lid upward with the ball of the index finger. This discrimination is a fine one, requiring a practiced appreciation of minute differences in muscle tone. The breathing tends to be regular and of fair volume at this point. 2. As anesthesia progresses into second plane the eyeball activity disappears. The eyeballs come to rest exactly in a centric midline position. The muscle tone of the upper lid disappears completely, causing the palpebral fissure to widen spontaneously. Flicking the upper lid gives the impression of complete flaccidity. The breathing remains regular, and may or may not diminish in volume at this point. As the anesthesia progresses into lower second plane and on into third plane, there is a distinct decrease in amplitude of respiration, and an increase in rate. 3. The pupillary signs are not of any value up to and including second plane anesthesia. The pupils do not dilate until a profound depth of anesthetic level is reached. This dilatation may be anoxic in origin." 7 references.

J. C. M. C.

McCLURE, R. D.; WARREN, K. W., AND FALLIS, L. S.: *Intravenous Pectin Solution in the Prophylaxis and Treatment of shock.* Canad. M. A. J. **51**: 206–210 (Sept.) 1944.

"Our clinical experience with pectin has been confined primarily to its use in the prophylaxis of shock in extensive surgical procedures where blood was used formerly for this purpose. In addition we have had a very limited experience with pectin in the treatment of postoperative and traumatic shock. . . . All solutions were prepared by Hartman and Schelling, who emphasize the care which must be observed in the preparation and standardization of pectin solutions. Each batch must be tested separately for its osmotic pressure, viscosity and specific gravity. The pH must be adjusted carefully before administering to pH 7.0. . . . During the period from August, 1941, to March, 1944, pectin solution was administered to 275 patients by various divisions of the surgical department of the Henry Ford Hospital. . . . In an effort to evaluate our clinical experience we have classified our results according to arbitrary standards. The results of those cases in which there were minor variations in pulse and blood pressure during the operation, and in which the postoperative period was devoid of any manifestation of shock were classified as good. In those patients in whom the blood pressure fell below 100/80 and was maintained below this level for more than thirty minutes, or in whom it fluctuated widely between the normal and the pre-shock level but required no other supportive treatment the results were labelled as fair. The poor results occurred in those patients in whom the blood pressure fell to 80/40 or below and those in whom pre-existing shock was treated with pectin without an improvement in their condition. Measured by those standards the results were good in 75%, fair in 20% and poor in 5%. . . . Rouleaux formation . . . is present after pectin administration, persists for at least twenty-four hours, but causes no detectable symptoms. . . . The sedimentation rate rises in all cases following intravenous injection of pectin. . . . Only two patients in a series of over 300 patients manifested any evidence of reaction. Purpura [may develop]. . . . Dr. Hans Popper of the Hektoen Institute Cook County Hospital, Chicago, has reported the deposition of a peculiarly stained material in the kidney, liver, and spleen of patients receiving large amounts of intravenous pectin solution 5,000 to 9,000 cc. But in no instance was there any pathological change when less than 4,000 cc. of pectin had been given. He also found spleno-

megaly in rabbits in which large amounts of pectin had been injected. . . . Pectin, though inferior to blood or plasma, appears to be of more value than glucose or saline in the prophylaxis of shock in extensive surgical procedures. Pectin is non-toxic and non-antigenic in the quantity 1,000 to 1,500 cc. usually required to maintain blood pressure in the presence of shock producing conditions. Untoward results appeared only after the intravenous injection of amounts in excess of 4,000 cc." 6 references.

J. C. M. C.

ADAMS, R. C.; LUNDY, J. S., AND SELDON, T. H.: *Shock in Relation to Anesthetic Management.* S. Clin. North America, Mayo Clinic Number 808–813 (Aug.) 1944.

"The treatment of shock by the members of the department of anesthesia in a large surgical hospital has resulted in efficient teamwork between surgeons and anesthetists. This has been mutually beneficial and of definite advantage to the patient. . . . The anesthetist begins before the time of the operation to evaluate the surgical patient and what will happen to him during surgical intervention. . . . Having the general condition of the patient in his mind, together with the operative possibilities, the anesthetist chooses his anesthetic or a combination of them, to suit the case. . . . The attempt must be made to administer the minimal amount of anesthetic agent that is commensurate with the needs of the surgeon. A so-called good anesthetic may not necessarily be one which provides optimal working conditions for the surgeon. Too much anesthetization may instigate, and also aggravate, shock from other causes. On the other hand, too little anesthetization, or the choice of an inadequate agent or method, in the hope of minimizing anesthetic shock, may work in the reverse manner. Too light surgical anesthesia, poor relaxation, active reflexes, straining and so forth may lead to prolongation of the operation, excessive retraction and manipulation and excessive surgical trauma in general, all of which contribute to production of surgical shock. It is better in the long run to use a method of anesthesia which is adequate for the operative procedure so that the operation may be expedited and the patient returned to his bed as soon as possible. . . . The main causative factors which may throw the surgical patient into a state of shock are: (1) psychic trauma, (2) pain, (3) loss of heat, (4) surgical trauma, (5) oxygen want and (6) loss of blood and other fluid. The first two of these are taken care of by the preliminary medication and the anesthetic itself. Loss of heat can be minimized by application of external heat and minimal exposure of the region of operation. Surgical trauma to a certain degree is inevitable but can be minimized by gentle manipulation by the surgeon and his assistants. . . .

"A continuously patent airway is essential and is best provided by insertion of an intratracheal tube. This permits the efficient oxygenation of the patient which is so vital in combating shock. It also facilitates artificial respiration and resuscitation if the need arises. Apparatus must be at hand for the administration of oxygen under positive pressure, whereby the lungs can be inflated should circulatory and respiratory function become depressed. Facilities for suction-aspiration of the tracheobronchial tree must be provided. . . . Loss of blood and tissue fluid from the site of operation is variable and may depend on many factors. The important thing is that these losses, if extensive, must be compensated for before the patient reaches a profound state of shock. . . . Complicated apparatus and blood chemical