

## THE J-TYPE AND THE S-TYPE AMONG MATHEMATICIANS

BY

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MATHEMATICIANS in England and America have been recently intrigued by reports of a lecture delivered by Prof. L. Bieberbach, of the University of Berlin, to the Verein zur Förderung des mathematisch-naturwissenschaftlichen Unterrichts. They have, however, found difficulty in judging the lecture fairly from secondhand reports. It is now possible to form a more reasoned estimate, Prof. Bieberbach having published a considerable extract, under the title "Persönlichkeitsstruktur und mathematisches Schaffen", in the issue of *Forschungen und Fortschritte* of June 20.

Prof. Bieberbach begins by explaining that his exposition will make clear by examples the influence of nationality, blood and race upon the creative style. For a National Socialist, the importance of this influence requires no proof. Rather is it intuitive that all our actions and thoughts are rooted in blood and race and receive their character from them. Every mathematician can recognise such influences in different mathematical styles. Blood and race determine our choice of problems, and so influence even the assured content of science (den Bestand der Wissenschaften an gesicherten Ergebnissen); but naturally do not go so far as to affect the value of  $\pi$  or the validity of Pythagoras' theorem in Euclidean geometry. . . .

Our nature becomes conscious of itself in the malaise (in dem Unbehagen) produced by alien ways. There is an example in the manly rejection (mannhafte Ablehnung) of a great mathematician, Edmund Landau, by the students of Göttingen. The un-German style of this man in teaching and research proved intolerable to German sensibilities. A people which has understood how alien lust for dominance has gnawed into its vitals . . . must reject teachers of an alien type. . . .

Prof. Bieberbach proceeds to distinguish between the 'J-type' and the 'S-type' among mathematicians. Broadly, the J-type are Germans, the S-type Frenchmen and Jews. The differences of type appear quite clearly in the varying treatments by different

mathematicians of the theory of imaginary numbers. For example, in Gauss (an outstanding instance of the *J*-type) one finds above all insistence on the 'anschauliche Bedeutung von  $\sqrt{-1}$ '. . . . On the other hand, there are expositions of the theory by mathematicians of the *S*-type (for example, Cauchy) which produce a malaise (die Unbehagen verursachen) in one belonging to the *J*-type. . . . Technical virtuosity and juggling with conceptions are signs betraying the *S*-type, hostile to life and inorganic (dem Lebensfeindlichen unorganischen *S*-typus). . . .

Typical of the *J*-type are the 'nordisch-falische' Gauss, the 'nordisch-dinarische' Klein, and the 'ostbaltisch-nordische' Hilbert. . . . One of the crowning achievements of the *J*-type is Hilbert's work on axiomatics, and it is particularly regrettable that abstract Jewish thinkers of the *S*-type should have succeeded in distorting it into an intellectual variety performance (intellektuelles Variété). . . .

But perhaps I have quoted enough; and I feel disposed to add one comment only. It is not reasonable to criticise too closely the utterances, even of men of science, in times of intense political or national excitement. There are many of us, many Englishmen and many Germans, who said things during the War which we scarcely meant and are sorry to remember now. Anxiety for one's own position, dread of falling behind the rising torrent of folly, determination at all costs not to be outdone, may be natural if not particularly heroic excuses. Prof. Bieberbach's reputation excludes such explanations of his utterances; and I find myself driven to the more uncharitable conclusion that he really believes them true.