but residents had been observing it for an hour or more. The moon was full and high overhead. Fleecy streaks of cloud, commonly termed "high fog," much too thin to obscure the disk, drifted slowly across; these seemed to be the cause of the unusual phenomenon. When we first saw it there was an inner circle, about six moon-diameters, bright, opalescent white, followed by the spectral rings from red to violet. The total diameter of the violet ring was about 12 moon diameters. Each color was sharply separated from its neighbors and the whole formed a magnificent and brilliant exhibit of the spectrum. The intensity and purity of the colors seemed to be much more pronounced than is usually seen in solar rainbows.

Points of visibility were somewhat localized. On Geary Street, five blocks away, the rings were gone and the moon was surrounded only by the opalescent disk, fading gradually outwardly. A few minutes later, at the academy, the spectral band was even more brilliant and sharply defined than when first observed, due apparently to its having shrunk to about half its former diameter. Six blocks away a few minutes later it had disappeared.

The variation in size was doubtless the result of the difference in elevation of the cloud. A slight tendency to become oval in shape was noticed occasionally, and this was probably also caused by variable thickness and elevation of the refractive stratum.

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SCIENTIFIC BOOKS

THE STORY OF A MIND

Franklin Paine Mall, The Story of a Mind. By FLORENCE RENA SABIN, M.D., Member of the Rockefeller Institute for Medical Research. The Johns Hopkins Press, pp. i–xiii, 1–342. $2.75.

HERE is the fascinating story of the life and work of one of the outstanding figures in the promotion of research in anatomy and embryology and in the reorganization of medical education in the United States. From a farm in Iowa and from a village school, Franklin Paine Mall, of German blood from both parents, went to the Medical Department of the University of Michigan in 1880 and in 1883, at the age of 26, was graduated with the degree of M.D. Stimulated by an inner drive for more knowledge he went to Germany without any very definite plan; but, with the thought that he wanted to know more about ophthalmology, he spent the academic year of 1883–84 at Heidelberg University and at the end of that year, realizing that his interests were chiefly in anatomy and embryology, he went to Leipzig and sought and obtained the privilege of working under the foremost authority in the world on those subjects, Wilhelm His. Here he learned the latest methods of research in embryology and, still more important, the value of exact methods in scientific research. A research topic was assigned him and he was encouraged to work independently, and the independence and thoroughness of his work were demonstrated by the fact that in this, his first research, he reached conclusions at variance with those of his revered professor, who subsequently acknowledged his own mistake and for the remainder of his life remained a devoted friend of Mall.

A third year in Germany he spent in the laboratory of the distinguished physiologist, Carl Ludwig, in Leipzig, and it is no exaggeration to say that Ludwig then and ever after treated him as a beloved son. He not only suggested an important problem of research and gave constant encouragement and frequent advice, but when the results of this and of later researches were submitted to him for publication, he edited them and even had the illustrations redrawn—and all with a delicacy of suggestion and a pride in the work of his young friend which was certainly most unusual and which indicated that he recognized in Mall a person of extraordinary ability and promise. When Mall expressed his great obligations and asked how he could ever repay them, he was told merely, "Pass it on!"

This ideal association with Ludwig was probably the most potent factor in shaping Mall's career, and in after years his aid and encouragement to those who did research work in his laboratory, and the love and admiration which they had for him, are evidences that he followed Ludwig's admonition to "pass it on."

On his return to the United States, Mall sought and obtained a fellowship at the Johns Hopkins University under Dr. Welch, whom he had met in Ludwig's laboratory and who ever after remained his great friend and admirer. This fellowship in pathology he held from 1886 to 1889. From 1889 to 1892 he was adjunct professor of anatomy in Clark University, and on the organization of the new University of Chicago he joined or rather led the migration from Clark to Chicago, where for a single year 1892–93, he was professor of anatomy in the Division of the Biological Sciences. He then yielded to the persuasions of Dr. Welch to accept the chair of anatomy in the newly organized Department of Medicine at the Johns Hopkins University, and this position he held until his death in 1917.

This bare outline of Dr. Mall's university connec-

tions gives no hint of the importance and thoroughness of his research work, which was published in more than one hundred monographs and contributions, nor of his great service in training dozens of the leading anatomists and embryologists of this country, nor of the leading part he took in the establishment of research journals, nor of his unceasing labors for the reorganization of medical education in this country. All this and much more is told with a wealth of detail and a great measure of admiration and affection by one of his former students and associates, Dr. Florence Sabin, in the book under review. This volume is not merely "the story of a mind," as the sub-title phrases it, but it is also the story of an era in medical science and education—the story of the transition of many medical schools in this country from the status of trade schools, conducted in many instances for the profit of proprietors and therefore with little or no laboratory facilities and with no regard to research, to the full stature of university departments for graduate study. In this transitional era the Johns Hopkins University, established in 1876, and its Medical School, fully organized in 1893, took a leading part, and probably no member of its staff was more influential in bringing about this transformation than Dr. Mall. His own standing as an investigator, his high ideals for medical education and especially his far-sighted planning accomplished more in the reform of medical education in America than is generally recognized, for he worked quietly and often through others who received the credit for what he had planned and started.

His method of teaching was almost completely different from that usually practised. Partly because he was not himself a public lecturer and partly because of his own experience in the laboratories of His and Ludwig, he taught by the inductive laboratory method, assigning problems and materials and leaving students to do the work. This was the method of His and Ludwig, of von Baer and Louis Agassiz, and in the form of "autonomous courses" it has of late begun to displace didactic lectures in many colleges and universities.

The important part which Mall took in the establishment of the *American Journal of Anatomy* and the *Anatomical Record,* as well as his last great work in bringing about the establishment in Baltimore of the Department of Embryology of the Carnegie Institution of Washington is described in this book. Also his leadership in the campaign for full-time clinical professors in medical schools is outlined, and here, for the first and only time in this book, Dr. Sabin indicates "a limitation in Mall's vision—that he underestimated the amount of technical skill actually in possession of the medical profession and the time necessary to acquire it." And this suggests that in general the book is written from the standpoint of a devoted follower of Mall rather than of an impartial judge. In particular the contrast in medical science and education before and after Mall is over-emphasized, as for example when it is said that his "program, contrasted with the ones which preceded it, is like a breath of fresh air and reminds one of the awakening of Rip van Winkle in a new era" (p. 225). And when it is stated that "to Newall (sic) Martin belongs the credit for starting modern physiological research in this country" (p. 27) one should recall some of the eminent physiologists who were Martin's predecessors or contemporaries. Other cases of such over-emphasis are evident throughout the book. There can be no question as to the great stimulus given to medical science and education by the Johns Hopkins University and by Dr. Mall, but there were other men and institutions in the forefront of this advance; on the whole, however, this is a faithful account of the great part taken by Mall in this advance.

It may seem ungracious to call attention to a number of errors, most of them trivial, but in the interest of accuracy the following errata should be noted: on page 6 the date 1885 should be 1855; everywhere (pp. 13, 14, 15, 16, 197) the name of the founder of the first medical school in America is given as "Shippan" instead of Shippen. Among those members of the faculty of Clark University who migrated to Chicago in 1892 Bolza is erroneously assigned to chemistry instead of mathematics while Nef, Watase and Wheeler are not mentioned and Lillie appears as "Lilly" (p. 88). On page 190 Miall should be substituted for "Mall" and on page 214 Linton for "Linten." Among the journals in which Joseph Leidy is said to have published his researches is listed the *Proceedings of the National Academy of Sciences,* which was not established until eighteen years after Leidy's death; evidently the *Proceedings of the Academy of National Sciences of Philadelphia* is intended. The statement on page 236 that "scientific journals were new to this country when the *Anatomical Journal* was started" is either a "slam" at the several reputable journals that had long been in the field or it is an oversight.

No doubt these and other minor errors are "slips" which will be corrected in any future edition. On the whole, this book is an inspiring account of the life, scientific work and educational activities of an extraordinarily able and forceful leader whose significant work remains after him, although his quiet and retiring personality has caused him to remain relatively unknown.

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