

soundness of this tenet: but only to right any misconception which may arise from the slightly ambiguous statement made by Mr. Keyes in which the writer's name is mentioned. To be explicit: Mr. Keyes says: "The present sharp meeting of mountain and plain is now explained by causes other than dislocation, through ordinary stream corrosion according to Paige."

The writer wishes to say that in the paper from which the idea above is drawn² the process under discussion was the formation of certain sloping planated rock surfaces which though likely to originate on the borders of enclosed desert basins do not in the process of their formation vitiate in any way the hypothesis of basin range structure. In fact, such surfaces may be used to prove (by their elevated positions) the very existence of such faults as are needed to establish the basin range structure. They are but an incident in a long series of changes of which basin range structure itself is but a minor part. After all there is nothing inherently antagonistic in processes of deflation, stream erosion or block faulting. All have operated and are operating to-day and any explanation of physiographic forms or account of physiographic history which would ignore any one of them is open to obvious criticism.

SIDNEY PAIGE

AN INVESTIGATION OF A "HAUNTED" HOUSE

Called by telephone a few days ago to examine a large and handsome house in the Back Bay district of Boston for the reason that it was acquiring an unfortunate and annoying reputation as being "haunted," the writer found a really serious state of affairs.

The trouble centered in the third and fourth stories, which were occupied by the children and servants—the slumbers of whom were disturbed by strange sensations. It was said to be a common occurrence for servants to awake in the night with a sensation of oppression, "as if some one were tapping upon me," or with a "creeping feeling going all over me with a feeling of being paralyzed." Sounds

²Rock-cut Surfaces in the Desert Ranges," *Journal of Geology*, Vol. 20, No. 5, 1912.

were also said to be heard, as if some one were walking about the house or overhead. These sensations often continued after the sleeper was thoroughly awake and even after the lights had been turned on. The children of the family, who also slept on the upper floors, were similarly affected. A little boy, for example, awoke one night and inquired of his nurse why she had been lying on him, and persisted for some time in his delusion. Another child rushed screaming into the nurse's room crying that a man was waking him up, and asking why she let the man frighten him so. The children appeared sluggish in the morning and pale, even cold water losing its power to enliven them.

These and other symptoms were well defined and often repeated, and had extended over the period of about two months during which the family had occupied the house as tenants. Upon inquiry it appeared that previous tenants had been troubled in the same way, matters having reached the point where the servants actually talked of seeing walking apparitions. The present occupant, although not entertaining any vitalistic theory of the phenomena, was fully alive to the reality and gravity of the situation, and anxious to find the underlying cause.

A comparatively simple and mechanistic solution of the problem soon appeared. It had been suspected that the trouble might have its origin in undetected leaks of illuminating gas, and the writer was called in to verify this theory. It developed, however, that the large amount of "furnace" gas escaping from a viciously defective hot-air furnace was quite sufficient to cause the trouble. In this furnace the separation between the fire box and the hot air ducts (upon which the hygienic integrity of the apparatus depends) was badly broken and as a result the inhabitants of the house were bathed in an atmosphere of diluted flue gases. To make matters worse, a small boiler for a steam-heating system had been placed within the fire box directly over the fire, the effect being to cool the top of the fire and so promote incomplete combustion.

In the light of these facts the sufferers' symptoms are readily explained. Flue gases contain, and especially when combustion is incomplete, considerable amounts of sulphurous oxide and carbon monoxide, both distinctly poisonous gases. Furnace gas was common in this house and often very strong—so that the eyes watered and an appreciable effect could be felt in the throat, symptoms at once suggestive of sulphur. The rapid tarnishing of all silver objects was a further indication of the presence of this substance. For the most serious symptoms, however, the responsibility must be thrown on carbon monoxide. The poisonous nature of this gas is too well known to require comment, and sensations of oppression and other mental disturbance are typical of the more acute poisonings, while anæmia, malnutrition, loss of psychic powers and diminished vigor are characteristic of the chronic condition. That the trouble was most aggravated on cold nights—when windows were closed and ventilation poorest, and at the top of the house, is consistent with the furnace explanation. It seems probable that the belief in walking spirits was nourished by real noises coming from an adjoining house. Any such noises would, of course, be likely to be exaggerated in the minds of persons awakened in the night while suffering from carbon monoxide poisoning.

The hygienic lessons are patent. Here is a clear case of thoroughly serious poisoning which might have had at any time a fatal result, and all due to a defective hot-air furnace. This apparatus, often praised for its ventilating effect and probably with justice when in sound condition and properly operated, may evidently become a distinct menace to health. And may not there be similar cases of a milder order, such as escape detection while still causing slight poisoning? Emphasis is also thrown on to the entire question of the possible dangers from flue gases. Brick sewers have been found to be sometimes permeable to illuminating gas; may not these poisonous flue gases sometimes escape into houses through porous or leaky chimneys?

Slight leaks of illuminating gas have often been suggested as a cause of headaches and anæmias of obscure origin; perhaps we should look to leaky furnaces and flue gases for similar effects.

This case should also be of interest to experimental psychologists and investigators of psychic and spiritualistic manifestations, since the reputation which this house was gaining as being haunted apparently arose in large measure from genuine sensations of apparitions and the like, induced by the breathing during sleep of a tainted atmosphere.

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SCIENTIFIC BOOKS

Das Erdöl. Seine Physik, Chemie, Geologie, Technologie, Und sein Wirthschaftsbetrieb. In fünf Banden. Herausgegeben von C. ENGLER und H. v. HOEFER. Leipzig, verlag von S. Hirzel. 1912.

With the vanishing supply of natural gas, and the diminishing output of the world's stock of light petroleum, this work appears at an opportune moment. The first volume edited by Dr. Engler under the title "*Die Chemie und Physik des Erdöls*," and just issued, contains 855 pages with full index, and 18 large plates, the latter giving complete analyses and optical activity of petroleum from the principal fields.

The scope of this work and its comprehensive magnitude as indicated by its title and fully substantiated by the first volume, promises the most thorough and complete compilation on petroleum and its products that has ever appeared. It is fortunate that its preparation was undertaken by two such well-known workers in this field. The name of Dr. Engler especially is familiar to every one who is interested in petroleum.

Since the comprehensive report on petroleum by Peckham, to the United States Geological Survey,¹ the great accumulation of lit-

¹Report on the Production, Technology and Uses of Petroleum and its Products, Government Printing Office, 1885.