now in progress in the writer's laboratory along these lines.

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SEASONAL EFFECT OF LIME ON STRAWBERRIES

LIME is very essential on the very acid soils of the famous Hammond, Louisiana, strawberry section to carry the plants through the summer. Experiments by A. H. Meyer and B. Szymoniak, of the Louisiana Experiment Station, with various amounts of lime indicate that a pH of 5.0 to 5.5 is best for the dormant season of the strawberry, which is during the hot months of the summer, whereas with lime the plants came through in a vigorous condition. To the contrary, in the cool part of the year, even on the check plats with a pH of about 4.0, the strawberries did well vegetatively. As the strawberries were badly injured in the spring of 1933 by a late frost, no apparent differences were revealed from the yields of the unlimed and limed plats. The dying of the strawberry plant in the summer on the unlimed plats apparently is due to less resistance to aluminum toxicity or else to a greater solubility of the aluminum during the summer.

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SPIRALING IN TREES

I HAVE read with much interest the articles and letters in SCIENCE and in *Nature* during recent years on spiraling in trees. Because all other explanations seem so inadequate I was beginning to consider it an innate and heritable character, this supposition being supported by the fact that the type of spiral found in the trunk is present also in the branches.

However, a few days ago I found a dead tree that was irregularly spiraled. About head high for 3 or 4 feet it spiraled to the right and above that for 5 or 6 feet it spiraled to the left. Still higher up it seemed to be irregular, but I could not be so sure, as more bark was still in place there. The tree was about eight inches in diameter and all in the party agreed that it was some kind of gum tree. Gum wood is notoriously difficult to split, and this may be due to such irregularity of grain.

I found also a dead sapling about 1¼ inches in diameter that spiraled to the left. It was quite decayed and on breaking it open found a separate inner core about ⅝ inches in diameter that spiraled to the right. These appeared to be the first and the second year's growth. I could not determine the kind of tree it was. This recalled to my mind that in central India the wood commonly used for furniture and for building purposes has such irregular grain that it can not be planed because whichever way one tries to plane it the plane runs into or against the grain. The native carpenters do not use an ordinary plane bit with a smooth cutting edge but one with the edge of the plane bit finely notched. I did not investigate closely how the grain is arranged, but now I wonder if possibly it may have been due to annual reversal of spiraling.

These irregularities make the inheritance hypothesis of spiraling difficult, but whatever the cause of spiraling may prove to be these irregularities must be taken into account.

Along the Sky Line Drive in Virginia are countless thousands of dead trees that have lost their bark and have been weathered sufficiently to show the grain clearly. This would seem a favorable place to study spiraling.

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QUOTATIONS

THE NEW MATHEMATICS[1]—A LECTURE BY PROFESSOR BIEBERBACH

IT had appeared hitherto that mathematics, of all the fields of intellectual endeavor, would continue to preserve its neutrality, even in the fiery furnace of the revolution. However, a noteworthy lecture delivered by Professor Bieberbach, the brilliant exponent of function theory and *Ordinarius* at the University of Berlin, before the annual meeting of the *Verein zur Förderung des mathematischen und naturwissenschaftlichen Unterrichts* on Easter Tuesday at the Berlin Technische Hochschule, seems to indicate that the doctrine of blood and race is encroaching even upon this domain and subordinating the most abstract of sciences to the totalitarian state. In this respect, historical significance for developments in the Third Reich may be ascribed to the speech of Bieberbach.

Bieberbach chose as his starting point an actual occurrence, the dispute between the Göttingen student body and Edmund Landau, the famous number theorist, and the stormy rejection of this teacher by the students. This attitude (Bieberbach asserts) is well founded and justified; for the case of Landau shows clearly that there is a German and a Jewish mathematics, two worlds separated by an unbridgeable

[1] Translation of an article appearing in the Sunday, April 8, 1934, issue of the *Deutsche Zukunft*, a German national weekly.

chasm. The selection of problems, as well as their treatment, is characteristic of the thinker and therefore a product of his racial filiation. Landau's style exhibits a haughtiness of spirit and confuses and repels because of its remoteness from reality. To demonstrate his point, Bieberbach chooses as an example the introduction of circular functions and the number π in Landau's new *Einleitung in die Analysis* and contrasts it with the exhaustive method employed by the Aryan mathematician Erhardt Schmidt in handling the same problem. "A people that has found itself can not tolerate such a teacher and must reject foreign thought."

Bieberbach also asserts the existence of such differences between the French mode of mathematical thought and the English-German, and illustrates with a statement of Poincaré's concerning Maxwell, who, however, seemed objectionable to many of his German contemporaries and even to his British countrymen. And Bieberbach touches upon these differences in the introduction of the concept of imaginaries by Gauss, who found satisfaction in intuition, and by the French (Cauchy-Goursat), who stressed the formal aspects. He ingeniously strives to bring his whole argument into accord with Jaensch's psychological theory of types and classifies the French and Latins under the abstractly-thinking S-type, the Germans under the I-type, which is most receptive to reality. "In us Germans the Cauchy-Goursat exposition arouses intolerable displeasure." Naturally not in a Landau. Such a thing is inherent in a person's mental make-up.

Bieberbach's rejection of Landau is cutting in the extreme, a repudiation in the condemnatory style of George. As prototypes of the German-Jewish antithesis in mathematics he cites the two personalities Gauss-Jacobi, Gauss the Saxon as opposed to Jacobi the Oriental, a man of ruthless egotism and intellectual arrogance. While the thought process of Gauss is always deep and clear and inclined to the intuitional and its application, that of Jacobi, on the other hand, is ever wilfully abstract, full of intellectual arrogance and of a diabolical cleverness; in general, a juggling with concepts and an unmistakable craftiness are distinguishing marks of Jewish mathematics. Also Bieberbach makes Jacobi responsible for initiating the separation of pure and applied mathematics. He considers it characteristic of Jewish thought to start from material already at hand and exploit it to the utmost, whereas Aryan thought is genuinely creative. What results is a "dehumanization" of mathematics, estrangement from nature, intuition and practise.

A person familiar with the subject might perhaps venture to offer a few modest objections. He might call attention to Gauss's second proof of the fundamental theorem of algebra, a particularly profound and valuable work which, in reality, is historically the origin of that "dehumanizing" process; he might recall that Gauss himself only reluctantly permitted his official duties as astronomer to divert his attention from his purely theoretical researches, and that Jacobi, who was enthusiastically pursuing his studies in the perturbation theory and in dynamics, had no observatory at his disposal, but only a teacher's chair (he had, however, such astronomical friends as Bessel). Above all, the qualified observer would take into consideration the fact that every mathematician, not only Jacobi, is bound to suffer, if compared specifically with the incomparable Gauss.

Yet, in the following particulars, Bieberbach's conclusions are of more importance. He calls attention to the principle of his teacher Felix Klein, the "Education to Intuition," and contrasts it with the elucidations of the Viennese axiomatist Hahn, according to which a departure from intuition is necessary. Here the opposing type comes into view and the surrender of science to this type is neither necessary nor desirable. There can be no complete mathematical domain independent of intuition and life; the dispute over fundamentals that is now raging is, in reality, a race struggle. "Deep-rooted political implications mold the style of thought."

As far as practical "Kulturpolitik" is concerned, mathematics must be freed from the curse of sterile intellectualism; its weight will fall upon those thinkers, alien to the people and to the race, who will not exist in the future, and whose representatives of the past need no longer be thought of as German research workers. Since German mathematics is rooted in blood and soil, the state may and must support and care for it. The great achievements of German mathematicians of the past and present reveal the science as a forceful manifestation of the national consciousness; and for that reason it needs no further justification. By its method of exposition Bieberbach's representation may perhaps perform a service in the preservation of mathematical activity in Germany and in its salvation in these troubled times.

Much of Bieberbach's exposition suggested a relationship to Schopenhauer's mathematical observations. And, indeed, Bieberbach remarked that he himself had seen a problem readily solved by intelligent laymen, while the scientifically trained mathematician was still immersed in profound meditation. Bieberbach did not mention individuals important for his observations, such as Hermann Minkowski—who, in some respects, might be considered his ideal type—and Georg Cantor. Furthermore, he did not carry his logical conclusions to the point of distinguishing problems and exercises with reference to their racial characteristics.

P. S.