gradual hemodilution which is reflected in a decreasing radioactivity count and falling hematocrit.” They go on to say that “in some instances a different pattern was encountered” and this pattern was that of rapid hemodilution.

Furthermore, in an extensive experience in our laboratory with rapid, massive hemorrhage in rats (50 per cent of the total circulating volume), maximum hemodilution did not occur until 8-12 hours following the hemorrhages. We believe therefore that practically none of the available evidence supports the use of the hematocrit drawn shortly after a major bleeding episode as indicative of the magnitude of the blood loss. If this false premise is used as an indicator of blood volume restoration, the amount of the loss will be underestimated since maximum hemodilution will almost certainly not yet have occurred at the time of the determination.

The determination advocated by the authors, filling an important need and being simple, is attractive but we believe that any sense of security based upon such a variable indicator is not valid, and urge that any clinical use of the hematocrit measurement be made with full understanding of the usual physiologic sequelae of major bleeding episodes.

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Monitoring During Anesthesia

To the Editor.—The several points which Dr. Holaday makes in his recent letter to the Editor (Anesthesiology 22: 643, 1961) concerning “Monitoring During Anesthesia” are very well taken and deserve to be emphasized. While it may be true that “few anesthesiologists possess the skills necessary to define their needs” in terms of, for example, the frequency response of a given electronic amplifying system, we believe that any reasonably well-trained anesthesiologist should be discerning enough to be able to tell his engineer exactly what information he is interested in recording. And any reasonably well-educated engineer, after spending a few sessions in the operating room, would have no difficulty in knowing how to go about getting this information.

Perhaps an equally important problem centers around the fact that we are not exploiting to any significant degree those methods which have been proved in the laboratory and are available for clinical use. To sight a specific example: the ear oximeter. While this device may not provide individual determinations as accurate as a blood gas analysis, the information is continuously available and is accurate enough (+2.5 per cent) in the upper ranges. It is certainly far more accurate than the human eye can hope to be. It will provide valuable information and, in our experience, is quite reliable. (Recently, without any prompting on our part, our cardiac surgeon, in surveying the surgical mortality of mitral stenosis over a ten-year period, arrived at the conclusion that the improvement noted in the last few years was directly attributable to the more accurate information available with the ear oximeter during surgery.) One could easily point to other examples wherein known reliable methods of monitoring certain physiologic phenomena are not being commonly used to any significant degree.

In attempting to seek out reasons for this, I find that often a knowledgeable anesthesiologist will “poo-poo” the value of certain well defined physiologic determinations. One claimed that he could tell more about homeostasis by having the surgeon feel the aorta than with a direct arterial tracing. Still another claimed that all these “fancy” goings-on served only to detract the anesthesiologist’s attention from the patient. These anesthesiologists would look askance at any study in animals which did not contain accurately defined physiologic data, and yet are satisfied to discuss with great finality what happened to their patients and why, based upon a five-minute reading of indirect blood pressure, pulse and respiratory rate.

The argument is offered that these instruments are expensive. In this respect, perhaps
we ought to look about us and answer the question, "What have we done to make anesthesia safer for our patients in the past thirty-five years?" This has been a period during which we have introduced some very remarkable drugs—all very useful, very fast and very potent. True, we have trained more and better doctors to handle those drugs. But have we given them any better tools with which to work? Almost none! The anesthesia machines are prettier, the flow-meters, less troublesome, and the CO₂ absorbers collect CO₂ better. But the only monitor is still the same mercury (or air) manometer. The empty space in the cabinet could easily be taken up with some useful monitoring equipment, none of which is too complicated for anyone to operate.

It is time that we began to utilize physiologic monitors more commonly. In the final analysis, the more information we have about what is happening to our patients, the better will we be able to make intelligent decisions about what to do.

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Machines and Men

To the Editor.—Every so often an article appears pointing out how valuable this or that device is in the conduct of anesthesia or in monitoring the patient. Somewhat less often an article appears decrying the substitution of machines for clinical acumen. Thirty years ago, the British Journal of Anaesthesia published an editorial, "Machines and Men," and a letter to the editor which covered both sides of the argument quite well:

"The ever increasing tendency of machinery to preponderate in the affairs of mankind, which is probably the most noticeable feature of the modern world, is in no department of life more remarkable than it is in our specialty of anaesthetics. So much, indeed is this the fact, that one observer remarked that the anaesthetist of the future will not be a doctor clad in a sterile overall in the operating theatre, but an engineer in dungarees working outside it. Here, with a vast machine that records respirations and heartbeats, blood pressure and muscle tone and the rates of flow of liquids and gases and their pressures, he will sit with oilcan and spanner and regulate the wheels and cranks and cogs of his machinery, without eye or ear having direct cognizance of the patient who is being operated upon.

"This is, of course, but a fanciful sketch and yet it is not in some ways very far removed from present truth. And the question at once suggests itself, is it altogether for the patients' good that the anaesthetist should become more of a mechanic and less of a medical man? Is there, in fact, any danger that by this increased attention to the mechanical side of his art, he will lose something of the medical side, and that by knowing so much more of the machinery that he uses, he will know proportionately less of the man on whom and for whose benefit it is being used? We confess to a certain apprehension that there is some foundation for these fears. This apprehension arises from observation of the young anaesthetist of today as he matures. We notice and applaud his mechanical skill. We marvel at, and perhaps envy, his unrivalled assortment of tubes and taps and mechanical devices of various kinds, but we are, on the other hand, sometimes a little shocked at the comparative inadequacy of his clinical acumen and observation. It does not checr us to see him successfully carrying out a difficult and elaborate method of administration without realising that his patient has achieved a condition in which remedial measures are immediately necessary. We believe that it is still the patients' condition which should be the anaesthetist's first care, not the condition of his machinery.

"Nobody, of course, can question the benefits which improved machinery have brought to the administration of anaesthetics. It is only through advances on the mechanical side that the wide and efficient use of nitrous oxide and oxygen has become possible, that intratracheal insufflation has become an everyday practice and that continous level supplies of ether vapour can be given with ease. Have