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A CLINICAL PAPER BASED UPON CASES IN THE
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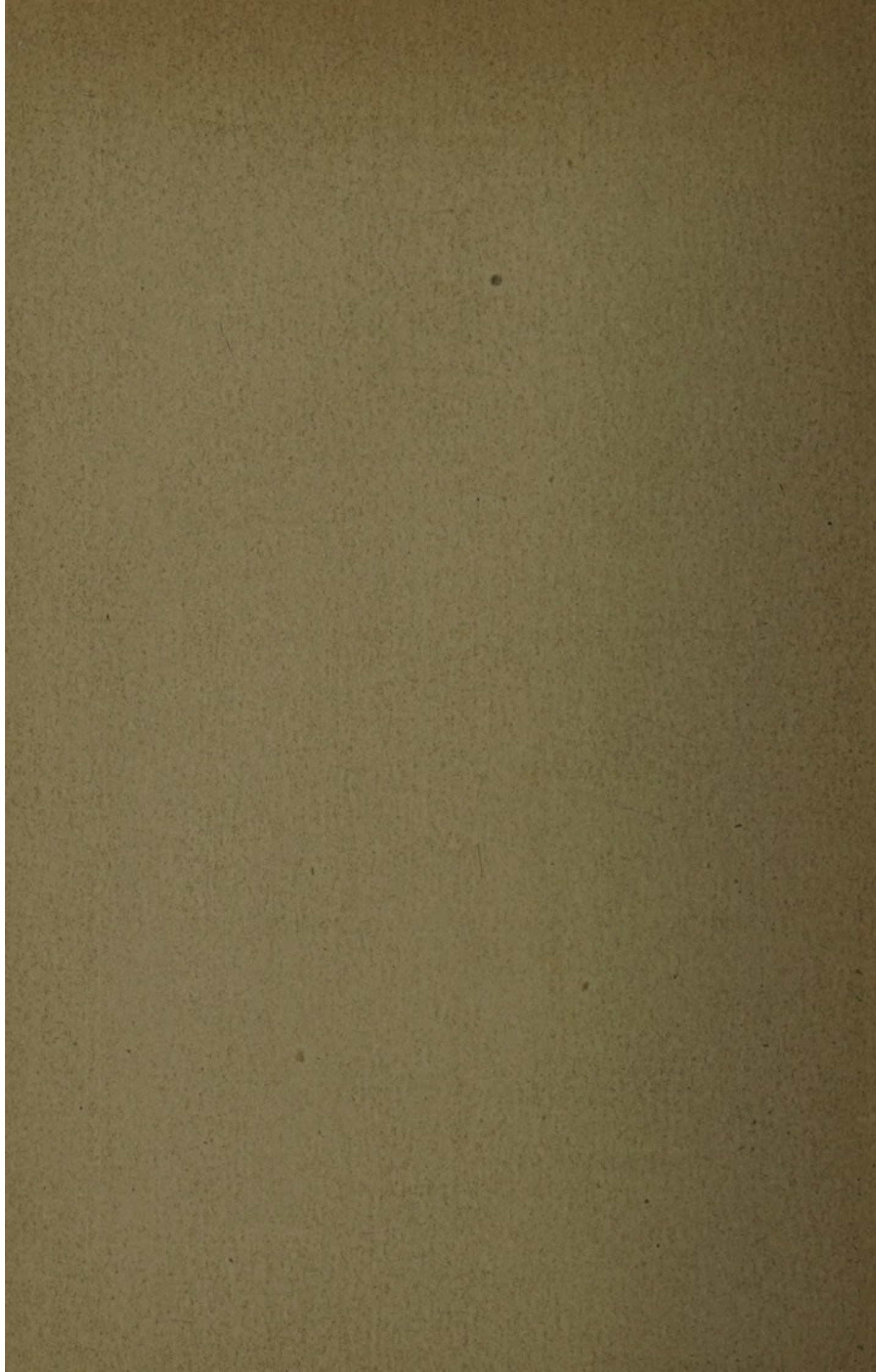
C. R. AGNEW, M.D., AND DAVID WEBSTER, M.D.

[Read before the Medical Society of the County of New York, Novem-
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By DAVID WEBSTER, M.D.,

Reprinted from THE MEDICAL RECORD, December 11, 1880.

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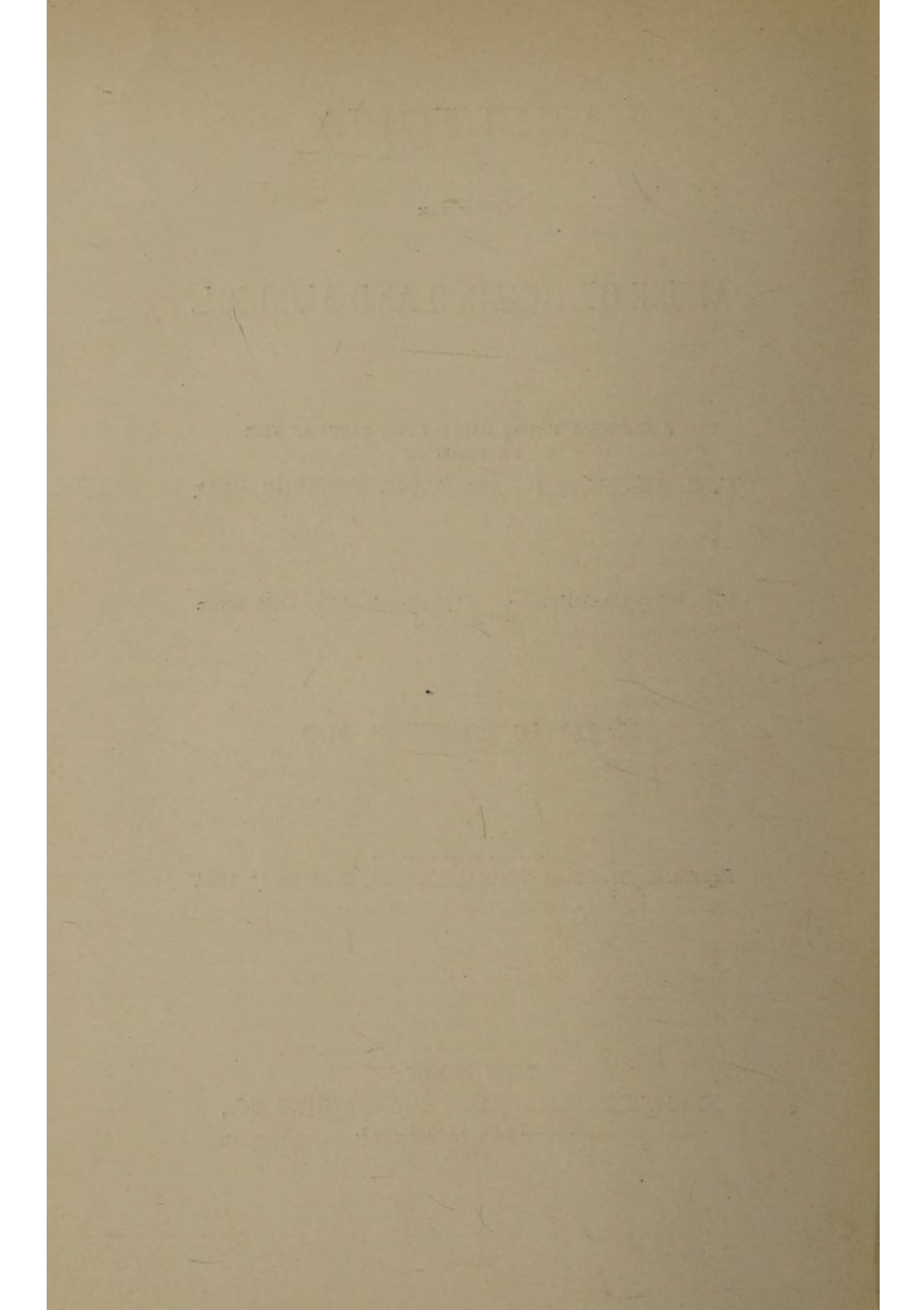
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AMBLYOPIA FROM THE ABUSE OF TOBACCO AND ALCOHOL.

Mr. President and Gentlemen—In coming before you this evening with some remarks upon the amblyopia or impairment of vision, which arises from the abuse of alcohol and tobacco, I believe I have selected a subject which will prove to be of interest to the general practitioner as well as to the specialist. Probably every physician has to deal with the poisonous effects upon the nervous system of alcohol and tobacco in one form or another. And, I think, the careful medical man, when called to a case of chronic disease in the adult male, and even in some cases of acute trouble, rarely omits to inquire into his habits as regards the use of tobacco and spirits, and often finds it necessary to regulate, or to forbid entirely the use of these drugs.

That the abuse of alcohol alone, or of alcohol and tobacco combined, may produce impairment of vision, ranging all the way from the slightest blurring to total blindness, no physician acquainted with the subject will, I think, venture to deny.

Some, however, doubt that *tobacco alone* ever causes impairment of vision. And indeed it is difficult to demonstrate, beyond all controversy, that it ever does. Such cases seem to occur very infrequently in this country, and when we meet with one of them we often find it very difficult to exclude all other causes of amblyopia. Take, for instance, the case of J. A. (No. XII. of the cases herewith presented). He was sixty years of age, and had smoked a strong pipe most of the time when awake, for over forty years. He had rarely tasted liquor. He had never had syphilis nor malarial disease. In short, no other probable cause could be found for his impairment of

vision than his being perpetually subjected to the poisonous influences of his pipe. On the other hand, how often do we meet with cases of amblyopia for which we can find *no* probable cause! May this case not have really belonged to that category, and the excessive use of tobacco merely a coincidence? We think the sequel goes to prove that it was really a case of tobacco amblyopia. The patient's tobacco was cut off, and, at the end of a week, without any treatment or medication, his sight had doubled itself in one eye and *nearly* doubled itself in the other.

Dr. Edward T. Ely, of this city, recently examined the eyes and tested the vision of 102 workers in tobacco, chiefly cigar-makers. The doctor sums up his results in the following words: "My own impressions, gathered from these examinations as well as from other experience, are, that tobacco has of itself only a comparatively slight influence in impairing the vision; that working in tobacco is as healthful as most other sedentary occupations; that in certain persons peculiarly susceptible to it, or, when combined with other noxious influences, it may impair the vision or the general health, just as has been claimed for it; and that constant contact with it, as with other poisons, may beget a tolerance of it sufficient to contradict all theory." The doctor also says, and, I think, correctly: "A tobacco amblyopia is mentioned in all modern text-books on the eye, and most ophthalmologists believe in it, and on good and sufficient evidence, so far as we can judge."

Mr. Jonathan Hutchinson, of London, seems to have no doubt of the effect of tobacco in producing amblyopia. In the Ophthalmic Hospital reports, vol. vii., he publishes twenty-nine cases that have come under his care. Of these cases he says: "For myself, I may briefly avow that I have scrupulously investigated other possible causes, and that I feel no hesitation in believing that in most of these cases tobacco is the real one." In two of Mr. Hutchinson's cases there was white atrophy of both optic disks with total blindness. In one case the disks were very white and the patient had only perception of light. The other cases had vision ranging from per-

ception of light to two-thirds the normal. Mr. H. states in this article that he has long held the opinion "that when tobacco causes blindness it does so in virtue of an idiosyncrasy," and that "it is by no means improbable that such idiosyncrasy will be found occasionally in several members of the same family."

As regards such family idiosyncrasies, I have seen several instances of optic nerve atrophy occurring in adult males who were brothers, but, in these cases, the disease could not be attributed to the use of tobacco, nor could any very probable cause be assigned.

In vol. viii. (*ibid.*) Mr. H. publishes tables containing the "facts as to progress" in sixty-four cases of tobacco amaurosis. "Recovery or great improvement took place in seventy-five *per cent.* In four cases the disease was arrested, sight remaining stationary after a certain degree of failure. In seven cases sight became worse while under care, and five others were quite blind when first seen, and are believed to have continued so."

The fact that so careful and so competent an observer as Mr. Hutchinson has made a diagnosis of tobacco amaurosis in so large a number of cases is, of itself, one of the strongest of arguments in favor of the existence of such a disease. At the same time, it would appear that it is met with much more frequently in England than in any other country. This, according to Mr. Hutchinson, seems to be accounted for by the fact that the poorer classes of Englishmen usually smoke a kind of tobacco called *shag*, one of the strongest and worst of its forms.

As regards the ophthalmoscopic appearances found in amblyopia from alcohol and tobacco, I think all ophthalmologists will agree that "there is no special lesion of the fundus of the eye that would at once enable one to diagnosticate the nature of the disease as depending upon the excessive use of alcohol or tobacco."

Before making a diagnosis of amblyopia from tobacco and alcohol, we must get in all the facts which go to make up the case—the clinical history, the symptoms, subjective and objective, the various

complications, the habits of the patient, as well as the ophthalmoscopic appearances.

I must confess, however, that when a man comes to me on account of failing vision, and I find the characteristic "chloroform odor" on his breath, and the scent of tobacco issuing from every pore of his skin—a condition which is quickly appreciated while making an ophthalmoscopic examination by the direct method—I at once suspect that I have discovered the cause of his affection, and am only likely to have my opinion changed by *positive evidence*, ophthalmoscopically, or otherwise. For instance, if I found such a patient had choroidal atrophy, or choked disk, or incipient cataract, I would hardly refer these to alcohol and tobacco as a cause.

The ophthalmoscopic appearances in this disease are, however, within a certain range, quite constant, and are always referable to the optic nerve and retina. When seen in its earlier stages, there are the appearances of a low grade of neuritis, or, at least, of hyperæmia of the optic disk. Later on, there are appearances of incipient optic-nerve atrophy.

In the cases herewith presented, the ophthalmoscopic lesion most frequently noted was "incipient atrophy of optic nerves." This was noted in seven cases out of the twenty. In two cases, "optic disks too pale;" in two cases, "optic-disks of a dirty, brick-dust color;" in two cases, "nasal half of disk too red and temporal half too white;" in one case, "disks too pale, and white bands by the sides of some of the retinal vessels," showing the existence of a perivasculitis.

In some cases, not well enough recorded to be included in this paper, we find it noted: "Fundus has a smirched, dirty look, but no lesion," or, "smirched condition of optic disks; surface of disks red and outline seen with difficulty, yet an abnormal whiteness shining through from beneath the surface; venous pulsation." Of course, it is only possible for those skilled in the use of the ophthalmoscope to appreciate these nice distinctions in the ophthalmoscopic appearances, but the physician will readily understand us when we say that they all refer to dif-

ferent degrees of vascularity, of inflammation or atrophy of the optic nerve and retina.

In eighteen of the cases herewith presented, both alcohol and tobacco were used in excess ; in one case tobacco was used excessively, from ten to fifteen strong cigars daily for ten years, and alcohol moderately, only an occasional glass of gin being taken ; and in one case, as before stated, the amblyopia seemed to be wholly due to the abuse of tobacco. In this case the vision rose from $\frac{5}{200}$ to $\frac{7}{10}$ in each eye, the patient abstaining from tobacco, and being subjected to appropriate treatment.

In some of these cases we omitted to note the length of time during which the patient had been addicted to the habitual use of spirits and tobacco ; but in most of the cases it was many years—in one case ten, in one case thirty-eight, and in one case forty years.

The time that had transpired since the patient first noticed impairment of vision varied from three weeks to over a year.

In nearly all the cases the impairment of sight had been *gradual*, although in one case it had been ushered in *suddenly* "after prolonged exposure of the eyes to glare on the water." In this case, however, the sight continued to deteriorate gradually after the first onset of the disease. In all the cases there was simultaneous decay of vision in both eyes. In nine cases, or in nearly *fifty per cent.*, the amount of impairment was exactly the same in both eyes. The greatest difference of vision in the two eyes of any one patient was where one eye had vision $\frac{2}{30}$ and the other $\frac{2}{100}$.

In several cases it may be doubted whether the impairment of vision was *wholly* due to alcohol- and tobacco-poisoning. Several of the patients had been subjects of malaria ; one said that his sight began to fail during an attack of "bilious diarrhœa ;" one had had syphilis, but there was no evidence of any syphilitic disease of his eyes, and on the other hand he was habitually saturated with spirits and tobacco, and recovered his vision when these were cut off, and he had been under treatment for a few weeks.

The patients were all men, their ages ranging from thirty to sixty. Two were physicians, two were gentlemen of leisure, one a sea-captain, one a lawyer, one a merchant, one clerk, one speculator, one auctioneer, one machinist, one equestrian, one mechanic, one watchman, one coachman, and one laborer.

About one-half the number were married and the other half bachelors.

In all of these cases, or nearly all, the treatment by hypodermic injections of strychnia was pursued, and generally with great apparent benefit. Our routine method of using the strychnia is this: We have put up, at a reliable apothecary's, four grains of nitrate of strychnia in an ounce of distilled water. Each minim of this solution contains one one-hundred-and-twentieth of a grain of nitrate of strychnia. We usually begin by injecting into the subcutaneous cellular tissue three minims of this solution, or one-fortieth of a grain of the drug. We then increase the amount injected by one minim daily, giving one injection a day until some of the physiological effects of the drug have been produced.

The most frequent of these we have found to be a kind of stiffening of the legs with a tendency to "kick out" in an irregular manner. We have usually kept the patient sitting for fifteen or twenty minutes after the injection, in order to observe the effect. Frequently the first symptom of any effect upon the system would be this uncontrollable tendency to step higher, or to one side, or in some direction not in accordance with the wishes of the patient while going down-stairs to go out. At the same time stiffness of the muscles of the thighs would be complained of, and sometimes slight spasmodic twitchings, or rigidity, of the muscles of the jaws or other muscles would be observed. The next most frequent symptom was vertigo, and sometimes headache. I remember that one man, who lived in Williamsburg, was attacked with a sudden dizziness, and fell down on the sidewalk when he had nearly reached his home. He soon recovered his self-control, however, and reached home without assistance. In a very few cases "little knotty pains" in the bowels were complained of, just

such pains as I have heard some persons say they experienced from drinking lager beer.

I may say, however, that although we have been using nitrate of strychnia hypodermically for over eight years, and often in three or four different patients a day, we have never yet seen any alarming symptoms from its use, and we do not think there is much danger attendant upon its use in the way we have described. Cases have been reported, however, in which symptoms of decided strychnine-poisoning followed its use in amaurosis and amblyopia. But I have not heard of any *fatal* results.

One very disagreeable complication, however, arose in several cases, and that was a tendency to inflammation at the site of the puncture.

In one case a small abscess formed and persisted for several weeks in spite of such treatment as was employed. When this complication occurs a change in the treatment usually seems to be indicated.

We have commonly given our injections in the back of the neck, sometimes in the arm, and less frequently in the temple.

The question naturally arises, How long should we continue these hypodermic injections of strychnia? Our practice has been to continue them up to physiological effects, and then to stop them if no marked benefit has ensued. If the vision continues to improve after physiological effects have been reached, the injections may be continued for an indefinite period, that is, as long as they seem to be doing any good. The quantity injected should be diminished, however, so as just to fall short of physiological effects.

We have, in some cases, after reaching physiological effects, stopped the strychnia injections for a few weeks, and then resumed them again, going over the same ground as at first with decided benefit.

The largest dose of strychnia I have injected in any one case was, to the best of my recollection, one-fifth of a grain. I have seen one patient, however, who, under the care of a friend of mine, had the dose increased to one-half of a grain before physiological effects were produced. Usually physiologi-

cal effects show themselves after you have increased the dose to from one-fifteenth to one-tenth of a grain.

You must not suppose, gentlemen, that in these cases of amblyopia from alcohol- and tobacco-poisoning we do nothing for the patient but treat him with hypodermic injections of strychnine. The first and most important thing of all in the treatment is *entire abstinence* from the poisons which caused the disease. We find it the best way to cut off the alcohol and tobacco *at once and completely*. The "tapering-off system" will not do here. If the patient be allowed to use either tobacco or alcohol at all, he will be almost sure to do so to the point of saturation or toxic effect. It is certainly much easier for a person accustomed to the immoderate use of tobacco and alcohol to drop them entirely than to limit their use short of satiety. And generally they are ready and willing to do so when the importance of such abstinence is fairly represented to them, and they are told to choose between the continuation of the indulgence and their eyesight. Such patients have frequently told me that they were themselves surprised at the facility with which they dropped the habit, their "hankering" having continued, to any unpleasant degree, for only a few days. I have known some of these patients to *relapse* into their habits of drinking and smoking, but strange to say, I do not recollect any patient who came to us for treatment a second time, having been once cured. Perhaps the amblyopia does not recur; perhaps such patients are ashamed to apply a second time to the same physician for treatment, being conscious of a sense of moral degradation in having neglected to follow his advice.

Besides stopping the use of tobacco and alcohol, and placing the patient upon injections of nitrate of strychnia, his hygienic circumstances should be carefully looked into, and his whole manner of living should be properly regulated. Of course other medicines besides strychnia are frequently indicated, and should be used.

Dr. Charles S. Bull, who published a paper in the *American Journal of Medical Sciences* for April, 1873,

“On the Treatment of Various Forms of Amblyopia and Amaurosis,” in which he reports twelve cases which he had treated with hypodermic injections of strychnine, gives the following as his conclusions in regard to the value of the strychnine treatment: “In all cases of functional amblyopia we may expect good and permanent results from strychnia; and even in some cases of organic origin, provided there be no extensive atrophy of the nerve-structures, some improvement is gained by the use of the drug.”

Some of our colleagues say that they have no confidence whatever in the strychnine treatment, and do not resort to it at all, or, having tried it, and failed to get such good results as others have claimed, have abandoned it altogether.

Yet it seems to me that we may be reasonably sure that our patients of the class spoken of in this paper usually recover their vision more rapidly under the strychnine treatment than they would under any other. Look at Case V. of this series, for instance. On his first visit he had vision $\frac{1}{100}$ in each eye; one thirty-sixth of a grain of strychnia was injected, but reeking as he was with alcohol and tobacco, there was no immediate improvement. On his second visit, one week later, he, having abstained from tobacco and alcohol, had vision $\frac{2}{100}$ in right, and $\frac{2}{80}$ in left eye. A hypodermic of strychn. nitrat. gr. $\frac{1}{30}$ was then given, and vision rose in *one minute* to $\frac{2}{50}$. *Five* minutes later, vision was $\frac{2}{40}$, the vision thus having *doubled* itself in one eye and *more than doubled* itself in the other within six minutes from the time of the injection.

Also look at the case of Mr. McK—— (Case VII.). He came to us with vision $\frac{6}{100}$ in each eye. We gave him a hypodermic of strychn. nitrat. gr. $\frac{1}{4}$, and a few minutes later his vision rose to $\frac{24}{80}$ each eye, the sight being more than quadrupled in each eye before leaving his seat.

These cases would seem to demonstrate beyond a doubt that strychnia, used hypodermically, has a certain specific influence upon the visual apparatus. Dr. Bull, in the paper above cited, says, concerning the influence of strychnia upon the sense of sight,

“the only point that we are sure of is that it produces a distinct irritation or excitement of the nervous portion of the visual apparatus.”

There can be no doubt that most patients who are the victims of alcohol- and tobacco-poisoning would recover a certain amount of vision by simple abstinence from tobacco and spirits. Cases IX., X., XII., and XVI. bear out this assertion. Each of these patients abstained for one week without treatment. The vision of Case IX. went up from $\frac{2}{200}$ to $\frac{2}{70}$ each eye; the vision of Case X. rose from $\frac{1}{200}$ to $\frac{2}{100}$ each eye; the vision of Case XII. rose from $\frac{5}{200}$ each eye to $\frac{5}{100}$ right, and $\frac{5}{120}$ left; and the vision of Case XVI. rose in right eye from $\frac{2}{100}$ to $\frac{2}{80}$, and in left eye from $\frac{2}{80}$ to $\frac{2}{60}$.

Of the twenty cases here reported the vision was improved, while under treatment, in all the cases except *two*, in which it remained unchanged. In seven cases, or in about thirty-four per cent., the vision rose from various degrees of impairment to the normal standard, in one case going up from counting fingers at twelve and fifteen feet to $\frac{2}{20}$ each eye.

If I were to formulate my conclusions drawn from these cases and from other sources of information, they would be about as follows :

1. Amblyopia from poisoning by alcohol alone, or by alcohol and tobacco combined, is not uncommon.

2. Amblyopia from poisoning by tobacco alone *does occur*, but, in this country, somewhat rarely.

3. Cases of amblyopia from abuse of tobacco and alcohol will usually improve, perhaps to a limited extent, on simple abstinence from the poisons causing the disease.

4. They will improve much more rapidly under treatment by hypodermic injections of strychnia, this drug having a specific stimulating influence upon the nervous portion of the visual apparatus.

My thanks are due to Dr. C. R. Agnew for his permission to make use of the following cases drawn from his case-books.

CASE I.—Dr. G—, aged thirty-two years; American, married; came under observation in January, 1873. His vision had been acute until the previous

June, when it began to grow dim, without pain or other symptom, "just as a twilight sets in." The failure of sight gradually increased until now. Right eye, V. = fingers at fifteen feet, and left eye, V. = fingers at twelve feet. He chews and smokes tobacco freely, and takes two or three drinks of whiskey daily, occasionally more.

Ophthalmoscopic examination, through dilated pupils, reveals "a dirty-looking macular region and whitish optic disk" in both eyes.

January 28th.—The patient was put upon hypodermic injections of nitrate of strychnia, commencing with gr. $\frac{1}{8}$ and increasing to gr. $\frac{1}{4}$. The strychnia was then stopped for a few days, and the patient put upon iodide of potassium and bromide of ammonium.

February 10th.—Urine examined by Dr. Edward Curtis, and pronounced normal.

February 12th.—Patient examined by Dr. E. C. Seguin, who finds no evidence of intracranial or spinal disease.

The strychnine injections were then renewed, and carried from gr. $\frac{1}{4}$ up to gr. $\frac{1}{6}$, when the patient returned to his home, with only slight improvement of vision.

June 11, 1875.—Vision $\frac{2}{0}$ in each eye. Used no medicine but cod-liver oil after leaving New York, and took that only two months. He attributes his recovery of vision more to total abstinence from whiskey and tobacco than to any medication. His recovery was very slow, and he could see sufficiently well to shoot last fall for the first.

October 4, 1878.—He has had no further trouble with his eyes. Vision remains $\frac{2}{0}$.

CASE II.—A. C. R.—, aged fifty-four years; American, bachelor; officer in U. S. Navy; came under observation June 16, 1875. First noticed sight was beginning to fail about two months ago, while in Savannah, during an attack of "bilious diarrhoea," which "laid him up" for three weeks. Had chills and fever when a boy. Has never been subject to headache; never had venereal disease. No albumen in urine.

Has used tobacco since sixteen years of age, and has smoked excessively this winter. Has used wine and spirits habitually all his life, never to excess; "only five or six glasses of whiskey a day."

The patient is very thin. He says he never had much flesh, but lost much of what he had during his illness in Savannah.

R. V., $\frac{20}{70}$; L. V., $\frac{20}{40}$. No improvement with glasses.

Ophthalmoscopic examination: "Apparently has incipient atrophy of both optic nerves." Advised to stop the use of tobacco and spirits, and injected strychniæ nitrat., gr. $\frac{1}{24}$.

June 17th.—Injected strychn. gr. $\frac{1}{20}$.

June 22d.—Has smoked only three cigars daily, and has drunk no spirits. Vision remains the same. Injected strychn., gr. $\frac{1}{17}$.

July 6th.—R. V., $\frac{20}{40}$; L. V., $\frac{20}{20}$. Has had a daily injection of strychn. nitrat., the dose to-day being gr. $\frac{1}{8}$.

July 15th.—Vision remains the same as when last tested. Injected to-day strychn. nitrat., gr. $\frac{1}{8}$, which produced some "stiffening of his legs." Sent into the country.

September 2d.—Has been at Richfield, N. Y., for three weeks, during which he gained $3\frac{1}{2}$ lbs. in weight. While at Richfield he drank three large glasses of mixed milk and cream daily. He went thence to Saratoga, where he stayed three weeks, but gained no flesh while there. Vision, $\frac{20}{20}$ each eye; visual fields normal.

April 20, 1879.—Captain R. states that he has had no further trouble with his eyes.

CASE III.—Thos. McS——, aged thirty-one years; Irish, married; coachman; came under observation January 8, 1874. A year ago had some redness of his eyes during the snowy weather. Never had pain in his eyes or head; never had syphilis nor malarial disease. Noticed sight getting bad for the last five weeks.

Smokes a pipe most of the time when not driving, and drinks freely of ale, and occasionally of whiskey.

Vision $\frac{15}{20}$ each eye; no improvement with glasses.

Ophthalmoscopic examination: Dirty, congested look of fundus and nasal half of disk; temporal half of disk too white. Injected strychn. nit., gr. $\frac{1}{4}$. No immediate improvement of vision.

January 15th.—Has abstained from tobacco and spirits for a week, and vision remains the same. Injected strychn. nit., gr. $\frac{1}{4}$, and before he left his seat vision rose to $\frac{2}{20}$ in each eye.

Mr. McS—— was then sent to the Manhattan Eye and Ear Hospital, and placed upon daily increasing injections of nitrate of strychnia. These injections were continued for some days after the physiological effects of the drug had been reached. The patient states that his sight became much better while under treatment, but no note was made of the amount of improvement.

February 10, 1879.—Vision $\frac{2}{20}$ each eye. The patient states that he smokes and drinks only occasionally.

CASE IV.—Doctor F——, aged fifty-four years; married, Irish; has noticed that his sight was failing for several months. Now, September 4, 1876, R. V., $\frac{2}{10}$; L. V., $\frac{2}{7}$. No improvement with glasses. He has for many years been addicted to an excessive use of tobacco and spirits.

Ophthalmoscopic examination: “Incipient atrophy of both optic nerves.” Advised to quit the use of tobacco and spirits, and to place himself upon the use of nitrate of strychnia.

February 24, 1879.—Dr. F——, states that immediately after consulting me, his son, also a physician, began to inject him with nitrate of strychnia, commencing with a small dose and increasing a little daily, until physiological effects were produced. He then began taking it in increasing doses by the stomach. He increased the dose up to gr. $\frac{1}{8}$ daily, and this having affected his muscular system slightly, he stopped the drug. He has been taking it from time to time ever since, and has abstained from the use of tobacco and alcohol. His vision gradually improved from the first. Now, V. $\frac{2}{20}$ each eye; visual fields normal.

CASE V.—G. B. W——, aged thirty-seven years;

married, clerk; came under observation October 23, 1873. Blurring of sight came on suddenly after prolonged exposure to glare on the water three or four months ago, and has since gradually increased. For several years has smoked on an average fifteen strong cigars daily, and has drunk on an average eight or ten glasses of brandy a day. Had what his physician called a chancre fifteen years ago, but it was never followed by any of the constitutional symptoms of syphilis.

Vision $\frac{1}{100}$ each eye; no improvement with glasses. No color scotoma, nor limitation of visual fields.

Ophthalmoscopic examination: "A dirty, ill-defined appearance of the optic nerve and retina." Injected strychn. nit., gr. $\frac{1}{36}$. No immediate improvement of vision.

October 30th.—Has abstained from tobacco and alcohol for one week without treatment. R. V., $\frac{2}{100}$; L. V., $\frac{2}{80}$. Injected strychn., gr. $\frac{1}{36}$, and one minute later V. $\frac{2}{60}$ both eyes. Five minutes later V. $\frac{2}{40}$ both eyes.

November 6th.—The injection has been daily increased, and the dose has reached gr. $\frac{1}{14}$. Vision $\frac{2}{30}$ both eyes.

November 7th.—Injected strychn., gr. $\frac{1}{12}$, which produced such decided effects that the patient had to lie down for an hour before he had sufficient control of his limbs to leave the office.

November 17th.—Has had strychn., gr. $\frac{1}{4}$, injected daily since last note. Vision $\frac{2}{20}$ each eye.

CASE VI.—A. L.—, aged fifty-eight years; American, married; speculator; said that his sight had been failing for the last nine months. He had for many years smoked, chewed, and drunk to excess.

Ophthalmoscopic examination: "Disks dirty, atrophic excavation, retinal veins enlarged and pulsating."

R. V., $\frac{2}{80}$; L. V., $\frac{2}{100}$; no improvement with glasses. Placed upon daily injections of nitrate of strychnia. After three injections, gr. $\frac{1}{4}$, gr. $\frac{1}{20}$, and gr. $\frac{1}{8}$, vision rose to $\frac{2}{50}$ both eyes. After five more injections, R. V., $\frac{2}{40}$; L. V., $\frac{2}{30}$; and after three more, R. V., $\frac{2}{30}$; L. V., $\frac{2}{30}$. This patient was under treatment fourteen days, and received eleven injections, six of

which were of gr. $\frac{1}{2}$ each. No physiological effects were produced.

CASE VII.—Colin McK——, aged forty-nine years; machinist and engineer; could see well with spectacles up to three months ago, since which vision has gradually but rapidly failed. Has smoked from ten to fifteen strong cigars daily for ten years; occasionally drinks a glass or two of gin; drinks coffee four times a day. Vision, $\frac{6}{100}$ each eye; improved by $+\frac{1}{8}$, but not to $\frac{20}{200}$.

Ophthalmoscopic examination: “Incipient atrophy of optic nerves.”

Strych. nitrat. gr. $\frac{1}{4}$ was injected into the back of the neck, and within five minutes vision rose to $\frac{20}{80}$ each eye.

He returned to his family physician with a letter, and we have not heard from him since.

CASE VIII.—C. S. P——, aged forty-six years; auctioneer; saw well with glasses up to five weeks ago; read the newspapers up to nineteen days ago. Never had syphilis nor malaria. General health good.

Previous to the commencement of his failure of sight he was constantly under the influence of alcohol and tobacco, and still has his pipe in his mouth at least half the time.

Ophthalmoscopic examination: “Incipient atrophy of optic nerves.” R. V., $\frac{20}{100}$; no improvement with glasses. L. V., $\frac{20}{30}$, with $+\frac{1}{8}$. Central scotoma of both eyes, but no color-blindness.

This patient was treated with strychnia injections from April 17th to May 10th, when he was discharged with vision unchanged, and has not been heard from since.

CASE IX.—R. E——, aged forty-six years; complains of gradual impairment of sight. Drinks and smokes excessively. V. $\frac{20}{200}$ each; no improvement with glasses.

Ophthalmoscopic examination: “Optic disks of a dirty, brick-dust color.”

Advised to abstain from tobacco and spirits and return in a week.

March 2d.—V. $\frac{20}{70}$ each eye, after a week's abstinence.

March 13th.—He has had five injections of strychn. nitrat., the last being gr. $\frac{1}{15}$. V. $\frac{20}{80}$ each eye.

March 19th.—R. V., $\frac{20}{80}$; L. V., $\frac{20}{40}$.

CASE X.—G. B——, aged fifty years; has long been addicted to the excessive use of tobacco and alcohol. Vision has been declining for several months, and is now $\frac{15}{20}$ each eye.

Ophthalmoscopic examination: “Incipient atrophy of optic nerves.”

January 15th.—Has abstained from alcohol and tobacco one week without treatment. V. $\frac{20}{100}$ each eye.

January 25th.—Has had eight injections of strychn. nitrat., the last dose being gr. $\frac{1}{12}$. R. V., $\frac{20}{80}$; L. V., $\frac{20}{30}$.

CASE XI.—E. L——, aged fifty-five years; lawyer; came under observation June 16, 1875. Has smoked four or five cigars a day, and drank brandy and water in the evening for many years. Has had increasing mistiness of vision for three or four weeks. Puffiness of lower lids for years. Urine normal. Never had syphilis nor malaria. Never has headache nor pain in the eyes. Latterly he has “lost stomach.” R. V., $\frac{20}{40}$; L. V., $\frac{20}{30}$; picking out the letters slowly. Reads J. 4 with glasses with difficulty.

Ophthalmoscopic examination: “Dirty disks.”

June 22d.—Has smoked only one cigar a day, and drank no spirits, and has drunk milk freely. Vision unchanged.

July 6th.—The dose of strychn. nitrat. has been increased from gr. $\frac{1}{40}$ to gr. $\frac{1}{8}$. R. V., $\frac{20}{40}$; L. V., $\frac{20}{20}$.

July 15th.—The dose has been increased to gr. $\frac{1}{5}$. Slight physiological effects on arms and legs.

August 23d.—R. V., $\frac{20}{30}$; L. V., $\frac{20}{20}$. Can now see the lineaments of faces across the street, while before he could see only the dark outline. He had twenty-two injections in all.

CASE XII.—J. A——, aged sixty years; Scotchman, married; mechanic; came under observation January 17, 1878. Has had failing eyesight for over a year. Has smoked a strong pipe most of his waking hours for more than forty years. Has rarely tasted liquor. No headache. Never had syphilis nor malaria. Urine normal. V. $\frac{5}{20}$ each eye.

Ophthalmoscopic examination: “Brick-dust atro-

phy of both optic nerves." Ordered to stop tobacco and return in a week.

January 24th.—R. V., $\frac{5}{100}$; L. V., $\frac{5}{126}$. Put upon strychn. sulph. gr. $\frac{1}{60}$ thrice daily, by the mouth.

April 4th.—V. $\frac{20}{100}$ each eye. Put upon a mixture containing bromide of ammonium, iodide of potassium, sesquicarbonate of ammonia, and tincture of columbo.

July 23d.—V. $\frac{20}{70}$ each eye.

CASE XIII.—M. C——, aged forty-eight years; laborer, married; came under observation January 2, 1879. Patient is partly deaf, and belongs to a family nearly all of whom are hard of hearing. Had malaria when fourteen years old. Never had venereal disease. Five months ago went to Coney Island, where he thinks the glare of the sun on the water injured his eyes, for the sight has since gradually failed.

Chews tobacco all the time. Smoked and drank excessively up to two weeks ago, when his physician ordered him to stop it.

R. V., $\frac{10}{200}$; L. V., $\frac{2}{200}$; no improvement with glasses.

Ophthalmoscopic examination: "Incipient atrophy of optic nerves."

January 8th.—The dose of hypodermic strychnine has been carried up to gr. $\frac{1}{11}$.

R. V., $\frac{20}{200}$; L. V., $\frac{6}{200}$.

CASE XIV.—T. W——, aged forty-one years; came under observation January 17, 1878. Stomach out of order. Is very nervous. Drinks, smokes, and chews freely. For years smoked ten or twelve cigars a day. Now averages five or six. Urine normal.

R. V., $\frac{20}{30}$, with $+\frac{1}{24}$; L. V., $\frac{20}{80}$, with $+\frac{1}{30}$ c. ax. $90^\circ \ominus -\frac{1}{30}$ c. ax. 180° .

Ophthalmoscopic examination: "Disks too pale; white bands by the sides of some of the retinal vessels."

January 30th.—The strychnia injections have been carried up to gr. $\frac{1}{7}$, which produces some stiffness of the thighs. R. V., $\frac{20}{20}$, Hm. $\frac{1}{36}$; L. V., $\frac{20}{60}$, with $+\frac{1}{30}$ c. ax. $90^\circ \ominus -\frac{1}{30}$ c. ax. 180° .

CASE XV.—J. M——, aged forty-two years; equestrian; married; came under observation September

24, 1877. Blurring of eyesight has been going on for over three months. Contracted "dumb ague" in Georgia some years ago.

Smokes seven or eight cigars daily, and drinks a great deal of whiskey.

Vision $\frac{2}{7}$ in each eye, and no improvement with glasses.

Ophthalmoscopic examination: "Incipient atrophy of optic nerves."

Ordered to quit tobacco and whiskey, and put upon dialyzed iron, with strychn. sulph., gr. $\frac{1}{60}$, *ter in die*.

September 28th.—V. $\frac{2}{4}$ each. Appetite much improved.

October 8th.—Has had nine hypodermic injections of strychn. nitrat., commencing with gr. $\frac{1}{40}$ and increasing to gr. $\frac{1}{11}$. V. $\frac{2}{3}$ each.

October 9th.—Injected strychn., gr. $\frac{1}{10}$. Patient soon after became dizzy, and vision rose to $\frac{2}{5}$ each eye.

CASE XVI.—G. M.—, aged fifty-one years; married; merchant; came under observation July 10, 1876. At the age of seventeen he had scarlatina severely, which impaired his memory for a year. He had "camp fever" during the war, and chills and fever nine years ago. Never had syphilis.

Has for many years smoked three or four cigars a day, and has always drunk more or less brandy or wine daily, but "never to excess."

Has had gradual impairment of vision for nine months, as though a veil were drawn over objects. Has for some time been under the care of a physician for his eyes, and has been taking the bromides without appreciable benefit.

R. V. $\frac{2}{100}$; no improvement with glasses; L. V. $\frac{2}{80}$, with $+\frac{1}{2}$.

Ophthalmoscopic examination: "A low grade of optic neuritis, with commencing atrophy of both optic nerves."

Advised to stop tobacco and spirits for a week and take no medicine.

July 17th.—Has practised abstinence for a week, as directed. R. V., $\frac{2}{80}$; L. V., $\frac{2}{60}$. Injected strychn. nitrat., gr. $\frac{1}{4}$.

July 24th.—The dose of strychn. nitrat. has been gradually increased to gr. $\frac{1}{10}$. Has had pain in forehead for three or four days. Vision $\frac{2}{80}$ each eye.

July 27th.—Strychn. nitrat., gr. $\frac{1}{9}$, produces "leg symptoms."

August 11th.—Vision $\frac{2}{40}$ each eye.

August 22d.—Vision $\frac{2}{30}$ each eye. Is taking a daily injection of strychn. nitrat., gr. $\frac{1}{8}$.

September 25th.—Vision $\frac{2}{20}$ each eye, with $+\frac{1}{2}$.

CASE XVII.—J. M.—, aged thirty-eight years; watchman; bachelor; came under observation March 28, 1879.

In the beginning of the winter got a pair of shoes that were a size too small for him, and he thinks wearing them affected his eyes. Three or four weeks after he commenced to wear them he first noticed, while reading a newspaper, that his sight was failing, and it has gradually grown worse ever since.

He has smoked both pipe and cigars since he was fifteen years old. Smokes at least half a paper of tobacco daily, and drinks a glass of ale every day, and often whiskey. Had chills and fever five years ago. Not subject to headache. Never had venereal disease, but has been addicted to masturbation since the age of seventeen.

Urine and heart examined by experts, and found to be normal.

Vision $\frac{2}{70}$ each eye, and no improvement with glasses. Visual fields not contracted. Tension normal in both eyes.

Ophthalmoscopic examination: "The nasal half of each optic disk is too red, the temporal half too pale. There is visible pulsation of both the retinal veins and arteries, extending to a comparatively long distance from the disks, and in some of the larger branches it can be traced as far as the equator of the globe. In the veins the pulsation is of the usual character, except in its intensity, and the extraordinary distance to which it can be traced from the disks. The arteries, however, seem to start up, and move as a whole with each impulse of the heart, without apparent change of calibre. As the arteries start forward, the veins contract; and as the veins fill

out again, the arteries recede to their former position."

This patient was exhibited to the New York Ophthalmological Society, the pulsation of the retinal arteries, without glaucoma, or embolism, or organic disease of the heart, being considered almost unique.

He was injected with nitrate of strychnia at irregular intervals, until the 27th of April, the largest dose being gr. $\frac{1}{12}$. He was discharged with vision $\frac{2}{30}$ each eye.

CASE XVIII.—W. C. P.—, aged thirty-two years; came under observation February 6, 1877. Eyes began to blur on reading about eight months ago. At that time he could see well in the distance, but now he has difficulty in reading a sign across the street. Has long been in the habit of drinking and smoking without restraint.

R. V., $\frac{2}{30}$; L. V., $\frac{2}{80}$; no improvement with glasses. Eyes blur at times so that he cannot see $\frac{2}{200}$, and then suddenly clear up again. Urine normal.

Ophthalmoscopic examination: "Optic disks too pale, especially the left."

Stopped tobacco and spirits, and commenced the use of strychn. nitrat. by injections.

February 9th.—R. V., $\frac{2}{20}$; L. V., 4^0 .

February 22d.—Is up to strychn. gr. $\frac{1}{17}$. R. V., $\frac{2}{20}$; L. V., $\frac{2}{30}$.

March 1st.—Strychn. nitrat., gr. $\frac{1}{8}$, produced slight dizziness.

March 2d.—Patient comes from a champagne supper, at which he drank wine and smoked nearly all night. He was ordered a Turkish bath, but did not report again.

CASE XIX.—J. B.—, aged thirty years; American, gentleman of leisure, married; complains (May 8, 1879) that he has been getting near-sighted. Drinks five or six times a day, and smokes at least four or five cigars daily. Guns and fishes much. Studies natural history and reads at night. Had rheumatic gout at nineteen or twenty. Six or seven years ago had chills and fever, and has since had occasional neuralgia of head and down back. Never had venereal

disease. Urine normal. V. $\frac{5}{100}$ each eye. With $-\frac{1}{12}$, V. $\frac{10}{100}$ each eye. Visual fields normal.

Ophthalmoscopic examination: "A soiled or dirty look of the optic disk and fundus."

To desist from tobacco and spirits, and to drink two quarts of milk daily.

May 26th.—The hypodermic injections of strychninat. have been carried up to gr. $\frac{1}{8}$, and "stiffening of the jaws" has been produced.

R. $\frac{20}{200}$; L. $\frac{5}{200}$.

May 28th.—Vision $\frac{20}{200}$ each eye. Em.

June 20th.—Vision remains $\frac{20}{200}$ each eye.

CASE XX.—D. A.—, aged thirty-two years; bachelor; American, gentleman of leisure; has lived a very dissipated life from early youth, indulging freely in tobacco, spirits, and venery. Has had syphilis, and has several times been in a state of great nervous prostration from alcoholism.

Never had any trouble with eyes until about three weeks ago, when, having steered a boat twenty-two miles against a head-wind, the next morning his eyes were red and watery. They soon recovered from that attack, but four days ago a blur came over the sight of both, and is daily increasing. No pain in eyes, no headache. Had malarial disease thirteen years ago.

Smokes from ten to fifteen cigars daily, and is constantly in state of semi-intoxication.

R. V., $\frac{20}{80}$; L. V., $\frac{20}{126}$; no improvement with glasses. Reads J. 11 with both eyes at once.

Ophthalmoscopic examination: "Optic disks too pale."

Advised to quit tobacco and spirits, to drink freely of milk, to rub himself briskly from neck to heel with hair mittens and strap every morning, following the friction with a sponge-bath, and to take potas. bromid., gr. xx., every night on going to bed.

June 6th (two days later).—Vision unchanged. Had a night-sweat last night. Ordered quin. sulph., gr. ij., *ter in die*.

June 7th.—R. V., $\frac{20}{100}$; L. V., $\frac{20}{64}$.

June 13th.—Has taken Marburg's tincture, 3 j., every four hours, and quin. sulph., gr. ij., every two

hours, since four days ago, when his temperature rose to $103\frac{3}{4}$.

June 16th.—Has had, besides the treatment mentioned, two injections of strychn. nitrat., gr. $\frac{1}{4}$ each. R. V., $\frac{20}{40}$; L. V., $\frac{20}{64}$.

June 25th.—Has had daily increasing hypodermics of strychn. R. V., $\frac{20}{40}$; L. V., $\frac{20}{80}$.

July 14th.—Took injections of strychn. up to a week ago, when he had an acute development of tertiary syphilis, manifested by acute nodes on right tibia, and acute arthritis of right ankle-joint. Was put upon hydrarg. biniodid., gr. $\frac{1}{6}$, and sodii iodid., 3 ss., *ter in die*. On the second day ran the iodide of sodium up to gr. xl., and continued at that dose for three days, and then dropped to one scruple three times daily.

Six days ago had a severe chill lasting three-quarters of an hour, followed by fever and profuse sweating, with headache. Gave quin. sulph., ʒj., between meals. Is now taking brandy, ʒj., in each dose of Marburg's tincture.

R. V., $\frac{20}{20}$; L. V., $\frac{20}{32}$.