PERFORATING wounds of the rectum and pelvic colon occur either in association with penetrating or crushing wounds of the abdominal wall or through the purposeful or accidental introduction of instruments or foreign bodies through the anus. Wounds of the first type include traffic and industrial injuries as well as gunshot and stab wounds. This type of injury has been amply covered in the surgical literature.

Our interest at present lies in the second type of injury; that is, those produced by the insertion of an instrument or a foreign body into the rectum. These injuries are of importance, not because of their frequency in civilian life, but because of the professional usage (for diagnostic and therapeutic purposes) of introducing various instruments into the rectum and sigmoid. The possibility of injuring the rectum and colon in the course of such procedure has been widely rumored; hitherto no compilation of data on this subject has been available in the American literature. This type of accident does not cause the majority of cases of traumatic rupture of the intestines, as was shown by Cooke (1), who reviewed seven hundred odd cases of penetrating wounds of the intestine, practically all of which were due to crushing and penetrating wounds of the abdominal wall and perineum. Accidents due to therapeutic and diagnostic procedures do constitute an important minor portion of such injuries which have never received recognition or proper emphasis; a frank and open admission of such facts should lead to an appreciable reduction of the incidence of this lamentable mishap.

Amongst civilian injuries which may cause perforation of the colon are impalements, insertion of foreign bodies into the rectum, and pneumatic injuries. Impalements are accidents in which the body falls vertically upon a sharp or pointed object, driving it into the rectum. These accidents are seen not infrequently in civilian life, occurring commonly among children. They are associated in most instances with considerable injury to the external parts as well as with laceration and perforation of the colon. Rumback reviewed 147 cases of impalement injuries of the rectum and colon. Of this number 44 were treated by laparotomy and 29 or 66% recovered. Of the remaining 102 unoperated cases, 48 or 47.2% recovered.

One not infrequently hears of serious lesions, often perforations of the colon, produced by the insertion of foreign bodies into the rectum. The variety of objects which have been introduced into the rectum is astounding. Bottles, broomsticks, projecting knobs of furniture, hardware appliances and many other devices may be found in the rectum under varying circumstances. The commonest occurrence of this accident is in instances of ano-eroticism, although it has occurred in cases of criminal assault and occasionally in so-called "pranks." The practice is doubtless widespread; the reported cases of serious traumatization are probably small in proportion to their actual incidence.

A not very frequent, but always well publicised accident is the pneumatic or air-hose injury of the rectum and sigmoid. Andrews (4), in 1911, reported 13 such injuries and many more have since been published. Some authors have attempted to determine the amount of air pressure required to perforate the colon. It will be shown later that this pressure need be no greater than that produced by a hand bulb. However, injuries produced by hose lines carrying air under great pressure are always more severe, the perforations being nearly always multiple, occurring for the most part, in the pelvic colon. The 13 cases reported by Andrews (4) were all fatalities. Since then many such cases have been saved by prompt surgery. Our own experience is limited to one case, an individual who, 5 years previously, by the mischievous insertion of an air-hose into his rectum, had suffered multiple perforations of his pelvic colon. At that time the injuries had been minimized by the physician called in the emergency and castor oil was freely administered; notwithstanding which, a laparotomy the succeeding day resulted in a protracted convalescence and eventually a complete restoration of function.

The force exerted on the bowel wall is always in excess of that required to penetrate it and the perforations are frequently multiple. Such perforations occur in the majority of instances at or about the recto-sigmoid angle because this point is more or less fixed...
and because the colon here becomes an intraperitoneal organ. Lesions which diminish the mobility of the sigmoid, such as post-operative adhesions and localized peri-colonic inflammations have been regarded as contributing elements in the etiology of some cases of perforation.

INJURIES DUE TO DIAGNOSTIC AND THERAPEUTIC PROCEDURES

Professor Ad. Schmidt (5), of Munich, has said "One hears much of the skill and the ability of the physician and surgeon, but much less is heard or read of the misfortunes and accidents which occur in medicine and surgery, but from these we may often learn more." With this thought in mind we have attempted to determine, the approximate frequency with which injuries and perforations occur in the course of diagnostic and therapeutic manipulations within the rectum and pelvic colon; to learn, if possible, what factors in their execution are associated with threats of danger and what possible errors of technic may lead to the incidence of such injuries. The American literature contains very few references to perforations of the colon in the course of sigmoidoscopy, there being no instance of such a report by a man who himself was responsible for the accident. French and German physicians have been more frank and have freely discussed what technical errors to avoid in order to minimize the hazards of this procedure. They have also taught the means of early recognition of technical perforations of the sigmoid and have emphasized the prompt steps necessary to meet the situation when it occurs.

A general survey of the literature has been undertaken in order to emphasize the possibility of this trauma occurring at times in the hands of those best qualified to perform such examinations.

There have been 33 cases of instrumental perforation collected from the world literature. Of these, 18 occurred in the course of proctoscopy or sigmoidoscopy; several were due to dilitation of rectal strictures, others due to the introduction of enema tips and recto-sigmoid angle. A case

TABLE I

<table>
<thead>
<tr>
<th>Case Details</th>
<th>Time of Operative Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>58 cases</td>
</tr>
<tr>
<td>1. Up to 7 hours</td>
<td>No. of cases Recovered Deceased after perforation: 13 7 6 Mortality 47%</td>
</tr>
<tr>
<td>2. 7 hours to 72 hours</td>
<td>No. of cases Recovered Deceased after perforation: 5 0 5 Mortality 100%</td>
</tr>
</tbody>
</table>

knowledge of two more. The first instance occurred in the course of a routine sigmoidoscopy in which there was no disease of the colon; the patient was cooperative, the sigmoidoscopy was performed with ease and without strain. The perforation occurred while using no undue force. The other instance occurred during the fulguration of a polyp. In this last case the perforation was not at first recognized, so that several enemas had been administered before the true situation was appreciated; free air under the diaphragm and a localized peritonitis removed any doubt as to the occurrence of the trauma. Both patients recovered.

The answers to the questionnaire indicate that perforation occurs more easily in the presence of a diseased colon. This is not uniformly true, many men having seen perforations in the presence of a perfectly normal colon. It is true that the amount of force or air pressure required to rupture a thinned-out, weakened bowel wall is much less than that necessary to rupture the normal bowel. However, numerous cases in the literature and personal experience in one case, (B. B. C.) are convincing that no great amount of force need be exerted to push the end of the sigmoidoscope through the colon, at or above the fixed point at the recto-sigmoid angle. A case quoted by Dick (6) illustrates the ease with which a manual perforation may occur.

The greatest number of perforations reported by qualified sigmoidoscopists have occurred with the use of air inflation apparatus. The use of a hand bulb, though helpful, has not been entirely safe. Originally condemned by French authors, it is now generally considered dangerous.

The importance of passing the sigmoidoscope under direct vision has been emphasized by Buie (7) and other writers. They have cautioned that the obturator of the instrument be removed as soon as the anus is passed; the progress of the instrument must be guided entirely by the eye. Failure to observe this funda-