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ADOLPH HANS SCHULTZ
1891–1976

A Biographical Memoir by
T. DALE STEWART

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Biographical Memoir

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November 14, 1891–May 26, 1976

BY T. DALE STEWART

RESIDENCE IN THREE successive countries—Germany, Switzerland, the United States, and then again Switzerland—serves to divide Adolph Schultz's life span of eighty-five years into four segments: one, a German period (from his birth on November 14, 1891 to ca. 1897); two, a first Swiss period (from ca. 1897 to 1916); three, an American period (from 1916 to 1951); and four, a second Swiss period (from 1951 to his death on May 26, 1976). The American period was not only the longest, but also the most scientifically productive; it comprised the peak years, between the ages of twenty-five and sixty, of his career.

I. GERMANY

Of the German period of Schultz's life few facts are available. He was the only son among four children born to Julius and Sophie (Frick) Schultz in Stuttgart. When he was about six years old his German father died, and his mother, a Swiss by birth, took the four children to Zurich. Some twenty years later he stated in the curriculum vitae appended to his doctoral dissertation: "*Ich . . . besuchte Schulen in Deutschland und zum grössern Teil in Zürich und bestand im September 1910 die eidgenössische Maturitätsprüfung.*"¹

¹"Anthropologische Untersuchungen an der Schädebasis," *Archiv für Anthropologie*, 16 (1917): 104.

II. SWITZERLAND

Schultz's first Swiss period saw him through not only most of his preparation for college, but his undergraduate and graduate training as well. As an undergraduate he spent three semesters at the University of Zurich and two at the University of Bern. In Bern he served on the side as a visiting assistant lecturer in zoology in Professor J. U. Duerst's *Zoo-technisches Institut*. Then in April 1913, following his return to Zurich, he matriculated in the doctoral program at the University there under the supervision of Professor O. Schlaginhaufen and seven semesters later received his Ph.D. in anthropology.

For his dissertation Schultz undertook an anthropological investigation of the base of the human skull. Although the Anthropological Institute in Zurich had series of skulls from a number of racial groups, with the exception of Ancient Egyptians and recent Swiss (Daniser), none had a sufficient representation for Schultz's purpose. In order to bring all of his skull samples up to adequate size, he visited several institutions in Germany. In Professor W. Waldeyer's anatomy department in Berlin he obtained the skulls of some West African Negroes and Chinese; in Professor G. Schwalbe's anatomy department in Strassburg, Greenland Eskimos; in Professor A. Jacobi's department in the Royal Museum for Zoology-Anthropology-Ethnology in Dresden, Australians and Chinese; and in Professor J. Ranke's department in the Anthropological Institute in Munich, Australians and Chinese. In all he studied 394 skulls from six racial groups.

Schultz elected to take the majority of his skull measurements with the skull oriented in one or the other of two unconventional horizontals: glabella-basion and glabella-inion. Otherwise he took a selection of conventional measurements not requiring reference to a horizontal. To explain the unconventional measurements, he supplied neatly drawn and lettered diagrams. He also drew by hand the rest of the

illustrations. Notable, too, is the fact that the measurements, listed individually, are summarized statistically in the form of means, standard deviations, and coefficients of variation, all with their probable errors. I mention all this because later in his career his publications generally became richer in pen-and-ink renderings (including tables) and poorer in statistical analyses.

Three papers appeared in print ahead of the dissertation, two in 1915 and one in 1916. The first two refer to some of the same German skull collections from which he obtained data for the dissertation. This suggests that in advance of the visit(s) to the German institutions Schultz made plans to collect data needed for the investigation of three different problems. Here may be the beginning of the program of data collection for which he became famous. From this time on his examinations of specimens were so well thought out and so complete that, before many years would pass, he could dip into his data bank for much of what he needed to deal with a new problem or to summarize the morphological characteristics of a particular primate species.

These four publications also reveal a beginning shift in interest from traditional physical anthropology, which deals mostly with man, the highest primate, to a broader type of study (now called primatology), which deals with all the primates. The first of these publications (1915) makes no mention of nonhuman primates, the second (1915) makes slight reference to them, and the third (1916) gives them extensive coverage. The dissertation, which was published fourth (1917), was planned, of course, before this shift in interest had time to develop.

Reminiscing about this period of his life at the Third International Primatological Congress in Zurich in 1970, Schultz said:

In my student years of 1910 to 1916 at the University of Zurich interest in primates happened to be unusually well represented in the Anatomical

Institute under the direction of Ruge and in the Anthropological Institute, which had been founded by Martin, who was succeeded by Schlaginhaufen. Together these departments . . . had assembled very extensive collections of entire bodies and skeletons of nonhuman primates largely through the cooperation of the Swiss Bütikofer, the director of the Rotterdam zoo and distinguished student of Indonesian primates. This material served for great many important papers on primate anatomy by Ruge himself, his staff and his graduate students. . . . At the same time the Zurich collections had formed the basis for such well-known primatological monographs from the anthropology department, as Mollison's pioneering report on body proportions, Schlaginhaufen's study of dermatoglyphics and Oppenheim's comparative data on cranial variability, for all of which unusually large series of specimens had been available. Last not least, in 1914 there appeared Martin's great *Lehrbuch der Anthropologie*, in which primates were dealt with in every chapter, confirming the close alliance between physical anthropology and primatology. . . .

It is hardly surprising that as a young student of anthropology in the midst of so much primatological interest I soon came to feel that the study of nonhuman primates was really more fascinating and rewarding than that of mere man, whose morphology had already become known to what seemed to me then down to the last details.²

III. TO AMERICA

The first Swiss period of Schultz's life ended and his American period began when he came to the United States in the fall of 1916. The circumstances leading to this move are explained by Florence R. Sabin in *Franklin Paine Mall; the Story of a Mind* (Baltimore: Johns Hopkins University Press, 1934). One of the projects that Mall had in mind in 1913 for the new Department of Embryology, which he had induced the Carnegie Institution of Washington to establish at the Johns Hopkins Medical School in Baltimore, was an anthropometric record of the Department's collection of human embryos. Continuing the account in Sabin's words:

²*Folia Primatologica*, 26 (1976): 6-7.

Mall did not go abroad in 1913 [as was his custom] but asked me to consult for him the anthropologists in Germany, Switzerland and France and explain his problem of securing someone to measure human embryos with an adequate technique. As a result Dr. Michael Reicher was recruited from the department of Professor Schlagenhaufen in Zurich. He came to Baltimore and started the work, but when the war broke out he was obliged to return to Europe and Dr. Adolph Schultz, also from Schlagenhaufen's laboratory, was appointed [to continue with the work] (pp. 304-5).

By the time Reicher left Baltimore the number of his measured specimens had reached 385.³ Although he hoped to return to Baltimore after the war and for this reason left his data behind, Schultz continued the work, and by the time he published on the subject in 1922 and 1923, he had extended the coverage to 623 specimens. Not until 1929, however, did Schultz get around to publishing the details of the technique he used in measuring the fetuses.

Two actions by Schultz during this period indicate how well he was adjusting to life in his adopted country: in 1924 he married, and in 1934 he became a naturalized American citizen. Travis Bader, who became his wife and ultimately was to survive him briefly, was from Virginia. I once visited them at their vacation retreat, an old family house in McGaheysville, located in the Shenandoah Valley some 75 miles in a direct line southwest of Baltimore.

While Schultz was working on the fetuses, he was also gathering data of other sorts, such as information concerning the prenatal sex ratio and the development of the external nose. The second subject led in 1919 to a contribution to the Carnegie's publication series: it represented the first of his seven *Contributions to Embryology* between 1919 and 1949.

Schultz's bibliography shows that by 1921 he was also studying primate specimens other than human. One of his papers that year reports the occurrence of a sternal gland in

³Carnegie Institution of Washington, *Yearbook*, 13 (1914): 105, 109.

an orang, and another describes fetuses of the Guiana howling monkey. Thereafter papers of this sort gradually increased in frequency; in other words, his shift in interest from physical anthropology to primatology, already evident before he left Zurich, was continuing and expanding in Baltimore.

This shift took another form in 1923 when Schultz participated in the first of four primate collecting trips to Central America. On the first trip, which had as its destination eastern Nicaragua, he was accompanied by O. O. Heard. George Wislocki and F. F. Snider joined them in 1924 on the second trip to the same area, generally described as the middle course of the Principolka River and a tributary thereof, the Yao-ya River. The third and fourth trips, in 1929 and 1932, were organized by Herbert C. Clark of the Gorgas Memorial Institute for Tropical Medicine and centered on Chiriqui in western Panama. Originally designed primarily to acquire embryos and fetuses, the success otherwise of all these trips may be judged from the number of mature skulls alone collected: a total of 379 from among three species (howlers, capuchins, and spiders). A by-product of the second trip was an anthropological study of twenty-five and twelve adult Indian men of the Rama and Sumu tribes, respectively.

The first trip to Nicaragua was financed by Schultz personally, the second by the Carnegie and the Johns Hopkins Medical School. The participation of Johns Hopkins suggests that the school was already interested in having Schultz join its staff. In 1925 he accepted the position of associate professor of physical anthropology in the Department of Anatomy, the first such position in any American medical school.

To fill the vacancy created by Schultz's departure, G. L. Streeter, who had succeeded Mall as director of the Carnegie's Laboratory of Embryology, brought in C. G. Hartman from the University of Texas. This was a happy arrangement

for Schultz, because Hartman at once set about establishing a colony of rhesus macaques on the top floor of the Carnegie building next door to the anatomy building, and he invited Schultz to maintain the colony's growth records. Schultz was also offered the remains of any members of the colony that died. In turn he generously shared these remains with his anatomical colleagues.

Out of this collaborative effort grew the precedent-setting book, *The Anatomy of the Rhesus Monkey*, edited by Hartman and Straus (1933). The chapter therein by Schultz, "Growth and Development," contains his observations and measurements of more than twenty animals born in the Hartman colony.

Between 1927 and 1938 Schultz had a small primate colony of his own populated by six chimpanzees (counting offspring) and an orang. These animals were kept in improvised quarters in a former stable behind the anatomy building. As a medical student at Hopkins in this period, I remember well the vocal and mechanical din created by these caged animals. The colony came to an end when the strength of the largest male chimpanzee—named "Dayton" by Schultz after the antievolution trial in Dayton, Tennessee—made it impossible to keep him confined to quarters.

Besides observing the living nonhuman primates around him, Schultz was always seeking the remains of those dying in captivity. Animal dealers, directors of zoos, and owners of circuses responded generously, but their shipments of dead animals occasionally led to amusing incidents. For example, there is the tale of the zealous prohibition agents in Washington's Union Station, who, after apprehending a zoo attendant bound for Baltimore, were abashed to find that the bag he was carrying, when opened in the midst of a crowd, contained a dead monkey and not the suspected liquid contraband. Other tales concern phone calls to Schultz at incon-

venient hours from irate clerks in the office of the express company demanding that he come at once and claim stinking packages. The odor was so bad sometimes, it is said, that he was forced to expose and examine these specimens on the fire escape of the anatomy building.

Of course, not all of the shipments were in such wretched condition. Among the most notable acquisitions were the huge gorillas "Congo" and "Gargantua." The latter gained for Schultz considerable publicity because *Life* magazine (December 5, 1949) published a large picture of him, caliper in hand, bending over the corpse stretched out on an embalming table.

Given a choice, Schultz preferred animals shot in the wild to animals that had died in captivity. This being the case, he was quick to accept an invitation from Harold Coolidge to participate in a primate collecting expedition headed for southeast Asia in 1937. The other scientists on the Asiatic Primate Expedition (APE) included C. R. Carpenter and S. L. Washburn. In Thailand, the first stop for field work, the party proceeded to the city of Chiang Mai, 375 miles north of Bangkok; before leaving the country two months later they had amassed a total of 233 gibbons, along with representatives of other kinds of primates. Subsequently Schultz and Washburn spent three months near Sandakan in North Borneo collecting forty-four gibbons, seven oranges, and series of several kinds of lower primates. Most of the skeletons were returned to the United States in a roughed-out and dried state. Back in Baltimore, Schultz cleaned up those acquired for his personal collection, as well as those going elsewhere but which he intended to study.

The Anatomy Department at Hopkins provided few assistants for the staff. This mattered little to Schultz, because he was quite capable of dealing with his specimens once they were skeletonized; and this he often did, even to

the point of numbering the bones and constructing the boxes to house them. He also measured the bones, wrote his manuscripts in longhand, and illustrated them with masterly pen-and-ink drawings. All this he carried out in a single large room with two windows on one side and storage shelves going to the ceiling on the other three sides. Considering that he expended so much of his time getting his data assembled and analyzed, it is remarkable that he published as much as he did.

I think it is unlikely that Schultz ever had one of his well-organized and beautifully illustrated manuscripts rejected by an editor. It should be noted, however, that during his years in Baltimore he had close connections with the founders and/or editors of the more important new journals devoted, at least in part, to primate studies: in Washington, A. Hrdlička of the *American Journal of Physical Anthropology* (1918); also in Washington, N. Hollister of the *Journal of Mammalogy* (1919); and in Baltimore, R. Pearl of the *Quarterly Review of Biology* (1926) and *Human Biology* (1929). Between 1918 and 1949 these four journals alone carried 36 of his articles. Among the larger pieces may be mentioned the 1930 article in *Human Biology* (136 pages, 23 hand-drawn figures) and the 1944 article in the *American Journal of Physical Anthropology* (129 pages, 30 hand-drawn figures).

Schultz's early intensive efforts to report the growth and development of particular primates, primarily through measurements, gradually became interspersed with efforts to provide interpretive summaries. A few titles will suggest the points he wished to emphasize: "Man as a Primate" (1931), "Characters Common to Higher Primates and Characters Specific for Man" (1936), "Variability in Man and Other Primates" (1947), "The Physical Distinctions of Man" (1950). These general articles, perhaps more than the others, left enduring impressions on the thinking of primatologists.

In the late 1940s a new trend in the field of anatomy, known as "histochemistry," arrived in force at Hopkins as a new head of the department took over. Schultz could find no indication in this change that the encouragement and support he had always received would continue, so in 1951, when he reached the age of sixty, he retired and went back to Zurich, taking with him his primate collection. Thus, after thirty-five years in Baltimore, Schultz's highly productive American period came to an end.

IV. BACK TO SWITZERLAND

The second Swiss period of Schultz's life began auspiciously with his resumption of Swiss citizenship. Schlaginhausen, who in 1951 had reached his fortieth year as director of the University of Zurich's Institute of Anthropology, relinquished the position. Schultz was appointed director of the Institute and was also designated professor of anthropology in the University. The Institute provided a repository for his collection and a natural place for him to continue his studies; the professorship gave him further status with only limited academic duties. The portion of his bibliography covering this final period shows that, except for the year 1951, he continued to publish at about the same rate as he had in Baltimore: two to four articles a year, but now more often in German.

The incorporation of Schultz's personal collection of primate specimens into the Institute's collection resulted in a virtually unequalled primatological resource. From the combined collections Schultz selected for exhibition some of the more unusual specimens and others that illustrated evolutionary changes and phylogenetic relationships. Perhaps because he had never before had a display facility, he took special pleasure and pride in showing off the arrangements he had created.

In 1956 Schultz joined Dietrich Starck and Helmut Hofer to edit a new series of primatological monographs published by S. Karger of Basel, entitled *Primatologia* (*Handbook of Primatology*). In 1962 Karger announced the beginning of another monograph series entitled *Bibliotheca Primatologica*, with the same set of editors. The first fascicle of the new series, with Josef Biegert serving as temporary substitute editor for Schultz, constituted a *Festschrift* in celebration of Schultz's seventieth birthday. The fourteen articles contained therein were prepared by personal friends residing on four continents.

Seventy is the retirement age at the University of Zurich, so in 1962 Schultz relinquished the directorship of the Institute to Josef Biegert and in the University simply became Professor Emeritus of Anthropology. This second retirement, like the first, had little apparent effect on Schultz's output of publications until a few years before his death. Particularly noteworthy is the fact that in this period he published his first commercial book (1969). Translated from English into German in his lifetime, it has now been translated also into Italian and Spanish.

REFLECTIONS

The man whose scientific activities are chronicled above was of rather solid build and above-medium height. At first meeting his complexion and the color of his hair—sandy red until his late years—may have seemed to some to bespeak a testy disposition, but more often than not the opposite was the case; usually he was outgoing, humorous, warm-hearted, and generous. This is not to say, as a colleague has noted, that he was not “capable of moral indignation and strong language at misbehavior, professional or other.”⁴ Yet he rarely

⁴*American Journal of Physical Anthropology*, 46 (1977): 192.

engaged in public debate, being content perhaps to make his points with the overwhelming evidence contained in his published reports. Nor was his avoidance of debate the result of any lack of command of the English language, which he spoke fluently and with surprisingly little German accent.

Not given much to hobbies, he had, as noted, a remarkable talent for scientific illustration and perhaps for this reason appreciated art in general and often visited galleries. Nothing appears to have had any effect on his personal art style, however, not even contact in Baltimore with Max Brödel, the artist who manifestly raised the level of medical illustration in America.

As the above chronicle shows, his central aim from the outset of his career was to acquire as much data on the physiques of as many different kinds of primates as possible for the purpose of drawing therefrom broad generalizations and sound taxonomic conclusions. Eventually he had access to larger samples of many more different species of nonhuman primates than anyone before him. And everything he learned from his studies of these specimens seemingly ended up in publications. When asked, late in life, to state briefly for a biographical dictionary (*World Who's Who in Science*, 1st ed., 1968) his main accomplishments, he listed the following:

Established correlations and differentiations between development in man and other primates; demonstrated [that] close similarity of man and apes early in life . . . diminishes through differing growth rate [s]; noted [as] human specializations [the] longest postnatal growth period and life span, latest beginning and ending of fertility [p. 1504].

Had he been offered space in which to list more of his accomplishments, quite likely he would have included his revelation of a host of facts regarding the relative variability of the different primate species, by sex and during growth. Among other things, this showed that, contrary to prevailing opinion, the great apes are more variable than man and most

Old World monkeys. On these grounds he cautioned human paleontologists against attributing too much significance to single hominid fossil finds. His observations led him also to take a conservative view of the established classification of the primates and in this regard to resist some of the radical ideas put forth by those using newer biochemical approaches.

A conscientious, innovative, and energetic worker, employing the basic techniques of physical anthropology, he played a major role in developing the young science of primatology into an important part of modern biology. Beyond doubt his many and varied contributions to this field made him one of the world's leading primatologists.

THIS MEMOIR GREATLY expands the information about Dr. Schultz I was able to assemble in the obituary notice I prepared for the American Philosophical Society in 1976 (*Yearbook of the American Philosophical Society*, 1976:118–22). At that time the excellent obituaries by Josef Biegert (*Folia Primatologica*, 26(1):1–23, 1976) and W. W. Howells (*American Journal of Physical Anthropology*, 46(2):189–96, 1977) were not available to draw upon. I am indebted additionally to Dr. Biegert, as well as to Dr. Howells and Dr. E. G. Erikson, for generously supplying further information and to Dr. Biegert and Dr. Howells for kindly reviewing the final manuscript. The biographical sketch of Dr. Schultz published by Dr. Erikson in 1981 (*American Journal of Physical Anthropology*, 56[4]:365–71) contains personal reminiscences and ten photographs taken in Baltimore and Zurich.

HONORS AND DISTINCTIONS

AWARDS

Viking Fund Medal in Anthropology, 1948

M.D. Honoris Causa, Universität Basel (Schweiz), 1962

MEMBERSHIPS

National Academy of Sciences (Elected, 1939)

American Philosophical Society

American Anthropological Association

American Association of Anatomists

American Association of Physical Anthropologists (Second President)

American Society of Mammalogists

New York Academy of Sciences (Hon.)

Anatomical Association of Great Britain and Ireland (Hon.)

Zoological Society of London (Foreign Fellow)

Society for Human Biology (Hon.)

Société d'Anthropologie de Paris (Hon.)

Österreichische Akademie der Wissenschaften in Wien (Corr.)

Anthropologische Gesellschaft in Wien (Hon.)

Deutsche Gesellschaft für Anthropologie (Corr.)

Schweizerische Gesellschaft für Anthropologie (Hon.)

Schweizerische Naturforschende Gesellschaft

Zürcher Naturforschende Gesellschaft

Istituto Italiano di Antropologia, Roma—già Società Romana di Antropologia

International Primatological Society (Hon.)

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1915

- *Einfluss der Sutura occipitalis transversa auf Grösse und Form des Occipitale und des ganzen Gehirnschädels. Arch. Suisses Anthropol. Gén., 1:184-91.
- *Form, Grösse und Lage der Squama temporalis des Menschen. Z. Morphol. Anthropol., 19:353-80.

1916

- *Der Canalis cranio-pharyngeus persistens beim Mensch und bei den Affen. Morphol. Jahrb., 50:417-26.

1917

- *Anthropologische Untersuchungen an der Schädelbasis. Arch. Anthropol., N.F. 16:1-103.
- *Ein paariger Knochen am Unterrand der Squama occipitalis. Anat. Rec., 12:357-62.

1918

- *Studies in the sex-ratio of man. Biol. Bull., 34:257-75.
- *The fontanella metopica and its remnants in an adult skull. Am. J. Anat., 23:259-71.
- *The position of the insertion of the pectoralis major and deltoid muscles on the humerus of man. Am. J. Anat., 23:155-73.
- *Relation of the external nose to the bony nose and nasal cartilages in whites and Negroes. Am. J. Phys. Anthropol., 1:329-38.
- *Observations on the canalis basilaris chordae. Anat. Rec., 15:225-29.

1919

- *Changes in fetuses due to formalin preservation. Am. J. Phys. Anthropol., 2:35-41.
- The development of the external nose in whites and Negroes. Carnegie Inst. Washington Publ. 272, Contrib. Embryol., 9 (34):173-90.

Asterisk denotes articles in which the author's first name is spelled "Adolf."

1920

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An apparatus for measuring the newborn. Johns Hopkins Hosp. Bull., 31:131-32.

1921

The occurrence of a sternal gland in orang-utan. J. Mammal., 2:194-96.

Fetuses of the Guiana howling monkey. Zoologica (N.Y.), 3: 242-62.

Sex incidence in abortions. Carnegie Inst. Washington Publ. 275, Contrib. Embryol., 12(56):177-91.

1922

Das numerische Verhältnis der Geschlechter. Nat. Mensch, 3:66-76.

Das fötale Wachstum des Menschen. Verh. Schweiz. Naturforsch. Ges. Bern, T. II:295-99.

Zygodactyly and its inheritance. J. Hered., 13:113-17.

1923

Bregmatic fontanelle bones in mammals. J. Mammal., 4:65-77.

Fetal growth in man. Am. J. Phys. Anthropol., 6:389-99.

1924

Preparation and preservation of anatomical and embryological material in the field. J. Mammal., 5:16-24.

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1926

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Studies on the variability of platyrrhine monkeys. *J. Mammal.*, 7:286-305.

1927

- Les variations chez l'homme et leur signification au point de vue de l'évolution. *Bull. Soc. Etude Formes Humaines*, 5:59-77.
Studies on the growth of gorilla and of other higher primates with special reference to a fetus of gorilla, preserved in the Carnegie Museum. *Mem. Carnegie Mus.*, 11:1-86.
La croissance foetale chez l'homme et autres primates. *Bull. Soc. Etude Formes Humaines*, 5:270-334.

1929

- The metopic fontanelle, fissure, and suture. *Am. J. Anat.*, 44:475-99.
The technique of measuring the outer body of human fetuses and of primates in general. *Carnegie Inst. Washington Publ.* 394, *Contrib. Embryol.*, 20(117):213-57.

1930

- Notes on the growth of anthropoid apes with especial reference to deciduous dentition. *Rep. Lab. Mus. Comp. Pathol., Zool. Soc. Philadelphia*:34-45.
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1931

The density of hair in primates. *Hum. Biol.*, 3:303-21.

Man as a primate. *Sci. Mon.*, 33:385-412.

1932

The hereditary tendency to eliminate the upper lateral incisors.

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Human variations. *Sci. Mon.*, 34:360-62.

The generic position of *Symphalangus klossii*. *J. Mammal.*, 13:368-69.

1933

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1934

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1936

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1937

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1938

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With W. M. Krogman. Anthropoid ape materials in American collections. *Am. J. Phys. Anthropol.*, 24:199-234.

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1939

Notes on diseases and healed fractures of wild apes and their bearing on the antiquity of pathological conditions in man. *Bull. Hist. Med.*, 7:571-82.

1940

The size of the orbit and of the eye in primates. *Am. J. Phys. Anthropol.*, 26:389-408.

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