(2) As above, but with system in operation.

(3) If the method is non-traumatic to the animal, the animal should presumably show no increase in fear/anxiety, or escape reactions, or higher plasma cortisol levels when the procedure is repeated. In this test, (1) above would be repeated to evaluate habituation, and (2) above, with the animal being resuscitated with minimal trauma. With this design, we may be able to "ask" the animal to tell how it felt during (2) above. Great care would have to be taken with recompression — in fact, this test may only be applicable to evaluating gas chamber euthanasia. The possibility that the animal is rendered amnesic should also be considered.

(4) Conditioned Reflex Test. A sophisticated procedure which will tell if the animal is still conscious, may have application in future studies. A cat or dog may be quickly conditioned via an auditory signal (a bell or tone) to anticipate receiving a mild electric shock. It may be trained to escape or raise one leg in order to avoid the shock (EKG-associated tachycardia may also be monitored). Since an unconscious animal would have no overt reaction to the bell or tone, a clear behavioral index of consciousness is available. This technique will not, however, be reliable when an animal is (a) attempting to escape from the chamber (prior "shaping"/habituation may be needed), (b) semiconscious, (c) conscious but in a state of muscular rigidity. EKG or auditory evoked potential changes (necessitating the implantation of electrodes in the auditory cortex) following the conditional signal (bell or tone) may help overcome such variables.

**SUMMARY**

Of the physical methods, the captive bolt pistol comes nearest to being a proven method of killing dogs and cats in a manner approaching the ideal of euthanasia. It has been rejected, often with little consideration, because the sight of blood disturbs some people more than other features associated with killing. From the animals' viewpoint, its use should be considered.

Decompression does not yet appear to have been adequately investigated with respect to its effects on dogs and cats for it to be considered as an acceptable form of euthanasia. It is an efficient means of killing large numbers of animals.

Electrocution is an effective method of killing. In view of the difficulty experienced in having long-known precautions utilized in the design and operation of equipment, the method is deservedly treated with the greatest circumspection.

Among drugs which can be administered by injection only one group is considered effective and humane. This is the barbiturates of which sodium pentobarbitone (pentobarbital sodium) is the example most widely used. Properly administered, it causes death in a way generally considered to be the ideal for euthanasia. Providing the proper administration, overcoming the relatively high cost and the difficulty of obtaining supplies are the chief obstacles preventing the wider employment of barbiturate euthanasia.

Of the gases and their various combinations, only carbon monoxide from exhaust fumes is in wide use for killing dogs. Carbon dioxide is being used on a small scale to kill cats and laboratory animals while carbon dioxide with chloroform is being used in a few places on dogs and cats in the U.S.A. Seven critical areas where knowledge needs to be deepened before a more definitive assessment of available and potential methods can be made have been isolated and recommended for research deserving priority attention. The projects are:

1. Decompression studies (page 9)
2. TB1 (page 21)
3. Comparison of certain gases (page 39)
4. Carbon monoxide production from charcoal furnaces (page 41)
5. Carbon monoxide generation from chemicals (page 41)
6. Hydrocyanic acid gas (page 41)
7. More refined behavioral tests to complement basic physiological measurements as well as to overcome some of the intrinsic limitations of such indices of pain, distress and consciousness (page 41)