PRESIDENTIAL ADDRESS.

Delivered by Dr. L. T. SHEA,
Retiring President of the Australian Society of Anaesthetists,
at the Annual General Meeting in Perth, Western Australia,
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"The thing that hath been, it is that which shall be; and that which is done is that which shall be done; and there is no thing new under the sun."

"Is there anything whereof it may be said 'See this is new?' it hath been already of old time, which was before us."

"There is no remembrance of former things: neither shall there be any remembrance of things that are to come with those that shall come after."

Ecclesiastes 9 - 11.

It is chastening to reflect for a few moments upon modern anaesthetic usage in the light of its history, short though this may be. With perhaps the notable exception of ether, every agent introduced into anaesthetics has followed quite closely a similar historical pattern — an initial wave of enthusiasm is followed by a trough of relative disappointment; the better agents, after a varying period of reappraisal, recover to a level of use which is a true index of their real clinical value. Such is the story of chloroform, Avertin, ethylene, nitrous oxide, cyclopropane, the various barbiturates (including thiopentone), pethidine and so on.

With each passing year the history of halothane bears a closer and closer resemblance to that of chloroform. The lapse of time between the introduction of both these agents and the appearance of the first reports of liver damage is striking. Yet, if one re-reads papers written during the 'initial enthusiasm' phase of any of the agents mentioned, it is evident that the writers are universally blind to the extreme probability that the brave new agent will surely repeat the history of its predecessors.

It is true that halothane has an historical advantage over chloroform in the ready availability of modern accurate vapourisers, so that the dictates of Waters' (1951) reappraisal of chloroform — that it must be administered in a high-oxygen atmosphere; that it must be accurately vapourised, and that it must be used in known low concentrations — are nowadays capable of easy realisation. These three principles may have been new in Wisconsin in 1951, but history shows that they have been known and made use of for over one hundred years. For instance, Joseph Clover in 1862 invented his chloroform bag. Having no supply of bulk oxygen he filled the

bag with a known volume (180 litres) of air, to which was added and vapourised sufficient chloroform to produce the desired maximum concentration (3%).

In 1905 Levy produced a chloroform apparatus of considerable modern significance. Its maximum output was in the vicinity of 4%, achieved by the incorporation of a mixing and diluting box very similar to the arrangement of the modern E.M.O. ether vapouriser. The concentration of the contained vapour was kept constant by means of a water-bath (thermo-compensation, 1905). The flow permitted through the vapouriser was regulated manually, according to the temperature (manual thermo-compensation, 1905). In 1943 a modern version of Levy's apparatus was built at Oxford, the E.S.O. chloroform vapouriser, for the use of air-borne troops. The only improvement on Levy's vapouriser in 50 years has been the addition of automatic thermo-compensation, as in the Fluotec, the Emotril, the Tacota, and the E.M.O. ether vapourisers. But even the most modern of these machines has very undesirable flow-characteristics at low flow rates.

An interesting sidelight on such novelties is the periodic appearance of some intrepid soul willing to make a really effective pass at the problem of vapourising ether. One of the first of these was a surgeon, Lawson Tait, whose vapouriser (1876) was notable for its complete negation of all acceptable safety principles, the sole emphasis being on achieving vapourisation. As Sykes points out the records do not state how long this apparatus was in use before it blew up. A sub-committee of the A.M.R.C.,* reporting on anaesthetic fires, concluded:- "no-one but a doctor would be naive enough to bring a source of ignition into the vicinity of an inflammable vapour, and not expect it to ignite." Pinson's ether bomb is next on the list of really effective vapourisers, with its modern experimental counterpart to be found in the Oxford Vapouriser No. 2.

Modern endotracheal techniques, and consequently the design of modern vapourisers, have gone full-circle back to their origins in the wide-bore tube and the wide-bore draw-over or inhalational vapouriser. Morton's original vapouriser was of this type, as also was that of John Snow — only automation really separates these early forms from their modern counterparts.

(*American Medical Research Council).

Nowadays it is fashionable for anaesthetic departments everywhere to take an active part in the operation of respiratory units. Such units have four constant components:- paralysed patients (the paralysis being due to either their disease, their medical attendants, or both); most of the patients have tracheostomies; all the tracheostomies have a tube of some sort or other in them; and, lastly, there is an assortment of devices for inflating the lungs through these tubes. Each and every one of these components antedates by a considerable period of time the advent of both anaesthetic departments and respiratory units. For example, in 1542 (420 years ago), Vesalius passed a reed into the Arteria Aspera of an animal, and demonstrated that the lungs could be inflated through it. In 1667, Robert Hook performed a similar experiment before the Royal Society. In the late eighteenth century intubation of the trachea, as a means of artificial respiration in drowning and asphyxia, was frequently practised. In 1858, John Snow administered an anaesthetic to an animal through a wide-bore tracheostomy tube. In 1871, Trendelenburg, seeking a solution to the problem of preventing the aspiration of blood into the lungs, did a preliminary tracheostomy through which the anaesthetic was administered by means of a cuffed tube, one that bore a striking resemblance to the design of modern tracheostomy tubes.

The idea of resuscitation lifeless and apparently dead subjects by pulmonary inflation is certainly now new, though it began to be applied in anaesthetic practice only in 1934 (Nosworthy). The really first reference is in Genesis 2:7, wherein the Lord God breathed the breath of life into the nostrils of the hapless and newly-created Adam. Then, Elijah, as recorded in I Kings 17:17-23, apparently rendered a comparable service to the widow's dead son, while Elisha, II Kings 4:18-37, is said, in a decidedly repetitious statement, to have performed what might well have been mouth-to-mouth inflation as well as external cardiac compression in a fatal case of sunstroke! Further, Ezekiel 37:9, in the discussion of the valley of dry bones, has similar inflationary implications.

In 1812 Charles Waterton, the squire of Walton, near Wakefield, went to South America to investigate for himself reports of the Wouralie poison, used by the Indians on their arrows. Of the respiratory paralysis produced by wouralie he writes:- "It is supposed by some that wind introduced into the

lungs by a small pair of bellows would revive the poisoned patient, provided the operation be continued for a sufficient length of time". How true, indeed. On his return to England Waterton conducted a number of experiments with samples he brought back. "A she-ass received the wouralie poison in the shoulder, and appeared dead in ten minutes. An incision was then made into the wind-pipe, and through it the lungs were regularly inflated for two hours with a pair of bellows. Suspended animation returned. On stopping the inflation she once more sank into apparent death! Respiration was continued in this manner for another two hours, 'after which she got up and ate hay'."
The donkey was renamed "Wouralia" and sent to Walton Hall, where she passed the rest of her life in peace. The squire would no doubt be interested to see his method in constant use to-day all over the world, and even in his own house, for the Hall is now a maternity home run by the Corporation of Wakefield (Sykes).
Functionally all respirators derive from this original 'pair of bellows'.
There have been times when I would willingly have exchanged a faulty respirator for a similar pair of bellows.

Can we see anything, by sighting along the line of history, into the future? There is no doubt that the general forward-leading thread of anaesthetic knowledge has always been and shall remain a sure guide from the labyrinth of former ignorance to the ultimate separation of the total concept of anaesthesia into its component parts — hypnosis, analgesia and relaxation — each of which will be readily controllable, both as to duration and extent. Indeed, the least likely of these has been largely realised in the relative ease with which we now control both the extent and duration of total relaxation.
Although due credit must go to the Liverpool School for bringing us as close as we are at present to the goal of controllable analgesia and controllable hypnosis, it must be remembered that the sole aim of the very first anaesthetists was to produce analgesia. Relaxation was both unheard of and unnecessary, while loss of consciousness was at first regarded as an unwelcome complication. Early clinical reports describe how the patients moved, vomited and abused their medical attendants during the operation, but provided that there was no recollection of pain everyone concerned was highly delighted.

The principle of adequate analgesia, established in 1846, would certainly bear restatement in 1963, in view of its not infrequent abrogation during the course of certain anaesthetic techniques.