A Correction.

IN my letter *re* "Birds attacking Butterflies and Moths," in NATURE for March 6 (p. 415), there occur the words, "I conclude, therefore, that they were last year's birds, which knew and disliked *D. limniace*." There is some slip here, for what I meant to say was, "I conclude, therefore, that last year's bird knew and disliked *D. limniace*." This, it will be seen, agrees with the context; I only used one Babbler last year, and offered *D. limniace* to this only. F. FINN.

Indian Museum, Calcutta, March 27.

SOME SCIENTIFIC CENTRES.

IV.—THE HEIDELBERG PHYSICAL LABORATORY.

MOST travelled Englishmen are doubtless acquainted with the ancient town of Heidelberg, so famous for the beauty of its situation and the grandeur of its ruined castle. But far fewer know the charms of the long and romantic valley of the Neckar, at the almost sensational exit of which, from the Odenwald into the level plain of the Upper Rhine, Heidelberg stands. So also it is true that while most educated people connect Heidelberg with the great names of Kirchhoff and Bunsen and their epoch-making discoveries in spectrum analysis, it is only the special students who know how large in extent and how important in result and example is the work which has steadily gone on for many years in the physical laboratory in the Friedrichsbau.

Its small beginnings in the middle of the last century are marked by the name of Kirchhoff scratched on the window of what is now the private room of the senior assistant. From this window one may look out over the Rhine plain towards busy Mannheim, as Bunsen and Kirchhoff did one night when a fire was raging there, and they were able by spectroscopic examination of the flames to ascertain that barium and strontium were present in the burning mass. But the same window also looks across the Neckar to the Heiligenberg, along the slopes of which runs the "Philosophers' Walk," the chief of the many paths among the wooded hills around the town, which the two friends were wont to traverse in their daily "constitutionals." Bunsen is known to have said that it was during such walks that his best ideas came to him. One day the thought occurred, "If we could determine the nature of the substances burning at Mannheim, why should we not do the same with regard to the sun? But people would say we must have gone mad to dream of such a thing." All the world knows now what the result was, but it must have been a great moment when Kirchhoff could say, "Bunsen, I *have* gone mad," and Bunsen, grasping what it all meant, replied, "So have I, Kirchhoff!"

Kirchhoff's four-prism spectroscope, together with other apparatus of his, is preserved in the collections of the Laboratory, and well deserves the almost reverential awe with which it was examined by a certain foreign professor, who protested that objects of such historic interest should be kept in a fire-proof safe.

Kirchhoff, who in his later years suffered much from ill health, left Heidelberg in 1875 on his appointment as professor of theoretical physics at Berlin, where, by the way, he had no official laboratory, and carried on his experimental work (*e.g.* the research on the conductivities of the metals for heat and electricity) in the laboratory of his friend von Hansemann. His successor at Heidelberg was his former pupil, Quincke, who has been professor there ever since, and is now the "doyen" of German physicists, both by length of service—for though only sixty-seven he has been a professor for more than forty years—and by the amount and variety of his scientific work. It is true that this work has not been of the kind that gets into the newspapers, but the real students will certainly value it none the less on that account, and even the beginner in science has heard of "Quincke's Interference Tube" and his standard measurements of capillary constants. English students may well take some special interest in Quincke, for his personal relations with English men of science (*e.g.* Lord Kelvin and Sir Henry Roscoe) have been particularly close; he is never tired of dwelling with admiration on the achievements of Young, Faraday and Kelvin—and in the case of Young in particular of vindicating his priority in respect of many of the ideas in light and sound often regarded as original to Fresnel and Helmholtz—and nowhere have his own researches been more highly valued than in this country, as is shown by the long list of Universities (Cambridge, Oxford, Glasgow) and learned societies (from the Royal Society downwards) which have conferred their honours upon him.

Georg Hermann Quincke was born at Frankfort a. O. in 1834 of partly Huguenot extraction. One who has seen the diagrams, with circles worthy of Giotto, which he draws on the blackboard, or had experience of his apparently intuitive knowledge of the possibilities of the most various materials and mechanical processes, might well be inclined to regard this kind of power, so valuable to the physicist, as an inheritance from some skilful Huguenot ancestor. From 1852 onwards he studied at Berlin, and then for a time at Königsberg, attracted thither (with others, such as Kirchhoff and Clebsch) by the fact that F. E. Neumann was delivering the only course of lectures on mathematical physics then to be heard in Germany. Neumann's mathematical and experimental genius had considerable influence on Quincke, and it was here that the profound interest in molecular physics which has dominated his life-work was aroused in connection with the theory of capillarity. But Neumann allowed his pupils too little scope for originality, and Quincke removed to Heidelberg, where (in 1854) Kirchhoff had just been appointed professor of physics. Under him Quincke carried out (in 1856) his first physical research, an investigation of the lines of flow of an electric current from one point to another of a metal plate. With a plate made of adjoining semicircles of copper and lead, Kirchhoff's law of the refraction of currents was confirmed, viz. that the *tangents* of the angles of incidence and refraction are in a constant ratio, though, curiously enough, this ratio was not found equal to that of the conductivities of the two metals, as the theory requires, but only about half as great. During this time—in which Matthiessen and Roscoe were among his fellow students—Quincke also worked much with Bunsen, especially in gas and mineral analysis, and, indeed, his first published paper was on the red and grey gneiss of the Erzgebirg (1856). Doubtless the association with Bunsen did something to cultivate Quincke's native faculty for the ingenious adaptation of the simplest materials, of which more hereafter.

From Heidelberg Quincke returned to Berlin, "promovierte" in 1858, became "Privat docent" in 1859, in 1860 was appointed professor at the Royal Prussian "Gewerbe Akademie" and in 1865 "ausserordentlicher" professor at the University of Berlin, posts which he held till 1872. His courses of lectures included the only one in mathematical physics then given in Berlin. But as regards original work the young professor was much hampered by the fact that he had neither stores of apparatus nor even a decent library of scientific literature at his disposal. In both respects he was much aided by his friend Wilhelmy (of invert sugar fame), who possessed a good deal of apparatus brought from Paris, and by Mitscherlich. Before this Mitscherlich had introduced him to G. Wiedemann, and a beautifully kept juvenile note-book had led to his drawing the figures for some of Wiedemann's publications. How well he was capable of such work will be clear to all who have seen his lithographed sheets of instructions for practical work in use in his present laboratory, with their admirable diagrams.