

THE ARTS AND SCIENCES

Penology

CAPITAL PUNISHMENT BY LETHAL GAS

BY ANTHONY M. TURANO

THAT hanging was originally employed for the execution of criminals mostly because of its impressive terror is evidenced by the fact that in England executions were always public, and that the body was subsequently gibbeted as a part of the performance. It is doubtful whether the question of painlessness was ever considered under the earlier jurisprudence. But the retention of the gallows in modern times is large'y due to the knowledge that it does not, in fact, cause much pain. If a hanging is properly performed there seems to be no doubt that the release of the trap produces an almost instantaneous loss of consciousness, and a cessation of the heart beat within from seven to fifteen minutes.

Death does not result, technically, from strangulation, but from a fracture or dislocation of the cervical vertebrae that severs or wounds the spinal cord; although it is true that the result is also hastened by the noose itself, through its compression of the windpipe and its obstruction of the cerebral circulation.

Among the reasons that caused a number of American States to depart from execution by hanging is the fact that the preliminaries require rather skillful handling. If the drop is insufficient the fracture of the vertebrae will not take place; and unless the performance is repeated, death occurs by the much slower proc-

ess of strangulation. And it has happened lately in at least one case that a barbarous decapitation of the prisoner has been caused by too deep a drop for an unusually heavy body.

It is generally agreed that death by electrocution is more rapid than by hanging, but there is a division of opinion on the question of its painlessness. There is small doubt, however, that the first application of 1,700 or 1,800 volts brings about, by the end of the first ten seconds, a complete cessation of all the vital functions, including respiration and circulation. The current is then reduced to low voltage, and later again increased, as a measure of precaution, and to suppress the remaining reflexes. As in the case of hanging, a successful electrocution depends on expert operation. An imperfect application of the current may cause great pain, as is reported to have occurred in the case of Ruth Snyder. And the body may be burned at the places where the electrical contact is made.

When the Nevada Legislature decided, several years ago, to try capital punishment by lethal gas, it expected to remove, for humanitarian reasons, all of the objections that attend the other methods. It was to be a physically painless death in the absolute sense, and it was to exclude all possibility of bungling in technique. The main consideration was to save the condemned man the terrors of the ordeal, as well as some of the mental anguish of its anticipation. It was planned, therefore, that the sentencing court should fix the

time of execution indefinitely during a certain period of a week. The hour would be decided by the prison officials, without the knowledge of the prisoner. While he slept, he was to be dispatched painlessly and unconsciously, by means of a subtle and narcotic gas, without ceremony or punitive vengeance.

Unfortunately, the purpose of the law was completely defeated by the haphazard manner in which it was drawn. By failing to repeal all of the provisions of the earlier law, the Legislature left it the duty of the sentencing judge to fix a definite day of execution when cases are appealed, and the Supreme Court sustains the sentence. But the chief difficulty lies in the fact that the death penalty is directed to be inflicted by "lethal gas," without setting forth a precise formula, or the manner in which it is to be administered. The prison officials, left to their own devices, do the best they can under the limitations of the statute, but the inevitable result is a sharp contrast between the humane motives of the Legislature and the ritual whereby it is attempted to carry it out.

Seeking a gas that would be both quick and deadly, the Nevada prison authorities chose prussic acid, and the system whereby it has been administered in five executions involves the use of a concrete compartment, about ten feet square, with a low ceiling, wherein the prisoner is seated and strapped to a specially built chair. The cell is air-tight at the door and the observation windows. Suspended by strings are ten or twelve one-ounce pellets of sodium cyanide in solid form, and under them is a container filled with sulphuric acid. When the signal is given, the strings are severed, and the dropping of the pellets into the liquid immediately generates the deadly fumes, known as hydrocyanic gas.

The reactions of the prisoner appear in

detail from a report by Dr. Edward E. Hamer, the Nevada health officer, on the execution of Robert H. White on June 2, 1930. (The prisoner's last request, denied by the warden for sound reasons, was that he be given a gas mask!) At 4:36 A.M. he was strapped to the chair. A stethoscope was applied to his chest, and the elongated tube of the instrument was connected to ear-pieces outside the cell, where the doctor made his observations. The report says:

This was at 4:36 A.M. The heart action at that time was 108, strong and regular. The gas was started generating at 4:37½. At 4:38 the pulse rate was 120, regular and strong. A small inspiration was taken at 4:37¾, at which time the prisoner indicated that he smelled the gas. At 4:38 he took a very deep inspiration, turning his head toward the gas. He gave a spasmodic cough, his head fell forward, and he became unconscious. Following this first deep inspiration there was a complete stopping of the heart action for fifteen seconds. After that short period, or at 4:38½, the heart began to beat again in an irregular manner, continuing thus for fifteen seconds, when it became regular and strong. There was no apparent loss of power in the heart action. After this, for two minutes, the heart became slower, beating 100 times a minute at 4:41½ and 80 times a minute at 4:44. At 4:46½ the beats were distinctly regular but coming very weak. The last was noted at 4:47. Respirations during this time, after the first deep inspiration, were convulsive and irregular.

The record does not greatly differ from that in the case of John Hall, whose execution I witnessed on November 28 last; except that in the Hall case loss of consciousness apparently occurred some seconds later. Once the pellets fall into the liquid, there can be no bungling, and death is a certainty within from nine to fourteen minutes.

On the question of pain, there is considerable variance in medical opinion.

Some physicians hold that since the drug is a quick paralyzant of the respiratory organs, its effect must be painless. They hesitate to assert, however, that such a paralytic effect can possibly be as instantaneous as that produced by an electric current.

Others affirm, just as emphatically, that a great deal of pain must be involved, at least during the first minute, on account of the fact that death by suffocation is always very painful.

In the case of Hall, the heart action was recorded by Dr. Erwin J. Hund of Reno by means of an electrocardiograph. His findings are here given in part:

The heart action continued for more than a minute after its cessation was announced by stethoscopic observations. There was evidence of convulsions for as long as four minutes and twelve seconds after the first inhalation of gas. There was evidence of strangulation, indicating that this form of death is not painless, nor as rapid as is claimed. The time of possible pain is certainly much longer than in successful executions by hanging, the guillotine, or electrocution. The first two involve instantaneous severing of the spinal cord, and the latter a general paralysis of heart and nerves. Hydrocyanic acid gas acts, at first, primarily as a violent paralyzant of respiration only, with resulting strangulation.

I saw the prisoner tilt his head backward twice in violent convulsions during the first three or four inhalations. The neck muscles were taut, the eyes seemed to pop from their sockets, and there was an unmistakable struggle of the arms and body against the leather straps of the chair. The face remained upturned for fully thirty seconds during the second convulsion, while the features were horribly distorted.

It may be true that some of these reactions were unconscious and that they also accompany other forms of execution,

but the point is that they are obstreperous enough to dispel the popular notion that death by lethal gas, under the present formula and method, is an instantaneous or peaceful dropping to sleep.

In brief, it seems to be plain that the new method carries no humane advantage over a well-performed hanging, and much less over a competent electrocution. A certain amount of physical pain may be reasonably presumed, together with all of the mental torture that attends the ordeal, both in itself and by anticipation.

Yet it is probable that if the original intent of the Nevada Legislature were carried out by well-considered further legislation, the innovation might still result in perfect euthanasia. Whatever the number of minutes or seconds of pain that may be involved in all forms of execution, the mental elements are undoubtedly greater. There are many kinds of lethal gas that are well known to produce painless death by inducing preliminary sleep. The handiest of them, in fact, if not the least expensive, is to be found in the prison kitchen.

Probably the most painless viaticum, however, would be afforded by carbon monoxide, because it is odorless, and has the dual quality of narcotic and asphyxiant. The time of death could be fixed indefinitely, within a given week. At a time chosen by the warden, the prisoner could be given a simple opiate or soporific, and the gas could be administered while he slept in his cell. Thus he would be carried to Lethe in the arms of Morpheus without the mental anguish of the springing trap or of being bound to an electric or gas chair.

Such a demise would be not only merciful to the prisoner, but it would also save the prison officials a great deal of extremely objectionable labor.

Oceanography

TIDAL WAVES

BY CHARLES FITZHUGH TALMAN

WHEN an erratic upheaval of the ocean surface causes the inundation of a low-lying shore the event is popularly described as a tidal wave. This name is inappropriate for three reasons. First, an event of this character is not tidal in the sense of being related in any way to the normal and regular movements of the sea, under the gravitational effects of the moon and the sun, that are commonly classed as tides. Second, the invasion of water rarely takes the form of a single wave; it is usually a series of waves, or sometimes merely a rapid general rise of sea level. Third, the name tidal wave has long been applied in scientific literature to the slight bulge of ocean waters (not perceptible as a wave except where it forms a "bore" near the mouths of certain rivers) that, in sweeping around the globe, causes the ordinary high tide on seacoasts.

Thus it is an interesting example of the vicissitudes of language that the scientific world, after years of objection to the popular application of this term, has now so far accepted it that an international body of experts engaged in investigating the non-tidal phenomena above mentioned calls itself, in the official English versions of its publications, the Committee for the Study of Tidal Waves. In French it is called the Commission pour l'Étude des Raz de Marée; a title that does slightly—but only slightly—less violence to the literal meanings of words than does the English one.

This committee, which was created in 1927 by the International Geodetic and Geophysical Union, has its secretariat in

Paris and is composed of some thirty well-known oceanographers, meteorologists, seismologists and volcanologists of several nationalities, including four Americans. Its varied scientific complexion corresponds to the diverse character of the phenomena—pertaining to the sea, the atmosphere and the solid crust of the earth—with which it has to deal.

In the light of what we know today about tidal waves of non-tidal origin, these events may be divided into two broad classes. The first class comprises those in which the disturbance of the water is due to an abrupt dislocation of the ocean bed; the second, those in which it is due to a storm. If the initiating episode of the tidal wave is under the ocean it may consist of a volcanic outbreak or of a big landslide along the steep slope of a submarine gorge or valley, but most conspicuous tidal waves of submarine origin are probably due to the sudden rupture and faulting of the underlying rocks incident to a severe earthquake.

It frequently happens that the cause of a tidal wave is fairly obvious to casual observation, even though the mechanism involved may not be altogether clear to the layman. Thus an earthquake may ruin a coastal city, which is immediately afterward engulfed by great waves from the sea, and in such a case it is a natural inference that the waves were stirred up in some way by the quake. Again, as happened the other day at Santa Cruz del Sur, on the south coast of Cuba, the rising waters and terrific winds of a hurricane may perform their work of devastation at the same time, so that the connection between them is evident.

On the other hand, a good many tidal waves are wholly mysterious until traced