I will not say to obtain a reply, but even to fix the attention. Sometimes you will be received with a vacant smile, an uncertain look, an unintelligible grunt. The functions of organic life continue to be exercised, those of the life of relation are almost wholly abolished. An apoplectic singularly resembles a general paralytic arrived at the last phase of his affection. You might be deceived here if you were not enlightened by information derived from the past of this patient. You will be definitely informed by the examination of the lesions which you will find hereafter in the amphitheater, and which you know differ entirely from those which we meet in diffuse meningo-encephalitis. In closing that which relates to intelligence in apoplexies, I ought to call your attention to one interesting peculiarity, which has been brought out by one of my pupils, Dr. De Finance, in an excellent work upon the mental state of apasic patients. Whatever may be the intellectual weakening in patients who are the subjects of hemorrhage or of softening, there is one aptitude which most frequently is preserved: it is the aptitude for play. These patients, even when memory exists no more, and when intellect is impaired, can follow a game of cards, of dominoes, of checkers, understand the plays, even, to a certain extent, combine and discuss them. Nothing is more curious than the frequent preservation of this faculty in the midst of the general wreck of their understanding.—*Gazette des Hopitaux*, June 14, 1881.

Let us pass in review first the immoral or criminal acts committed by apoplexies, we shall find out what may be, perhaps, the civil capacity of these patients.

1. *Immoral and Criminal Acts.*—I have read, in the course of my life, an immense number of proceedings drawn up by police commissioners of the city of Paris or its suburbs against apoplexies. It is always the same set of facts which are related: such an apoplectic is lost in the street, was unable to regain his residence, sat down upon a bench and slept there; such another has publicly held out his hat to those passing by, and asked alms; this one has urinated on the public way, has exposed his genital organs, or has forgotten to button his pantaloons; that one has raised the skirts of a little girl in open day before the whole world, upon the slope of the fortifications; another, in the *Jardin des Plantes*, has made obscene proposals to a nurse, and offered her two cents to suckle the child in his presence; another has squatted down and evacuated his bowels in a public square; another has made attempts to take obscene liberties with little boys; another has taken three prunes from the stand of a grocer; another has stolen a little saber in a store; another has eaten and drunk in a creamery without having money to pay; another has entered a carriage and had himself driven around for several hours, and he was able neither to remunerate the driver, nor make known his identity; another, having slept two hours in a *café*, could not indicate his address; another readily followed a woman of pleasure and installed himself at her house, and, believing himself at his own residence, would not go away; another alights from a wagon, has lost his ticket, refuses to pay a second time for his seat, becomes insolent and is arrested; finally, another is completely undressed in a public place.

The supposed criminality of an apoplectic is sometimes, moreover, very serious. I remember a very curious case which occurred some years ago. A farm servant, aged thirty-seven years, affected with hemiplegia from a cerebral lesion, who was neither hysterical nor epileptic, became pregnant. She was confined in the night, and the next morning her infant was found dead. She was taken into a court of assizes on charge of infanticide. Acquittal took place because it was easy to demonstrate that, in fact, they were concerned not with a voluntary infanticide, but with an infanticide by omission, the servant not being in a state to take care of her infant.

You will see, after the facts which precede, how important it is to be able to appreciate correctly the degree of responsibility of apoplexies. In the presence of such persons accused, the mission of the judges is not always easy. Magistrates are liable to be too indulgent or too severe. It is upon the physician that devolves the unquestionable duty of casting light upon the question. Now it is evident that your estimate should differ according as you find yourself in the presence of such or such another apoplectic. Refer in your mind to the details into which I entered at the beginning of this lesson. If you have to do with one of those patients whom we have classed in our first, and even in our second group, so that an attentive examination demonstrates to you that the apoplectic possesses a degree of will and reason sufficient so that the act charged was free and conscious, you ought necessarily to admit the responsibility. If it is proved to you, on the contrary, that the intelligence is distinctly diminished, that the will has failed much, but that there still remain, nevertheless, quite precise notions as to good and bad, the just and the unjust, it will be necessary for you to make prevalent the idea of a proportional, that is to say, a modified responsibility. Among these last, in fact, liberty is so limited that we cannot without injustice make them bear the whole responsibility of their faults; it is sufficient that they have to answer in a certain measure for the morality of their acts.

If, finally, the attack was more profound, if unconsciousness was proven, if dementia is positive, you should claim for the apoplectic the benefits of Article 64 of the penal code, which is thus expressed: "There is neither crime nor misdemeanor when the prisoner was in a state of dementia at the time of the act."

2. *Civil Acts.*—If it is important to be able to judge clearly of the mental state of apoplexies in the point of view of the responsibilities which these patients sometimes incur, and the criminal acts or misdemeanors for which they have to answer before the court of assizes or simply before the tribunals of correction, it is no less necessary to know how to appreciate the degree of their capacity in the matter of civil acts. There is a question here which presents itself every day. Let a question arise as to an agreement, to a financial transaction, a guarantee, a marriage, a prohibition, a judicial opinion, a will, you may be asked as to the value of a consent given by an apoplectic, of a signature which he may have affixed, of a contract which he may have concluded.

It is not rare, in fact, that an apoplectic consents to a burdensome agreement. Being well, he had a store, a shop, a manufactory; he carried it on himself, or was assisted by associates or employés. Then the disease came; the attack of apoplexy was produced; then it was that the faculties became weaker and the intelligence diminished. The people who surround him, interested in his affairs, very quickly perceive this falling and hasten too often to experiment upon the situation to the injury of the patient. His associates, for their greater profit, engage in venturesome operations, in which he alone incurs the risks, while they arrange matters in such a way as to share the benefits of the enterprise or of the speculation if it shall be profitable. The physician cannot, to be sure, interfere of himself in cases of this sort; he

has not the right, you understand, to set himself as governor or manager of families. But let the patient's wife come to consult him, and this circumstance is not very rare, concerning such an operation or such an agreement which her husband is about to conclude, and it will then be necessary for him to declare his opinion conscientiously.

You ought, in a case of this nature, to have recourse, in order to discharge your whole duty, not only to the attentive examination of the objective symptoms presented by the patient, but also to the elements of information, which I will call, if you wish, extra-medical. Is he concerned in a partnership without sufficient guarantees, in an ill-advised loan, in an unjustifiable removal of capital? It is very probable that your apoplectic, in a state of health and before his attack, would not have complied with these maneuvers, unhandsome, imprudent, and, perhaps, disastrous.

There may present, in practice, questions still more difficult. The patient is alone, without children; he occupies a mansion which came to him from his father; those about him know that it is much easier to appropriate a sum of coin or a bundle of bank bills than to take possession of a piece of real estate. They overreach the proprietor, who opposes too little resistance to the interested counsels which they give him; they persuade him that he ought to sell and make use of good opportunities which offer. In such cases, you will sometimes be called upon to unmask the maneuver, at least to display the wicked projects in giving strong advice. Secure the preservation of the *status in quo*.

About the apoplectic are exercised the worst inclinations, the most criminal plots are woven. It is easy to lead this man, alone, isolated, alarmed as to the future, sometimes abandoned, who sees himself making each day a step toward the grave, to an inappropriate alliance. Shameless speculation is not wanting. It is a mistress, a domestic, who may have had for the patient the slightest but best calculated affection, and will easily succeed in making him marry her, with a contract in good and due form. Here is a fact which recently occurred: An apoplectic was placed in a retreat, with the consent of his family, by a regular process and upon my certificate. Soon an old mistress sent an order from the court which set the patient at liberty. He was immediately taken to a little house, almost inaccessible, situated not far from the fortifications, whence he only went out to the church. On the very threshold he was stricken with a new attack, and died in a few months. In vain did we intervene, five or six physicians and myself, to prevent this marriage; one would not have believed it. At the autopsy, M. Laségue, G. Bugeon, and myself found old, quite characteristic lesions. So it was that by a criminal stratagem a family has been defrauded of a part of the fortune which should of right come to them.

In the presence of such facts, what ought to be the attitude of the physician? He should not forget the reticence which professional discretion imposes upon him. In no case, is it proper for him to become an informant of his own accord. But I claim that it is sometimes disgraceful that he cannot take certain straight forward, honest, and helpful initiative steps.

Should Apoplexies be "Interdicted?"—To this most grave question, as it is necessary to place the patient under supervision and to suppress his capacity as to civil acts, one could not answer by a simple yes or no. The application, in fact, should be different according to the case.

Do not forget, moreover, that "interdiction" is a measure which it is necessary to use with the greatest reserve, an extreme measure to which it is allowed to have recourse only when the most serious interests of the patient, or the no less legitimate ones of his family, are set in peril. So the physician ought to pronounce in favor of "interdiction" only in the case of demonstrated dementia, when the memory is affected without hope of return, and the will is annihilated.

If intelligence is only diminished, if certain faculties persist while others are tottering, if the will is weakened without being destroyed, it would be preferable to have recourse to the giving of a "judicial council" (*un conseil judiciaire*). The "judicial council" is a sort of middle state between the free exercise of all the rights and "interdiction." The individual who is so provided preserves the enjoyment of his effects, the disposal of his revenue, but he is not allowed to alienate his real estate, to invest or withdraw funds, or to contract important engagements without the consent of his "judicial council." He can marry; he can even make a will.

If the apoplectic is placed in a retreat, it will be well to have him name a provisional administrator.

Finally, there are cases where intelligence, in spite of the cerebral lesions, is well preserved, where the faculties are so clear that one can, without inconvenience to the patient, without prejudice to those about him, leave him the free administration of his fortune. It is upon you, you see, upon the estimate that you form, upon the judgment which you formulate, that will depend the taking of such or such measures which I have just indicated with regard to these patients.

I ought, before ending this lesson, to take up one last question: Can an apoplectic make a valid will? Article 901 of the civil code says, "to make a gift during life, or to make a will, it is necessary to be sound in mind." Now, from the details upon which we have heretofore entered, it follows that certain of our patients have surely preserved a sufficient degree of reason to be able to make a will validly; that others, on the contrary, are evidently unfit to do so. Here again is concerned a question of degrees, even of shades, of which you will be the sovereign judges.

Having reached the end of this lesson, which I have shortened at more than one point in order not to overstep the limits which I have assigned myself, I should be happy to have convinced you of the practical interest which exists in knowing well, under its multiple aspects, the intellectual state of the patients whom I have designated "apoplexies." May I have been able to introduce into your minds the thoughts which seem to me indispensable from the standpoint of professional practice each day! These thoughts, no one should ignore to-day, especially, when cerebral pathology has entered upon a new and fruitful way, thanks to important works, many of which have been inspired by the observation of patients placed under treatment in this scientifically celebrated hospital.—*Gazette des Hopitaux*, June 21, 1881.

COLD STORAGE.—The increasing use of cold storage for perishable food stuffs, which are apt to be scarce at certain seasons, is one of the characteristics of the time. Last summer, when fresh eggs were plentiful and cheap, a gentleman in Chenango Co., N. Y., stored in a mammoth cooler some five thousand barrels of eggs. Now they sell in this city as "fresh laid" eggs, at a large profit. As the eggs are removed the cooler is filled up with ducks and other fowl to be sold next spring.

CARE OF THE INSANE.*

By H. WARDNER, M.D., Superintendent of the Illinois Southern Hospital for the Insane.

THE problem of the best care and treatment of the insane is exciting much active thought in the professional and philanthropic mind.

As the result of the following experiment may add something toward the solution of the problem, I offer it as a contribution to that end:

On the 19th of April, 1881, the male department of the Illinois Southern Hospital for the Insane, at Anna, was destroyed by fire. About half-past one o'clock in the morning of that day, two hundred and sixty patients were marched out of the burning building upon the grounds in front, where they were kept until the flames were subdued. They were then crowded into the chapel, center building, and fourth story of the female department, the women in that story being doubled in on the floors below to give necessary room for the men.

About three men occupied the space that should be allotted to one only. It was evident that these patients could not be kept in this crowded condition during the approaching hot months, pending the reconstruction of the burnt wing, without great injury to both physical and mental health. It was decided to construct temporary quarters for a part of them, and the decision was carried out as speedily as possible.

Within a distance to make it readily accessible to the domestic department of the hospital, a temporary building of one story was erected in the form of a cross, with very long arms, the head and foot of the cross corresponding to the usual center building. Each arm, or wing, is one hundred and fifty feet long, and twenty-eight feet wide. At the end of each wing, furthest from the center building, are six well-ventilated, single or seclusive rooms, for such cases as might be required to be separated from the rest, all the remaining portion of the wing being used as one long dormitory.

A room used for baths, lavatory, and water closet was built out from the rear side of the angle of junction with the center building. The center building is twenty-eight feet wide and one hundred and twenty-two feet long, and is divided into three apartments: an attendant's room, a clothing room, which is also a common connecting hall, and a large common dining room.

At the rear side of each wing is a courtyard one hundred and sixty-four feet long by one hundred and forty feet wide, inclosed by a board fence high enough to prevent the demented patients from wandering from the premises. A door from the wing opening into the courtyard is kept open during the day time, and the patients may pass at will either way. Seventy-five patients were assigned to each wing under the care of four attendants during the day time. During the night one attendant watches the building and all the patients in both wings; the partitions dividing the wings from the center building being constructed of wooden bars with interspaces to admit of the free circulation of air, and give better facilities for oversight.

The patients assigned to these quarters were chronic cases, a considerable portion of them being demented, epileptic, and paralytic.

In noting the results of this forced experiment, we observed that the change was highly pleasing to these afflicted people. A poor demented old man who had been unable to get out of the hospital with the others, exclaimed: "I thank God my foot is on the ground once more."

They delighted in the free, open air of the courtyards, which, by the way, were well shaded with forest trees, and amply furnished with seats. They lost the sickly pallor usually observed among patients kept within walls. The ample space left each man free to exercise in his own peculiar way without infringing upon the privileges of his neighbors; and consequently the irritation and assaults, especially among the epileptic, provoked by limited quarters and personal contact, have been reduced to the minimum.

During the entire season there has been but three or four occasions to use restraint, and those arose from epileptic excitement. These patients have been remarkably healthy during the season, no case of serious disease having originated or developed among them. They have been contented, and the number of escapes have not been more than in previous years.

Sleeping as they have in such large associate dormitories seems to have had the effect to keep them more quiet, and with the exception of occasional excitement from epileptic attacks, there has been no more disturbance than might have occurred had the same number of sane people been lodged in the same room. Those who had previously been noisy and disturbed their neighbors, while occupying single rooms or small dormitories, out of consideration for others, or in consequence of the restraining influence of numbers, and the eye of the night attendant, became quiet and acquired the habit of keeping still, if not of sleeping well. In fact, a general improvement has been observable both in physical and mental conditions.

It was intended to take down this temporary building after a part of the burned wing had been reconstructed and ready for occupancy, and use the material in the rebuilding of the remaining part of the hospital; but its use has proved so satisfactory that it will be retained for temporary use during hot weather, and at times when it becomes desirable to renovate portions of the hospital edifice, if it should not be devoted permanently to the use of the epileptic and feeble patients.

A similar building would, in my opinion, be found of great advantage at every hospital constructed on the ordinary plan, and its occupancy by selected patients during the hot months would prove beneficial, and a great relief from the monotony of the corridor and wards which give to asylum life so much of its prison-like gloom.

The asylum at St. Joseph, Mo., met with a similar misfortune in 1876, which forced upon the management the necessity of providing temporarily for their patients during the reconstruction of the hospital.

In the biennial report of that institution for 1881, the superintendent, Dr. Catlett, asserts that his experience in providing for the insane in cottages and farm dwellings during the reconstruction of the hospital, a period of fourteen months, has in his judgment established the expediency and practicability of providing for all classes of insane in far less expensive dwellings than the model asylum edifice. The doctor notes particularly the beneficial effects of the free out-door life upon the irritable, excitable, and enfeebled patient. He concludes his remarks upon the subject in the following language:

"I extract from the valuable crucible of experience lessons in therapy and provisions for insane, which tend to convince

* Read before the Tri-States Medical Society, October 26, 1881.

me that the model asylum edifice of this era of psychological activity is perhaps erected both at the too great expense of the humane public, as well as opposed to the best hygiene and curative interest of the improved and chronic insane; or, in other words, I am almost persuaded to assert my belief that less expensive segregated cottages, erected on asylum farms for the treatment of the improved and chronic insane, sufficiently near the main edifice where all can be under one supervision, and where exchange of patients may readily be made, when the condition of the patient requires it, would be a very great improvement in the present mode of provision and treatment of the insane.

These experiments having shown such results become strong arguments in favor of a cottage plan, combined with the prevailing system so as to give more freedom and outdoor life, especially to the chronic insane. Such additional facilities need not cost over twenty per cent. of what the usual hospital structures cost the taxpayers of the country, which is on an average about \$1,000 per capita. Our building at Anna, which I neglected to state is furnished with hot and cold water, a system of sewerage, and is lighted by gas, cost thirty-seven dollars per capita, but is intended for summer use. If such accommodations were added to hospitals already built and in operation, but constructed to meet the emergencies of the winter season, it would result in materially diminishing the cost of maintenance, while the sanitary and hygienic conditions would no doubt be materially improved.

With us at Anna, the result of our experiment has been a strong argument in favor of such a plan, and has largely dispelled the doubts we have entertained as to its utility.

DEGENERATION AND REGENERATION OF SEVERED NERVES.

In a recent lecture on the functions of the nervous system the venerable Dr. John C. Dalton reviewed at some length the experimental investigations of Waller and Türck. It is forty years, Dr. Dalton said, since the present movement of experimental investigation as to the functions of the nervous system commenced. It had long been a familiar fact that if a nerve was cut the immediate consequence is a suspension of the functions of the section thus separated from the main trunk. If the nerve was motor the muscles supplied by it became palsied; if sensory, there was suspension of sensibility in the parts supplied. But this suspension was not always permanent. Sometimes, after a few days had elapsed, the interrupted function was restored, and this was soon ascertained, by examination, to be due to the uniting of the cut surfaces or ends by granulation and the formation of new fibers. For many years investigation was exclusively directed to the study of the cicatrix and its process; but at length one more curious than the rest extended his studies to the mode of degeneration in the portion of the nerve severed from its trunk, and made some striking revelations, finding that the retrogressive alteration consisted in the granulation of the nervous fibers and the development of fat globules. By experiments on rats it was discovered that section of the sciatic nerve was not only followed by granulation of the fibers, but that when this process was complete the nerve ceased to respond to galvanic stimulation, and had, in fact, lost its functional capacity. A few years later the celebrated Waller, English by birth and education, but for many years resident on the Continent, availed himself of the fact that such degeneration can always be distinguished by microscopic inspection to begin a new method of inquiry as to the anatomy and function of the nervous system, whose results were presented to the Academy of Sciences, France, in a brilliant series of communications. It was Waller who first traced the degeneration that follows section through the whole distribution, availing himself of the extensibility and transparency of the living frog's tongue for this purpose; who discovered that the process of regeneration was by the formation of new fibers, not by the rehabilitation of the old, and who first established the existence of special centers of nutrition. If, for example, the posterior root of a spinal nerve is cut external to the ganglion, the nerve degenerates throughout the whole length of the severed section; if, on the other hand, the section is made interior to the ganglion no such degeneration occurs. In connection with the remarkable experiments of Waller on dogs and cats, Dr. Dalton reviewed the equally important and nearly contemporary discoveries of Türck, of Vienna, who from studies of disease after death had arrived at very similar results. It was the latter who discovered that in some tracts of the nervous system degeneration is propagated from the surface toward the brain (centripetally), while in others the course of the destruction was centrifugal.

DISORDERS OF SLEEP.

By H. POVALL, M.D., Mt. Morris, N. Y.

In olden times, when there were gods on Olympus, nay, even at an earlier period, before the Titanic divinities fell from their high estate to "wander in vain about bewildered shores," Sleep, the son of Erebus and Nox, gave rest to mortals and gods. Sleep, the brother of Death, dwelt in his dark cave with Dreams around him, and Morpheus as his minister to guard him from noise. Sleep and Death together bore Sarpedon's body to the land of the Lycians; and at the very vestibule and gate of Orcus did the pious Æneas see the same twin brethren seated when he visited Pluto's realm. Sleep was as godlike an agency to the nations of old as death itself. "So like death," says Sir I. Browne, "I dare not trust it without prayers, and a half-adieu unto the world, and take my farewell in a colloquy with God."

What is it? Sleep "which covers a man all over, thoughts and all, like a cloak, that is meat for the hungry, drink for the thirsty, heat for the cold, and cold for the hot."* This sleep, modern observations and researches seem to prove, follows a diminution, both in quantity and rapidity of the circulating blood; and that if this reduced rate of circulation be increased by any cause, sleep departs. The writings and experiments of Mr. Durham, Dr. Jackson, and others, have thrown great light on this subject, and tend strongly to remove all doubt as to this being the true interpretation. Since it is clearly of great importance that we should know what it is that we want to bring about when we are trying to procure sleep, it will be well to examine the theory briefly. The principal evidence as to the state of the human brain in sleep is derived from observations of a woman at Montpellier, a case with which most physicians have become acquainted. She had lost a portion of the skull-cap, and the brain and its membranes were exposed. "When she was in deep or sound sleep, the brain lay in the skull almost motionless; when she was dreaming it became

elevated, and when her dreams, which she related on awaking, were vivid or interesting, the brain protruded through the cranial aperture." This condition has also been experimentally brought about and observed in animals, and the same result has been seen, namely, that in sleep the surface of the brain and its membranes became pale, the veins ceased to be distended, and only a few small vessels containing arterial blood were discernible. When the animal was aroused, a blush spread over the brain, which rose through the opening of the bone. The surface became bright red, innumerable vessels, unseen before, were now everywhere discernible, and the blood seemed to be coursing through them very rapidly. The veins, like the arteries, were full and distended, but their difference of color rendered them clearly distinguishable. When the animal was fed and again allowed to sink into repose the blood-vessels gradually resumed their former dimensions and appearance, and the surface of the brain became pale as before. The contrast between the appearance of the brain during its period of functional activity and during its state of repose or sleep was most remarkable.**

These observations entirely contradict the theory that sleep is due to pressure from distended veins, to venous congestion; and further experiments made by Mr. Durham proved that when pressure was made upon veins and distention of them produced, the symptoms which followed were not those of sleep, but of torpor, coma, or convulsions.

And this view is completely corroborated by what we know of diseases which are accompanied by these symptoms. Common observation, too, confirms it; we must often have noticed when looking at a person asleep that the face appeared paler than usual, and that a flush came over it on waking; and all are agreed that the circulation is diminished, as also the respiration during sleep. A person in tranquil and natural sleep often breathes so slowly and so gently that we are obliged to listen attentively to discover that he breathes at all.

The disorders of sleep may be divided into four classes: namely, mental, physical, hygienic, and habit.

Mental disorders. The physician regards sleep as the rest, and the only rest, of the brain wherein reside those functions which we call mind. All parts of our bodies rest at one time or another; they cannot always work, but for their rest they need not sleep. They rest when not in active work, between their work, some more, some less, but the brain proper, that is the highest mental part thereof, rests only in sleep. Healthy sleep presupposes a healthy state of brain, and we must carefully exclude from our notions of sleep all those phenomena which are the result not of healthy but of unhealthy processes going on in the brain, some of which though apparently akin to sleep nevertheless depend on an entirely opposite condition of things. And this brings us to consider what that is which either arouses us from sleep, or repels it, which keeps the brain at work, and hinders its repose. It appears to be a certain strong excitation of that function of the nerve centers, called feeling, whether it be the feeling of emotional excitement, such as the passions or sentiments, or fear of impending disaster, or hopes of good fortune, or the feeling of bodily pain, or even strong sensations of noise or light. All these may be grouped together under the head of feelings, and any one of them, if sufficiently potent, will prevent the access of sleep or banish it from the sleeper. Probably the most frequent cause which keeps awake those who possess neither the happy carelessness of childhood, nor the apathy of old age with its blunted sensibilities, is mental worry, or anxiety of some kind or other. The professional man, whatever his calling, has constantly some important matter on hand, which may turn out well or ill—with an increased or diminished reputation among men—about which he cannot help thinking. Another has been sitting up late at some brain-work, and though, perhaps, he has no great fears about it, yet he has been working hard and long, and he cannot forget it, and shake it off; it haunts him long after he has laid his head on the pillow longing for sleep. Anticipated pleasure, no less than fear, may excite and disturb us and banish sleep. Who does not remember such seasons during his youth and riper years?

Mental emotion quickens the brain circulation. It may be slight or violent, transitory or permanent, but it increases cerebral action. An instant conversion of fear or anxiety into certainty of prosperity or success may sometimes at once bring relief, and from sheer fatigue sleep may follow, but more frequently, the effect of the mental tension is kept up for some considerable time. In short everything which stimulates the brain to a certain amount of action prevents sleep, and this stimulus must be removed before sleep can be obtained.

Not only mental but physical causes also prevent sleep. There may be discomfort of every conceivable kind, from actual violent pain to the malaise of dyspepsia after an indigestible meal, or an uncomfortable position, or an ill-made bed. Most of us have been kept awake by pain of some kind—an aching tooth or a gouty toe. And most of us know the uneasiness attendant upon indigestion and gastric irritation, which though it may not amount to pain, does, nevertheless, by sympathy, react upon the nerve centers, and stimulate them sufficiently to banish sleep. And in the same way hunger, when there is nothing to be digested, will often keep us awake. Cold will prevent sleep; so also will undue heat. In short any irritation of the external senses will prevent sleep, and anything to which the senses are not accustomed will excite them.

Pursuing this point still further, "disorders of sleep" may be due to normal and abnormal conditions of the brain. The brain substance and its membranes may be perfectly free from disease, and yet the rest may be broken and sleep repelled by causes already referred to. These disorders of sleep may, therefore, be called normal. Arising from temporary causes, they excite no alarm as to the future; the causes being removed, the effects soon cease, and balmy sleep returns to bless and refresh the entire system.

But there is a class of disorders much more serious in their results. The advent of these disorders is announced by an invincible tendency to sleep. These disorders cast a pall over the entire system, stealthily but surely stealing a march on the physician who may not have had practical experience in their manifestation. Physical pain may be absent, or so slight as to excite little or no alarm, and yet the natural fount of intelligence, consciousness, and perception may be on the wane. The most acute and powerful intellects among men have thus failed in the noon-time of their being; the brilliancy of genius has been extinguished in youth, just when its possessors had climbed the steps and reached the pinnacle of fame, from causes at first unobserved or little heeded, but nevertheless most potent for evil. Such are plethoria, softening of the brain, coma, trance,

cataplexy, insensibility from apoplexy, alcohol, and poisons. All these orders may be regarded as abnormal, being due to unhealthy processes going on in the brain.

"Disorders of sleep" may also be due to defective hygiene. This is especially true of the condition of our crowded cities and towns, where the poor huddle together in small tenements, one room serving in many instances for laundry, cooking, dining, sitting, and sleeping. It is impossible for the occupants of such a place to have refreshing, healthful sleep; with an atmosphere reeking with unwholesome odors and noxious gases. Here the germs of fever are matured, and find in these blanched, attenuated forms a suitable soil in which to multiply and develop. This evil is not confined to large towns and cities. In almost every section of country, old and new, little or no attention is given to proper location, size, and ventilation of our bedrooms. The dining, sitting, and drawing rooms receive the lion's share of attention from architects and proprietors, but the rooms in which we are supposed to spend one-third of our life in health, and in sickness our only abode, are usually miserably small, dark, and without proper ventilation. How can sleep under such adverse circumstances be refreshing or invigorating? How can nature's daily waste be repaired excepting the material required to this end be possessed of all the health-giving elements so amply provided by a beneficent Creator?

Excess of heat and cold are to be avoided if we wish to sleep soundly; bedrooms must be warmed in winter and cooled in summer; people must get rid of the old prejudice about opening bedroom windows, and must eschew feather beds and heaps of spreads and comforters, if they would avoid disordered sleep.

Disorders of sleep may be due to habit. Many persons are habitually bad sleepers, and all know what it is to lie awake and be unable to sleep, even when they are in ordinary health. Nor is it difficult to form the habit. It is an established fact that drinking alcoholic liquors to excess, the use of tobacco, snuff, and opium eating are the result of habit, and even chronic constipation may be brought on by continuously neglecting the calls of nature for evacuation; but in like manner constipation in many instances may be relieved by a daily resort to the closet at a given hour. The habit of insomnia is no more difficult to form than any of these when any of the nervous exciting causes are present to which we have referred in another part of this paper.

The ailments of many persons are due to this habit; the cares and work of the day pursue them far into the night, and when morning dawns, it finds them unrefreshed. Nervous tension continued without intermission, the health gives way, nervous exhaustion ensues, sleep becomes next to impossible. If this condition continues unabated under suitable therapeutic treatment, the end advances with rapid strides.

A class of persons of highly nervous temperament have become so habituated to unrest that their nights are spent in semi-consciousness, their days in a tempest of excitement which all about them are made to feel. Can it be wondered at if the stomach fails to discharge its allotted task? if nutrition is ill performed? if a nervous system run at high pressure for years ultimately breaks down in either permanent imbecility or insanity?

Thus we learn that health, happiness, longevity are all more or less dependent on normal sleep, and anything that repels it should be avoided with all our powers, ever remembering the words of the Psalmist, "For so He giveth His beloved sleep."—*Therapeutic Gazette*.

THE BONE-CONDUCTION OF SOUND.

In the New York *Medical Journal and Obstetrical Review* for February, 1882, Dr. J. A. Andrews, Assistant Surgeon to the Manhattan Eye and Ear Hospital, gives an account of his investigations in regard to the intermittent perception of sound, as conveyed through the cranial bones—the observations having been mostly clinical, largely with the use of the tuning-fork. In order that an explanation for the phenomenon of intermittent bone conduction may be understood, he thus formulates the points in differential diagnosis between an affection of the middle ear and one of the labyrinth, as evidenced by examination with the tuning-fork:

1. If a vibrating tuning-fork, *c*, be placed between the teeth, the hearing power being normal on one side and diminished on the other, and its tone be intensified in the ear of which the hearing power is diminished, the cause is seated in the external or middle ear, and the labyrinth is unaffected.

2. If the hearing power be impaired in both ears, and the sound of the tuning-fork be heard better in the worse ear, and intensified on closure of the ear of which the hearing is most impaired, the cause is still located in the middle ear.

3. If under either of the above-mentioned conditions the vibrations of the tuning-fork be not heard better in that ear of which the hearing power is most impaired, even if its meatus be closed with the finger, and middle-ear disease as a cause can be excluded, there is an affection of the central apparatus of hearing. If the tone of the tuning-fork be still intensified by closure of the ear of which the hearing power is least impaired, there is disease of the central apparatus on one side only. Should the sound of the tuning fork not be intensified by closure of either ear, then the disease is on both sides, and has its seat in the labyrinth or in the brain.

In the first and second propositions the increased resonance results from the reflection of the vibration from the cranial bones upon the nerve. In the third proposition the reflection or condensation of the vibrations of the tuning-fork upon the nerve when the meatus is closed does not intensify their perception, because the function of the auditory nerve itself and not that of the conducting apparatus is impaired. The peculiarity that in some cases of middle-ear disease the watch is not heard by bone conduction, and in other cases examination with the tuning-fork gives the signs of labyrinth disease—*i. e.*, the tuning-fork being heard by bone conduction better in the ear which is normal as to hearing power, therefore diminished instead of increased in the ear of which the hearing capacity is impaired—can not, it seems to him, be explained by assuming an interference with the conduction through the chain of ossicles.

He inclines to the belief, based upon experiments, that this phenomenon is due to increased intra-labyrinthine pressure, brought about in those cases of middle ear disease in which there is an accumulation of fluid in the tympanum, or the membrana tympani is much depressed, in the former instance by the fluid in the cavity acting upon the oval or round window, or both, and in the latter instance by the plate of the stapes being forced against the membrane in the oval window. In both cases the terminations of the acoustic nerve suffer a mechanical irritation which gives rise on the one hand to subjective noises in the ear, and on the other hand

* Cervantes.

* Durham on the "Physiology of Sleep," Guy's Hospital Reports, 1860.