terest to the mineralogist and botanist. The Chester County Natural Historical Society, Dr. E. T. Wherry, of the University of Pennsylvania, and Dr. E. M. Gress, state botanist of Pennsylvania, were largely responsible for the successful planning and conducting of the meeting and field trips.

THE fourth annual fall Field Camp of the department of geology and geography of Syracuse University was held in the vicinity of Catskill, New York, from September 12 to 17, under the direction of Dr. George B. Cressey, chairman of the department. Headquarters were at the Kiskatom, a country hotel near Palenville.

THE first meeting of the London Scientific Film Society was held on September 20. The society plans to give a series of shows of scientific films to its members and their guests during the coming season. Professor Sir Frederick Gowland Hopkins, Sir William Bragg, Professor L. Hogben and Professor Julian Huxley are patrons of the society, which has about a hundred and fifty members.

GEORGE A. HORMEL AND COMPANY, of Austin, Minn., has made an annual grant of $25,000 to the University of Minnesota to establish the Hormel Research Foundation for the promotion of researches in the field of food technology. Most of the research will be devoted to problems of importance to the packing industry. The work will be conducted by a committee consisting of Professors George O. Burr, R. A. Gortner, H. O. Halvorson, Walter M. Lauer and Samuel C. Lind, chairman. The post-doctor of philosophy fellows who will take part in the research in 1938–39 are: Claude H. Hills (biochemistry); J. P. Kass (biochemistry); Lewis S. Keyser (organic chemistry) and Floyd C. Olson (industrial bacteriology).

UNDER the terms of the will of the late Miss Grace M. Edwards, of Boston, the president and fellows of Harvard College will receive $25,000 for the benefit of the Arnold Arboretum.

FREE illustrated lectures at the New York Botanical Garden have been announced for three o'clock on Saturday afternoons as follows: October 1, Rock Garden Construction, A. C. Pfander, assistant superintendent; October 8, Humoring the Garden Soil, T. H. Everett, horticulturist; October 15, Botanists and Human Progress, J. H. Barnhart, bibliographer; October 22, Winter in Oaxaca, W. H. Camp, assistant curator; October 29, Garden Work with Shrubs, P. M. Koster, nurseryman; November 5, Some Important Drug Plants, Professor Wm. J. Bonisteel, Fordham University; November 12, Alpine Flowers of Central Greece, Professor Clarence H. Young, Columbia University, and Mrs. Young; November 19, Origin and Improvement of Plants, A. B. Stout, curator of education and laboratories; November 26, The Romance of Plant Names, H. A. Gleason, head curator and assistant director.

AN Associated Press dispatch dated from Berlin on October 4 reads: "German medical journals no longer may accept articles by Jewish doctors, the Nazi Commissioner for Medical Journalism ordered. The order added that 'our German doctors will subscribe to foreign journals only if they are published by Aryan publishers and edited by Aryan doctors.'"

DISCUSSION

AN INSTANCE OF PROGRESSIVE INDIVIDUATION IN VISUAL FUNCTIONS

THIS is simply an anecdote. It is utterly lacking in scientific control, but, like all such incidents, it had to be "caught on the fly" and taken for what it is worth. At least it serves to illustrate what I mean by individuation in the sensory field.

The incident which I am about to relate concerns my dog, Ponto. In breeding he is three fourths German police and one fourth Scotch collie. I procured him when he was ten weeks old, and till this incident kept him tied most of the time. Occasionally when I was going about the premises I turned him loose, and particularly I did so each morning when I went for my mail at the rural delivery box. This is south of the main entrance to my laboratory. These daily trips were occasions of great joy to Ponto, as he showed by leaping upon me, and especially by taking the lower end of my cane in his mouth and playing with it, then dropping it only to catch it up again. He obviously regarded my cane and myself as friendly creatures.

This went on for about four weeks, when Ponto had a new and strange experience with me and my cane. Instead of going out of the south door of my laboratory I went out of the west door. Ponto, being free, met me instantly and took the tip of my cane in his mouth as usual. He played about my feet as I walked along till we passed the servants' quarters to the northwest and entered the poultry yard beyond, the poultry yard being so situated as not to be visible from the west door of my laboratory on account of the servants' quarters. When we entered the poultry yard Ponto set upon the hens and gave them a merry chase. To chastise him I reprimanded him loudly and threw my cane at him. He fled precipitately and ran out of danger back to the laboratory.

The next morning Ponto met me as usual at the

front door for the excursion to the mail box. He made the customary salutation and played with my cane as I walked along. There was nothing in his behavior to indicate that he remembered the incident of the day before in the poultry yard or regarded either myself or my cane as a menace. But later the same day I went out of the west door of my laboratory again on my way to the poultry yard. Ponto met me at the door and, taking the tip of my cane in his mouth, played along happily till we passed the servants' quarters and came in view of the poultry yard. At that moment he stopped and seemed to survey the situation. His ears and tail drooped disconsolately, and, turning about, he went sorrowfully back to the laboratory. These reactions were repeated for several days following.

Now, the poultry yard had done nothing to chastise Ponto. It was myself and my cane that had functioned in that capacity. According to the theory of association the dog would be expected to associate (synthesize) the chastisement with me and my cane, the moving objects which overtly effected the reprimand. But, obviously, my cane and I held no menace for him so long as we were alone in his field of vision. As soon, however, as we made a common visual pattern with the poultry yard he recognized a menacing situation. It was the total pattern that acted as the stimulus. And this did not require an act of synthesis by Ponto. The totality (oneness) was primary, and in the primary total visual pattern none of the elements had acquired a sufficient degree of individuality of their own for the dog to recognize them as such in the composition of the field and to attach to them their true significance. In other words, Ponto could not individuate my cane, myself and the poultry yard.

But Ponto's behavior when he was six months old suggested that he had made progress in powers of visual individuation. He would then seat himself before me while I stood quietly, and would gaze into my eyes intently and inquiringly as if he expected something to come out of them. He had obviously noticed that my eyes were a part of me, and a very special part, for after we had looked each other straight in the eyes for a while, and without either of us making any other movement, he would playfully leap at my face. This leap was so sudden and close that I had to dodge to escape it.

Possibly I owe psychologists an apology for this trespass upon their field, particularly those who give little consideration to neurology or have no sympathy for Gestalt psychology. Kuo,[1] for instance, has criticized my "uncritical acceptance of the 'gestalttheorie.'" This does not seem to me quite justified, for I had not thought of accepting any theory of psychology. In fact I have not studied the theory of Gestalt in its broader implications. But I am in agreement with the theory in the interpretation of the relation of the part to the whole in organismic behavior. And in so far as I have advocated the theory I have been impelled by facts of structural and functional growth of the nervous system and the organism. In both structural and functional development I see the antagonistic processes of integration and individuation; the one tending to maintain the integrity of the organism, the other tending to dismember it. Normal development requires the whole to dominate the parts. If this is in accord with the *"gestalttheorie,"* as I think it is, all well and good, but beyond this I have no personal interest in the theory.

Within normal limits individuation makes for greater efficiency of living, both motor and sensory. In the visual functions I consider it as the biological process which makes possible a figure on a ground. Genetically, we see, first, totalities (wholes); later we "regard" parts of the totalities. It is possible that Ponto in his younger days saw my cane as a part of myself, for he was constantly trying to lick my hands, though I avoided this caress as much as possible and reproved him for it. Taking the tip of my cane in his mouth may have given him a similar satisfaction, and he could do this with impunity. Only later, I think, was he able to "regard" my cane as such; for this would be possible only through the process of individuation. In former writings I have spoken of this process as "reduction" of the field of stimulation,[2] or "progressive restriction of the stimulogenous zone,"[3] or "progressive reduction in the extent of the reflexogenous zone or range of the impinging stimuli."[4]

In this as in all my communications I take pleasure in acknowledging a grant by the Josiah Macy, Jr., Foundation to support my work.

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[1] Zing Yang Kuo, *Psychological Review*, 39: 499–515, 1932.

STROBOSCOPIC ILLUSIONS CAUSED BY LIGHTNING

ON June 10, 1938, a thunder-storm lasting from 5:30 to 7:30 P.M., accompanied by brilliant lightning, occurred at Iowa City, Iowa. The sky, piled high with white cloud masses, was brightly illuminated at frequent intervals during this storm. An 8-inch electric fan running on a window sill facing the storm was sharply silhouetted against this light background throughout each flash. Lasting through many flashes

[2] G. E. Coghill, *Proc. Nat. Acad. Sciences*, 16: 637–643, 1930.

[3] *Ibid., Archives of Neurology and Psychiatry*, 21: 989–1001, 1929.

[4] *Ibid., Jour. Gen. Psychol.*, 3: 431–435, 1930.