acquired syphilis, his experience was decidedly in favour of the use of iodide of potassium; but the principle of its success depended upon its being pushed rapidly to large doses, thirty to sixty grains two or three times daily. He thought that the influence of heredity was much overrated. The deafness was more likely to be due to the unnoticed effect of exanthema in early life on the ears.

Dr. BARR (Glasgow), referring to hereditary influence in ear-disease, said that he believed that hereditary tendency was a marked factor in the causation of nearly all diseases of the ear. Probably the most hereditary aural disease was the so-called sclerotic form of middle ear-disease, when the naso-pharyngeal mucous membrane was less involved than in most of the other diseases of the ear. According to Dr. Barr's experience of hospital patients suffering from aural affections, there was a great preponderance of the male sex over the female; this was to be expected from the greater exposure of the male sex to causes which brought on catarrhal affections. The symptoms of certain affections of the ear very often simulated diseases of other organs of the body. There was probably no mistake more common than for an acute inflammatory process in the middle ear to be taken for a meningitis, especially in children. Dr. Barr related a marked case in illustration of this mistake.

Mr. R. ELLIS (Newcastle-on-Tyne) observed that in the hospital to which he was attached one thousand cases of ear-disease came under observation yearly, and the proportion was about three females to one male. The combination of tubercle and otorrhoea must of course be rare, as had been observed by Mr. Lennox Browne; but still they did occur together. He had this summer seen a young gentleman, who suffered from enlarged cervical and inguinal glands, together with otorrhoea in both ears. The otorrhoea went on *pari passu* with tubercular disease of the lungs, and he died within three months with cavities in the lungs and otorrhoea.

Dr. C. WARDEN (Birmingham) corroborated Mr. Field's remark that aural furunculus was frequently caused by bad air and sewer-gas. Hereditary causes were very common, also strumous. He believed that cancer of the ear was not so uncommon as was stated. He regarded it an act of folly to grope about the meatus, instead of using the simple syringe.

Dr. McBRIDE (Edinburgh) considered that there was a form of ear-disease due to syphilis, which had not received sufficient attention. It consisted of deafness, shown only by means of the tuning-fork to be due to disease of the middle ear. The tympanic membranes might be perfectly normal in appearance. This form of ear-disease only differed from an ordinary case of sclerosis in the greater rapidity of its advent. Dr. McBride then called attention to the observations of Wendt on diphtheria. He had met with cases of otorrhoea due to this disease, which were most obstinate. In tubercle, two forms of ear-disease had been met with and described: suppurative and cheesy, recently observed by Buck. In renal disease, especially the cirrhotic, hæmorrhages might take place into the tympanum, and lead finally to suppuration.

Mr. T. MARK HOVELL (London) mentioned the case of a medical man, who stated that during early adult life he was subject to catarrh, accompanied by deafness, which passed off as usual after a few days, but he never found his hearing otherwise affected. About ten years ago, he ate some fish, which was not fresh, for dinner, and the following morning on waking found that he was "absolutely deaf". His hearing partially returned after a few days. Since that time, he had found that any error in diet was followed by increased deafness. Mr. Hovell asked if anyone present had met with a similar case.

Mr. PURVES (President of the Section) was certain that the papers read would, from their manysidedness, give to the practitioner who read them some information, and probably lead him to seek special advice where he would formerly have trusted to his skill in general medicine. He was, however, somewhat surprised to find no mention of anæmia, lactation, tabes dorsalis, fright, or embolism, as causes of aural disease. As regards the use of iodide of potassium, he considered it useful in the acute stages of acquired syphilis, but had seen little benefit from it in the tertiary stages when nervous tissue had been involved, and none in affections of the nerve in the congenital form. As to the question of heredity, Mr. Purves could not agree with Dr. Woakes or Dr. Pritchard. He had no hesitation in saying that there were hereditary affections causing impairment of the nervous structures directly, as well as impairment of function through mucous membrane change. This was, to his mind, proved by the frequent combination of an affection of the retina—retinitis pigmentosa—with a degeneration of the acoustic nerve, the combination being found not uncommonly in the children of consanguineous parents. There were cases in which there was undoubtedly a congenital affection of two sensory nerves, the one determinable to the observer by examination of both function and structure, the other by the functional disturbance only. Examina-

tion of the institutions for the deaf and dumb would certainly give examples of such. Of the liability to aural disease of one sex above another, he was not aware, except as regards nervous affection influencing the accommodation of the ear, to which females were, he believed, liable at the time of commencing menstruation, during pregnancy, lactation, and from nervous shock. In phthisis, he had seen perforations of the membrana tympani of a most obstinate character, with extensive destruction. In aural affections arising during diphtheria, there was always the difficulty of limiting the part due to the mucous membrane affection, and that due to the nervous, the accommodative part. Till cases were observed in which the membranes of the tubes and cavities were free from the affection, and yet there was loss of hearing, we could not speak definitely as to its causing accommodative loss.

Mr. FIELD, in reply, said he was pleased to find that most of the speakers thought highly of the efficacy of large doses of iodide of potassium in diseases of the internal ear from acquired syphilis, although he must admit he had not met with great success from the administration of such doses of the drug. In some patients, he had noticed that large doses, such as a drachm three times a day, had produced a very feeble action of the heart; so much so, that sometimes he had been unable to prescribe it. In congenital syphilis of the ear, he thought it was of no use. With regard to the question that had arisen as to the relative proportion of males and females affected with ear-troubles, he believed that more women attended hospital practice, probably because they were able to get away more readily than men during out-patient hours. He thought that aural diseases were hereditary in a great degree; and, contrary also to the opinion of several speakers, he had seen a very severe form of incurable ear-disease, with loss of the membrana tympani, in patients suffering from phthisis. He was glad that Dr. Warden supported his view with regard to sewer-gas and aural furunculus, etc. Most of the cases they had discussed showed the great importance of local combined with constitutional treatment in nearly all forms of aural disease.

A PROPOSED SUBSTITUTE FOR CARBOLIC SPRAY IN ANTISEPTIC SURGERY.

Read in the Section of Surgery at the Annual Meeting of the British Medical Association, August 1882.

By A. W. MAYO ROBSON, F.R.C.S.ENG.,

Lecturer on Pathology in the Leeds School of Medicine.

THE purpose of the present paper is to give the results of some experiments, which have extended over a period of two years, and which were undertaken in the hope of bringing before the notice of the profession a substitute for the carbolic spray, now used in antiseptic surgery.

Most, if not all, surgeons acknowledge the advantage of the Listerian method of dressing wounds; and nearly all are equally unanimous in asserting that the spray, hitherto a necessity, is both inconvenient and dangerous. The surgeon has his vision obstructed, "especially if wearing spectacles", and his sense of touch impaired. He, moreover, has the serious discomfort of living, during a considerable portion of his time, in an atmosphere too much resembling a Scotch mist. There are many slighter inconveniences to patient, assistants, and surgeon, which are so well known, that it is quite unnecessary for me to mention them; but these are trifling when compared with the dangers to the patient attending the use of the spray, especially in abdominal surgery.

That the risks of poisoning are not fanciful has, I think, been abundantly proved by Dr. Keith and other operators, who have been led to abandon the spray in ovariectomy. I believe I have myself seen death caused in more than one case of abdominal section, by chilling of the viscera and by carbolic poisoning.

About two years ago, an apparatus was advertised which created a current of air by means of a fan set in motion by clockwork, the air being forced through layers of gauze, moistened with 1 in 40 carbolic solution. About the same time, I had an apparatus made, which created a current by means of bellows, and sucked the air through a series of wash-bottles filled with 1 in 10 carbolic solution. From some experiments I made at the time with sterilised flasks, I came to the conclusion that, although the carbolic atmosphere was pure or aseptic, it was not antiseptic.

It then occurred to me that, if one could saturate the air with some volatile antiseptic, such as eucalyptol, cajuput, or peppermint, a really antiseptic air might be obtained, which, by being diffused in a room,

or blown on a wound, might answer the same purposes as the spray, without having its disadvantages. I was prevented by other work from following out my idea until last September, when I made the following experiments.

The first and most essential point to be proved was, whether or not air impregnated with the vapour of volatile antiseptics is really antiseptic. To ascertain this, I sterilised a number of flasks of hay-infusion, by boiling for fifteen minutes, capping with cotton-wool, and continuing the boiling for five minutes longer; after which, to prove their freedom from life, they were placed in an incubator, and kept at a temperature of 100° Fahr. for two days. Having obtained some large wide-mouthed glass jars, capable of holding several gallons, I poured into one series about an ounce of eucalyptus oil, and into another the same amount of cajuput oil, so as to have a thin layer of fluid covering the bottom of the jar. Into these jars, the sterilised flasks, previously freed from their cotton covering, were inserted; being suspended by means of thread from a bar placed across the mouth of the receiver. The transference and opening of the flasks were rapidly performed under carbolic spray; but when they were once in the jars, there was nothing to interfere with the entrance and exit of the ordinary atmospheric air. After a varying period of exposure of from two to twenty-two hours, the flasks were recapped with cotton and again transferred to the incubator, in doing which, the usual precautions were adopted; and, in addition, the cotton which had to come immediately over the flask was just damped with a little 1 in 40 carbolic solution, to avoid the contact of germs. After being in the incubator for two days, they were put aside, to be examined at leisure.

No change occurred in the flasks through keeping, the hay-infusion looking bright and transparent throughout. There was a slight sediment in all, both in those simply sterilised and in those subjected to the action of eucalyptus and cajuput; but in no case was there a formation of scum on the surface of the fluid. In contrast to this, some flasks that had been simply exposed to the air, and then covered with cotton-wool, began to appear opaque, and scum over within a few hours.

In order that the report might be free from bias, I asked Mr. Abbott, an experienced microscopist and botanist, to examine the solution microscopically for me, which he kindly did, giving his opinion before I examined the slides.

The following are a few examples.

1. Hay-infusion, sterilised August 18th, placed in incubator for two days; exposed to eucalyptus-air for two hours on 22nd; then placed in incubator again for two days. Examined September 7th, and found to be free from living organisms, but to contain very few of what appeared to be dead micrococci in the slight sediment.

2. Sterilised August 18th; incubator till 20th; eucalyptus-air for thirteen hours; incubator till 23rd. Examined September 7th under $\frac{1}{2}$ objective, and found free from living organisms.

3. Sterilised August 20th; incubator till 22nd; cajuput-air for twenty-two hours on 23rd; incubator for two days. September 7th, $\frac{1}{2}$ objective revealed a few still rods and micrococci, which only showed the Brownian movement, but apparently no living organisms.

Numerous flasks, acted on in a similar manner to the above, were examined with like results, except in one case, where living bacteria and micrococci were found. In this example, the usual precautions had been adopted: it failed from some cause.

The experiments related go far, in my opinion, to prove that, in the vapour of eucalyptus, cajuput, and other volatile fluids, we have powerful antiseptics, which, at the ordinary temperature of the atmosphere, may so saturate the air as to kill all infective particles; perhaps not only bacteria and micrococci, but also the germs of fevers and other infectious diseases.

I have experimented in a similar manner with terebene, and have obtained good results; but, as eucalyptol is abundant, cheap, and not unpleasant, it has been selected for further tests.

In my microscope-room, which is an attic at the top of the house, and in which there are numerous organic particles, rendering the air anything but pure, I exposed flasks, prepared as above, to the vapour of eucalyptol, by scattering it on the floor, half an hour before removing the plugs of cotton from the sterilised vessels. The hay-infusions, exposed for periods varying from one to twenty-four hours to this atmosphere, for the most part remained free from germs, after being placed in the incubator; but, as the results were not always the same, I cannot vouch for this method being reliable to sufficiently purify the air for an antiseptic operation.

Hence I was led to devise the machine which I now show you, in which the air is first passed through a cylinder containing cotton-wool, which Pasteur has proved to be sufficient to free it from germs; but, as this would only be a pure, and not an antiseptic air, it is then passed

through two cylinders containing pumice-stone, over which about an ounce of eucalyptol has been poured. Thus it emerges as a pure air, loaded with invisible particles of an antiseptic, which seems to be capable of destroying any vestiges of germ-life which may have been drawn in from the surrounding atmosphere: it is directed over the desired spot by means of five coralline nozzles, which act on a ball and socket-joint, capable of being fixed in a certain direction by a screw. The bellows were obtained from Mr. Fletcher of Warrington, and give a continuous current at a considerable pressure. Messrs. Meyer and Meltzer make the entire machine. The following cases from my own practice and the practices of other surgeons will illustrate the use of the apparatus.

CASE I.—Mr. G., after suffering for three weeks with onychia, called to consult me, with inflamed and suppurating axillary glands. On April 27th, I opened the abscess under eucalyptus-air, getting out about two ounces of pus. I put in a drainage-tube, and dressed the wound with salicylic silk. The instrument and hands were dipped in 1 in 40 carbolic solution; but the wound itself was neither syringed nor sponged with carbolic solution. On April 29th, the matter had perforated the dressing, which was changed, and the drainage-tube removed. On May 1st, the wound was dressed in the same way. There was thin fluid on the dressings, but no pus. There was no redness round the point of incision; and the discharges throughout were quite sweet and free from bacteria, as proved by microscopic examination. On May 4th, the wound was healed. Before the incision, the temperature was 100° to 101° for several days, but never above normal after the opening was made.

CASE II.—Mrs. G. had been confined three weeks. She had previously caught cold, and had a gathered breast, which was intensely painful and very much enlarged. On April 29th, I opened the breast under the eucalyptus-air, and dressed with salicylic silk. On May 1st, the drainage-tube was removed. She had no pain since the operation, and felt quite well. The discharge was aseptic, and there was no redness round the wound. On May 5th, the dressings were removed. The wound was healed.

CASE III.—Miss C. had an aneurysm by anastomosis of the scalp, which was removed under eucalyptus-air on May 1st. On May 4th, the dressings were changed. The wound had run an aseptic course throughout.

CASE IV was one of strumous disease of the finger with abscess, which was opened freely on April 27th. On April 29th, it was dressed. There was little discharge; the wound was aseptic and free from organisms. On May 3rd, it was healed.

CASE V.—Miss P., suffering from chronic pyæmia following caries of ribs, had a parotid abscess. On May 1st, the abscess was opened under the eucalyptus-air, and an ounce of pus let out. It was dressed once a week for several weeks, and ran an aseptic course. No pus was seen after the first dressing, and the small amount of fluid showed no trace of bacteria.

CASE VI.—Mr. L. was the subject of large varicocoe, which he was anxious to have radically cured. On July 10th, the operation of cutting down on the veins, ligaturing them at the external abdominal ring and at the testicle, and then cutting the varicocoe away, was done under the antiseptic air. A drainage-tube was inserted, and salicylic wool-dressing applied. The wound was dressed on the 11th, 13th, and 15th; its course was aseptic, and it healed on the latter date.

Mr. T. Pridgin Teale removed a return growth of scirrhus of the breast on April 27th, under the eucalyptus-air. Mr. Ward, House-Surgeon of Leeds Hospital, who kindly reported the case to me, said that the wound pursued a strictly aseptic course until it was healed. In this example, it is only fair to say that the wound was wiped over with a carbolic sponge before being closed up; which however, is the course usually adopted when the carbolic spray is used.

Mr. Teale has also kindly adopted the eucalyptus-atmosphere in other cases, one of which was a large fatty tumour of the side; and in this example no carbolic acid was allowed to come into contact with the wound. The wound remained aseptic and the temperature normal throughout.

Dr. Clouston has been good enough to allow the eucalyptus-air to be used in four cases of empyema. He tells me that the course in all the cases was aseptic; and in one of these examples the dressings were examined, and found to be free from organisms.

Mr. Spencer Wells, who kindly used my first crude machine, sent me the following account of an operation.

"June 9th. I amputated a breast under your eucalyptus-vapour, put in a drainage-tube, used sutures to unite the skin up to the tube, and dressed it with salicylic wool. I did not touch it for three days; then removed the tubes under the eucalyptus-vapour; put on more

wool; left this four days; then removed the sutures. Union by first intention up to opening left for the drain. No fever; no sign of any putrefactive process. Drain-opening now closed."

I fear, gentlemen, my paper has been somewhat long and full of detail; but I hope the importance of the subject will warrant my occupying your attention for this length. At present, I fear my instrument is somewhat cumbersome, and it certainly occupies one person to work the bellows; but if, in an institution such as a large hospital, the hydraulic bellows used to work the organ, or the water-power used for the lift, could be made available, it would be an easy matter to have a pipe to each ward and to the operating-room, which would convey the desired current, ready to be attached to the machine wherever it might be wanted.

STATISTICS OF TEN YEARS' SURGERY AT THE WEST BROMWICH HOSPITAL.

Read in the Section of Surgery, at the Annual Meeting of the British Medical Association, at Worcester, August 1882.

By HENRY LANGLEY BROWNE, F.R.C.S.E., Surgeon to the Hospital.

THE West Bromwich Hospital has been open for ten years. It has hitherto contained twenty-five beds, but is now enlarged to make up fifty.

From 1872 to 1882, those twenty-five beds have been occupied by 2,297 patients, and the mean average of stay has been twenty-six days. The total number of cases of accident has been 1,406, of which 581 have been cases of fracture, and of these 133 have been compound fracture.

There have been 136 major operations, including amputations, 75; lithotomy, 27; herniotomy, 8; ligature of large arteries, 4; excision of spleen, 1; excision of joints, mamma, etc., 20; ovariectomy, 1; total, 136. A case of ligature of the subclavian and the carotid is still living.

On analysis of the amputations, one arrives at some very remarkable and interesting facts. They can be divided into two periods of five years each, during the first of which (1872 to 1877) amputations were performed not antiseptically; and during the latter (1877 to 1882), in which strict antiseptic precautions have been used. A comparison of the different results of the two periods may be made from the following tables.

Summary of Amputations from 1872 to 1877.

	No. of Cases.	Recovered.	Died.
Thigh	9	5	4
Leg	12	12	0
Shoulder-joint	2	2	0
Arm	9	8	1
Forearm	4	4	0
Both thighs	1	0	1
Thigh and shoulder	1	0	1
	38	31	7

This gives a mortality-rate per cent. of 18.42; but, omitting the double amputations, the death-rate of which Mr. Burdett states to be 80 per cent., it is reduced to 13.8—the average of sixty-one cottage hospitals being 17. The mean average stay in hospital was fifty-seven days. There were, besides, 25 compound fractures not requiring amputation, with a mean average stay in hospital of forty-six days.

Now, let us proceed to the second period.

Summary of Amputations from 1877 to 1882.

	No. of Cases.	Recovered.	Died.
Hip-joint	1	1	0
Thigh	6	6	0
Leg	12	11	1
Shoulder-joint	2	2	0
Arm	4	4	0
Forearm	10	10	0
Double of thigh and arm	1	1	0
Double of leg and forearm	1	1	0
	37	36	1

This gives a mortality-rate of 2.7 per cent. only. The average residence in hospital was forty-one days. There were 33 other cases of compound fracture, with an average residence of thirty-three days each.

Can anything speak more strongly than the above figures of the advantages of Listerism in general surgery in hospitals? It is true that the death-rate of the first five years was very low, notwithstanding

the fact that, towards the end of that period, there had been a few cases of erysipelas in the wards; but there have been no more under the happier rule of antiseptics.

Much has often been said about the increased cost of Lister's treatment; but, if it will reduce the average stay in hospital of amputations from fifty-seven to forty-one days, and of compound fractures from forty-six to thirty-three days, surely it must be much the most economical.

Last year, having seen so much of the splendid results of abdominal surgery, in Mr. Lawson Tait's practice, without antiseptics—results attributable in a great measure to absolute care in cleanliness—I was anxious to see whether the same results could be obtained in general surgery; and therefore made the following experiments.

A girl, aged 16, came into the hospital with acute suppuration of both hip-joints. The left joint was freely incised under the spray, washed out with carbolic acid, and drained and dressed antiseptically. When the dressings were removed, the wound had closed, and there was no further suppuration. At the same time, the right hip-joint was freely opened without the spray, was washed out with warm water only, drained, and dressed with dry dressings. It continued to suppurate for twenty weeks, and there is still a small sinus unhealed.

Again, after Ogston's operation for knock-knee had been several times successfully performed antiseptically, in one case I sawed off the internal condyle without antiseptics—of course taking every precaution to have clean instruments. The result was, acute inflammation and ankylosis of the joint.

There is only one more remark to be made with regard to the operations; and that refers to the cases of operation for strangulated hernia. In every case, although operated upon as soon as possible after admission to hospital, the bowel was either gangrenous, or approaching that state—consequently, seven cases out of eight died. This will continue to happen until cases are sent in at the earliest stage, and until the folly of waiting for symptoms of obstruction, and the use of any "taxis" whatever, are given up altogether. Surely, if a man who has been in the habit of returning his own hernia continually finds that he cannot do so, it would be infinitely better to operate at once than run the risk of "taxis" and delay. The invariable success of this plan in private practice proves how superior it is.

In every case possible, compound fractures were treated by Mr. Gamgee's method.

REPORT OF A SUCCESSFUL CASE OF OPERATION FOR STRANGULATED INGUINAL HERNIA AT SEA.

By ULICK A. DALY, B.A., M.B.T.C.E.,
Surgeon Peninsular and Oriental Steamship *Kohilla*.

AN operation for the relief of a strangulated hernia is always a cause of considerable anxiety to a surgeon; not, indeed, on account of any great danger in the operation itself, but of the exceedingly dangerous condition that demands it. The numerous difficulties one has to contend with in carrying out any surgical operation at sea must, I fancy, be obvious to all, though none but those who have had to do so can fully appreciate the many unavoidable impediments to surgery on board ship. Want of a proper place to operate in is one of the chief difficulties. In this case, the place chosen was a clear space about six feet square, on the main deck, opposite a large gangway-port, in order to obtain the best supply of light. In the centre I had the carpenter's bench placed, which was the best operating table to be had. I then had a canvas screen stretched from one bulk-head to the other, thus cutting this space off from the rest of the deck. This formed our operating theatre.

With these few preparatory remarks, I will now give a brief account of the case.

The patient was a negro, a native of Zanzibar, about twenty-six years of age. He was a very strongly built man, of great muscular development, and had been for some years a coal-trimmer on board different Peninsular and Oriental steamers. By his own account, he had been ruptured for some years, but it gave him very little trouble. About two years ago, he said, the rupture came down, and was returned without difficulty by the surgeon of the ship in which he then was. Personally I knew nothing of his previous history, as he did not belong to our crew, but was only taken on board as a passenger at Penang. He came on board the steamship *Kohilla* on September 15th, 1880, apparently in good health. The following morning, at 10 A.M., he was carried to my surgery in great agony. On examination, I found that he was suffering from an immense scrotal hernia, with evident signs of strangulation. As nearly as I could learn, the hernia had been down for about