The author remarks in his preface that the material has been so arranged that "the text in large type ... may be read by itself". Yet we find on page 34 (large type) references to equations (7) and (8), which are in small type. All these, however, are unimportant oversights, and the reviewer turns from this work with the feeling that there is in it a wealth of valuable information on practically every phase of the theory of functionals, with many suggestions for its future development. The bibliographical list that heads each chapter is a feature of not inconsiderable value.

I. A. BARNETT

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# JUNG ON ALGEBRAIC FUNCTIONS

*Einführung in die Theorie der algebraischen Funktionen einer Veränderlichen,* by Heinrich W. E. Jung. Berlin, Walter de Gruyter, 1923. 246 pp.

The three great paths in the study of the algebraic functions of a complex variable—the geometric, the analytic, and the arithmetic—have as a common starting point a single algebraic equation, $f(x,y) = 0$. The traveler on one of the roads, once away from the point of departure, is often far out of hailing distance from those on the other paths; yet he is at times agreeably surprised to find he has reached the same point as they. At such times there will be a sign-post telling him and his fellow-climbers that they have reached the Riemann-Roch Theorem, it may be, or the Lückensatz of Weierstrass. Whatever the point to which the various paths converge, it is almost certain to be concerned with *genus*, or *deficiency*, if another language is used.

Multiplicity of dialects is, indeed, characteristic of the study in question. Not only has each path its own vocabulary, but the arithmetic path, with which we are chiefly concerned here, has no single valid language.* In Jung's book, for instance, we miss the mention of *Ring, Führer, Ideal, Modul, Integrabilitätsbereich, Polygon,* although most of the concepts named find a place. On the other hand, certain terms are borrowed from algebraic geometry, in particular, *canonical class* (corresponding to the canonical series) and *adjoint functions* (corresponding to adjoint curves).

* For a comparison of the content, and to some extent of the language, of the various theories, see Emmy Noether, *Die arithmetische Theorie der algebraischen Funktionen einer Veränderlichen, in ihrer Beziehung zu den übrigen Theorien und zu der Zahlkörpertheorie*, JAHRESBERICHT DER D. MATH.-VEREINIGUNG, vol. 28 (1919).