[Cases where Death has occurred from other Causes in Patients remaining free from Breast-Cancer.]

No.	Condition.	Age.	Operation.	Cause of Death.	Period between Operation and Death.
1	Married	54	Breast only	Not known	Died after 2 years; no reappearance.
2	Married	41	Breast only	Paralysis	Died after 1 year and 6 months; no reappearance.
3	Married	62	Breast and glands.	Liver-disease	Died after 1 year and 9 months; no reappearance.

Cases remaining free from Two to Ten Years.

No.	Condition.	Age.	Operation.	Period since Operation.
1	Single	62	Breast and glands	10 years.
2	Married	40	Doitto	7 years.
3	Married	56	Doitto	3 years, 8 months.
4	Married	49	Doitto	3 years, 4 months.
5	Married	63	Breast only	3 years, 4 months.
6	Single	67	Breast and glands	3 years, 2 months.
7	Married	57	Doitto	3 years.
8	Single	—	Doitto	2 years, 6 months.
9	Married	47	Doitto	2 years, 3 months.
10	Married	50	Doitto	2 years.

Cases remaining free from One to Two Years.

No.	Condition.	Age.	Operation.	Period since Operation.
11	Married	47	Breast and glands	1 year, 10 months.
12	Married	57	Doitto	1 year, 9 months.
13	Married	41	Doitto	1 year, 3 months.
14	Married	50	Doitto	1 year, 2 months.
15	Married	52	Doitto	1 year.

In the case where the operation was done for relief, without hope of cure, the patient was a married woman, aged 58. The breast was a great ulcerating mass, smelling horribly, and giving great pain. It was removed along with both pectoral muscles, which were infiltrated. The glands were removed. The third costal cartilage subsequently necrosed and dropped out, but the wound healed over. She died, after eight months, from recurrence in the lungs and lower end of the humerus, having lived free, during that time, from pain or serious discomfort.

"THE CHEMICAL LUNG."

OR A READY MEANS OF SURROUNDING PATIENTS WITH ABSOLUTELY PURE AIR.*

By RICHARD NEALE, M.D.

THE vast importance of securing a supply of pure air, whether to restore health, or to retain that great essential for the enjoyment of life, is being daily more and more intelligently pressed upon the consideration of both medical and non-medical minds.

Two years since, when nearly suffocated in the Metropolitan Railway, the idea occurred to form a "lung" that should rob the atmosphere of noxious gases, just as the human lung appropriates the surrounding oxygen; and hence the title "chemical lung". Some, however, object to this name, as there is no strict analogy between the human lung and the "chemical lung". The great affinity that the caustic alkalies have for carbonic acid and sulphur gases, showed that the idea was not impossible to carry out. In its punkah form, the "chemical lung" is constructed thus. An endless cellular sheeting (A), four feet broad by five feet in circumference, giving a superficial area of 140—150 cubic feet (calculating the cells), is caused, by a simple mechanism (C D), to revolve, when swayed to and fro like an ordinary punkah, through a trough (B) containing between two and three gallons of a weak solution of caustic soda or potash. This, hung in the sick-room or ball-room, or in any other place where the heat and impurity of the atmosphere are objectionable, renders the air perfectly cool and absolutely pure; and free not only from carbonic acid and other products of respiration, but also from all the mechanical impurities of the atmosphere, such as dust and infective germs, which, coming into contact with the wet sheet, are fixed and washed down into the trough. On one occasion, eight young children were treated, during an attack of measles, in one small room, it being essential to isolate them from the mother, who was daily expecting her confinement; and, by the aid of the "chemical lung", the air was kept perfectly pure, and they all rapidly recovered without any complication, the mother also escaping the infection. One such "chemical lung" has for months kept the air of a mission-room, in one of the poorest localities in London, so pure, cool, and sweet, that, despite twenty-four flaring bat-wing gas-burners,

and crowded audiences, the missionaries and other workers leave, after many hours' labour, free from headache and from that peculiar nausea frequently attending work among large assemblies of unwashed poor in confined spaces. During the winter, the room of a consumptive patient was kept so pure and fresh, night and day, that, on entering, one involuntarily took a deep breath to inhale the deliciously pure air. At Aden Civil Hospital, a ward previously untenable, owing to a case of phagedenic gangrene, was kept perfectly pure by the aid of the "chemical lung", in its punkah form. Last June, a room crowded for five hours by twenty couples, while dancing, was also most efficiently cooled and purified, the windows being purposely closed.

The importance of being thus able to surround both patient and attendants with a chemically pure atmosphere will be particularly appreciated, should the experiments of M. Giboux prove to be accurate, who found that rabbits, made to inhale the air expired by consumptive patients, rapidly became tuberculous; and, although it is not proved that such air is as noxious to the human race as to rabbits, still no one doubts that pure air is an essential in the cure of pulmonary, as well as of all other diseases. During an experiment before Professor Lister, a room filled to suffocation with the odour of burning fat and sulphur, together with the products of fifty gas-jets burning for an hour or more, was absolutely purified, and its temperature lowered seventeen degrees, in twenty minutes, while a few whiffs of the burning fat vapour that had escaped into other parts of the house were appreciable for hours.

In its punkah form, the "chemical lung" has the power of rendering the air of any room absolutely pure, and of any required temperature; evaporation cooling the atmosphere if overheated, while, by simply placing a spirit-lamp below the trough, filled with hot water, the temperature may be raised, and the room filled with warm moist air. The accompanying diagrams illustrate how this "chemical lung" can purify theatres and other buildings, and also that great opprobrium of sanitary science, the atmosphere of the underground railway, when, for an outlay of less than one shilling per train, a noxious atmosphere could be rendered pure and pleasant, to the great advantage of the shareholders.

Reference to the following diagrams will show how the "chemical

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

lung" can be adapted so as to purify the air of large buildings, without causing draught, by means of a fan and tank.

The figure (3) represents a diagram of the application of the "chemical lung" to a theatre or any other large building. A is a rotary fan, set in motion by an engine (not seen) which draws the vitiated atmosphere from the upper part of the building through the funnel-shaped office of B, placed in the ceiling where the air is hottest and most foul, and forces it through the tank C, which contains the chemical solution. The air, entirely deprived of all its impurities, passes out through the trunk D, at a temperature regulated at pleasure. By this arrangement, all draught is avoided, the pure air being either distributed by the branches opening out at the upper part of the several box or gallery floors of the building operated upon, or allowed to escape at once into the basement of the building, and so flood it with pure air cooled or warmed at pleasure.

The application of the principle, and the position and form of the apparatus, will necessarily depend on the structural features of the building itself.

The vitiated atmosphere may be forced by means of a fan either through a moist or dry chemical substance, at the rate of 5,000 to 16,000 feet or more per minute.

The advantages claimed for this scheme are :

1. Simplicity of adaptation, as the pipes may be carried outside the building like ordinary rain-water pipes, only larger.
2. Utilising the heat of the building, so that no warming apparatus is necessary, and the purified air can be supplied at any required temperature.
3. Economy : the chemical agent when used up having a market value equal to, if not exceeding, its original cost.
4. That the air is perfectly pure, being deprived of all organic and chemical impurities incident to a crowded building.

The above diagram illustrates one of the many means by which it is possible to render the atmosphere in an underground railway, or any similar tunnel, perfectly pure and wholesome, excepting for the carbonic oxide gas, which may be easily destroyed by heat, and, indeed, by proper care, need not exist at all. A is a tank in a specially constructed carriage, in which a fan, C, is worked by the progress of the train. The tunnel-air is forced through the solution A' by means of the perforated pipe D D, passing out absolutely pure.

AN execution by the old fashioned method of beheading is reported from Copenhagen. It appears that the executioner bungled terribly, and aroused the indignation of the public.

ON INVALID TRANSIT.

By RICHARD DAVY, M.B., F.R.C.S.,
Surgeon to the Westminster Hospital.

SINCE publishing my observations on invalid transit in 1876, public attention has been directed more carefully to the absolute necessity of improvement in carriage building for such purposes; and my present object is, to again refer to the essential points demanded by the civil population. 1. For the comfort of the patient. 2. For the convenience of the surgeon in charge.

1. *The Comfort of the Patient.*—The necessity for conveying a patient from one door to another, in any part of Great Britain, without any shift, must imply a van capable either of being drawn by a horse, or shunted on to a railway truck, or embarked on a steamer, and therefore able to resist inclement weather. or stand exposure; and carry on, so to speak, the wants of a sick-room during the journey. The utmost rest must be afforded to damaged structures; and this, I have always contended, is granted by the swing element in bed construction. The provision of plenty of room, air, light, etc.; stretcher mechanisms; and the easy entrance to and exit from the van, are necessary conditions for invalid comfort. The general appearance of the carriage should be quiet and unsuggestive; seclusion must be guaranteed at the option of the patient or surgeon; and the floor must be so constructed as to be easily cleaned without any hitch. The van must not exceed one-horse power; and must clear, on a truck, railway bridges and tunnels on the line.

2. *The Convenience of the Surgeon in Charge.*—Free communication must exist between the driver and the attendant inside. Space for chloroform, brandy, lint, bandages, and general provisions; also for sanitary utensils. All mechanisms—such as blinds, doors, windows—to be of the simplest and strongest kind. Within reasonable limits, the greatest amount of cubic capacity, and no fixtures capable of interfering with the rapid execution of surgical or nursing details. I have recently ordered Mr. John U. Burt, of 23, Swinton Street, King's Cross, to build a van for me embodying these conditions; and Mr. Burt has succeeded in every respect; and the van permits the carriage of one, or even, on an emergency, six invalids, one surgeon, and the driver.

Annexed are two drawings. Fig. 1 shows the general appearance of the van, with the door open (see also BRITISH MEDICAL JOURNAL,

Fig. 1.

October 28th, 1876). Fig. 2 exhibits an inside view; showing a ham-

Fig. 2.

mock suspended (A); the line of two duck-litters (B), capable of easy removal; the cupboard for provisions, etc.; and the low-level floor-line, crank hind axle, suspended platform door, etc. The greatest inside capacity is: length, 9 ft.; breadth, 4½ ft.; and height, 4 ft. 9 in.

By reason of the capacity of this van, invalids may be carried from spot to spot in their own beds, or on their own sofas. Chairs or camp-stools may be placed at discretion. At night, the inside is lit by a good hand-lamp. The carriage runs very easily, and offers a striking contrast in all respects to the intolerable four-wheeled cab.