degeneration or including sclerosis of the tubes will suggest recourse to special cardiac support and remedial agents.

To a number of medical men I owe my thanks for faithful observations, and the record of facts associated with the use of the *lycopersicum esculentum* in public institutions, hospitals and alms houses, which I can not detail here.

Personal experiences are in my possession, delivered orally and in writing by those who have individually noted the deleterious effect of the acute attacks as exemplified in their own bodies and which are not within the scope of this paper to recite. They, however, suffice to prove the tenable ground upon which this theory is based. General depression is reported to have been a common sequence to their employment in one of the alms houses near Pittsburg and also in several of the hospitals in the vicinity. Many of those who were in health were reported as being depressed, while the ill were rendered worse after their use. This would lead us to the conclusion that those in charge of hospitals, alms houses and other charitable institutions in which they are employed should expunge them from the list of foods.

The supplies for the military should never include this vegetable, as it has been abundantly proved that it can not be for the physical good of the men or subserve the interests of hygienic and economic food supply.

At any time when any great mental or bodily endurance is required, the tomato is treacherous and can not be relied upon as a food. When some acute loss or bereavement occasions emotional influences that call for cardiac reserve force, and under all circumstances where fortitude is demanded, the ingestion of tomatoes is to be discouraged. Those who are called upon to endure loss of sleep or mental strain, the student, the speaker or the statesman, will find them worse than useless.

DISCUSSION.

DR. PAUL PAQUIN, St. Louis.—I never before knew that tomatoes were injurious to mankind. According to the paper, I should have been dead ten years ago, and I doubt if many of us would remain in good health. I remember when the tomato was not used at all as an article of diet, but since then it certainly has been used very extensively, and I had never before supposed that there was anything poisonous about it. But I would like to know if we are still to have some other kinds of heart. We have a tobacco heart, we have the onion breath; probably we will have a carrot heart, and a potato heart. I doubt, indeed, if we will ever be able to make a list of the vegetables which we may eat safely. Are not some of the results attributed by the author to eating tomatoes produced by eating anything, almost? I would like to know on what scientific investigation it has been discovered that the tomato is a baneful enemy of mankind.

DR. HILL, Milwaukee.—I wish to say that in my opinion the symptoms which he has ascribed to the tomato are the result of wind on the stomach—being the direct effect of fermentation. I wish to call attention also to one other fact, that is, that in rural districts where the tomato is grown and ripened on the vines these results are not often observed; that it is not only not harmful, but that it acts as a most excellent regulator of the bowels and an excellent article of diet. But in cities the tomato, like all other fruits, has been of necessity shipped in the green state and not allowed to ripen by nature's process, but by the process of putrefaction, which continues in the stomach, and if used in large quantity it produces fermentative change and the results named in the paper. One other remark; it concerns his treatment. It is the use of two drugs diametrically opposed to each other, one a cardiac depressant, the other a cardiac stimulant—acetanilid and alcohol. I would suggest that it is rather to the alcohol that the relief is due, because the alcohol given in that form, although not quite as efficient as the aromatic spirits of ammonia, acts as a stomachic,

relieving the stomach of its gases by stimulating the action of the muscular fibers and increasing peristalsis, as well as incidentally stimulating the heart.

DR. J. W. GROSVENOR, New York.—I would ask the reader if he knows what the toxic agent is that produces these dire results. Have any chemical studies been made to show what the toxic principle is?

THE CHAIRMAN, DR. QUINE, reminded Dr. Grosvenor that it had been suggested in the paper that the toxic agent was acidum lycopersicum.

DR. ENGLISH—Dr. Hill, who has called attention to the fact that my prescription is incompatible physiologically, is certainly correct, and its very incompatibility is the very essence of it. In the first place it contains acetanilid, an anti-acid, which has a corrective action on the conditions in the stomach generated by the tomato, but at the same time depresses the heart. It is necessary to support the heart by the use of alcohol. It is the proper way to employ acetanilid unless you want to employ it for its depressing effects.

THE EFFECT OF ALCOHOL ON THE ORGANS OF SPECIAL SENSE.

Read in the Section on Practice of Medicine, at the Forty-seventh Annual Meeting of the American Medical Association, Atlanta, Ga., May 5-8, 1896.

BY J. W. GROSVENOR, M.D.

NEW YORK.

No extended argument is needed to demonstrate the effect on the organs of special sense¹ of alcohol in large quantities, sufficiently large to destroy temporarily the functions of these organs.

Any person in the condition in which he may be properly called "dead drunk" is completely narcotized. His entire nervous system is paralyzed. He may have taken a half pint or a pint of whisky or brandy. Either of these amounts is a large quantity, the former for a child, the latter for an adult.

The person overcome by a complete alcoholic stupor has lost for the time being the functions of the special senses. Speak in stentorian voice to the victim of such a condition and he gives no sign of the existence of the sense of hearing; expose his eyeballs to a bright light and the pupils give no response to indicate the presence of vision; prick and cut the body with a sharp instrument and he manifests no sense of feeling; place the most pungent volatile substances near his nostrils and you observe no suggestion that they painfully affect the olfactory nerves. He is as profoundly narcotized as though he were fully under the influence of ether or chloroform.

The person who has taken an alcoholic drink in quantity sufficient to place him under its positive influence though not sufficient to profoundly narcotize him, who is able to control his acts to a considerable extent suffers in his organs of special sense in like manner, though not to the same degree, as the person whom it has completely overwhelmed with narcotism.

Hearing is lessened, as evidenced by the fact that a much louder voice than ordinary is necessary in order to attract the attention; such a person on the street for lack of normal vision frequently comes in contact with a post or another person; the sense of feeling is blunted, since he may fall and bruise himself severely without complaint of injury or pain; or he will drink a glass of rum, brandy or whisky without observing the caustic effect usually produced upon the mucous membrane of throat and stomach.

It is a well-established fact that the sense of sight is permanently injured by the excessive use of alcohol. Amblyopia alcoholica is noticeable in the early stage of alcoholism. The disease advances or recedes

¹ Special attention is directed in this paper to the senses of seeing, feeling, hearing and weight.

according as the amount of alcohol taken is increased or diminished. The pathologic factor of the disease is an interstitial neuritis, proliferation of connective tissue followed by degenerative atrophy of the optic nerve. This disease has been clearly described by Dr. Charles H. May. (*The Medical Temperance Journal*, July, 1891, taken from *Quarterly Journal of Inebriety*.)

The effects upon the organs of special sense of extremely large and moderate quantities of alcohol as stated above have been recognized by common observation ever since the discovery of this substance several centuries ago. Among physiologists and therapeutists of the present day there appears to be no very marked difference of opinion as to the most prominent effects of alcohol upon the human organs when taken internally in large quantities.

It is acknowledged to be an anesthetic, a paralyzer. Opinions widely diverge, however, as to its effects when taken in small or minute quantities.

The effect of exceedingly moderate or minute quantities of alcohol upon some of the organs of special sense has been demonstrated by carefully conducted experiments. Of all scientists, perhaps no one has wrought more thoroughly and satisfactorily in this field than Dr. J. J. Ridge, of London, England. For the purpose of determining the effect of small doses of alcohol upon the sense of feeling he used an instrument which is best described in his own words:

"An instrument was constructed in which were two points in an upright position, and about half an inch apart. A third upright point was situated between the two, and was capable of being moved in a straight line nearer to one or the other of the stationary points. These three points were covered in so as to be invisible, but the forefinger could be passed through a hole in order to feel them. The middle point was moved by a rack and pinion, and the person tested was required to move it until, in his opinion, it was as nearly as possible equally distant from the two outside points. The movement of the middle point was recorded on a dial invisible to the subject of the experiment. This form of instrument was preferred to the ordinary esthesiometer, because in that instrument (in using which the person has to state the earliest moment that he can distinguish the points of a pair of compasses or two, while they are gradually separated) imagination might more easily vitiate the conclusions."

The results of his experimental researches made upon the sense of feeling, with the instrument above described, are embodied in the following table:

FEELING.													
Ab. Abstainer.	Number of degrees on the dial from exact center <i>before</i> alcohol.					Average.	Number of degrees on the dial from exact center <i>after</i> alcohol.					Average.	Amount of absolute alcohol given.
Ab...	6	6	3			5	10	8	10			9.3	2 drams
Ab...	6	80	4	30	10	16	20	24	46	45	5	28.	2 drams
Ab...	8	40	7	9		16	33	24	7	30		23.5	2 drams
Ab...	3					3	14					14.	2 drams
Ab...	75					75	115					115.	2 drams
						115						189.8	

The quantity of alcohol, two drams, given to each individual tested may reasonably be regarded as quite small. Five abstainers were tested, the total number of tests being fourteen *before* and the same number *after* alcohol was given. The average number of degrees on the dial from the exact center *before* taking

the alcohol was 23; *after* taking the alcohol 38. The smaller number represents the greater sensitiveness of feeling or touch.

This may not be regarded as a great difference, but it is a difference that is positive and shows that so small a quantity of alcohol as two drams may sensibly affect the nerves of feeling and decrease their sensitiveness.

The effect of small doses of alcohol upon the sense of vision was tested by Dr. Ridge as described by himself as follows: "Vision was tested by noting the distance at which a row of letters could be read with one eye without alcohol, and then the distance at which the same letters differently arranged could be read with the same eye afterward. The distance varies very greatly in different individuals; but of course in the same individual it would remain the same, provided that the alcohol had no effect. Indeed, one might naturally expect a slight improvement in the latter trials, by reason of the fancy letters employed. The following table gives the results obtained:

Ab. abstainer.	Distance of distinct vision in feet before alcohol.	Average.	Distance of distinct vision in feet after alcohol.	Average.	Amount of absolute alcohol given.
Ab. 1	7	7.25	7	6.81	1/2 dram
Non-Ab. 1	9	7	8.75	7.87	1 dram
Ab. 2	10.5	10.75	10.5	10.56	1 dram
Non-Ab. 2	4.25	5.25	5.25	4.91	2 drams
Ab. 3	9	7.25	8.83	9.25	2 drams
Ab. 4	11.25	10.25	10.56	10.56	2 drams
Ab. 5	10.5	13	12.80	13	2 drams
Ab. 6	9.25	10.25	9.75	8.50	4 drams
Ab. 7	6	5.75	5.91	5.25	4 drams
Ab. 8	15.5	15.75	15.75	14.75	4 drams
			93.75	85.38	

General average—9.375 before; 8.538 after."

Ten individuals were tested, eight abstainers and two non-abstainers. Thirty-three trials were made before the ingestion of alcohol and the same number after its ingestion. The average number of feet at which the letters could be read before taking the alcohol was 9.375, after taking it 8.538. Expressed in inches the difference was 10.044. This number represents that on the average the individuals tested, in order to see the letters distinctly, were obliged after taking the alcohol to approach 10.044 inches nearer to them than before taking it.

One of the individuals took 1/2 dram, two others 1 dram each, four others 2 drams each, three others 4 drams each. In the case of each individual the average of his tests showed that his vision was decreased in from fifteen to thirty minutes after taking the alcohol.

The average difference in the vision point before and after the alcohol doses in the majority of cases was not very large; indeed, in some of them it was quite small. In one it was more than two feet, which is 19.50 per cent. of the larger distance. The average of all the tests showed that it was necessary to shorten nearly 9 per cent. after taking alcohol the distance between the vision point and the letters before taking it. Derangement of vision, in the form of hallucinations, is recognized as an every-day occurrence in cases of acute alcoholic delirium, the sight of strange things and living creatures that can not possibly exist at the time within the range of vision.

The same experimenter, Dr. Ridge, tested the muscular sense of weight before and after the ingestion of small quantities of alcohol. He has thus described his method of procedure:

"The amount of muscular force required to overcome different resistances is measured by a special sense connected with the muscles but exercised by the nerves. Comparison between two weights requires the action of the judgment. The more acute the perceptive faculties are, so much the more readily will the judgment decide upon small differences between two weights. The effect of alcohol on this muscular sense was determined by an arrangement in which a weight was attached to a certain lever, and the person experimented upon was required to slide an equal weight along another lever exactly similar to the first until, in his opinion, the weights appeared to be the same. It is obvious that the position of the weights on each lever ought to be exactly the same and, therefore, the more sensitive the muscular sense is the nearer will the individual be able to place them before he ceases to detect any difference." The following table gives an exhibit of his results:

WEIGHT.														
Ab.	ab-stain'rs.	Distance between the weights, in Average-millimeters before alcohol.					Distance between the weights, in Average-millimeters, after alcohol.					Amount of absolute alcohol given.		
Ab.	14	8				11	7	20				13.50	1/2 dram	
Non-Ab.	22	10	16	18		16.50	18	20	22			20	1 dram	
Ab.	3	4	2	10		4.75	8	4	8	3		5.75	1 dram	
Ab.	4.5	7	9	7	7	6.90	13	11	12.5	18	13	13.50	2 drams	
Ab.		2	9	5	4		5	4	13	10		8	2 drams	
Non-Ab.	2	4	5	2		3.25	10	4	4	6		6	2 drams	
Ab.	2	2	5			2.25	1	7	4	3		3.75	2 drams	
Ab.	5	7	9			5.25	10	8	8			6.50	2 drams	
Ab.	9	1	11	1		4.40	3	8	11	15	4	8.20	2 drams	
Non-Ab.	2	3	4	1		2.50	6	6	8	3		5.75	4 drams	
												60.60	90.95	

General average—6.060 before; 9.095 after.

Dr. Ridge thus sums up his tests upon the muscular sense of weight:

"From this table certain facts are apparent: 1, that in every case the average sensibility to weight and power of discrimination was decidedly diminished by small doses of alcohol, the general average indicating that the sensibility is diminished about one-third; 2, that single trials are not reliable, since many circumstances may unite to produce a fallacious result. Thus some of the trials after alcohol were actually more accurate than some of those before it, although the average of each individual conforms to the general average of the whole; 3, that non-abstainers are affected, as well as abstainers; 4, that small doses act in a similar way to large doses, and that the difference is only in degree, not in kind."

The deceptive nature of alcohol was observed in all these experiments. Each person tested was confident that his powers were equal to the accomplishment of more than scientific experiment showed was possible. This fact teaches that the alcoholic drinker's assertions as to the integrity of his special senses are not reliable. His organs of special sense may have lost a considerable portion of their natural powers and he may still be unaware of this condition.

Experiments made by Dr. Scougal upon the sense of hearing show that alcohol in small quantities affects this special sense in the same way as the other organs of special sense are affected by it.

Dr. T. D. Crothers has made simple tests of the sense of hearing and has arrived at similar conclusions.

In cases of alcoholic insanity the sense of hearing is frequently disordered. In this form of insanity the

occurrence of hallucinations of hearing has been noted often by those who have the care of the insane; unusual voices and sounds that at the time have been beyond the reach of normal hearing. Aural and visual hallucinations have led to many fatal assaults upon supposed enemies, the assailants believing that the false impressions received through the senses of sight and hearing were true.

Some observers have noted in cases of alcoholism that the special senses suffer occasionally in one half of the body; there is loss of sight of one eye, hearing of one ear, taste of one half of the tongue and smell of one nostril.

The results of these experiments declare in unequivocal language that alcohol in small or extremely moderate doses weakens the nervous supply of the organs of feeling, seeing, hearing and weight; that to a certain extent it paralyzes these special senses.

According to Dr. Ridge, "Dr. Lionel Beale long ago pointed out how it (alcohol) affected the protoplasm of cells and diminished the movements of amebæ, to which leucocytes are apparently analogous." Dr. Ridge has found that the action of alcohol on leucocytes is injurious. His experiments with plants show that they do not thrive when watered with water which contains half of one per cent. of alcohol; that thus vegetable protoplasm is materially injured. The vegetable cell is not so very different from the animal cell as to prohibit the belief that if the protoplasm of the former is injured by minute doses of alcohol, that of the latter is affected in a similar manner.

Dr. Ridge has also discovered that alcohol in almost incredibly small quantities will promote "the growth and multiplication of microbes whose function is antagonistic to the protoplasm of organized beings." "In the presence of these minute quantities of alcohol decomposition goes on more rapidly and the micrococci and bacilli thrive and swarm more abundantly." He has thus shown that alcohol in the minutest quantities is injurious to "constructive protoplasm" and favorable to "destructive protoplasm."

Without doubt the protoplasmic nerve cells of the organs of special sense are as sensibly affected by alcohol as the cells of any other tissues of the body. Consequently the effect of minute quantities of alcohol on both vegetable and animal cells is a strong argument that it injures the constructive protoplasm and favors the destructive protoplasm of the organs of special sense.

Dr. Prout's experiments made more than eighty years ago proved that alcohol in a small or moderate quantity lessened the amount of carbonic acid exhaled from the system. More than a physiologic amount remained in the system to act as a poison upon the tissues and fluids. From this result the legitimate conclusion can be drawn that the special senses would suffer their share of injury.

It is a fact well-known that the long and excessive use of alcohol internally has a degenerating influence upon nearly all the solids and fluids of the body. This is quite noticeably true of the nervous and circulatory systems. Growing cells become deteriorated, tissues are hardened, blood loses a part of its vitalizing elements. It is not unreasonable to believe that as the whole system is burdened with this "genius of degeneration," alcohol, the organs of special sense must bear their proportion of the burden.

During the last few years railroad managers have

observed the injurious effect of alcohol upon their workmen when occupying positions that require delicacy of touch, keenness of vision and acuteness of hearing. Not long since a large railroad corporation investigated the conditions surrounding every accident that had occurred on its lines during the preceding five years. It was found that 40 per cent. of all accidents were due entirely or in part to drinking men. In 18 per cent. it was strongly suspected that the drinking habits of employes was the cause of the accidents. The company in a single year lost property to the amount of one million dollars through the incompetency of beer-drinking engineers and switchmen.

Michigan has passed a law which imposes a heavy penalty upon those railroad companies which employ men who are in the habit of using alcoholic intoxicants. Railroad managers, as practical business men, are recognizing the utility of employing total abstainers as a measure calculated to reduce financial losses on account of accidents.

Some railroad companies prohibit their employes from drinking any kind of intoxicants and from entering a drinking saloon during working hours; other railroad companies demand from their employes the signing of a total abstinence pledge which shall hold good for every hour of every day.

This action of railroad managers shows their appreciation of the doctrine that even small quantities of alcohol impair the organs of special sense, and that in order to do the best work in railroad business the workman must have eyes, ears and hands perfectly free from the poisonous touch of alcohol.

From the experiments and investigations herein detailed we are warranted in drawing the conclusion that alcohol in small quantities does not act upon the organs of special sense as a stimulant, but as a depressant; not as an energizer, but as a paralyzer. The claim that alcohol in any quantity strengthens and sharpens the vision, the touch, the hearing, has no defensible foundation for its support.

If these conclusions are reasonable concerning that part of the nervous system that supplies the organs of special sense, may we not assert with reasonable certainty that the same result obtains in other and, indeed, in all other parts of the body? Surely the nervous cells are not so very unlike in different parts of the organism as to forbid this conclusion.

Neither does alcohol in small doses differ in quality from alcohol in large doses. One drop of it has the same characteristics as a thousand drops. The large quantity produces a more powerful effect than the small quantity, but in kind the effect is the same.

In the study of this subject some of the thoughts which have been forced upon my attention are as follows:

1. Guided by the chief characteristic of alcohol, its paralyzing influence, is it not more appropriate to call it a depressant than a stimulant?

2. If alcohol becomes popularly known as a depressant, will it not be less frequently used by the laity in those physical conditions which are commonly supposed to demand stimulation?

3. Knowing that alcohol is a depressant even when given in small doses, ought not the medical profession to exercise great care in administering it in debilitated states of the system?

4. The use of alcoholics hypodermically in cases of heart failure or arrest of respiration caused by ether or chloroform narcosis is bad practice.

5. It is the duty of the medical profession of this country, clearly and fully comprehending not only the damage to the organs of special sense, but also the ravages upon all the important organs of the body caused by alcohol, to discourage by every laudable effort the habit of drinking alcoholic intoxicants, to the end that our national life may be characterized by physical and moral integrity, clear brains, steady hands and brave hearts.

DISCUSSION.

DR. G. W. WEBSTER, Chicago—I have yet to find any form of illness or sickness, or any condition of health, where alcohol in any dose acts as a stimulant, as we understand the word stimulant. Not that I wish to be understood as objecting to the use of alcohol in its proper sphere, but it is never, under any circumstances nor in any dose, a stimulant. There is not one particle of evidence with which I am acquainted based upon careful observations, that will for one moment justify us in stating that alcohol is, in any dose or in any sense, a stimulant. It is, in all doses and under all circumstances, a depressant, an anesthetic.

DR. YAGER, Kentucky—I speak now of this subject in a medical sense, and wish to endorse to a great extent what Dr. Grosvenor has said. While I give whisky in sickness, I have not touched a dram of it myself, but became its opponent from a moral sense.

DR. H. A. HARE, Philadelphia—If it is possible for anyone to say that there is no evidence that alcohol acts as a stimulant, it is perfectly possible for it also to be said that the world does not go round. Now, you may bring every citizen of Atlanta into this room who knows anything at all about the matter, and he will tell you that under some circumstances alcohol does act as a stimulant, and how it is possible for any physician who has used alcohol properly in the treatment of disease to say that under certain circumstances it does not act as a stimulant, is to me most extraordinary. I have had a very large hospital experience, and have had the opportunity of watching the use of alcohol, not only in my own hands and in the hands of my colleagues, but in the hands of the most celebrated therapeutists of the world, and I repeat that alcohol acts distinctly as a stimulant. Furthermore, I wish, in this connection, to call the attention of this Section to what I believe to be the great danger of medicine at the present time. We are too fond either of saying that a remedy will cure every case of a certain disease, or that it is absolutely useless in all cases of that disease. I do not want anybody to think it is my custom to teach that alcohol is always, under all circumstances, a stimulant; but on the other hand, I do not want it thought that I regard alcohol as a depressant at all times and in all diseases. Digitalis can not be used in every cardiac case, and the same is true of alcohol. The sensible doctor is rational in his therapeutics and fits his drug to the case.

DR. R. H. BABCOCK, Illinois—I believe that alcohol in appropriate doses is a cardiac stimulant; in too large doses, it is a cardiac depressant. My views upon alcohol are derived from my experience with it. Let me state an instance, the case of a physician whom I saw only last Saturday, who has a dilated heart, both right and left ventricles being dilated; has moderate arterial sclerosis, pulse ranges from fifty-two to sixty; who can not bear even small doses of digitalis, five drops producing shortness of breath and increased cyanosis. A moderate dose of whisky, in that patient, stimulates the heart to a pulse rate of seventy-two, the pulse becomes fuller and stronger, the color better, the patient feels exhilarated, and it is followed by no symptoms of depression. Now, if alcohol in moderate dose, the dose differs, of course, in individuals, stimulates that physician's heart to that kind of action, then I believe that alcohol in that case is a cardiac stimulant, not a depressant.

DR. JOHN A. OUCHTERLONY, Louisville—I can not say that I believe alcohol is a stimulant. I know it. Knowledge is always better than belief when we deal with matters which are capable of demonstration. I can not believe that all previous experience has been erroneous, that the great work quoted on narcotics and stimulants was a mass of nonsense. We can judge of the effects of alcohol as we judge of the effects of all other remedial agents that we are accustomed to employ in our efforts to cure disease. Alcohol in small doses, suitable to the patient, is undoubtedly a stimulant, and it is a very remarkable fact that the instincts of all nations have led them to bring forth from organic matters some form of alcoholic stimulant. That there should be universally such craving for an article which is absolutely injurious to the human economy, does not seem reasonable; on the contrary, I think that this very fact is an

indication that alcohol, according to the experience of all ages and of all nations, is a stimulant, capable of serving useful purposes, dietary and therapeutic.

DR. W. M. RICHARDS, Joliet, Ill.—I must endorse the Doctor's paper; as a stimulant, I have never yet ordered a dose of alcohol, nor have I seen an increase in the force of the heart. We do get a more rapid action of the heart, but it is simply from paralysis, not from stimulation. It simply paralyzes the capillaries, so that the heart can get rid of the blood which goes to it, and never stimulates. I have seen an athlete put up dumb-bells before taking alcohol, then wait a reasonable time after taking alcohol in order to get its effects, and try to lift them again, and he could not do it. You see a man come in cold; he takes a glass of liquor, and in a few minutes thinks he is warm. He is simply paralyzed, so that he is insensible to the effects of cold. He goes out under the influence of alcohol, feels that he is perfectly warm, sits down and freezes stiff. A man under the influence of alcohol thinks he is powerful enough to whip two men, but at the same time it requires two men to hold him up. Call that stimulation? He is simply paralyzed. I believe alcohol can be given in its place, just as you would use nitroglycerin, or any nitrite.

DR. MINOR, Asheville—I would ask the gentleman who has just sat down whether it is legitimate to draw conclusions as to the effects of alcohol from intoxicating doses. It seems to me it would be as justifiable to say, after observing the effects of eighteen grains of corrosive sublimate, that the action of mercury is always poisoning. It depends upon the amount of alcohol administered as to what effects will be produced. I see many who prescribe it indiscriminately, and I agree with those who deprecate such abuse.

DR. HARE, Philadelphia—I would like to call attention to a point of some importance, namely, the statement which has just been made that alcohol acts as a paralyzer of the capillaries; that it does not act as a stimulant; but that the increased rapidity of the heart is due to removal of pressure in front of the heart by paralysis of the capillaries. Now, I challenge that gentleman to present one jot or tittle of scientific evidence that his statement is correct. I refer again to the experiments of Cerna, of Castillo, and a number of foreign investigators as well as American, which prove beyond all doubt, as far as you can prove any scientific fact, that the administration of certain doses of alcohol, according to the size of the person or animal receiving it, produces a rise of arterial pressure and not a fall. And I can also prove by most careful scientific experiments that alcohol actually increases the quantity of heat which is manufactured in a man's body; that under its influence he will manufacture more units of heat in an hour than before he took the alcohol. And to show that I am not biased I may go on and say that at the same time alcohol increases heat production, when taken in overdoses it also increases heat dissipation, and the increase in heat dissipation is so much in excess of the increase in heat production that the temperature falls. It is not well to take an alcoholic stimulant and be exposed to cold, because, the blood goes to the surface of the body and carries with it a certain amount of warmth which is lost. When we expose our bodies to cold the peripheral capillaries become contracted, the blood rushes to the central vital organs to be kept warm by them, the subcutaneous tissue, and muscles. But in a warm room the blood again flows to the surface to carry heat with it. If we take alcohol before going into the cold, the blood which filled the inner vessels of the body, is driven out. It does not go there by paralysis of the capillaries. You do not see the peripheral capillaries congested by paralysis when a man dies. The peripheral capillaries are paralyzed by death, but does the surface become flushed and red? Not at all. It becomes white like marble. Why? Because the whole vascular system is paralyzed and the blood settles in the larger vessels. I would call the attention of the Section once more to what I claim is the fault in the whole study of therapeutics, namely, dogmatic treatment. In this instance the assertion has been made absolutely without citing a single authority, that alcohol does this or that; that alcohol paralyzes the peripheral capillaries in all diseases; that it lowers arterial pressure and acts like nitroglycerin. If the gentleman will produce facts to prove that, or if he can not, I want him to state that, in his opinion, that is the case, and not give it out as a definite scientific statement.

DR. HAINES, Ohio—It certainly has been shown, by all the gentlemen who have experimented and taught, that alcohol is a stimulant when given in proper doses and in the appropriate condition. I think we will find it has a stimulating influence, and one that can be safely relied upon in time of trouble.

DR. YAGER, Kentucky, stated that it was the universal use of alcohol which he was opposed to.

DR. JENKINS, Iowa—Whenever views on a medical subject are

expressed which are entirely antagonistic to all the experience and the teaching of the profession and of those out of the profession, there is certainly something wrong. According to clinical experience I do not believe a small dose of alcohol can be otherwise than stimulating. I can not believe that this notion advocated lately, that alcohol is a depressant, and that its action can be explained along that line is correct. I look upon alcohol, like upon many other drugs, as exceedingly dangerous, but I should hate to discontinue its use because it is capable of doing harm, just as I should hate to discontinue the use of such a remedy as strychnia, or even some of the opiates, because they are capable of doing harm. Used in proper doses, and under proper circumstances, they all do a great deal of good.

DR. HILL, Milwaukee—That alcohol is, as it has lately been called, a narcotic, I think Professor Wood, in his vast work, has outlined it sufficiently well that we may understand it; a difference of opinion regarding the physiologic action of this drug, as in many others, being due to a difference between its influence when used as a therapeutic agent and as a toxic agent. Investigations which have led to the view that it is a narcotic or a soporific have been based on its use in almost lethal doses, and not in therapeutic doses.

There is another law in therapeutics which should be borne in mind in this connection, that any remedy which stimulates any nervous center will by its continued or excessive use produce paralysis of the same center. With these two suggestions in mind, I think we can readily reconcile the statements of those who consider alcohol a stimulant with those who consider it a paralyzer or narcotic. I think this drug, as clinical observation of many years has proved, is a most valuable stimulant, because when used in toxic doses it does produce other effects, constitutes no reason why he should cease employing it as a stimulant. Of course it has other effects; it has toxic effects; it has other effects in sepsis. Its dosage can not be given in drams nor in grams, for it is one of the remedies upon whose use the disease and the immediate condition of the patient have a wonderfully modifying influence.

DR. GROSVENOR—My chief object has been to show that experiments have been made which, to my mind, prove conclusively that upon the organs of special sense alcohol in these very small doses produces paralysis. By small doses I mean from half a dram to two dram doses. I am open to conviction if there is a scientific basis on which to prove that alcohol is a stimulant. Just because alcohol has, by our forefathers and great forefathers, been regarded as a stimulant, is no reason why we should regard it as a stimulant to-day. We are living in a new generation, and this subject of the action of alcohol on the human system has been revolutionized by men who are competent to experiment upon it and to carefully note the results.

SOCIETY PROCEEDINGS.

American Neurological Association.

Annual Meeting held at Philadelphia June 3, 4, 5, 1896.

The President, DR. F. X. DERCUM in the chair.

THE PRESIDENT delivered an address entitled

THE FUNCTIONS OF THE NEURON.

He dwelt at great length upon the various views advanced by Nansen and quoted several abstracts from this well-known author's work. Speaking of naked axis-cylinders, Dr. Dercum stated that they are in all likelihood a physiologic impossibility in the cerebrum; for were they numerous, we can suppose nothing but a constant overflow of stimuli from one cell to another, and consequent incoördination, not only of thought but also of action. This is the view advanced by Nansen. The speaker stated that the question had arisen in his mind as to whether the neuron was not an absolutely fixed morphologic element, and whether it did not possess a certain, though perhaps limited, power of movement. Continuing, he said: "Realizing the practical value and the wide application of this idea, I have examined the literature to see whether a similar interpretation of nervous phenomena has occurred to others, and to gather such facts, if any, as could be brought forward in its support. I found that this thought had occurred independently to three observers, one in Germany and two in France." Ramon Cajal, however, opposes the theory of the mobility of the neuron, and maintains, on the other hand, that the neuroglia cells possess a great deal of mobility. He points out for instance that the neuroglia cells of the cortex are at times stellate and at others much elongated. Their processes have numerous short arborescent and plumed collaterals.