triangular tract which lies in the northwest part of the Forest, bounded on the southeast by the three-mile long Catlin Lake. It is covered largely by old growth, but not virgin, spruce- northern hardwoods, together with upper spruce slopes, spruce flats and typical lake-shore and lowland vegetation. Several clearings remain from an original settlement.

Appreciation for the role of the Natural Area in land management research is developing rapidly. New possibilities are revealed where multiple land use is designed to supply the highest returns of such renewable resources as timber, wildlife, forage, water and recreational values. New interpretations of the critical controls of vegetation are made possible, not only in terms of the constantly acting and greatly over-emphasized weather and soil, but also of the intermittently acting factors such as fires, hurricanes and epidemic and cyclic population variations. New methods of management are revealed for regions remote or of irregular terrain where the vegetation must be controlled indirectly for conversion to desirable semi-natural types. For such reasons as these, it is of the utmost importance that samples of natural vegetation be preserved or be permitted to develop for study and reference. Increased though still insufficient interest in this subject has been evoked by such statements as those of Shelford,[1] Leopold,[2] Ashe,[3] Pearson,[4] Adams,[5] Shelford,[6] Toumey and Korstian,[7] Hanson,[8] Piemeisel,[9] Baldwin,[10] and Hough.[11] Due to the work of these men and others, natural areas have been established in many parts of the country, the most outstanding recent ones being the Panama Canal Zone Biological Area in Gatun Lake and the Tionesta Natural Area of 2,100 acres in northwestern Pennsylvania.

Regretfully, because the foresight of our forefathers was not always as well developed as we consider our own to be, many extensive parts of the northeast have been entirely stripped of their original vegetation cover, leaving nothing to indicate what the land had borne and might bear under a dynamic natural equilibrium. Although this is not entirely true of the Adirondacks, where state-owned virgin timber still exists at the higher elevations, protected by the provisions of the New York State Forest Preserve, no tract has come to the attention of the author which is at elevations comparable to those of the Huntington Forest and satisfactorily located in reference to other experimental lands as to permit a broadly planned research program. For the fulfilment of such a role, the Huntington Forest Natural Area is dedicated to scientific research of natural equilibria and is to be administered with full recognition of the dangers inherent in unwarranted trespass. It is to serve as an outdoor laboratory for studies of wildlife, flora, forests, soil and influences, and is admirably suited for long-time studies of conditions uninfluenced by anthropic factors. It is designed for investigations of the changes concomitant with the attainment of a dynamic equilibrium of flora, soils and weather, as well as fluctuations and variations in response to biologic and climatic cycles and to natural regeneration. Its position in the Huntington Wildlife Forest will permit it to benefit by the proximity of the technical headquarters of a field experiment station and to serve as an integral check area for purposes of comparison both with other and parallel experiments being run under disturbed conditions and with cultural operations throughout this part of the Adirondack Mountains.

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[1] F. B. Sumner, SCIENCE, 54 (1385): 39–43, 1921.
[2] A. Leopold, *Jour. For.*, 19: 718–721, 1921.
[3] W. W. Ashe, *Jour. For.*, 20: 276–283, 1922.
[4] G. A. Pearson, *Ecol.*, 3: 284–287, 1922.
[5] C. C. Adams, N. Y. S. Mus. Bull. 279: 37–46, 1929.
[6] V. E. Shelford, *Ecol.*, 14: 240–245, 1933.
[7] J. W. Toumey and C. F. Korstian, Foundations of Silviculture, p. 3, 1937.
[8] H. C. Hanson, *Sci. Mon.*, 48: 130–146, 1939.
[9] R. L. Piemeisel, SCIENCE, 92(2383): 195–197, 1940.
[10] H. I. Baldwin, SCIENCE, 93(2404): 81–82, 1941.
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THE RELATION BETWEEN MENTAL AND PHYSICAL DEVELOPMENT

IN a recent publication[1] Professor Franz Boas discussed the results of a growth study done in the Lincoln School. Emphasis was placed on the unexpectedly high relation between intelligence quotients and indices of physical development, both expressed as deviations from the mean of the age group. The graphs in which stature deviations were plotted against intelligence quotient deviations appear to be based on 22 points for the boys and 17 points for the girls. Assuming that these points represent individuals it is possible to compute coefficients of correlation. These are $+.68 \pm .08$ for the boys and $+.47 \pm .10$ for the girls. If, however, these points represent averages, the correlations can not be estimated from inspection of the graphs. Measures of variability must also be available.

Professor Boas feels that these results corroborate the inference drawn by him from the work of Porter.[2] Now, Porter's data show only the means without corresponding measures of variability. From the means alone one would conclude that, at a given age, physically accelerated children are in advanced grade loca-

[1] F. Boas, SCIENCE, n.s., 93: 339, 1940.
[2] W. T. Porter, *Trans. of the Academy of Science of St. Louis*, 6: 161, 1895.

tions. And, conversely, physically retarded children are retarded in grade location. But Porter does present, by way of illustration, the complete data on weight and grade location for 2,169 boys at age 9. A coefficient of correlation based on this portion of his total group is $+.06 \pm .01$.[3] Other studies are, in general, comparable. Correlations between height or weight with measures of intelligence appear regularly in the range $+.10$ to $+.20$. Baldwin[4] found a partial correlation, age constant, between height and mental age of $+.53$. But the partial between weight and mental age was $-.15$ on the same group, although height and weight are in general correlated closely.

The same problem has been attacked through longitudinal studies[5] in which spurts in physical growth are correlated with spurts in mental growth. Whether mental growth is measured by intelligence tests or school achievement seems not to be important. The correlations are in the area $+.15$.

The results cited by Professor Boas are, therefore, not in agreement with previous findings. In view of the lively controversial aspects of this problem the complete presentation of the data referred to by Professor Boas will be awaited with interest.

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THE SOLAR RADIATION CONSTANT AND THE ACTIVE REGION ON THE SUN

IN the April 11, 1941, number of SCIENCE Dr. C. G. Abbot, secretary of the Smithsonian Institution, has published a paper on some variations in the solar radiation constant which have not hitherto been described. Some of these variations in the intensity of solar radiations have occurred at successive periods of the solar rotation, indicating that they are, at least temporarily, confined to some geographic region upon the sun.

In a paper entitled "On the Localization of Sun-spots and Floccular Activity on the Sun's Surface" in *Publications of the Astronomical Society of the Pacific,* Vol. 47, 1935, and in SCIENCE of October 4, 1940, there was published a paper entitled "The Active Region on the Sun's Surface," in both of which papers attention was called to a permanently active sun-spot region occurring at definite intervals of 27.25 days. This region was shown to have been facing the earth on May 2, 1931, which was the last maximum referred to in the 1935 paper in the *Publications of the Astronomical Society of the Pacific.*

From the several dates to which Dr. Abbot refers as showing radiation irregularities, a few have been selected for comparison with the time at which the maximum-sun-spot region must have crossed the sun's central meridian.

The dates August 18, 19 and 20, 21, 1929, are given. From August 20, 1929, to May 2, 1931, was 620 days, which equal 22 solar rotations of 27.25 days each, lacking seven days of 23 solar rotations.

Another selected date is December 4, 5 and 6, 7, 1929. From December 5, 1929, to May 2, 1931, is 512 days, which equals 18 solar rotations plus 21 days, or 6 or 7 days before the next maximum sun-spot region is facing the earth.

July 7, 8 and 9, 10, 1930, are also referred to. From July 8, 1930, to May 2, 1931, is 298 days, or 10 solar rotations plus 25 days, or two days before the maximum of the next sun-spot region crosses the sun's principal meridian.

January 19, 1931, was 103 days before the disturbed region on the solar surface faced the earth. This was four solar rotations less six days.

The present writer undertook to find a relation between the solar constant and the permanently disturbed region on the sun several years ago, but without success. The limits of this region seem to be very sharply defined. However Abbot's results seem to suggest that the intensity of solar radiation may be related to the solar rotation period, but that its variation occurs a few days before the sun-spot disturbance region is facing the earth.

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AN ANALYSIS OF THE SPREAD OF EPIDEMICS

IN "Elementi per una teoria matematica del contagio" (Roma 1939, Editoriale aeronautico) Dr. Marcello Puma has developed an "equazione fondamentale," $\frac{\partial x}{\partial t} = k \,.\, x \,.\, (n - x)$, governing the spread of contagion.

I should like to state that in 1938 I published a paper ("Bibliotek for Laeger," November, 1938, Copenhagen), in which the above formula is developed and discussed as giving a possible explanation of epidemic waves. The paper contains some tests of the formula, comparing the courses of actual epidemics with the course described by the formula.

A much enlarged investigation of the theory supported by the analysis of numerous epidemics of different diseases will appear (in English) in "Acta medica scandinavica," Copenhagen.

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[3] D. G. Paterson, "Physique and Intellect," New York: Appleton-Century, 1930.

[4] B. T. Baldwin and L. I. Stecher, *Univ. of Iowa Studies in Child Welfare,* 2: 56, 1922.

[5] N. Bayley, 39th Yearbook, National Society for the Study of Education, Pt. 2: 49, 1940.