the channel was almost drained of lava, a full 3 meters below the normal level, and then rose again. There were a few further heaves, and for a moment a crevice just above the flowing mouth gave a violent jet of gas and dust, but no good fountains succeeded the warnings, and the flow became very quiet.

From the behavior of the lava and the heaving at the *boca* it is possible to say that escaping gas, not hydrostatic lift, is the cause of the fountaining. The rising of the lava at a mouth is a very common phenomenon at Parícutin, though it does not often fountain. Usually the gas escapes from many crevices in the surface of the big bubble before the bubble actually breaks. The display of the 7 simultaneous fountains observed on the Taqui side in 1944 still seems to hold the record for number and duration. One fountain, the closest to the cone, remained active there for almost half an hour after the rest had stopped, even though it was one of the later ones to develop.

On the evening of the 20th it was noted that the center of activity of the *boca* had migrated up the slope, apparently to the formerly quiet upper level. Lava was flowing rapidly from that mouth and down a steep slope, which remained incandescent for 100 meters or more during the night. The profile of the flow changed from a terraced two-step arrangement to a single steeper lava rapids. The front advanced rather slowly, in the usual blocks of various sizes, none immense, and the lava seemed to be pooling behind, breaking forth more rapidly somewhere else after it had built up sufficient pressure. This is a familiar phenomenon at Parícutin.

The expedition was unexpectedly successful in achieving a double result. It was possible not only to make the obvious observations and note the changes since the last visit, which constituted the primary goal of the geologists, but also to make closer observations on the flow and the cone than had been thought possible. The lava fountain observed from such a close range was mere good fortune. No further fountaining was observed during the visit, and it would be difficult to choose so propitious a time again.

Experimental Research Into Psychosomatic Phenomena in Medicine[1]

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PSYCHOSOMATIC MEDICINE IS CONCERNED with bodily disorders related to problems of adjustment of the personality to adverse life situations. The term psychosomatic medicine is not satisfactory, but since it has already come into common usage the world over, there is little profit in continued controversy concerning its acceptance.

Observation of the relationship of disease to social adjustment has always been an essential part of good medical practice. Only in the relatively recent past, however, through the work of Pavlov (*4*), Cannon (*1*), and others (*9*), has it become evident that psychosomatic phenomona are amenable to the experimental approach. Opportunities to pursue experimental investigations of such phenomena have not, as yet, been widely exploited by physiologists, chemists, or clinical experimenters. It must be evident, however, that while in psychology, as in mathematics and physics, many developments have been intuitive or theoretical, the facts of psychosomatic medicine eventually must be gathered in conformity with the same biologic criteria which are applied to any pathologic process.

Recently attempts to explore psychosomatic phenomena have afforded important data in support of the rapidly growing realization that the tissues of the body have only a limited number of ways in which they can react to noxious stimulation. The intense interest in pathology during the latter part of the last century had led to the notion that specific agents cause lesions of specific character in the organs. In fact, diseases of unknown origin were often classified on the basis of differing appearance of lesions under the microscope. More recently, however, it has been established that tubercles may be produced by agents other than the tubercle bacillus, and that even Aschoff bodies in the myocardium, formerly regarded as specific to rheumatic fever, may follow a variety of noxious experiences (*6, 7*). The work of Selye (*8*) has

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added impetus to the gathering body of evidence against the old pathologic concept that specific agents give rise to pathognomonic tissue disturbances. His data support the concept that the organism is capable of reacting to noxious events with a limited number of patterns of defense involving one or more organs or organ systems (*10*).

Clinically, the concept of the "nonspecific" patterns of reaction gains support from study of the bodily changes incident to chronic exposure to arsenic. Manifestations of arsenic poisoning may include lachrymation and photophobia, turbinate swelling, rhinorrhea and nasal obstruction, dry mouth, headache, nausea and vomiting, diarrhea, joint pains and swelling polyneuritis, weakness, weight loss, hypotension, renal insufficiency with hypertension, anemia, pigmentation, keratosis, and even carcinoma of the skin (*3*). Most of these disturbances may be induced, not only by arsenic, but by other noxious agents, chemical, physical, or bacterial. Many have been described as part of psychosomatic reactions.

Already available data from recent experimental work concerning psychosomatic processes relate to headaches, nasorespiratory, cardiovascular, and gastrointestinal disturbances. Recent investigations of vasomotor rhinitis serve to illustrate the research methods which have been used and to exemplify what has been learned concerning physiological mechanisms and their modifiability (*2*). The nasal chambers of a large number of normal human subjects and individuals suffering from vasomotor rhinitis were examined directly with the aid of a nasal speculum. Roughly quantitative observations were made of the degree of swelling of the turbinates and septal membranes, their color, the amount of secretion, and the degree of obstruction to air passage. While the nasal structures were under observation, the individuals were exposed to one of a series of noxious experiences.

Muscosal hyperemia with swelling of the turbinates, hypersecretion, and obstruction followed exposure to cold, the inhalation of irritating dust, pollens, chemical fumes, and the application of painful stimuli to parts of the body remote from the nose—even as remote as the reminder to the patient that he is caught in the toils of an unhappy marriage. These nasal disturbances gave rise to discomfort with sneezing and even to pain which radiated along the zygomata and about the eyes in the distribution of "sinus headache." Individuals subject to frequent colds or to attacks of "vasomotor rhinitis" serious enough to cause complaint reacted to these various stimuli more than did "normal" individuals unaccustomed to nasal complaints. In many of the patients with vasomotor rhinitis, especially of the nonseasonal variety, it was possible to correlate most of their episodes of nasal disease with periods of considerable emotional conflict. To check further the relevance of the adverse life situation, these subjects were interviewed during periods of relative relaxation and security. At such times their nasal changes were minimal. Observations of the nasal structures were maintained throughout a suitable control period, and then the presumably sensitive topic was introduced abruptly into the conversation. Repeatedly it was possible thereby to induce experimentally hyperemia, swelling, hypersecretion, and obstruction with their usually accompanying symptoms of sneezing and feelings of fullness and pain.

Arterial tension has been raised with accompanying diminution in renal blood flow following diverse kinds of stimuli including exercise, breath holding, cold, and situations provocative of frustration and anger (*5*). Moreover, profound changes in form and function and cellular response of the mucous membranes of the stomach, colon, bladder, and vagina have been induced by similar noxious stimuli including symbolic ones (*11*). Psychosomatic medicine is concerned with the occurrence of such organic disturbances and structural lesions in response to threats to the security of the individual.

It was possible in some of the patients to modify this morbid chain of events, interrupting, for example, a nasal disturbance by sympathetic handling and intelligent application to the individual's problems. The chief methods have been to afford the patient (1) warm, sympathetic, and attentive support, (2) an opportunity to ventilate his feelings without fear of censure or reprisal, (3) suggestions for a reorientation of attitude, and (4) advice and help in making it possible for the patient to rearrange the actual life situation. The most satisfactory results occurred when it was possible to interrupt the habitual pattern of reaction and induce the individual to deal more constructively with his problems and conflicts.

It has become clear that mechanisms invoked by the human personality to deal with problems of adjustment to its environment may either underlie or modify any disease process. Thus, an understanding of psychobiology is indispensable to the preparation of any physician and should receive, in medical schools, an emphasis comparable to that now given to physiology and anatomy.

The study of psychosomatic phenomena is, however, more than a point of view. While it is desirable for any physician to take into account the peace of mind, aspirations and fears of his patients, profitable study and advance of knowledge will depend upon the acquisition of special techniques, training, and experience. To determine whether such studies lie within the category of medicine or psychiatry is no more important than to inquire whether the phenomena of

ionization lie within the field of chemistry or physics. The various categories of medical specialization were made for convenience and not for the purpose of limiting the horizon of medical development. Psychosomatic medicine is becoming not a medical specialty, but a discipline of human biology which will draw from its roots. wherever they may lie among man-made categories of interest. As such, and because of the variety and prevalence of its manifestations it should attract the attention of more and more serious and productive workers in chemistry and physiology as well as in clinical science.

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Obituary

George Grant MacCurdy
1863–1947

On November 15, 1947, the beloved founder of the American School of Prehistoric Research was killed by a passing car as he stepped from his own near Plainfield, New Jersey, to ask road directions. He and Mrs. MacCurdy were motoring south, where they intended to spend the winter.

Dr. MacCurdy was the son of a Georgia planter who moved to Warrensburg, Missouri. He attended the State Normal College at Warrensburg, but he was able to pay for his education only by numerous long interruptions in his studies during which he taught school. When he needed more money for tuition, he would set out on a horse or even on foot, his valise in his hand, to look for work. On his first job, in 1881, he was paid $22.50 a month. But he rose with astonishing speed to be a principal, and at 26 was a superintendent of schools.

In 1891, with the help of a scholarship, he found himself admitted to Harvard with advanced standing. He devoted himself at that time to geology and biology, though Professor Putnam, then director of the Peabody Museum at Harvard, almost persuaded him to take up anthropology. That decision was to come later. He took his A.B. in 1893 and his M.A. the following year. During the summer of 1894 he was the guest of Alexander Agassiz at his biological laboratory at Newport. This was followed by four years of study at Paris, Vienna, and Berlin and intensive foreign travel that included even Turkey and Russia. In 1896 Dr. MacCurdy attended the International Zoological Congress in Leyden, at which du Bois first exhibited the bones of *Pithecanthropus.* This so fired his imagination that he determined to devote himself exclusively to anthropology and prehistoric archaeology.

On his return from Europe, Dr. MacCurdy became associated with the Peabody Museum at Yale, where he received his Ph.D. in 1905 and where he remained until he became professor emeritus in 1931. Under his curatorship the collections of anthropology and prehistoric archaeology at the Museum grew enormously and were catalogued with scientific skill. He also continued to travel widely and to keep in close touch with scientific developments abroad.

From 1910 to 1912 he spent part of his time in New York cataloguing and arranging for exhibition the prehistoric collections from the Old World at the American Museum of Natural History. As a result of this, he was offered an appointment in the Department of Anthropology there, but, since he preferred to stay at Yale, he declined.

During his whole career Dr. MacCurdy was a prolific author, as the immense list of his published works indicates. It is safe to say that no other scholar outside the Old World has made so many notable contributions to the study of its prehistory. Though he was chiefly interested in the Old World, he also traveled widely in the New World and wrote authoritatively on American subjects.

Of Dr. MacCurdy's many books, the most celebrated is, of course, his *Human origins,* which appeared in