is as old as his arteries," and that, comparatively speaking, it is possible for a man of 80, without atheromata, to be younger than a man of 30 who is the subject of it.

Atheroma is essentially a form of chronic arteritis affecting chiefly the middle and inner coats of arteries, but occasionally to some extent the adventitia as well. This chronic inflammatory process, like most inflammatory processes when chronic, leads to hyperplasia of the tissues affected, but chiefly to hyperplasia of the subendothelial connective tissues of the intima, giving rise to opaque, milky-looking, non-vascular patches, somewhat raised above the general surface of the intima. These patches may organize and become converted into dense fibroid tissue; or, on the other hand, the deeper parts may undergo fatty degeneration, break down and form a fluid, or semi-fluid cheesy mass constituting the so-called "atheromatous abscess." This may in time be entirely absorbed, leaving a thinned and weakened spot on the vessel wall. Sometimes an area which has undergone atheromatous degeneration may become impregnated with salts of lime, and form the calcareous plates so frequently found in the arch of the aorta. Instead of becoming absorbed or infiltrated with lime the atheromatous abscess may burst internally and its contents be discharged into the blood stream, leaving behind a raw surface on the intima known as an "atheromatous ulcer," on contact with which the blood will clot and form a thrombus.

Associated with this degenerative process in the intima, the middle or muscular coat of the artery frequently becomes thickened, and usually more so on one side than on the other, so that on transverse section it appears to be of a "signet ring" shape. Associated with this thickening of the media there may be a deposition of lime salts giving rise to calcareous degeneration of the middle coat. But this process, although present in the specimens shown, is no essential part of atheroma as such. It may be found quite independently of atheroma, and atheroma may be present where it is absent. It is met with as an independent disease, chiefly affecting the smaller arteries such as those of the limbs or viscera, converting the vessels into rigid tubes, through which the blood flows in a sluggish manner.² Generally speaking, however, it is a concomitant of atheroma, and gives valuable assistance in the diagnosis of the latter. It affects considerable tracts of the smaller arteries, and it may be present in one part of an artery and absent in another. Thus it may be present in the radial and absent in the brachial, or vice versa. It may exist in the femoral and be absent in the tibials, or it may be present in the tibials and absent in the femoral.

As regards diagnosis of atheroma, we are accustomed to associate it with cardiac degeneration and granular kidney, but as this case shows it may be independent of either. Most of the textbooks give the arcus senilis as one of the concomitant symptoms which may help us to form a diagnosis, but the arcus senilis is often seen in people with no suspicion of atheroma or vascular fibrosis of any form, and again it may be present, according to published cases in quite healthy young people, and absent as this case shows in cases of marked atheroma. Probably the most reliable sign of atheroma is the presence of calcareous degeneration of the radial, brachial, temporal, and tibial arteries or cerebral symptoms, such as hemiplegia due to thrombosis, where a sound heart enables embolism to be excluded, and when there is not the loss of consciousness usually associated with cerebral haemorrhage. Loss of memory for recent events may also be taken as one of the cerebral symptoms of atheroma.³

Then, again, a loud, prolonged, and purely systolic murmur heard over the aortic area, and conducted upwards towards the right clavicle, may reasonably be accepted as evidence of atheroma of the aorta, since pathologists tell us that narrowing of the aortic orifice due to endocarditis of the aortic cusps is of extreme rarity in the *post-mortem* room when contrasted with the frequency with which such murmurs are heard during life.⁴ As in this case, numbness and tingling pains of the extremities, when persistent, may be due to progressive anaemia from atheroma of the vessels supplying the affected parts. The personal history and personal habits of the individual may also afford valuable information, as there appears to be no doubt that alcoholism is a most powerful factor in the production of atheroma; but, after all is said, cases like

the present will probably occur when one can only be wise after the event.

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- ¹ Hulke and Holmes, *System of Surgery*, vol. iii, p. 16. ² *Textbook of Medicine*, Gibson, vol. ii, p. 168. ³ H. W. Syers, *Treatment*, vol. v., p. 215. ⁴ *Ibid*, p. 244.

ON TREATMENT OF HAEMOPHILIA WITH CALCIUM CHLORIDE.

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IN May, 1901, a patient, A. S., aged 25, came to the Dental Department of King's College Hospital for advice as to her teeth. It appeared from her story that two months previously a tooth had been removed for her at another hospital in London, and that the haemorrhage resulting therefrom continued for thirty-six hours. This so alarmed her that she was compelled to return to the hospital, where the bleeding was arrested by plugging, though even this procedure was not for some time successful. She was advised by the surgeon who attended her at that time that in future she must always warn any dentist of her tendency to excessive bleeding should he find it necessary to perform any further extractions. On investigation it was found that she gave a very definite history of haemophilia, which seemed to manifest itself on the very slightest provocation, though, as far as I could ascertain, the rest of her family were free from this diathesis.

Her appearance was very unhealthy indeed, that of a more or less chronic dyspeptic, which fact was entirely borne out by the foul condition of her mouth and general dyspeptic symptoms; she was not anaemic, and not subject to "purpura" or other condition associated with excessive haemorrhages except as stated. Her teeth were almost without exception carious and foul, many of them having abscesses, and all beyond hope of such conservative dentistry as we are able to employ in the dental department of a general hospital.

Before proceeding with a general clearance of her mouth, which the hopeless condition of her teeth necessitated, I decided to give her a preliminary course of calcium chloride internally, with a view to increasing the coagulability of the blood. She was ordered a mixture containing 10 gr. of this salt thrice daily for a week, and at the end of that time to return to the hospital, when, so as to be on the safe side, I contented myself with extracting one tooth only, and that an incisor, so that the socket could be very easily plugged if necessary. The haemorrhage resulting was, if anything, slightly more than one sees in the ordinary way, but at the same time nothing that could be regarded as in any way serious, and there was no recurrence on her return home.

She was directed to continue the calcium chloride, and after the lapse of another week I extracted three teeth, or rather what remained of them, with a similar satisfactory result as regards absence of excessive haemorrhage. She had then to leave London for three weeks, and, though she had been provided with a sufficient supply of the medicine to cover that period, for the last week of the three she neglected to take it. Hoping, however, that her previous dosing would at least have produced some effect, I extracted one tooth, and on this occasion the haemorrhage was more than on any of the previous ones, though at the same time not such as to require heroic measures.

I then increased the dose of calcium chloride to 15 gr., to be taken as before, and gradually removed all the remaining septic stumps, extracting as many as three or four at a sitting, each and every occasion being perfectly normal from the bleeding point of view.

Since the above case I have had one other typical haemophilic under my care who was treated in the same way, and with a similarly satisfactory result. Of course one cannot state positively that the absence of excessive haemorrhage in these two cases was due to the preliminary dosing with calcium chloride; but the fact remains that though previously both of these cases bled to excess on receiving the smallest wound, yet after a course of this calcium salt no trouble of this kind was manifested, except as stated above, when the patient neglected to take it for a week. Beyond the unpleasant taste,

and a certain amount of constipation which may or may not have been due to the use of this drug, the patient suffered no ill-effects, even after taking it for three or four weeks.

This means of increasing the coagulability of the blood was adopted in a puerperal case reported in the BRITISH MEDICAL JOURNAL in May, 1901, but, as far as I am aware, has not hitherto been employed as a preventive measure against the excessive haemorrhages of haemophilia, which are so troublesome and often serious in persons of this diathesis after the extraction of teeth.

NOTES OF CASES ILLUSTRATING THE USE OF ADRENALIN CHLORIDE IN OPHTHALMIC, NASAL, AND AURAL SURGERY.

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THE introduction of a solution of adrenalin chloride—1 in 1,000—has removed the difficulties which hitherto have been met with in using fluid extracts of the gland of having a fluid always ready and active. This difficulty was very great during the hot weather at a time when it was in great request in the treatment of hay fever.

The solution requires dilution to the extent of 1 in 5,000 for introduction into the nose and ear and to 1 in 10,000 for instillation into the eye. The diluent should be either boiled water or sterilized salt solution, and the diluted fluid should be put into coloured stoppered bottles. If exposed to the light, the fluid becomes pink and later brick-red, but does not lose its activity. In ophthalmic work I have found it chiefly of use in inflammatory conditions of the conjunctiva, and its use is indicated in pannus, iritis, keratitis, scleritis, and acute dacryocystitis. I have not used it much in operations on the eye, but I tried it in one case of enucleation without benefit. I was disappointed at this, as I had previously used liquid suprarenal and chloretone, and had removed an eyeball without any loss of blood. In aural work its use is indicated in chronic otitis media suppurativa with exuberant granulations or polypi, and acute inflammation of the membrana tympani.

In nasal work it is chiefly of use in swelling and hypertrophy of the mucous membrane, and in intranasal operations where a bloodless field is of importance, but the nose must always be plugged after the operation is finished, as haemorrhage may commence 30 to 40 minutes after the application of the fluid, and is then often troublesome. This is especially the case in partial turbinectomy, and for this reason I do not now use it in those cases. Of its value in the treatment of a stuffy nose from a cold in the head I have had the most pleasant personal experience, the relief being rapid and lasting. Patients can insert the wool themselves if instructed how to twist it on the end of a match so that the wool projects well beyond the end of the wood; it is advisable to warn them that the application will smart for about 40 seconds, and that the plug should be pushed up gradually, as after about a minute the mucous membrane shrinks and the wool slips in quite easily. The same advice applies to its use in hay fever, in which it gives most brilliant results.

CASE I.—A. M. had a severe cold in the head, and was quite unable to breathe through his nose. I placed a dossil of wool saturated with a 1 in 5,000 solution of adrenalin chloride in each nostril for five minutes. When the wool was removed he felt immediate relief, and nasal respiration was restored. In this case no further application was necessary.

CASE II.—H. M., aged 50, was sent to me with stenosis of the right nasal passage, which was due to an enormously enlarged anterior end of the middle turbinate bone, which was exerting considerable pressure on the septum. I applied 10 per cent. cocaine and 1 in 5,000 adrenalin chloride solution, and removed the anterior end with scissors and cold snare. There was no haemorrhage at the time, but although the nose was plugged with cyanide gauze, there was considerable oozing during the afternoon and night, which was increased the next morning when the gauze was removed. On another occasion I cocaineized this patient's nose without adrenalin chloride; about three hours after she suffered from pain in the eye, lachrymation, restlessness, feeling of suffocation, and rapid pulse. After the combined use of cocaine and adrenalin chloride, though more of the former drug was used, she suffered from no unpleasant after-effects.

CASE III.—N. F. was suffering from nasal stenosis, due to a thickened deflected septum. Cocaine 10 per cent., and adrenalin chloride 1 in 5,000, were applied, and a piece removed from the septum 1 in. in length with a Bosworth's saw, without any haemorrhage at the time. The

nose was plugged with gauze soaked in iodoform emulsion; the haemorrhage during the rest of the day was only slight. In this case there was no bleeding when I removed the plug on the following day.

CASE IV.—N. V. was a patient with large inferior turbinate bones, and unwilling to have the galvano-cautery applied. Adrenalin chloride, 1 in 5,000 was applied by means of wool plugs. The nasal passages were free for the remainder of the day, and the patient continues to use the solution himself with great benefit.

CASE V.—J. T., aged 45, came to me on August 31st, 1901, complaining of intense headache and pain in the right eye of seven days' duration, which during the previous twenty-four hours had been of a stabbing nature. On examination there was found oedema of the upper eyelid, and a distinct bulging over the inner angle of the orbit, with tenderness on the slightest pressure. The right nasal cavity was full of crusts, and when these were removed the mucous membrane was found to be swollen and congested, especially in the middle meatus. Into this wool soaked in 1 in 5,000 adrenalin chloride solution was packed and left for five minutes, the nose was then sprayed with an alkaline solution, and she was instructed how to apply the solution thrice daily on wool, and ordered to spray the nose night and morning. Two days later she reported herself as quite free from headache and pain, and so far no relapse has occurred.

I have had several patients in whom frontal headache was almost immediately relieved by the application of adrenalin chloride to the nasal cavities.

CASE VI.—J. H., aged 45, had been suffering from chronic conjunctivitis for the previous three months. She had used various lotions with temporary relief. Guttæ adrenalin chloride, 1 in 10,000, instilled thrice daily for ten days, produced an improvement which was rapid and permanent.

CASE VII.—A. W., aged 85, had been suffering for a long time with inflamed eyes and lids with lachrymation; the margins of the lower lids were everted and red. Guttæ adrenalin chloride, 1 in 10,000, were instilled twice daily. At the end of a fortnight great improvement was noticed, especially in the condition of the lids, which now looked quite healthy.

CASE VIII.—A. D., aged 5 years. This patient came to me for interstitial keratitis, after having been under treatment elsewhere for three months. He had marked photophobia, and would hide himself in any dark corner. Both eyes were affected in the usual way, and circumcorneal injection was very well marked; in addition he had a purulent nasal discharge with some necrosis of the vomer, and enlarged submaxillary glands. He was ordered hydrarg., hydrarg. c. creta, gr. i. ter die; guttæ atropæ, 1 per cent., and boracic acid lotion. As there was very little improvement, after a month's treatment I instilled 1 in 10,000 adrenalin chloride in the right eye only. At the end of a week there was very marked improvement in this eye, especially in the photophobia, but the left eye was more injected. Adrenalin chloride was therefore used in both eyes, and the left almost immediately commenced to improve, and at the end of three weeks the injection had disappeared, he could bear the sunlight, and his vision was improving.

CASE IX.—J. W. was sent to me on October 8th by Dr. Trumper, Market Rasen, with the following history. On October 4th he was standing behind a man who was shooting at a gallery and something from the rifle struck him on the right eye; it was not until the following morning that he went to Dr. Trumper, who removed some grains of gunpowder from the surface of the eye and instilled atropine drops; the lens was then becoming opaque. When I saw him there was marked iritis, circumcorneal injection being most intense at the inner and outer ends of the horizontal meridian. There was a small scar on the cornea in the outer part of the same meridian 3 mm. from the limbus, and opposite this was a posterior synechia. I examined him with the fluorescent screen and also took a skiagraph, but no foreign body could be seen, nor could anything be discovered with the ophthalmoscope. V. = fingers at 12 in. The atropine was continued and pit. hydrarg. grs. 4 ter die ordered. On the 17th the eye was more inflamed; V. = movement of hand; three leeches were ordered for the temple and belladonna fomentations to be applied every four hours. On the 14th there was a considerable exudation of lymph round the outer half of the ciliary body. On the 18th the eye was intensely injected and very painful. Gutt. adrenalin chloride 1 in 10,000 were instilled and ordered to be used thrice daily, and two leeches were given him to put on when he got home. On the 21st the eye was much quieter and less injected (the drops had given him such immediate and lasting relief from the pain that he had not applied the leeches), and he has had no pain since the adrenalin chloride was instilled. From this time on the eye made rapid improvement, and is now free from inflammation. The patient says that the relief from the drops was most marked.

CASE X.—J. G., a farm labourer, had had inflamed eyes for fourteen days. The conjunctivæ of both eyes were velvety, with scabs along the lids and also around the nostrils. Gutt. adrenalin chloride (1 in 10,000) were ordered thrice daily, and ung. acid bor. to be applied along the lids at night. In seven days the eyes were quite well.

CASE XI.—P. M., aged 18, came with a history of sore eyes of twelve months' duration; the margins of the lids were inflamed and most of the lashes had fallen out. Ung. acid bor. was ordered to be put on the lids at night, and adrenalin chloride (1 in 10,000) to be dropped in thrice daily. In four days a great improvement was visible, and at the end of a week the lids were cured.

CASE XII.—A. S. was suffering from a polypus in the middle ear, and had had double otitis media suppurativa for many years. In March, 1901, I performed the radical mastoid operation on the right ear, grafting the cavity on the fourth day. The left ear continued to discharge off and on, and she came to me on October 28th with great pain in this ear, and on examination I found a large polypus blocking the perforation in the membrana tympani. As she was an extremely nervous patient, it would have been necessary to anaesthetize her for the removal of this growth, so I instilled adrenalin chloride (1 in 5,000). At the end of ten minutes the polypus had shrunk to one-third of its former size, and I was able to relieve the pain by syringing out the pent-up pus. She has now been using the solution for three weeks; the polypus has disappeared; there is very little discharge and no pain. She will eventually require a mastoid operation, but the adrenalin chloride has given temporary relief.

Dr. W. H. B. Brook has kindly given me permission to