the same reasons, and also because the macula has no capillaries.

In other words, the movements are not ocular in origin, unless in a last analysis they are due to a shifting of the functional activity from one set of macular cones to another. The direction of the movements with a single eye seems to forbid this supposition, and one is driven to think of them as caused by the mechanism or physiology of the sensation-making centers in the cuneus of the occipital lobe—the cerebral center for vision. The fact suggests several not uninteresting queries as to the psychology and physiology of sensation.

The practical bearings of the phenomenon are of far greater importance and interest, and may be vaguely indicated as follows: There is no doubt, of course, as to the fact of the subjective production of images, ghosts, wraiths, telepathic visions, animals, snakes, etc., in delirium tremens, in clairvoyant states, in hypnotic conditions, in pathologic conditions of the mind and body and even in some people in health, when the mind is in a state of heightened sensibility, etc. It will be remembered that the vast majority of these subjective sensations occur in the night, in dim light, etc. If they occur with the eyes closed, that does not change the essential psychologic law of the apparent action and movement of the image, which must be conditioned upon the physiology or mechanics of visualization. The apparent movements of the images will obey the same laws of seeing, shifting as those of the distant light in the night. The facts of crystal-gazing, apart from the mere subjective creation of the images (about which, I take it, there is no doubt in the minds of students) and especially of the movements of these images, may receive a psychologic explanation, at least some light and rationality, from the analogy of the movements of the light I have described.

GEO. M. GOULD.

PHILADELPHIA,
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SHORTER ARTICLES.

BACTERIAL SPOT, A NEW DISEASE OF CARNATIONS.

WE have recently received for examination from Pennsylvania and the District of Columbia a number of carnation plants suffering from a spot disease of the leaves and stems that appears to be quite distinct from anything hitherto described. In its earlier stages the disease looks something like stigmonose, or puncture disease, but the small spots are usually surrounded by a narrow, water-soaked area or ring, while the center of the spot is usually slightly brown. As the spots grow larger they resemble more the ordinary carnation spot caused by *Septoria dianthi*. The water-soaked marginal area, however, makes it easy to distinguish from this latter disease. The spots increase in size more rapidly in soft-leaved varieties and soon collapse and dry, leaving a brown, sunken area. Badly diseased leaves soon wither. Microscopical examination shows that the spots in all stages are filled with bacteria, which, in the early and middle stages of the disease, are usually in pure cultures. These bacteria grow rapidly in beef broth and nutrient agar (acidity plus 15 of Fuller's scale) and on ten per cent. nutrient gelatine of the same acidity, but where malic acid is added to the nutrient gelatine at the rate of one half gram per one hundred cubic centimeters, the growth is extremely slow. The germ also grows well upon steamed potato. The colonies are round and unbranched, pearly white, wet and shining, and do not spread rapidly over the culture medium. After a few days the central portions of the colonies break up into zoogloœa. The complete cultural characters for various media have not yet been determined, but are now being investigated. It is evident that the organism causing this disease is quite distinct from the orange-colored one, *Bacterium dianthi*, described by Arthur and Bolley as the cause of '*Bacteriosis*' of carnations. Inoculation experiments have been made, both from a maceration of young diseased spots in distilled water and from pure cultures in beef bouillon. Bacteria from both sources, when applied to the surface of leaves, old or young,

where there was the slightest abrasion of the epidermis, produced by a fine needle, gave characteristic spots filled with bacteria in from forty-eight to seventy-two hours. Characteristic spots have also been secured by simply brushing the bacteria on the uninjured leaves. Under natural conditions the bacteria appear to gain entrance to the leaves and stems from the slight injuries produced by the red spider and by other causes. Slugs have been observed eating diseased spots, and infection from slug bites was observed. It is also evident that the organism has other ways of gaining entrance to the tissues, possibly through the stomata. We have found the disease so far on the varieties Mrs. McKinley, Mrs. Nelson, Lawson, and Crane, and it will doubtless be found on numerous other varieties. In some cases observed nearly every leaf and many of the stems were so badly spotted that it would be practically impossible to save the plants. When the disease has not progressed so far, however, it can be checked by thoroughly cleaning the plants of all diseased leaves and stems and burning what is removed. Then syringe the plants with a solution of commercial formaldehyde, one part to five hundred parts of water. This should be done in the forenoon so that the plants may dry before night. Syringe occasionally with water under pressure to keep down the red spider. Give the plants as much light and air as possible and keep the foliage as dry as practicable. Give the plants a second thorough cleaning after the new growth is well started and follow with a second light syringing with formaldehyde solution. It is probable that these recommendations may be modified after further investigation, but the procedure outlined is the best we can suggest at the present time.

A careful study of the disease and the organism causing it will be completed as soon as possible. Messrs. Lloyd Tenny and J. B. Rorer, assistants in pathology, are actively aiding in the investigation.

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THE FRONTIER OF PHYSIOGRAPHY.

The term physiography, as generally applied in geological studies, has become associated with and is inclusive of glacial geology; and from the character of the formations studied is sometimes referred to as superficial or surficial geology. The alternative use of the latter terms calls attention, also, to the fact that the field of its inquiries has not been generally regarded as extending deep into the earth's crust. As time has gone on the work of physiography has, in fact, been more and more sharply differentiated from that upon the consolidated portion of the lithosphere; and geologists of a special class have arisen known as physiographers, glacialists or surficial geologists—which, while not by any means equivalent terms, are yet regarded as all properly referring to men trained in a special way.

The features of the land areas are by this school of geologists interpreted to be largely fashioned under the action of water or ice, or both; in the case of the first of the agencies mentioned, according as the action has been affected by epeirogenic movements. The origin of earth sculpture has been, therefore, largely referred to the changes brought about by successive geographic cycles, during which elevation and tilting of the crust follow upon a period of subsidence. In a subordinate degree the relative hardness of the underlying rocks is brought into account by the modern school. As a result of this type of specialization or special generalization stress has been laid upon the *general* contours which are characteristic of a district or province, and with remarkable readiness and accuracy the stage of a geographic cycle through which a province is passing, and many of the earlier events of the cycle as well, are determined.

The unconsolidated deposits in glaciated regions have been further studied with minuteness as regards their form and extent as well as their composition, and an elaborate classification of them has been adopted. To the consolidated or 'hard' rocks this study has not, however, been extended; and, beyond the fixing of what may be termed erosional ear marks to determine the agent and the stage