exceptional cases in which any real benefit can be derived from their use, being extremely few.

4. Dr. Alden, of Massachusetts, says: "On every organ they touch, ardent spirits operate as a poison. Nowhere in the human body are they allowed a lodgment, until the vital powers are so far prostrated that they cannot be removed. They are hurried from organ to organ, marking their course with disturbance of function, until at last they are taken up by the emunctories of the system and unceremoniously excluded. * * * There is no such thing as a temperate use of spirits. In any quantity they are an enemy to the human constitution. Their influence upon the physical organs is unfavorable to health. They produce weakness, not strength; sickness, not health; death, not life."

5. Dr. B. W. Richardson, says: "Much craving for one thing is the most certain sign of a mad mind. When the physiological truth is understood, that what is called 'stimulation' or excitement, is in absolute fact *relaxation*, a partial paralysis of one of the most prominent mechanisms in the animal body, the minute, resisting, compensating circulation, we grasp quickly the error in respect to the action of 'stimulants' in which we have been educated, and obtain a clear solution of the well-known experience, that all excitement, all passion, leaves after its departure, lowness of heart, depression of mind and sadness of spirit. We learn, then, in respect to narcotics, that the temporary excitement they produce is at the *expense of the normal animal force*, and that the ideas of its being necessary to resort to them, that they may lift up the forces into true, firm and even activity, or that they may *add something*

useful to the living tissues, are errors as solemn as they are widely disseminated."

6. Dr. Felix Oswald says: "There is no bane in the South American swamps, no virulent compound in the North American drug stores, chemistry knows no deadliest poison, whose gradual and persistent obtrusion on the human organism, will not create an unnatural craving after a repetition of the lethal dose—a morbid appetency in every way analagous to the hankering of the toper after his favorite tipple. Swallow a teaspoonful of laudanum or a few grains of arsenious acid every night; at first your physical conscience protests by every means in its power; nausea, gripes, gastric spasms, and nervous headache warn you again and again, and the struggle of the digestive organs against the fell intruder, convulses your whole system. But, you continue the dose, and Nature, true to her highest law, to *preserve life at any price*, finally adapts herself to an abnormal condition—adapts your system to the poison, at whatever cost of health, strength and happiness. Your body becomes an opium-machine, an arsenic mill, a physiological engine, moved by poison, and performing its vital functions only under the spur of the unnatural stimulus."

7. Dr. Hayes, the Arctic Explorer, says: "While fresh animal food, especially fat, is absolutely essential to the inhabitants and travelers in Arctic countries, alcohol is not only completely useless but positively injurious. I have known the most unpleasant consequences to result from the injudicious use of whisky for the purpose of temporary stimulation, and have also known strong, able-bodied men to become utterly incapable of resisting cold in consequence of the long continued use of alcoholics."

8. Dr. Frank H. Hamilton, in writing concerning an experiment in the army of the Potomac, in giving to each soldier one gill of whisky per day, because of the great hardship and exposure to which the army was at one time exposed, says: "It is earnestly desired that no such

experiment will ever be repeated in the armies of the United States. In our own mind, the conviction is established by the experience and observation of a life, that the regular routine employment of alcoholic stimulants by man in health is never, under any circumstances, useful. We make no exceptions in favor of cold, or heat, or rain, nor, indeed, in favor of old drinkers, when we consider them as soldiers."

9. Dr. Wm. Jay Youmans says: "It is to the nervous system and especially to its great centre, the brain, that alcohol is first attracted after it has entered the circulation. It is to all intents and purposes a cerebral poison."

10. Dr. Dodds, of England, says: "Writers on Medical Jurisprudence rank Alcohol among narcotic-acrid poisons, of which small quantities, if repeated, always prove more or less injurious, and the morbid appearances seen after death occassioned by ardent spirits exactly agree with those which result from poisoning caused by any other substance of the same class."

11. Dr. Muzzey, of Ohio, says: "That alcohol is a poison to our organization, is evident from observation . . . . . What is a poison? It is any substance in whatever form it may be, which, when applied to a living surface, disconcerts life's healthy movement . . . . Such a poison is alcohol; such in all its forms, mix it as you may. It is never digested and converted into nourishment."

12. Dr. James Edmunds, of England, says: "We have a great horror of arsenic and fifty other poisons; while the fact is, that all these things are a mere bagatelle in relation to the most direct, absolute, immediate, and certain poisonings which are caused by alcohol."

13. Dr. Yellowlees, Medical Superintendent of the Glamorgan County Asylum, England, says: "With the single exception of hereditary predisposition, intemperance is by far the most fruitful of all the causes of brain disease, and even hereditary predisposition is often but another

name for parental intemperance. . . . . It is surely within the truth to say that half the existing cases of insanity are due directly or indirectly to this social curse. . . . No vice is more hereditary than intemperance."

14. Dr. Shepherd of Colney Hatch Lunatic Asylum, says : "Forty per cent. of those who were brought into the asylum, during the year 1876, were the direct or indirect victims of alcohol."

15. Dr. B. W. Richards, says. "Not one of the transmitted wrongs, physical or mental, is more certainly passed on to those yet unborn than the wrongs that are inflicted by alcohol."

16. Dr. S. Wilkes, physician to Guy's Hospital, London, says : "To my mind the most important question in therapeutics at the present day is the value of alcohol in disease. If it be said that its frequent use is an evidence of its potency, this is the more reason why its administration should be watched with the extremest care. So wedded, however, are some to the idea of the absolute necessity of stimulants, that they have expressed almost incredulity when they have heard it stated that fevers terminate favorably without them. Young persons with typhus and typhoid fevers do far better, I believe, without them. That they make good recoveries on simple milk diet, is a fact which my hospital cases prove, and which no argument can gainsay ; and on the other hand I have seen a marked improvement take place in some cases where a stimulant has been left off.

It is also a fact that in bronchitis I have repeatedly seen improvement after stimulant have been omitted, and as regards heart disease, I am convinced that the amount of mischief done is immense. In case of fevers and bronchitis the weak pulse is often but an indication of extreme capillary congestion, and a stimulus to the heart often aggravates the evil, and in case of a diseased and weak heart, when repose is indicated, a constant stimulation by alcohol adds immensely to its trouble.

It causes me daily surprise to observe that the effects of stimulation are overlooked.

Often have I been called to see a patient apparently dying, some times of a nervous disorder, at another time of a liver complaint, and at another of heart disease. He lies on the bed where he has been for some time, kept alive (as it is said) by brandy; the breath is abominably fetid; the heart's action is so rapid that it is impossible to say whether the organ is diseased or not; the patient refuses food, or if this be taken, it is rejected, and so he is plied with brandy to keep him alive; the body is, in fact, saturated with spirit or its elements. My first remark on seeing such a case is, that a man cannot live on alcohol; he must take some food or he will die. The correctness of such common-sense remarks is admitted, but qualified with the statement that no solids can be taken, and that if stimulants be omitted it is feared that the patient will sink. It is assumed that the constant administration of brandy is necessary for temporary maintenance of life, and the idea never seems to have been conceived that the stimulation of the heart causes the weak, fluttering pulse, and the stimulation of the stomach a subacute gastritis. Do you ask me what method I adopt? The simplest possible. I withdraw every drop of the stimulant, and in a few hours the irritated stomach is partly restored to its normal condition, the nervous excitement abates, the patient takes a little food, and begins to mend. Do you ask, again, whether I do not fear any frightful results from the sudden withdrawal of the stimulus? I say, not the least; I have no fear of the consequences. Not of delirium tremens?

Not in the least. This is a disease not induced by the withdrawal of stimulants, but on the contrary, is produced by a recent debauch. For the production of delirium tremens, the patient must have been such an habitual tippler as to have weakened his brain, and must have had an overdose of the stimulant to set up the disease.

There are no facts to show that the withdrawal of the accustomed drink is attended with any evil results, although I know that an imaginary fear of this kind leads to an

erroneous method of treatment—the plying the patient with a stimulant during the violence of the attack, the effect of which is to prevent or prolong the cure.

Rest and repose, with the avoidance of stimulation, is the treatment which the patient requires. I repeat that there are no facts to show that delirium tremens is produced by the withdrawal of stimulants; whilst it is a fact, as I could illustrate by many cases, that nothing but good, results from its absolute discontinuance in the desperate cases to which I have alluded. * * * I have seen repeatedly, where alcohol has induced palpitation, fluttering, great distress, and constant sleepless nights, but where, on the other hand, the withdrawal of the spirits has been of the most essential service. The administration of a stimulus, in the attempt to overcome disease, in lieu of good and well-tried remedies, evinces the very worst form of medical scepticism with which I am acquainted."

17. Dr. Henry Maudsley, of England, says: "As physicians we cannot afford to lose sight of the physical aspects of mental states if we would truly comprehend the nature of mental disease and learn to treat it with success. The metaphysician may, for the purpose of speculation, separate mind from body, and evoke laws of its operation out of the depth of self-consciousness; but the physician who has to deal practically with the thoughts, feelings, and conduct of men; who has to do with mind, not as an abstract entity concerning which he may be content to speculate, but as a force in nature, the operations of which he must patiently observe and anxiously labor to influence, must recognize how entirely the integrity of the mental functions depend on the integrity of the bodily organization —must acknowledge the essential unity of body and mind. To set forth this unity has been the chief end in these lectures, because I entertain a most sincere conviction that a just conception of it must be at the foundation of a real advance in our knowledge both of the physiology and pathology of mind."

18. Dr. N. S. Davis, of Chicago, says: "The law must recognize the important fact that inebriation is tem-

porary insanity, caused by the morbid effect of a physical agent on the brain and nervous system. Instead of arrests, petty fines, and temporary imprisonments in police stations, bridewells, etc., ending only in a further demoralization and speedy return to the dram shop, the law must provide well-appointed asylums, in which the victims of alcoholic disease can be legally placed, until, by the combined influence of correct instruction, abstinence, productive labor, and proper medication, the disease and morbid appetite are effectually removed. Such a change in the management of drunkenness would speedilly work other changes of vital importance to society.

Alcoholic drinks, becoming directly associated with the idea of disease and mental alienation, in the public mind, would speedily come to be universally regarded in their true light, as debilitating to body and mind, instead of tonic and life sustaining. This would necessarily be accompanied by a corresponding change in the language of the physician at the family fireside, and in the phraseology adopted in the press and the current literature of the day. Such a change would do more to discourage dram-drinking, and all its direful consequences, than all other measures combined. We hope, therefore, that all friends of the cause will give to this subject all that thought and patient investigation which its importance demands."

19. Dr. Edward Jarvis, of Mass., in an article upon the relation of education to insanity, says: "Intemperance is another cause of much insanity. About 10 per cent. of all stated are said to arise from this vice. This happens more among the poor and ignorant in a civilized society. Savages are protected from this cause of insanity simply by their want of opportunity; but in cultivated communities the means of intoxication are more accessible and obtainable; few are so poor as to be unable to obtain them, and it is noticeable that the poor are the most addicted to this indulgence, and furnish thereby a great portion of the victims of lunacy, ... We are irresistibly drawn to the conclusion that insanity is a part of the price that we pay for the imperfection of our civilization and incompleteness of

our education. . . . Our children will be required to pay the same price until all men, women and youths shall be educated to know the law of their being, and to feel and sustain their responsibility for the faithful management of the brain and mind, and the other organs and functions intrusted to their care."

20. E. D. Mansfield, in an article on the relation between crime and education, says: "The evidence upon the intimate relation of crime and ignorance is clear, complete and ample. It may be comprised in two general propositions:

First, That one-third of all criminals are totally uneducated, and that four-fifths are practically uneducated.

Secondly, That the proportion of criminals from the illiterate class is at least ten fold as great as the proportion from those having some education. * * * Against this fact some one will reply that a large number of criminals are intemperate, and therefore we may attribute to intemperance a large number of the crimes we now attribute to ignorance. True, if these were parallel cases, but they are not. In the first place, a large number of the intemperate are such from want of education, and especially from want of moral and religious training. We see a great many educated people (that is commonly educated) who are intemperate, but they seldom commit crime. Secondly, many of those committed to prison have become intemperate on account of previous criminal and vicious habits. We give the following examples of the traits of prisoners in regard to temperance and intemperance, in some of the principal prisons, viz:

Intitution.	Temperate.	Intemperate.
Northern Indiana Prison.....	105	104
Iowa State Prison.....	122	158
Minnesota State Prison	41	46
Illinois State Penitentiary.....	672	743
Kentucky State Penitentiary....	814	1,033
Detroit House of Correction....3,045		5,655
Total.....4,799		7,739

SUMMARY.

Temperate.....38 per cent.
Intemperate.....66 per cent.

21. From the United States Census of 1870, and the reports of officers, the following points are selected to show the magnitude of the traffic in alcoholic liquors:

Manufacture.	No. of establishments.	Product per annum.
Distilled liquors.....	719	$36,191,133
Malt liquors.....	1,972	55,706,643
Vinous liquors.....	398	2,325,238
Total.....	3,089	$94,223,014

Commissioner Delano in his report for 1869, says: "In the absence of reliable data to fix the annual consumption of *distilled* spirits, we are left to conjecture. Were I to express an opinion on this subject, I should place the amount at not less than 80,000,000 gallons."

Dr. Young, Chief of the Bureau of Statistics, says: "In the absence of accurate data, the following is an estimate of the sales of liquors in the United States during the fiscal year ending June 30, 1871:

Whisky.....	60,000,000 gallons @$6 retail,	$360,000,000
Imported spirits.	2,500,000 gallons @10 retail,	25,000,000
Imported wine.	10,700,000 gallons @ 5 retail,	53,500,000
Ale, beer, porter.	6,500,000 barrels @20 retail,	130,000,000
Native wines, etc.....		31,500,000
Total.....		$600,000,000

22. The following items derived from the vital statistics of the nation for the past thirty or more years, point to the existence of some great agency at work in the common practices of the people that operates in producing tendencies to disease. From the nature of the maladies shown to be increased, it is altogether probable that this cause is discovered in the more general use of the various stimulants and narcotics whose increased use is here given:

In 1850 one insane person to every 1479 sane
" 1860 " " " " " 1310 "
" 1870 " " " " " 1030 "

In 1850 one death from consumption to every 692 deaths
" 1860 " " " " " " 640 "
" 1870 " " " " " " 550 "

In 1850 one death by apoplexy and paralysis to 5,000 deaths
" 1860 " " " " " " " 4,000 "
" 1870 " " " " " " " 3,000 "

In 1850 one death from heart disease to every 7,000 deaths
" 1860 " " " " " " " 4,000 "
" 1870 " " " " " " " 2,250 "

In 1850 one homicide to every 102,000 deaths
" 1860 " " " " 31,000 "
" 1870 " " " " " 18,000 "

In 1860 one suicide to every 31,000 deaths
" 1870 " " " " 28,000 "

In 1820 amount of tea consumed $6\frac{1}{3}$ oz. per capita
" 1850 " " " " $12\frac{1}{3}$ " " " "
" 1878 " " " " 22 " " " "

In 1820 amount of coffee consumed, $2\frac{3}{4}$ lbs. per capita
" 1850 " " " " $9\frac{1}{4}$ " " " "
" 1878 " " " " 11 " " " "

In 1869 the amount of tobacco used in the United States equaled $4\frac{1}{2}$ lbs. per capita, per annum.

In 1876 the amount of tobacco used was 15 lbs. per annum for every man, woman and child.

Within the ten years from 1870 to 1880 the consumption of opium in the United States increased 100 per cent. The amount of the crude drug consumed per annum in 1880 equaled 400,000 lbs.

Within ten years, from 1870 to 1880, the amount of alcohol and malt liquors used in the United States increased 200 per cent.

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