Ritual in the Operating Room

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Ritual has been defined as standardized ceremonies in which expressive, symbolic, mystical, sacred, and nonrational behavior predominates over practical, technical, secular, rational, and scientific behavior (Beattie 1966; Durkheim 1961; Gluckman 1962; Goody 1961:169; Leach 1968), although anthropologists have acknowledged that rational, technical acts may occur as part of ritual behavior.

The analysis of ritual has assumed various forms. One is to investigate the meanings, types, and structures of the symbols used in rituals (e.g., Turner 1967; 1969). Another is to examine the thought processes that occur in ritual, or how the actors believe in the effectiveness of the rituals (Jarvie and Agassi 1970), how the thoughts expressed in ritual reflect their social structure (Levi-Strauss 1966), and how thought processes in ritual compare with those in science (Horton 1970). Another form of analysis of ritual focuses upon the structure and function of ritual in society. Van Gennup's (1960) pioneering work describes the ways in which rituals deal with movements of people through passages in time, place, and statuses, and distinctive phases. Gluckman (1962) shows how ritual may exaggerate the distinctions between different events enacted by the same people, and explained some means by which rituals masked conflicts by emphasizing solidarity. Douglas (1966) describes the ways in which ritual resolve anomaly by avoiding the dangers of pollution.

According to these studies of ritual, behavior in an operating room in a modern hospital would not be defined as ritual because it involves predominately technical, rational, and scientific activity. By relegating behavior in an operating room to a nonritual realm, the meanings of the symbols, movements, and thought processes they reveal are not likely to be subject to the same kinds of analyses as they would if they were termed ritual behavior. Even in Horton's (1970) provocative essay, in which he compares traditional and modern thought, traditional thought is conceived as magical, religious, and expressed in ritual; modern thought as secular, technical, and expressed in scientific activity. Although Horton emphasizes the similarities as well as the differences of these two kinds of thinking, he deliberately defines the two thinking styles as embedded in two separate and different contexts.

Recently, some anthropologists (Firth 1972; Moore and Myerhoff 1977) have acknowledged that secular ceremonies may be examined as rituals because they share the symbolic and communicative functions of rituals. In the same spirit this paper examines both ritual and science in one technical context, the hospital operating room. It describes behavior and thinking in the operating room in order to understand the functions of ritual in a scientific context. Specifically, it examines the functions and efficacy of sterility procedures.

Despite the elaborate rituals, and despite the rigorous application of advanced scientific knowledge in the operating room, infections do occur as a result of surgery. In the vast majority of cases the specific cause of these infections remains
unknown (Postlethwait 1972:300). In the United States each year there are approximately two million postoperative infections, causing 79,000 deaths among surgical patients (Boyd 1976:78). This paper argues that the elaborate rituals and technical procedures of the modern hospital operating room, manifestly designed to prevent infection, better serve latent functions. Ritual actually contributes to the efficiency of a technical, goal-oriented, scientific activity, such as surgery, by permitting autonomy of action to the participants and enabling them to function in circumstances of ambiguity.

THE OPERATING ROOM

In most modern hospitals the surgical area is isolated from the rest of the hospital, and the operating room is further isolated from other parts of the surgical area. The surgical area may include dressing rooms, lounges, storage rooms, offices, and laboratories as well as operating rooms. Entrance to the surgical area is restricted to those people who are properly costumed and who are familiar with the rituals within. These include surgeons, anesthesiologists, pathologists, radiologists, operating room and recovery room nurses, student doctors, nurses, and ward orderlies who work in that area. The major exception to these occupational roles is that of the surgical patient who, although costumed, is unfamiliar with the rituals. All of the people in the surgery area wear costumes which identify both their general role in the hospital, as well as denoting the specific areas within the surgical area which they are permitted to enter.

The restrictive entrance procedures and costume requirements contribute to the maintenance of cleanliness and prevention of contamination. Identification and separation of cleanliness and dirt are the most important concepts in the operating room. They govern the organization of the activities in surgery, the spatial organization of rooms and objects, the costumes worn, as well as most of the rituals.

The surgical area of University Hospital has four parts: the periphery, outer, middle, and inner areas (see Figure 1). Physical barriers separate these four areas. They function to prevent contamination from dirtier areas to cleaner ones. From outside to inside, these areas are differentiated according to increasing degrees of cleanliness. The periphery, the least clean area, includes the offices of the anesthesiologists, a small pathology laboratory for quick analyses of specimens, dressing rooms for men and women, and lounges for nurses and doctors. To enter the periphery area a person must wear a white jacket for identification as a member of the medical staff.

The outer area is separated from the periphery by a sliding door. Within the outer area, a nurse at the main desk can prevent the door from opening if an unauthorized person tries to enter. Entrance to the outer area is restricted to patients and to those medical personnel who wear blue or green costumes. The largest and most populated part of the outer area consists of an open corridor in which the daily operating schedule is posted and a blackboard indicating the current use of operating rooms. Patients awaiting surgery lie in narrow beds lined in a single row along one wall of the open corridor. A nurse, in charge of coordinating the timing and activities in each operating room, sits at an exposed desk in the outer area. She is in continual intercom communication with each operating room. The outer area also contains a large recovery room which houses patients immediately after their surgery is completed.

The middle area consists of three separate areas called “aseptic cores.” Each aseptic core contains five doors. One of them links the outer area to the aseptic core. Each of the other four doors leads to an operating room. Each aseptic core contains a long sink, three sterilizing machines (autoclaves), and many carts and shelves containing surgical equipment, sheets, and towels. In order to enter an aseptic core, a person must wear a mask which covers the mouth and nose, coverings for shoes and for hair, and a blue or green outfit.
The innermost area contains the operating rooms and small laundry rooms. In each aseptic core there are four operating rooms and two laundry rooms. Each operating room contains three doors. One door adjoins the outer area and is used exclusively for the patient to enter and leave the operating room. A door with a small glass window connects the aseptic core to the operating room. This is used by the operating room staff. The third door leads to the laundry room which serves as a depository for contaminated clothing and instruments.

**Preoperative Rituals**

One of the more important operating room rituals, scrubbing, takes place in the aseptic core before each operation begins. It is a procedure by which selected personnel wash their hands and lower arms according to rigidly prescribed timing and movements. The purpose of scrubbing is to remove as many bacteria as possible from the fingers, nails, hands, and arms to the elbows. The people who scrub are those who actually carry out, or directly assist in, the surgery; not
everyone in the operating room scrubs. The surgeon, assistant surgeon(s), and the scrub nurse, participate in the scrubbing ritual. Medical students and other surgical assistants consider it an honor if they are asked to scrub with a surgeon.

Before a person begins scrubbing he checks the clock in order to time the seven-minute procedure. He turns on the water by pushing a button with his hip, and reaches for a package which contains a nail file, a brush and sponge which is saturated with an antiseptic solution. For two minutes he cleans under each of his nails with the nail file. For two-and-a-half minutes, he scrubs his fingers, hands and arms to his elbows, intermittently wetting the sponge and brush with running water. Using a circular motion he scrubs all of the surfaces of his fingers on one hand, his hand, and, finally, his arm to the elbow. After rinsing that arm thoroughly under running water, he repeats the procedure for two-and-a-half minutes on his second hand. After having scrubbed for seven minutes, he discards the sponge, brush, file, and paper, and turns off the tap water by pressing a button on the sink with his hip.

After scrubbing, the surgeon and his assistant(s) enter the operating room by pushing the door with their hips. They hold their lower arms and hands in an upright position, away from the rest of their bodies. They are forbidden to allow their scrubbed hands and arms to come into contact with any object or person. The scrub nurse hands them a sterile towel to dry their hands. They dry each finger separately, and throw the towel into a container on the floor. The scrub nurse holds the outside, sterile part of a green gown for the surgeon and his assistant(s) to wear. They insert their hands through the sleeves, without allowing their hands to touch the outside of the gown. At this point, their hands, although scrubbed and clean, are not sterile. But the outside of the gown is sterile. After their arms pass through the sleeves, the scrub nurse holds their sterile gloves in place with the open side facing their hands. The surgeon, followed by his assistant, thrusts one hand at a time into each glove. They accomplish this in one quick movement, in which a hand is brought down from its upward position, thrust forward inside the glove and snapped in place over the sleeve. When only one glove is on, the surgeon is not permitted to adjust it with the other hand. However, when the second glove is on, he can adjust his glove and the sleeve of his gown and any other part of the front of the gown.

At this stage, the gown is not completely fastened. In order to fasten his gown, the surgeon unties a tie of his gown at waist level. Although this tie had been sterile, he hands it to the circulating nurse, who has not scrubbed. The circulating nurse brings the tie to the back of his gown. The back is a nonsterile area of the gown. The surgeon helps her reach the back by making a 360° turn, while she holds the tie. The circulating nurse secures this and two more ties to the back of the gown.

PRINCIPLES OF STERILITY AND CONTAMINATION

The rituals of scrubbing, gowning, and gloving suggest some basic principles underlying most of the rituals in the operating room.

1) In the operating room, objects, or parts of objects and people, are classified either as sterile or nonsterile (S = sterile; NS = nonsterile):
   (a) Nonsterile objects are further classified as clean, dirty, or contaminated.
   (b) No part of the circulating nurse or the anaesthesiologist is sterile.
   (c) Parts of the surgeon and the scrub nurse are sterile.

2) To remain sterile, sterile objects may only come into contact with other objects that are sterile (c = contact; > = remains, becomes, or is transformed into; therefore, $S \cap S > S$).

3) To remain sterile, sterile objects may not come into contact with anything that is not sterile ($\sim = not$; therefore, $S \sim c NS > S$).
4) Nonsterile objects may come into contact with other nonsterile objects, and both remain nonsterile (NS < NS > NS).

5) Sterile objects may be transformed into nonsterile by contact with objects which are nonsterile. This process is called contamination (S c NS > NS).

6) Contaminated objects can only be restored to sterility by either placing them in an autoclave for a specified period of time, or, in the case of a person's clothes, by discarding the contaminated clothes and replacing them with sterile clothes. If gloves become contaminated, rescrubbing for three minutes is required before replacing the gloves and the gown.

Before the operation begins, most sterile objects are either symbolized by the color green, or are in contact with an object colored green. Sterile instruments, for example, are placed upon a green towel which lies on a nonsterile tray. Although the green towel has been sterilized, it becomes contaminated at the bottom through contact with the nonsterile tray (S c NS > NS). The towel remains sterile at the top, however, and the sterile instruments lying on the top remain sterile (S c S > S).

The surgeon, his assistant(s), and the scrub nurse wear sterile gloves and a green or blue gown which is sterile in the front from the waist to the armpits. However, the gown is not sterile in the back nor above the armpits and below the waist in the front. That is why the surgeon unites the tie at the sterile side of his gown with his sterile gloves, and the circulating (nonsterile) nurse holds the tie without touching the surgeon's (sterile) gloves, and brings the tie toward the (nonsterile) back of the surgeon's gown. The sterile tie becomes contaminated when the circulating nurse's hand touches it. It remains contaminated because it is tied in the back of the surgeon's gown.

The potentials for manipulating the overhead light in the center of the operating room illustrate some principles of sterility and contamination. Before the operation begins, the scrub nurse places a sterile handle on the huge, movable, overhead light. This permits the light to be adjusted by the surgeon, his assistant(s), and the scrub nurse through contact with the sterile handle (S c S > S). The circulating nurse and anaesthesiologist, however, are also able to manipulate the light by touching the nonsterile frame of the light (NS c NS > NS).

In order for a person to move to the other side of the person next to him, as the scrubbed members of the operating team stand next to the patient's table, a ritual must be enacted. The person making the move turns 360° in the direction of his move, allowing his back to face the back of his neighbor. This movement prevents his sterile front from coming into contact with his neighbor's nonsterile back (S c NS > S). Instead, his nonsterile back only comes into contact with his neighbor's nonsterile back (NS c NS > NS).

Before the operation begins each member of the operating team is busily engaged in activities that are essentially similar for each operation. The surgeon and his assistant(s) gown and glove and check last-minute details about the forthcoming operation. The anaesthesiologist checks his tools, his gas supply, and his respirator. He also prepares the instruments for monitoring the patient's vital functions, and prepares the patient for receiving anaesthesia. In the outer area, a nurse checks to assure that the patient is properly identified and his operative site is verified. She independently checks the preoperative instructions written by the surgeon with the administrative order written when the surgery was booked, and asks the surgeon to identify the proposed operation and the precise site of the operation. Finally, she asks the patient to identify his name and the site of the operation.

Within the operating room, the words, "clean," "dirty," "sterile," and "contaminated" assume different meanings according to different stages of the operation.
Before the operation begins, the operating room is considered to be clean. Dirty objects have been removed or cleaned. Instruments and clothes which have been contaminated by the previous operation have been removed. Floors, walls, permanent fixtures, and furniture have been cleaned with antiseptic solution. The air in the operating room is continually cleaned during, and between, operations by a filter system.

Fields of sterility and cleanliness within the operating room are mapped out. Everyone in the operating room, with the exception of the patient, is knowledgeable about these fields. Some of the fields, such as that surrounding the patient, are invisible. Other fields are distinguished by the use of sterile paper sheets colored green. The sheets provide only a minimal material barrier against airborne bacteria yet serve as a symbolic shield separating fields of sterility and nonsterility. They are also used to isolate the operative area of the body from the rest of the patient's body. The sheets cover the entire body of the patient leaving a small opening for the operative area, or separate the head end of the patient from the rest of his body. The head end is considered nonsterile and is accessible to the anaesthesiologist and his equipment, which are also nonsterile.

After the patient is rendered unconscious by the anaesthesiologist, the scrub nurse applies an orange-brown antiseptic solution (Providine) onto the patient's skin. She pours the Providine liberally onto the skin, and distributes it with circular movements radiating outward from the center of the operative site. This action is repeated at least once, using a sterile sponge on a long holder which is discarded and replaced with each action. The sterile sponges become contaminated through contact with the patient's nonsterile skin (S c NS > NS). This action, which transforms the sterile sponge into a contaminated sponge, also transforms the dirty body area of the patient into a clean area. When this act is completed, sterile green paper towels are placed on the patient's body, exposing only his aseptic, painted, operative site.

Before the operation begins both nurses lay out and count all the sterile instruments and sponges that are likely to be used. The circulating nurse obtains articles from their nonsterile storage place. When the outside of sealed packages is nonsterile and contains sterile objects inside, the circulating nurse holds the outside of the package. She either thrusts the objects onto a green sterile towel, or asks the scrub nurse to grasp the sterile object by reaching down into the package and lifting the object upwards, with a straight, quick movement. These procedures are followed for each sterile needle, thread, or vial that is wrapped in a nonsterile wrapping in order to prevent contamination of sterile parts by the nonsterile parts of the same package. The two nurses also simultaneously count items that are laid out for use during surgery. The circulating nurse records the amounts of each item that are counted. Each item must be accounted for before the operation is completed, and the last count must concur with the total of the previous counts.

Different operations are classified according to the degree of sterility and contamination likely to be present. At University Hospital there are four categories of operations classified according to decreasing sterility: (1) clean; (2) clean contaminated; (3) contaminated; and (4) dirty. Eye operations, for example, are clean. Most gall bladder operations are clean contaminated. Duodenal operations are contaminated. Colonic operations are dirty. Intestinal operations are considered dirtier than many other operations because the contents of the intestines are highly contaminated with bacteria, requiring additional measurements for vigilance against contamination during the operation. Ritual during most operations is concerned with avoidance of contamination of the patient from the outside. Ritual in operations which are classified as contaminated or dirty are concerned, in addition, with contamination of the patient and the medical staff from inside the patient.
After the completion of dirty operations, the medical staff is required to discard all their outside garments before leaving the operating room. Since the unscrubbed members of the operating team wear only one set of clothing, before the operation they don an additional white, clean, nonsterile gown over their green or blue costume. After the operation is completed they discard the gown.

**The Operation**

Although extensive variation exists among types of operations, as well as variations among the medical conditions of patients, there is, nevertheless, considerable similarity in the structure of all operations. Operations contain three distinct stages. Specific rituals are performed during these stages. Stage One consists of the incision, or opening. Stage Two consists of the excision and repair. Stage Three consists of the closure.

The operation begins after the anaesthetized patient is draped, all sterilized instruments are counted and placed in orderly rows upon trays, and the nurses and doctors, wearing their appropriate costumes, are standing in their specified places. The anaesthesiologist stands behind the green curtain at the head of the patient, outside of the sterile field. The surgeon stands next to the operative site, on one side of the patient. His assistant usually stands on the opposite side of the patient from that of the surgeon. The scrub nurse stands next to the surgeon, with the pole of an instrument tray between them. The instrument tray is suspended over the patient's body. The circulating nurse stands outside of the sterile field, near the outer part of the operating room.

Silence and tension prevail as the first stage of the operation begins. With a sterile scalpel, the surgeon makes the first incision through the layers of the patient's skin, then discards the scalpel in a sterile basin. He has transformed both the scalpel and the basin from sterile to nonsterile. The transformation takes place because the sterile scalpel touches the patient's nonsterile skin. (The patient's skin, although cleaned with an antiseptic, is not sterile.) The scalpel, which has become nonsterile (S c NS > NS), touches the sterile basin and contaminates the basin (NS c S > NS). The surgeon uses another sterile scalpel to cut through the remaining layers of fat, fascia, muscle, and, in an abdominal operation, the peritoneum. The same scalpel may be used for all the layers underlying the skin because, unlike the contaminated skin, these layers are considered to be sterile.

As the surgeon cuts, he or his assistant cauterizes or ties the severed blood vessels. The patient's blood is considered sterile once the operation has begun. Before the operation, however, the patient's blood is considered to be nonsterile. This was illustrated graphically at University Hospital before a particular emergency operation in which a patient was bleeding externally from an internal hemorrhage. The nurses complained about "the man who is dirtying our clean room!" However, once the operation on this man began, his blood was considered sterile. Sterile instruments which touched his blood during the operation remained sterile (S c S > S) until contaminated by touching something nonsterile.

The rituals enacted during the first stage of the operation involve the transformation of objects defined as sterile and nonsterile, at the same time that the appropriate instruments are made accessible and are being used to make the incisions. The beginning of the first stage, in which the first incision is made, introduces new definitions of sterile and nonsterile. For example, the patient's blood and internal organs, which had been considered nonsterile before the operation, are considered sterile once the operation begins. (The surgeon's blood, however, remains nonsterile.) The patient's skin, although cleansed with antiseptic before the operation, becomes nonsterile once the operation begins and the incision is made (see Figure 2). The rituals also enforce the segregation of
sterile and nonsterile objects while the initial incisions are being made. The surgeon typically utters terse commands, usually stating the specific names of the instrument he needs. The scrub nurse immediately places the requested instrument securely in the palm of the surgeon's hand. If the instrument remains clean, the surgeon returns it to the scrub nurse and the scrub nurse places it upon the sterile tray. If it becomes contaminated, as occurs to the skin scalpel after the first incision, the surgeon places it into a container which could only be handled by the circulating nurse.

As the technical tasks become routinized during the first stage of the operation, joking begins. Most of the joking at this stage revolves around the operative procedures which are to be carried out during the next stage: "I can't wait to get

<table>
<thead>
<tr>
<th>Body Category</th>
<th>Outside Operating Room</th>
<th>First Stage (Incision)</th>
<th>Second Stage (Excision)</th>
<th>Third Stage (Closure)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient's Washed Skin</td>
<td>C</td>
<td>D</td>
<td>D</td>
<td>C</td>
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<tr>
<td>Patient's Gall Bladder (in gall bladder excision)</td>
<td>D</td>
<td>C</td>
<td>C</td>
<td>D</td>
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<tr>
<td>Patient's Colon (in colon resection)</td>
<td>D</td>
<td>C-OUTSIDE D-INSIDE</td>
<td>C-OUTSIDE D-INSIDE</td>
<td>D</td>
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<tr>
<td>Patient's Feces (in colon resection)</td>
<td>D</td>
<td>D</td>
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<td>Patient's Blood</td>
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<td>Surgeons Blood</td>
<td>D</td>
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C = Clean
D = Dirty
Discontinuity in Category
my hands on your gallbladder, Mr. Smith.” “Okay sports fans, we’re going to have some action.” The first stage of the operation ends when the first incision has been completed and the organs are exposed. The joking abruptly ends just as the second stage of the operation is about to begin.

The second stage of the operation consists either of repair, implantation or the isolation and excision of the organ, and the anastomosis. (An anastomosis is the connection of two parts of the body which are not normally connected.) This stage contains the greatest amount of tension of the entire operation, and adherence to ritual is strictly enforced. It begins with the identification and isolation of structures surrounding the organ to be excised. The surgeon identifies vessels, nerves, ducts, and connective tissues, carefully pulling them aside, and preserving, clamping, severing, or tying them. The surgeon utters abrupt, abbreviated commands for instruments to be passed by the scrub nurse, structures to be cut by the assistant(s), basins and materials to be readied by the circulating nurse, and the operating table to be adjusted by the anaesthesiologist. These people respond to the surgeon’s commands quickly, quietly, and efficiently. A delayed, or an incorrect, response may be met with noticeable disapproval from the others.

During the second stage of the operation many of the classifications of sterility differ from those of the first stage. In a cholecystectomy (gallbladder removal), for example, the gallbladder is considered to be nonsterile before the operation begins. Yet during the first and second stages the gallbladder is considered to be sterile, before it is severed. Once it is severed, however, although it is considered to be clean, it transforms to nonsterile (see Figure 2). It is placed in a sterile container, but the container becomes contaminated by its contact with the nonsterile gallbladder (S c NS > NS). Because it is nonsterile after it has been removed, it can only be handled by a nonsterile person such as the circulating nurse. But, since the gallbladder is clean and must be examined, it must not be further contaminated from sources outside of the patient. To prevent further contamination, the circulating nurse wears a sterile glove over her nonsterile hand to examine the gallbladder and its contents. The gallbladder is not sterile, but it is not grossly contaminated. It is clean, but nonsterile. It is avoided by the sterile members of the team, yet only touched by the nonsterile members if they wear sterile gloves. The ritual surrounding its removal and examination is complex, and the removed organ is avoided by most members of the operating team because its classification is ambiguous.

Once the gallbladder has been removed, x-rays of its ducts (which remain inside the patient) are taken to determine if gallstones remain. A masked, gownned and lead-shielded radiologist enters the operating room with a large x-ray machine that is draped with green sterile sheets. The surgeon injects a radio-opaque dye into the ducts, and everyone, except the radiologist, leaves the room to avoid the invisible x-rays. When the x-rays have been taken, the radiologist and the machine exit, the staff enter, and the operation proceeds.

Although unexpected events may occur at any stage of the operation, they are more likely to occur at the second stage because this stage contains the greatest trauma to the patient’s body. If a sudden hemorrhage or a cardiac arrest occurs, the rituals segregating sterile from nonsterile may be held in abeyance, and new rituals designed to control the unanticipated event take over. If, for example, hemorrhaging occurs, all efforts are dedicated to locating and stopping the source of hemorrhage and replacing the blood that is lost. Even though immediate replacement of blood is required, rituals are enacted which delay the replacement, yet ensure accurate matching. The anaesthesiologist and the circulating nurse independently check, recheck, record and announce the blood type, the number and date of the blood bank supply and the operating room request. They
glue stickers onto the patient's record and onto the blood bank record. This complex ritual involves repetition, separation and matching records before the blood is transfused into the hemorrhaging patient.

If a patient's heart ceases beating, a prescribed ritual is enacted by a cardiac-arrest team, whose members enter the operating room with a mobile cart, and enact prescribed procedures to recussitate the patient. Considerations of preserving the separation of sterility and nonsterility (including most of the rituals previously described) are ignored while this emergency ritual is enacted.

Tension remains high throughout the second stage of the operation. There is virtually no joking or small talk. As the remaining internal structures are repaired and restored in place, some of the tension is lifted, and the routinization of rituals continues. The second stage of the operation ends when all the adjustments to the internal organs are finished and only the sutureing of the protective layers for the third stage remains.

The third stage of the operation begins with the final counting of the materials used in surgery. Both nurses engage in this ritual of counting. They simultaneously orally count all the remaining materials, including tools, needles, and sponges. The circulating nurse checks the oral count with her written tally of materials recorded at the beginning of the operation. When the circulating nurse has accounted for each item, she informs the surgeon that he may begin the closing.

The rituals enacted during this stage of the operation are similar to those enacted during the first stage. The surgeon, or his assistant(s), request specific needles and sutures from the nurses. They sew the patient closed, layer by layer, beginning with the inside layer. Although careful suturing is an essential part of the operation, this stage is enacted in a comparatively casual manner. There is considerably less tension than there was during the second stage, and greater toleration for deviations from the rituals. Questions about the procedures are acknowledged and answered. Minor mistakes may be overlooked. If the surgeon touched his nonsterile mask with his sterile glove during this part of the operation, he would be less likely to reglove and regown than he would if the same incident had occurred during the second stage.

The silence of the second stage is replaced in the third stage by considerable talking, including jokes and small talk. Most of the joking revolves around events which occurred during the second stage and references are made to actual or potential danger during this stage. "I thought he'd never stop bleeding." "You almost choperated [sic] his spleen by mistake." "Well, I hope he has good term life insurance." Much of the small talk revolves around future activities of the medical staff. The subject of small talk rarely relates to the patient. It may involve the next operation, lunch plans, or sports results.

When the closure has been completed, the surgeon signals to the anaesthesiologist to waken the patient. The staff members finish recording information, transport the patient to the recovery room, and prepare for the next case. The operation is finished.

**Discontinuity and Operating Room Rituals**

The observed rituals help to establish the operating room as a separate place, discontinuous from its surroundings. They also helped to establish and define categories of appropriate and inappropriate behavior. This includes indicating behavior categories and their limits.

The rituals in the operating room and the meaning of many of the words used there are exclusive to that setting. The observed rituals express beliefs and values which are exclusive to the operating room. The use of the words, "clean," "dirty," "contaminated" in the operating room do not correspond to their use elsewhere. This indicates the existence of discontinuity between the operating room and the
outside. Discontinuity between the operating room and the outside is also reflected in the restricted entrances, the specific costumes required for entrance, the special language used, the classification and segregation of objects into sterile and nonsterile, and the dispassionate emotional reactions to parts of the human body. A person can be prohibited from entering the operating room if he were not properly dressed, if he transgressed the rules for segregating sterile from nonsterile, and he did not behave in a dispassionate manner upon viewing or touching parts of the body.

The boundaries which separate the operating room from the outside contribute to a particular mental set for the participants, which enable them to participate in a dispassionate manner in activities they would ordinarily view with strong emotion. For example, in the operating room, they look dispassionately upon, and touch internal organs and their secretions, blood, pus, and feces. Outside of the operating room context, these same objects provoke emotions of embarrassment, fear, fascination and disgust in the same persons. Discontinuity was illustrated during a movie shown to the surgeons outside of the surgical area of the hospital. The film illustrated different techniques for draining and lancing pus-filled abscesses. The reactions observed for the surgeons watching this movie were unlike any reactions observed for the same surgeons while they drained abscesses in the operating room. They uttered comments and noises indicating their disgust. They looked away from the screen. Outside of the context of the operating room, with its rituals and its isolation, the same events are experienced differently. In the operating room a purulent lesion is mentally linked to the rituals that are enacted during the act of lancing. The image of the lesion is embedded in the entire operating room context, including the ritual prescriptions for managing that lesion and for organizing the behavior of others in the room. In contrast, outside of the operating room, the image of the lesion is embedded in images of everyday life. In that context, the reaction to the lesion is one of disgust. Outside of the operating room there are no rituals to diffuse their concentration. Moreover, sitting in a darkened room, watching a movie, the viewers are forced to focus on the picture of the lesion. The only opportunity they have to diffuse their focus is to look away, or to make noises indicating their disgust. The operating room, with its focus upon precise rituals, permits diffusion of emotions and encourages discontinuity from everyday life.

The different stages of an operation express discontinuity of mental sets. For example, blood, internal organs, feces, and skin are classified differently during different stages of the operation, and some are different outside of the operating room. Figure 2 illustrates the transformations of the categories, “clean” and “dirty” for parts of the body during different stages of the operation. For each of the parts of the body—the patient’s washed skin, gallbladder, colon, feces, blood, and the surgeon’s blood—the greatest transformations of dirty and clean categories occurs before the first stage of the operation (the incision), and between the second and third stage (the excision and closure). For example, the patient’s blood is considered to be dirty outside of the operating room, yet it is considered to be clean during the first and second stages of the operation. But during the third stage, blood is again classified as dirty. Similarly, the patient’s skin, after having been thoroughly cleaned with antiseptic, is considered extremely clean outside of the operating room. However, once the operation begins, the patient’s skin is classified as “dirty.” It remains dirty for the first and second stages of the operation. Once closure takes place, during the third stage, the patient’s skin is transformed again to “clean.”

Rituals exaggerate the discontinuity in the operating room and they proclaim definite categories. An instrument is either sterile or nonsterile; it is never almost sterile or mostly sterile. A person is either scrubbed, gowned, and gloved, and,
Rituals in the operating room are prescribed for four different kinds of situations: (1) passing through the three stages of surgery, (2) managing unanticipated events, such as cardiac arrest or sudden hemorrhaging, (3) separating sterile from nonsterile objects. In each of these situations there exists a potential confusion about the appropriate classification of events. There is danger that objects and events can be confused or indistinct or that there is danger of contact of forbidden categories: blood may not be properly matched; the wrong operative site may be selected; an instrument may remain in the patient's body; objects or events may not match or fit; or sterile objects may touch nonsterile ones. For those situations in which behavior categories are not clear, rituals clarify. In a recent textbook for operating room nurses, more than one hundred prescriptions for precise behavior are spelled out in which confusion existed about definitions of categories (Berry and Kohn 1972). At University Hospital, the head operating room nurse claimed that the rituals performed in the operating room "were introduced in response to actual mistakes, problems, conflicts that we had, when how to behave was not clearly spelled out." Rituals in the operating room not only indicate the categories which are potentially confusing, they also indicate the boundaries, or limits, for these categories. Through the use of rituals it is clear to all the participants when Stage One ends and Stage Two begins. It is clear to them which part of the surgeon's body is sterile (between the armpits and waist in front) and which part is not sterile (the remainder). Rituals, then, make salient, and even exaggerate, the boundaries of categories.

Rituals in the operating room have much in common with rituals in other contexts, sacred or secular. Rituals are enacted during periods of transition. In the operating room they are enacted during transitions of events or classifications of objects. Danger is perceived during these periods of transitions. Indeed, Van Gennup (1966) emphasizes the dangers which lie in transitional states because the classification of neither state is clear. When states are not clearly defined, ritual controls the danger. Similarly Douglas (1966) claims that pollution behavior takes place when categories are confused, or when accepted categories are not adhered to, as in anomaly.

Beyond the operating room, rituals also indicate categories and limits or boundaries for these categories. These include rituals which define passages—of time, seasons, stages of life, or passages through different lands—as well as rituals of pollution. Rituals proclaim that something is in one category and not in another. One is an adult, not a child. It is the rainy season, not the dry season. We are in the new land, not the old land. I belong to this kinship group now, not that group. Even the middle, liminal, stage of ritual, which Turner (1969) describes as a kind of limbo, has limits. Although the middle state is neither incorporated into the first stage, nor reintegrated into the last stage, its boundaries are clearly recognized and known to all the participants.

In all societies rituals take place when categories are not clearly defined and when limits of categories are not known. Gluckman (1962) suggests, for example, that primitive societies have more rituals than modern societies because different roles are enacted with the same people in primitive societies. This may be understood as exaggerating the boundaries or limits of each of their roles, precisely because they are unclear. Indeed, ritual is found in modern secular society in those situations in which boundaries are unclear, not only during changes of status, such as marriages and deaths, but also in situations such as entering or leaving a house, installing a political officer, and beginning a team sport.
The operating room observations suggest that through its elaborate, stylized behavioral prescriptions, and obsession with detail, ritual exaggerates the boundaries between categories. Rituals create boundaries because boundaries have been transgressed or are unclear. When boundaries are not precisely defined, confusion may result about which category is operative at a particular time or place. The actors do not know to which situation to respond. Knowing the limits or boundaries gives shape and definition to the categories. Ritual by defining categories and prescribing specific behavior within these categories, creates boundaries. Moreover, when the boundaries are known, autonomy to function can increase (Katz 1968).

**Autonomy and Ritual**

At first glance, it seems improbable that ritual, with its emphasis upon specific detailed prescriptions for behavior, may provide autonomy for its participants. To be sure, it is known that ritual exaggerates and often provides license for behavior which may be prohibited in everyday life (Gluckman 1962). Studies by Katz (1968, 1974, 1976) suggest that autonomy increases when the limits of the system are known and implemented. On this basis one will expect that ritual, by indicating and clarifying boundaries of behavior categories—such as sterile/nonsterile or child/adult—increase the autonomy of the participants. Conversely, when the rituals have not been fully carried out—when a person is not clearly within the prescribed limits—there will be very little autonomy.

For example, when the surgeon enters the operating room after he has scrubbed, but before he has gowned and gloved, he is helpless. He has virtually no autonomy. His scrubbed, clean hands are not clearly classified as sterile, nor as contaminated (although strictly speaking, they are nonsterile). He has to exercise extreme caution lest his hands touch anything. If he touches a sterile object, that object becomes contaminated. If he touches a contaminated object, his hands become further contaminated, and he is required to rescrub. He is so helpless that he can do almost nothing. His hands are raised in a helpless position. He depends upon a nurse to give him a towel and to provide him with a gown and gloves. He is not able to put the gown on himself, nor to tie his gown once it is on. Even when he is gowned, he has no autonomy to touch anything. He cannot pull the sleeve of the gown from his hands. The nurse has to put his gloves on his hands for him. His classification of sterility is confusing because, being half sterile and half nonsterile, he does not clearly fit in either category. His autonomy is severely restricted. The autonomy of others interacting with him is also reduced. Only after he has completely scrubbed, gowned, and gloved, and become unequivocally sterile, does he attain his autonomy. He can move about within the sterile field and touch all sterile objects.

In the operating room, boundaries of categories are likely to become confused if a person is present who does not know the appropriate rituals. When this occurs, autonomy decreases, both for the uninitiated person, and for others who interact with him. On one occasion during surgery in University Hospital, the circulating nurse requested a scrubbed medical student to remove a sterile needle from the nonsterile wrapping which she held in her hand. Although the student knew that the wrapping was nonsterile and the needle was sterile, and he was familiar with many rituals, he did not know the precise ritual required for removing the needle. The ritual required him to grasp the needle between his forefinger and thumb, quickly thrust his fingers upwards, and place the needle upon the sterile tray. The circulating nurse was required to pull downward on the wrapping, discard the wrapping in a contaminated bag, and record the addition of that needle. Neither person had autonomy to deviate from this behavior.

The student succeeded in contaminating his glove and the needle by touching both with the nonsterile wrapping. A great deal of autonomy was lost through his failure to follow the prescribed ritual. The student had to reglove and regown.
The circulating nurse had to aid him in regloving and regowning. The needle had to be discarded. Since the needle had contaminated the sterile green towel on the tray, the towel had to be replaced, the sterile contents of the tray removed from the contaminated towel and replaced on the sterile towel. In addition, the circulating nurse had mistakenly recorded the addition of that needle, and, near the end of the operation, it appeared that a needle was missing. All the people present searched for the needle, both inside and outside the patient. This activity delayed the completion of the operation until the circulating nurse realized the source of the mismatching. In this case, the autonomy of most of the staff was restricted because one person did not follow the ritual properly.

The surgical patient who is awake can reduce the autonomy of the operating team. The conscious patient has autonomy to express his fears and concerns about the operation. Most members of the medical staff in the operating room regard the waking patient as a hindrance to the smooth performance of preoperative rituals. The waking patient may restrict discussions which are necessary for planning the strategy of the operation. Rendering the patient unconscious deprives the patient of all autonomy, while increasing the autonomy of the staff. The staff gains the autonomy to ignore the patient's psyche, to consider only the parts of his body relevant to the operative procedure, to joke about the patient and his expressions of fear, and to discuss subjects that have nothing to do with the operation. Although the patient loses autonomy, the staff gains autonomy.

It is well known to most laymen that irreverent behavior in the form of jokes and small talk occur in the operating room. Jokes and small talk in the operating room represent autonomous behavior par excellence. They are autonomous because they are not a prescribed part of the operative procedure. They often express values which are antithetical to the serious and dangerous nature of the operation itself. Jokes differ from small talk in that jokes explicitly focus on events of surgery (whether real or imagined), whereas small talk revolves around events unrelated to surgery. Both jokes and small talk trivialize the solemnity, significance, discipline and danger that typically accompany surgery. Although the precise content of jokes and small talk in the operating room is unpredictable, their timing is. They are not expressed while transitions take place—when stages are crossed, transformations from sterile to nonsterile occur, or when mismatching or emergencies occur. During transitions danger is often perceived to be present. All attention becomes focused on the rituals which are enacted to restore the boundaries. Jokes and small talk are expressed during those periods in which categories—of stages, sterility, or matching—are clearly defined. They occur when ritual succeeds in restoring and bounding these categories, and activities are routinized. Once the boundaries have been restored by ritual, autonomy flourishes. When the rituals are enacted routinely, the boundaries are defined and autonomy increased.

Jokes and small talk do not occur during periods of transition, when danger is present, although they express concern about these periods. Jokes are not expressed during the times that autonomy is most severely restricted, such as during the transitions. Autonomous behavior of joking and small talk occur after the transitions pass, after the tension subsides, after the rituals have been enacted in their carefully prescribed manner.

Most of the jokes focus on events which occur during transitional or dangerous periods. Jokes about organs to be severed do not occur during the dangerous period while the organ is being severed. Jokes about the incision do not occur while the incision is being made. Jokes about the incision only occur before or after the incision is made. When jokes touched on dangerous or transitional situations, they did so only after rituals had clearly indicated that the situation was over. Only then did the surgical staff make irreverent jokes about the most dangerous and vulnerable aspects of the operation. They made jokes in the crudest terms about internal organs, external appearances, sexual organs, the
personality of the patient, or other members of the operating team. But they did not joke about the rituals themselves. The operating room staff treated the rituals with reverence and less questioning than other surgical activities.

Many anthropologists have tried to understand the simultaneous presence of both controlling and autonomous aspects of ritual. Van Gennep (1960), and later, Firth (1972:3) emphasized the controlling and regulating function of ritual. Munn (1969) describes how ritual myths function as social control mechanisms by regulating states and bodily feelings. Turner (1969) describes the presence of elaborate autonomous improvisation within highly structured ritual. Leach (1968:526) suggests that stylization in secular ritual may be either “ecstatic, representing the intensification of formal restraint, or ecstatic, signifying the elimination of restraint.” Gluckman (1970) describes license in ritual as reversals that express behavior outlawed in everyday life. Gluckman (1970:125) also recognizes that license is only permitted in ritual when the limits are known and agreed upon by the participants: “The acceptance of the established order as right and good, and even sacred, seems to allow unbridled license, very rituals of rebellion, for the order itself keeps this rebellion within bounds.”

The rituals in the operating room, as well as those described by Gluckman, Leach, and Turner, suggest that the boundaries of behavior are not open to questioning. They are firm. However, within those boundaries there is a great deal of autonomy. In the operating room, the rituals themselves, as signposts indicating boundaries, are not open to question, nor to ridicule. However, within the boundaries considerable autonomy exists. There is autonomy to joke about everything, except the rituals. There is autonomy to question details about the rituals (e.g., how long to scrub), but virtually no autonomy to question the ritual itself (e.g., whether scrubbing was necessary).

CONCLUSION

In modern operating rooms rituals, as stylized, arbitrary, repetitive and exaggerated forms of behavior, occur as integral parts of surgical procedures. Most of the rituals in the operating room symbolize separation of areas containing micro-organisms from areas free of micro-organisms, or separation of realms of cleanliness (sterility, asepsis) from realms of pollution (nonsterility, sepsis, contamination).

Most rituals considered by anthropologists, especially those in sacred settings, express and communicate values, and are linked to institutions of everyday life. Such rituals are amenable to serious questioning of their major premises. It is different, however, with rituals in the hospital operating room. That setting is discontinuous with everyday life, and rituals there have no continuity with values or categories of thought outside of the medical setting. Inspection and introspection of their premises are thereby discouraged or overlooked, but nonetheless neglected. It is through the examination of rituals in extraordinary settings, whether in traditional or modern contexts, that we can become aware of some of the functions of rituals that, heretofore, have largely gone unrecognized in the anthropological literature. The study of the hospital operating room suggests that ritual defines categories and clarifies boundaries between important states by exaggerating the differences between them, doing so precisely where the boundaries normally are not clear and well-defined. It is then that rituals are enacted in order to avoid the confusion that may result when it is uncertain which categories are operative at a particular time.

By imposing exaggerated definitions upon categories, rituals also serve to increase the autonomy of the participants by providing them with an unambiguous understanding of precisely which categories are operative at a certain time. Without the boundaries provided by rituals, participants do not know to which situation to respond. When the boundaries are known, autonomy is increased.
Extreme license in ritual is an expression of this. In the operating room irreverent joking, as an example, is only possible after the ritual has succeeded in establishing a boundary between indistinct states. Autonomy is limited, and reverence and awe prevail during transitional states of ritual, when boundaries are not yet firm. When indistinct categories are ritually separated and given sharp definition, ambiguity of behavior is lowered and autonomy enhanced.4

NOTES
1. Occasionally others, such as salesmen or filmmakers, are allowed in parts of the surgical area. I was allowed free access to all surgical areas at all times, which included scrubbing and standing next to the surgeons and patient during surgery.
2. University Hospital is a pseudonym for a hospital in North America affiliated with a medical school.
3. The stages are heuristic. I have not encountered surgeons nor surgery texts which describe three distinct stages.
4. For reprints of this article contact Pearl Katz, 2214 Ken Oak Road, Baltimore, MD 21209.

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