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Review of: La carte du ciel: Correspondence inédite conservée dans les archives de l'Observatoire de Paris edited by Ileana Chinnici

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■ Modern (Nineteenth Century to 1950)

Heng-an Chen. *Die Sexualitätstheorie und "Theoretische Biologie" von Max Hartmann in der ersten Hälfte des zwanzigsten Jahrhunderts*. (Sudhoffs Archiv Beiheft, 46.) 308 pp., figs., table, bibl., index. Stuttgart: Franz Steiner Verlag, 2003. €44.00 (paper).

Max Hartmann (1876–1962) was one of the foremost German biologists of the first half of the twentieth century. Trained under Richard Hertwig (Munich) and Otto Bütschli (Heidelberg) and assistant under A. W. Goette (Strasburg) and J. W. Spengel (Gießen), Hartmann became a cell biologist of the first rank, specializing in protozoology. Beginning his career at the newly created Königlichen Institut für Infektionskrankheiten (later Robert-Koch-Instituts) in Berlin, he was chosen in 1914 to head the protozoology division of the new Kaiser-Wilhelm-Institutut für Biology in Berlin-Dahlem. Becoming director in 1935, Hartmann remained with the institute until the end of his career.

Hartmann was a leading contributor to the expanding knowledge of both pathogenic and benign protozoa. He focused on understanding the various modes of reproduction exhibited by widely different forms, studying the vast array of structures and processes connected with generative processes, leading him to concentrate on cell and nuclear division. His methodological approach, which aimed to establish homologies between structures in different species and groups, relied on the older morphological method of staining techniques (homologizing structures that stained similarly using a particular dye) combined with the newer "morphogenetic" technique developed by Theodor Boveri and Fritz Schaudinn. Schaudinn, a brilliant protozoologist who, until his premature death, was a colleague and close friend of Hartmann's, introduced the technique of following the developmental history of cell organelles to hypothesize about their functions in the life of the organism.

Hartmann built a number of successes on utilizing both techniques. Early on, he clarified the previously confused distinction between reproduction and fertilization and identified various modes of reproduction, both sexual and asexual. He contributed to an expanding knowledge base of the morphology, physiology, and systematics of a number of protozoan groups as well as lower plants and fungi. Like many of his cohort generation, Hartmann was not content to limit his focus to particular phenomena; from the beginning of his career, he sought to generalize his findings, applying insights gained from studying single-celled creatures to a general understanding of the metazoan cell.

The working hypotheses Hartmann developed to guide his understanding of reproduction in protozoa were thus soon developed into a general theory of sexuality, first introduced in 1909 and subsequently revised and expanded in Hartmann's major work, *Die Sexualität: Das Wesen und die Grundgesetzlichkeiten des Geschlechts und der Geschlechtsbestimmung im Tier- und Pflanzenreich* (Jena, 1943; 2d ed. 1956). Influenced by earlier views developed by Bütschli and Schaudinn, Hartmann's theory of sexuality was founded on the notion of the basic bisexual potency of sex cells. Working in tandem with those studying the genetics of sex determination, Hartmann's investigations indicated that sex could be altered by either external settings (the environment) or by internal conditions (genetics) to produce either male or female forms. These views supported those developed by Hartmann's colleague at the Kaiser Wilhelm, Richard Goldschmidt, based on his extensive study of the genetics of the moth *Lymantria.* They later led to investigation of the chemical basis for relative sexuality, work extended by his student Franz Moewus and intersecting that of Alfred Kühn and his group, leading to the identification of gamone, a hormone released by sex cells that affected those of the opposite sex.

Heng-an Chen's comprehensive study of Hartmann is thus most welcome and should be a "must-read" for those interested in late nineteenth- and early twentieth-century German biology. Philosophers will be particularly interested in the extensive discussion of Hartmann's neo-Kantian philosophy of biology. According to German custom, this book is Chen's (presumably unrevised) dissertation prepared under Prof. Brigitte Hoppe at Munich, published in a special series of *Sudhoffs Archiv.* This means that the organization is somewhat programmatic (the first chapter methodically describes all the extant literature dealing with Hartmann), and the prose often straightforward. However, this does not detract from the value of the book, which is extremely informative and easy to read. In short, this work deserves to be widely known and cited by English-speaking as well as German historians and philosophers of biology.

MARSHA L. RICHMOND

Ileana Chinnici (Editor). *La carte du ciel: Correspondence inédite conservée dans les archives de l'Observatoire de Paris.* Foreword by **Johan-**

nes Andersen. Prefaces by **Michel Combes** and **Salvatore Serio.** Introduction by **Giorgia Foderà, Nandou Daliès,** and **Suzanne Débarbat.** xviii + 475 pp., illus., bibl., index. Paris: Observatoire de Paris, 1999. €22, 87 (paper).

The idea of a photographic map of the entire celestial sphere was proposed as early as 1857 by Warren de la Rue of the Kew Observatory. Successful experiments along this line were carried out by Edward Pickering at Harvard and by David Gill at the Cape of Good Hope in the early 1880s. Gill conceived the idea of producing a series of photographic maps of the southern sky and wrote to Ernest Mouchez, the director of the Paris Observatory, to enlist his aid. Mouchez was sympathetic to the proposal and saw it as an opportunity to improve the catalogs of the northern stars as well. He ordered up a new telescope for Paris, specially designed for such work. After preliminary photographic work succeeded in producing clear images of stars down to the fifteenth magnitude, Mouchez wrote to colleagues around the world to stimulate their interest in a collaborative endeavor. It was Gill who insisted on the importance not only of a systematic approach but also of producing a catalog of coordinates to accompany the grand *carte du ciel*. He proposed that Mouchez call an international conference to organize the work. An international commission was held in Paris in 1887 to settle the technical details and to carve up the entire sky among eighteen participating observatories from twelve countries—from Greenwich to Paris to Algiers to the Cape of Good Hope, from Tacubaya (Mexico) to Rio de Janeiro, and from Sydney to Perth. It was the most ambitious international scientific cooperation in the history of astronomy (and perhaps in any science) up to that time.

The Paris Observatory became the administrative headquarters for the project, as well as the central clearinghouse for reducing the data. The Bureau des Measures of the Paris Observatory, where much of the numerical work was carried out, and which served as a model for similar efforts at other institutions, was directed by Dorothea Klumpke. As Ileana Chinnici writes, Klumpke's staff "was composed of ladies, which implied a better precision and care in the execution of the measures as well as a great economy of money, the work of women being less remunerated" (p. 8).

Ultimately, the project failed to come to fruition. Work had already stalled at some observatories before it was interrupted by the Great War. In 1922, the newly formed International Astronomical Union met in Rome and proposed to carry on with the project, with an estimated completion date of 1964! But the project as initially conceived was soon rendered obsolete by advances in astronomical and photographic technology, as well as by decisive shifts in astronomers' interests. Besides, the original limit of the fifteenth magnitude left invisible the great bulk of distant galaxies, which by the 1930s had already become the new frontier of astronomy

Ileana Chinnici's volume is based on the documents related to the *carte de ciel* in the archives of the Paris Observatory. An index lists all the relevant documents, whose dates span the range 1884–1913. Moreover, Chinnici has included full transcriptions of 732 documents, including much of Gill's correspondence relating to the project. The volume is generously illustrated by eighty black-and-white plates from around 1900—portraits of astronomers, pictures of observatories and telescopes, and photos of correspondence. I particularly enjoyed the photograph of three nuns measuring plates at the Vatican Observatory. A short introduction sketches the historical background of the *carte du ciel*. However, this volume is not so much a study as a valuable collection of primary materials. It will be of great use to historians of astronomy interested in the decades just before and after 1900. It will also be of value to those interested in the history of international scientific cooperation or in the history of grandiose projects that failed.

JAMES EVANS

Pascal Crozet; Annick Horiuchi (Editors). *Traduire, transposer, naturaliser: La formation d'une langue scientifique moderne hors des frontieres de l'Europe au XIXe siecle*. xxx + 262 pp. Paris: L'Harmattan, 2004. (paper).

The editors have brought together essays that cover Japan, China, and the Islamic world. Five out of ten contributions focus on Japan and three contributions are written in English. Joseph Needham's momentous, but often encyclopedic, approach made us realize that not only Europe but also China was the cradle of early scientific thought and discoveries, although he shed limited light on the constraints that China faced in recent times. China has recently set ambitious goals to rank among the world leaders in science and technology but has been lagging significantly behind Japan. The problem of tradition and modernization is much more serious and disturbing for original civilizations. Chinese, Indian, and Islamic civilizations have faced greater