

plained through a study of the reactions of the forces of gravity, magmatic intrusion, and atomic activity.

The prolonged sequence of intrusions of the surface by magmatic bubbles is regarded as the source of the crust. The process is not finished or ever can be, since radioactive disintegration continues to heat the core. We may infer that the thinning mantle will ultimately disappear and the planet will become a star.

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The soft Pliocene formations in the Ventura district are particularly susceptible to landsliding. Resultant movement has presented difficult and expensive problems in connection with the development of oil-producing properties. Extensive work has been undertaken by the Tide Water Associated Oil Company in an effort to stop existing slides and to prevent the development of new slides in the Ventura Avenue oil field.

The landslides in this field are of two types, bedding-plane slides and circular-type slides. Bedding-plane slides move along parallel bedding planes in areas where the dip of the formation exceeds 15° and is in the same direction as the surface slope. Circular-type slides are independent of the stratification of the formation. They occur in stratified material which is not dipping in the same direction as the surface slope, and in unstratified material such as old slides where the bedding has been destroyed.

The two principal causes of landsliding are the presence of water in the formation and the disturbance of equilibrium. Water is probably the most important cause for it lowers the coefficient of friction within the slide itself and along existing slide planes, reduces the shear and tensile strength of the formation, increases the weight of the landslide mass, and creates a lifting force due to hydrostatic pressure in the lower part of the slide. The state of equilibrium may be disturbed by a redistribution of weight by either natural or artificial means.

Three basic methods of landslide control are practiced in the Ventura Avenue field. They are the removal of water from the slide, the elimination of the source of the water, and the redistribution of the load. Water is removed by nearly horizontal "Hydrauger" holes, vertical water-well shafts, drain tiles, and tunnels. Elimination of the source of the water is accomplished by dressing and oiling the surface to facilitate rain-water run-off, and by preventing waste water, drilling mud, et cetera, from seeping into the formation. Redistribution of the load consists in removing earth from the head of the slide and compacting this material at the toe.

It is perhaps too early to judge the full effect of the corrective measures employed. However, results of observation in the past 3 years indicate that the measures taken have been highly successful.

FINAL REPORT OF COMMITTEE ON METHOD OF ELECTION OF OFFICERS¹

The committee on method of election of officers, a special committee appointed in 1944 to consider possible methods of electing Association officers by the use of a mailed ballot, and reappointed in 1945 to study the results of a questionnaire on the same subject, has completed its study of methods of election, reviewed the results of the questionnaire, and reports the following conclusions.

1. A majority of Association members, answering the questionnaire, wish to change to

¹ John G. Bartram, chairman; Ronald K. DeFord, W. Dow Hamm, John Smith Ivy, Hugh D. Miser, Clarence L. Moody, and Earl B. Noble. Submitted to M. G. Cheney, chairman of the executive committee, October 27, 1945.