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"VOODOO" DEATH

By WALTER B. CANNON

IN RECORDS of anthropologists and others who have lived with primitive people in widely scattered parts of the world is the testimony that when subjected to spells or sorcery or the use of "black magic" men may be brought to death. Among the natives of South America and Africa, Australia, New Zealand, and the islands of the Pacific, as well as among the negroes of nearby Haiti, "voodoo" death has been reported by apparently competent observers. The phenomenon is so extraordinary and so foreign to the experience of civilized people that it seems incredible; certainly if it is authentic it deserves careful consideration. I propose to recite instances of this mode of death, to inquire whether reports of the phenomenon are trustworthy, and to examine a possible explanation of it if it should prove to be real.

First, with regard to South America. Apparently Soares de Souza (1587) was first to observe instances of death among the Tupinambás Indians, death induced by fright when men were condemned and sentenced by a so-called "medicine man." Likewise Varnhagen (1875) remarks that generally among Brazilian Indian tribes, the members, lacking knowledge, accept without question whatever is told them. Thus the chief or medicine man gains the reputation of exercising supernatural power. And by intimidation or by terrifying augury or prediction he may cause death from fear.

There is like testimony from Africa. Leonard (1906) has written an account of the Lower Niger and its tribes in which he declares:

> I have seen more than one hardened old Haussa soldier dying steadily and by inches because he believed himself to be bewitched; no nourishment or medicines that were given to him had the slightest effect either to check the mischief or to improve his condition in any way, and nothing was able to divert him from a fate which he considered inevitable. In the same way, and under very similar conditions, I have seen Kru-men and others die in spite of every effort that was made to save them, simply because they had made up their minds, not (as we thought at the time) to die, but that being in the clutch of malignant demons they were bound to die.

Another instance of death wrought by superstitious fear in an African

tribe is reported by Merolla in his voyage to the Congo in 1682 (cited by Pinkerton, 1814). A young negro on a journey lodged in a friend's house for the night. The friend had prepared for their breakfast a wild hen, a food strictly banned by a rule which must be inviolably observed by the immature. The young fellow demanded whether it was indeed a wild hen, and when the host answered "No," he ate of it heartily and proceeded on his way. A few years later, when the two met again, the old friend asked the younger man if he would eat a wild hen. He answered that he had been solemnly charged by a wizard not to eat that food. Thereupon the host began to laugh and asked him why he refused it now after having eaten it at his table before. On hearing this news the negro immediately began to tremble, so greatly was he possessed by fear, and in less than twenty-four hours was dead.

Also in New Zealand there are tales of death induced by ghostly power. In Brown's *New Zealand and Its Aborigines* (1845) there is an account of a Maori woman who, having eaten some fruit, was told that it had been taken from a tabooed place; she exclaimed that the sanctity of the chief had been profaned and that his spirit would kill her. This incident occurred in the afternoon; the next day about 12 o'clock she was dead. According to Tregear (1890) the *tapu* (taboo) among the Maoris of New Zealand is an awful weapon. "I have seen a strong young man die," he declares, "the same day he was tapued; the victims die under it as though their strength ran out as water." It appears that among these aborigines superstitions associated with their sacred chiefs are a true though purely imaginary barrier; transgression of that barrier entails the death of the transgressor whenever he becomes aware of what he has done. It is a fatal power of the imagination working through unmitigated terror.

Dr. S. M. Lambert of the Western Pacific Health Service of the Rockefeller Foundation wrote to me that on several occasions he had seen evidence of death from fear. In one case there was a startling recovery. At a Mission at Mona Mona in North Queensland were many native converts, but on the outskirts of the Mission was a group of non-converts including one Nebo, a famous witch doctor. The chief helper of the missionary was Rob, a native who had been converted. When Dr. Lambert arrived at the Mission he learned that Rob was in distress and that the missionary wanted him examined. Dr. Lambert made the examination, and found no fever, no complaint of pain, no symptoms or signs of disease. He was impressed, however, by the obvious indications that Rob was seriously ill and extremely weak. From the missionary he learned that Rob had had a bone pointed at him by Nebo and was convinced that in consequence he must

die. Thereupon Dr. Lambert and the missionary went for Nebo, threatened him sharply that his supply of food would be shut off if anything happened to Rob and that he and his people would be driven away from the Mission. At once Nebo agreed to go with them to see Rob. He leaned over Rob's bed and told the sick man that it was all a mistake, a mere joke—indeed, that he had not pointed a bone at him at all. The relief, Dr. Lambert testifies, was almost instaneous; that evening Rob was back at work, quite happy again, and in full possession of his physical strength.

A question which naturally arises is whether those who have testified to the reality of "voodoo" death have exercised good critical judgment. Although the sorcerer or medicine-man or chief may tacitly possess or may assume the ability to kill by bone-pointing or by another form of black magic, may he not preserve his reputation for supernatural power by the use of poison? Especially when death has been reported to have occurred after the taking of food may not the fatal result be due to action of poisonous substances not commonly known except to priests and wizards? Obviously, the possible use of poisons must be excluded before "voodoo" death can be accepted as an actual consequence of sorcery or witchcraft. Also it is essential to rule out instances of bold claims of supernatural power when in fact death resulted from natural causes; this precaution is particularly important because of the common belief among aborigines that illness is due to malevolence. I have endeavored to learn definitely whether poisoning and spurious claims can quite certainly be excluded from instances of death, attributed to magic power, by addressing enquiries to medically trained observers.

Dr. Lambert, already mentioned as a representative of the Rockefeller Foundation, wrote to me concerning the experience of Dr. P. S. Clarke with Kanakas working on the sugar plantations of North Queensland. One day a Kanaka came to his hospital and told him he would die in a few days because a spell had been put upon him and nothing could be done to counteract it. The man had been known by Dr. Clarke for some time. He was given a very thorough examination, including an examination of the stool and the urine. All was found normal, but as he lay in bed he gradually grew weaker. Dr. Clarke called upon the foreman of the Kanakas to come to the hospital to give the man assurance, but on reaching the foot of the bed, the foreman leaned over, looked at the patient, and then turned to Dr. Clarke saying, "Yes, doctor, close up him he die" (i.e., he is nearly dead). The next day, at 11 o'clock in the morning, he ceased to live. A postmortem examination revealed nothing that could in any way account for the fatal outcome.

Another observer with medical training, Dr. W. E. Roth (1897), who served for three years as government surgeon among the primitive people of north-central Queensland, has also given pertinent testimony. "So rooted sometimes is this belief on the part of the patient," Roth wrote, "that some enemy has 'pointed' the bone at him, that he will actually lie down to die, and succeed in the attempt, even at the expense of refusing food and succour within his reach: I have myself witnessed three or four such cases."

Dr. J. B. Cleland, Professor of Pathology at the University of Adelaide, has written to me that he has no doubt that from time to time the natives of the Australian bush do die as a result of a bone being pointed at them, and that such death may not be associated with any of the ordinary lethal injuries. In an article which included a section on death from malignant psychic influences, Dr. Cleland (1928) mentions a fine, robust tribesman in central Australia who was injured in the fleshy part of the thigh by a spear that had been enchanted. The man slowly pined away and died, without any surgical complication which could be detected. Dr. Cleland cites a number of physicians who have referred to the fatal effects of bone pointing and other terrifying acts. In his letter to me he wrote, "Poisoning is, I think, entirely ruled out in such cases among our Australian natives. There are very few poisonous plants available and I doubt whether it has ever entered the mind of the central Australian natives that such might be used on human beings."

Dr. Herbert Basedow (1925), in his book, *The Australian Aboriginal*, has presented a vivid picture of the first horrifying effect of bone pointing on the ignorant, superstitious and credulous natives, and the later more calm acceptance of their mortal fate:

> The man who discovers that he is being boned by any enemy is, indeed, a pitiable sight. He stands aghast, with his eyes staring at the treacherous pointer, and with his hands lifted as though to ward off the lethal medium, which he imagines is pouring into his body. His cheeks blanch and his eyes become glassy and the expression of his face becomes horribly distorted. . . . He attempts to shriek but usually the sound chokes in his throat, and all that one might see is froth at his mouth. His body begins to tremble and the muscles twist involuntarily. He sways backwards and falls to the ground, and after a short time appears to be in a swoon; but soon after he writhes as if in mortal agony, and, covering his face with his hands, begins to moan. After a while he becomes very composed and crawls to his wurley. From this time onwards he sickens and frets, refusing to eat and keeping aloof from the daily affairs of the tribe. Unless help is forthcoming in the shape of a counter-charm administered by the hands of the Nangarri, or medicine-man, his death is only a matter of a comparatively short time. If the coming of the medicine-man is opportune he might be saved.

The Nangarri, when persuaded to exercise his powers, goes through an elaborate ceremony and finally steps toward the awestricken relatives, holding in his fingers a small article—a stick, a bone, a pebble, or a talon—which, he avows, he has taken from the "boned" man and which was the cause of the affliction. And now, since it is removed, the victim has nothing to fear. The effect, Dr. Basedow declares, is astounding. The victim, until that moment far on the road to death, raises his head and gazes in wonderment at the object held by the medicine-man. He even lifts himself into a sitting position and calls for water to drink. The crisis is passed, and the recovery is speedy and complete. Without the Nangarri's intervention the boned fellow, according to Dr. Basedow, would certainly have fretted himself to death. The implicit faith which a native cherishes in the magical powers of his tribal magician is said to result in cures which exceed anything recorded by the faith-healing disciples of more cultured communities.

Perhaps the most complete account of the influence of the tribal taboo on the fate of a person subjected to its terrific potency has come from W. L. Warner, who worked among primitive aborigines in the Northern Territory of Australia. In order to provide a background for his testimony I quote from William James' *Principles of Psychology* (1905):

> A man's social me is the recognition which he gets from his mates. We are not only gregarious animals, liking to be in sight of our fellows, but we have an innate propensity to get ourselves noticed, and noticed favorably, by our kind. No more fiendish punishment could be devised, were such a thing physically possible, than that one should be turned loose in society and remain absolutely unnoticed by all the members thereof. If no one turned round when we entered, answered when we spoke, or minded what we did, but if every person we met "cut us dead," and acted as if we were non-existing things, a kind of rage and impotent despair would ere long well up in us, from which the cruellest bodily tortures would be a relief; for these would make us feel that, however bad might be our plight, we had not sunk to such a depth as to be unworthy of attention at all.

Now to return to the observations of Warner regarding the aborigines of northern Australia, creatures too ignorant, he assured me, to know about poisons. There are two definite movements of the social group, he declares, in the process by which black magic becomes effective on the victim of sorcery. In the first movement the community contracts; all people who stand in kinship relation with him withdraw their sustaining support. This means everyone he knows—all his fellows—completely change their attitudes towards him and place him in a new category. He is now viewed as one who is more nearly in the realm of the sacred and tabu than in the world of the ordinary where the community finds itself.

The organization of his social life has collapsed and, no longer a member of a group, he is alone and isolated. The doomed man is in a situation from which the only escape is by death. During the death illness which ensues, the group acts with all the outreachings and complexities of its organization and with countless stimuli to suggest death positively to the victim, who is in a highly suggestible state. In addition to the social pressure upon him the victim himself, as a rule, not only makes no effort to live and to stay a part of his group but actually, through the multiple suggestions which he receives, coöperates in the withdrawal from it. He becomes what the attitude of his fellow tribesmen wills him to be. Thus he assists in committing a kind of suicide.

Before death takes place, the second movement of the community occurs, which is a return to the victim in order to subject him to the fateful ritual of mourning. The purpose of the community now, as a social unit with its ceremonial leader, who is a person of very near kin to the victim, is at last to cut him off entirely from the ordinary world and ultimately to place him in his proper position in the scared totemic world of the dead. The victim, on his part, reciprocates this feeling.

The effect of the double movement in the society, first away from the victim and then back, with all the compulsive force of one of its most powerful rituals, is obviously drastic. Warner (1941) writes:

> An analogous situation in our society is hard to imagine. If all a man's near kin, his father, mother, brothers and sisters, wife, children, business associates, friends and all the other members of the society should suddenly withdraw themselves because of some dramatic circumstance, refusing to take any attitude but one of taboo and looking at the man as one already dead, and then after some little time perform over him a sacred ceremony which is believed with certainty to guide him out of the land of the living into that of the dead, the enormous suggestive power of this two-fold movement of the community, after it has had its attitudes crystallized, can be somewhat understood by ourselves.

The social environment as a support to morale is probably much more important and impressive among primitive people, because of their profound ignorance and insecurity in a haunted world, than among educated people living in civilized and well protected communities. Dr. S. D. Porteus, physician and psychologist, has studied savage life extensively in the Pacific islands and in Africa; he writes:

> Music and dance are primitive man's chief defenses against loneliness. By these he reminds himself that in his wilderness there are other minds seconding his own . . . in the dance he sees himself multiplied in his fellows, his action mirrored in theirs.

There are in his life very few other occasions in which he can take part in concerted action and find partners. . . . The native aboriginal is above all fear-ridden. Devils haunt to seize the unwary; their malevolent magic shadows his waking moments, he believes that medicine men know how to make themselves invisible so that they may cut out his kidney fat, then sew him up and rub his tongue with a magic stone to induce forgetfulness, and thereafter he is a living corpse, devoted to death. . . . So desperate is this fear that if a man imagines that he has been subjected to the bone pointing magic of the enemy he will straight away lie down and die.

Testimony similar to the foregoing, from Brazil, Africa, New Zealand and Australia, was found in reports from the Hawaiian Islands, British Guiana and Haiti. What attitude is justified in the presence of this accumulation of evidence? In a letter from Professor Lévi-Bruhl, the French ethnologist long interested in aboriginal tribes and their customs, he remarked that answers which he had received from inquiries could be summed up as follows. The ethnologists, basing their judgment on a large number of reports, quite independent of one another and gathered from groups in all parts of the world, admit that there are instances indicating that the belief that one has been subjected to sorcery, and in consequence is inevitably condemned to death, does actually result in death in the course of time. On the contrary, physiologists and physicians—men who have had no acquaintance with ethnological conditions—are inclined to consider the phenomenon as impossible and raise doubts regarding clear and definite testimony.

Before denying that "voodoo" death is within the realm of possibility, let us consider the general features of the specimen reports mentioned in foregoing paragraphs. First, there is the elemental fact that the phenomenon is characteristically noted among aborigines—among human beings so primitive, so superstitious, so ignorant that they are bewildered strangers in a hostile world. Instead of knowledge they have a fertile and unrestricted imagination which fills their environment with all manner of evil spirits capable of affecting their lives disastrously. As Dr. Porteus pointed out, only by engaging in communal activities are they able to develop sufficient *esprit de corps* to render themselves resistant to the mysterious and malicious influences which can vitiate their lives. Associated with these circumstances is the fixed assurance that because of certain conditions, such as being subject to bone pointing or other magic, or failing to observe sacred tribal regulations, death is sure to supervene. This is a belief so firmly held by all members of the tribe that the individual not only has that conviction himself but is obsessed by the knowledge that all his fellows likewise hold it. Thereby he becomes a pariah, wholly deprived of the confidence and

social support of the tribe. In his isolation the malicious spirits which he believes are all about him and capable of irresistibly and calamitously maltreating him, exert supremely their evil power. Amid this mysterious murk of grim and ominous fatality what has been called "the gravest known extremity of fear," that of an immediate threat of death, fills the terrified victim with powerless misery.

In his terror he refuses both food and drink, a fact which many observers have noted and which, as we shall see later, is highly significant for a possible understanding of the slow onset of weakness. The victim "pines away"; his strength runs out like water, to paraphrase words already quoted from one graphic account; and in the course of a day or two he succumbs.

The question which now arises is whether an ominous and persistent state of fear can end the life of a man. Fear, as is well known, is one of the most deeply rooted and dominant of the emotions. Often, only with difficulty can it be eradicated. Associated with it are profound physiological disturbances, widespread throughout the organism. There is evidence that some of these disturbances, if they are lasting, can work harmfully. In order to elucidate that evidence I must first indicate that great fear and great rage have similar effects in the body. Each of these powerful emotions is associated with ingrained instincts—the instinct to attack, if rage is present, the instinct to run away or escape, if fear is present. Throughout the long history of human beings and lower animals these two emotions and their related instincts have served effectively in the struggle for existence. When they are roused they bring into action an elemental division of the nervous system, the so-called sympathetic or sympathico-adrenal division, which exercises a control over internal organs, and also over the blood vessels. As a rule the sympathetic division acts to maintain a relatively constant state in the flowing blood and lymph, i.e., the "internal environment" of our living parts. It acts thus in strenuous muscular effort; for example, liberating sugar from the liver, accelerating the heart, contracting certain blood vessels, discharging adrenaline and dilating the bronchioles. All these changes render the animal more efficient in physical struggle, for they supply essential conditions for continuous action of laboring muscles. Since they occur in association with the strong emotions, rage and fear, they can reasonably be interpreted as preparatory for the intense struggle which the instincts to attack or to escape may involve. If these powerful emotions prevail, and the bodily forces are fully mobilized for action, and if this state of extreme perturbation continues in uncontrolled possession of the organism for a considerable period, without the occurrence of action, dire results may ensue (cf. Cannon, 1929).

When, under brief ether anesthesia, the cerebral cortex of a cat is quickly destroyed so that the animal no longer has the benefit of the organs of intelligence, there is a remarkable display of the activities of lower, primary centers of behavior, those of emotional expression. This decorticate condition is similar to that produced in man when consciousness is abolished by the use of nitrous oxide; he is then decorticated by chemical means. Commonly the emotional expression of joy is released (nitrous oxide is usually known as "laughing gas"), but it may be that of sorrow (it might as well be called "weeping gas"). Similarly, ether anesthesia, if light, may release the expression of rage. In the sham rage of the decorticate cat there is a supreme exhibition of intense emotional activity. The hairs stand on end, sweat exudes from the toe pads, the heart rate may rise from about 150 beats per minute to twice that number, the blood pressure is greatly elevated, and the concentration of sugar in the blood soars to five times the normal. This excessive activity of the sympathico-adrenal system rarely lasts, however, more than three or four hours. By that time, without any loss of blood or any other event to explain the outcome, the decorticate remnant of the animal, in which this acme of emotional display has prevailed, ceases to exist.

What is the cause of the demise? It is clear that the rapidly fatal result is due to a persistent excessive activity of the sympathico-adrenal system. One of my associates, Philip Bard (1928), noted that when the signs of emotional excitement failed to appear, the decorticate preparation might continue to survive for long periods; indeed, its existence might have to be ended by the experimenter. Further evidence was obtained by another of my associates, Norman E. Freeman (1933), who produced sham rage in animals from which the sympathetic nerves had been removed. In these circumstances the behavior was similar in all respects to the behavior described above, excepting the manifestations dependent upon sympathetic innervation. The remarkable fact appeared that animals deprived of their sympathetic nerves and exhibiting sham rage, so far as was possible, continued to exist for many hours without any sign of breakdown. Here were experiments highly pertinent to the present inquiry.

What effect on the organism is produced by a lasting and intense action of the sympathico-adrenal system? In observations by Bard, he found that a prominent and significant change which became manifest in animals displaying sham rage was a gradual fall of blood pressure towards the end of the display, from the high levels of the early stages to the low level seen in fatal wound shock. In Freeman's research he produced evidence that this fall of pressure was due to a reduction of the volume of circulating blood.

This is the condition which during World War I was found to be the reason for the low blood pressure observed in badly wounded men—the blood volume is reduced until it becomes insufficient for the maintenance of an adequate circulation (see Cannon, 1923). Thereupon deterioration occurs in the heart, and also in the nerve centers which hold the blood vessels in moderate contraction. A vicious circle is then established; the low blood pressure damages the very organs which are necessary for the maintenance of an adequate circulation, and as they are damaged they are less and less able to keep the blood circulating to an effective degree. In sham rage, as in wound shock, death can be explained as due to a failure of essential organs to receive a sufficient supply of blood or, specifically, a sufficient supply of oxygen, to maintain their functions.

The gradual reduction of blood volume in sham rage can be explained by the action of the sympathico-adrenal system in causing a persistent constriction of the small arterioles in certain parts of the body. If adrenaline, which constricts the blood vessels precisely as nerve impulses constrict them, is continuously injected at a rate which produces the vasoconstriction of strong emotional states, the blood volume is reduced to the degree seen in sham rage. Freeman, Freedman and Miller (1941) performed that experiment. They employed in some instances no more adrenaline than is secreted in response to reflex stimulation of the adrenal gland, and they found not only marked reduction of the blood plasma but also a concentration of blood corpuscles as shown by the precentage increase of hemoglobin. It should be remembered, however, that in addition to this circulating vasoconstrictor agent there are in the normal functioning of the sympathico-adrenal system the constrictor effects on blood vessels of nerve impulses and the cöoperation of another circulating chemical substance besides adrenaline, viz., sympathin. These three agents, working together in times of great emotional stress, might well produce the results which Freeman and his collaborators observed when they injected adrenaline alone. In the presence of the usual blood pressure, organs of primary importance, e.g., the heart and the brain are not subjected to constriction of their vessels, and therefore they are, continuously supplied with blood. But this advantage is secured at the deprivation of peripheral structures and especially the abdominal viscera. In these less essential parts, where constriction of the arterioles occurs, the capillaries are ill-supplied with oxygen. The very thin walls of capillaries are sensitive to oxygen want and when they do not receive an adequate supply they become more and more permeable to the fluid part of the blood. Thereupon the plasma escapes into the perivascular spaces. A similar condition occurs in the wound shock of human beings. The escape of the plasma from

the blood vessels leaves the red corpuscles more concentrated. During World War I we found that the concentration of corpuscles in skin areas might be increased as much as fifty per cent (cf. Cannon, Fraser and Hooper, 1917).

A condition well known as likely to be harmful to the wounded was a prolonged lack of food or water. Freeman, Morison and Sawyer (1933) found that loss of fluid from the body, resulting in a state of dehydration, excited the sympathico-adrenal system; thus again a vicious circle may be started, the low blood volume of the dehydrated condition being intensified by further loss through capillaries which have been made increasingly permeable.

The foregoing paragraphs have revealed how a persistent and profound emotional state may induce a disastrous fall of blood pressure, ending in death. Lack of food and drink would collaborate with the damaging emotional effects, to induce the fatal outcome. These are the conditions which, as we have seen, are prevalent in persons who have been reported as dying as a consequence of sorcery. They go without food or water as they, in their isolation, wait in fear for their impending death. In these circumstances they might well die from a true state of shock, in the surgical sense—a shock induced by prolonged and tense emotion.

It is pertinent to mention here that Wallace, a surgeon of large experience in World War I, testified (1919) to having seen cases of shock in which neither trauma nor any of the known accentuating factors of shock could account for the disastrous condition. Sometimes the wounds were so trivial that they could not be reasonably regarded as the cause of the shock state; sometimes the visible injuries were negligible. He cites two illustrative instances. One was a man who was buried by the explosion of a shell in a cellar; the other was blown up by a buried shell over which he had lighted a fire. In both the circumstances were favorable for terrifying experience. In both all the classic symptoms of shock were present. The condition lasted more than 48 hours, and treatment was of no avail. A *postmortem* examination did not reveal any gross injury. Another remarkable case which may be cited was studied by Freeman at the Massachusetts General Hospital. A woman of 43 years underwent a complete hysterectomy because of uterine bleeding. Although her emotional instability was recognized, she appeared to stand the operation well. Special precautions were taken, however, to avoid loss of blood, and in addition she was given fluid intravenously when the operation was completed. That night she was sweating, and refused to speak. The next morning her blood pressure had fallen to near the shock level, her heart rate was 150 beats per minute, her skin was cold and clammy and the measured blood flow through the vessels of her hand was very

slight. There was no bleeding to account for her desperate condition, which was diagnosed as shock brought on by fear. When one understands the utter strangeness, to an inexperienced layman, of a hospital and its elaborate surgical ritual, and the distressing invasion of the body with knives and metal retractors, the wonder is that not more patients exhibit signs of deep anxiety. In this instance a calm and reassuring attitude on the part of the surgeon resulted in a change of attitude in the patient, with recovery of a normal state. That the attitude of the patient is of significant importance for a favorable outcome of an operation is firmly believed by the well-known American surgeon, Dr. J. M. T. Finney, for many years Professor of Surgery at the Johns Hopkins Medical School. He (1934) has publicly testified, on the basis of serious experiences, that if any person came to him for a major operation, and expressed fear of the result, he invariably refused to operate. Some other surgeon must assume the risk!

Further evidence of the possibility of a fatal outcome from profound emotional strain was reported by Mira (1939) in recounting his experiences as a psychiatrist in the Spanish War of 1936–39. In patients who suffered from what he called "malignant anxiety", he observed signs of anguish and perplexity, accompanied by a permanently rapid pulse (more than 120 beats per minute, and a very rapid respiration (about three times the normal resting rate). These conditions indicated a perturbed state deeply involving the sympathico-adrenal complex. As predisposing conditions Mira mentioned "a previous lability of the sympathetic system" and "a severe mental shock experienced in conditions of physical exhaustion due to lack of food, fatigue, sleeplessness, etc." The lack of food appears to have attended lack of water, for the urine was concentrated and extremely acid. Towards the end the anguish still remained, but inactivity changed to restlessness. No focal symptoms were observed. In fatal cases death occurred in three or four days. *Postmortem* examination revealed brain hemorrhages in some cases, but, excepting an increased pressure, the cerebrospinal fluid showed a normal state. The combination of lack of food and water, anxiety, very rapid pulse and respiration, associated with a shocking experience having persistent effects, would fit well with fatal conditions reported from primitve tribes.

The suggestion which I offer, therefore, is that "voodoo death" may be real, and that it may be explained as due to shocking emotional stress—to obvious or repressed terror. A satisfactory hypothesis is one which allows observations to be made which may determine whether or not it is correct. Fortunately, tests of a relatively simple type can be used to learn whether the suggestion as to the nature of "voodoo death" is justifiable. The pulse towards the end would be rapid and "thready." The skin would be cool and

moist. A count of the red blood corpuscles, or even simpler, a determination by means of a hematocrit of the ratio of corpuscles to plasma in a small sample of blood from skin vessels would help to tell whether shock is present; for the "red count" would be high and the hematocrit also would reveal "hemoconcentration." The blood pressure would be low. The blood sugar would be increased, but the measure of it might be too difficult in the field. If in the future, however, any observer has opportunity to see an instance of "voodoo death," it is to be hoped that he will conduct the simpler tests before the victim's last gasp.

HARVARD MEDICAL SCHOOL
BOSTON, MASSACHUSETTS

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