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ARNOLD LUCIUS GESELL

1880—1961

A Biographical Memoir by

WALTER R. MILES

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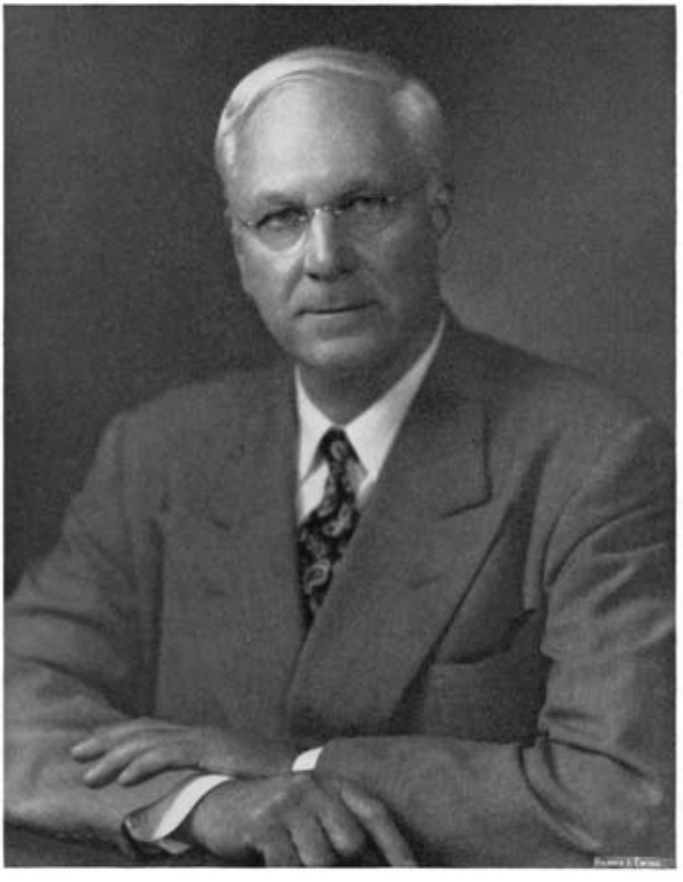

Arnold Gesell

ARNOLD LUCIUS GESELL

June 21, 1880—May 29, 1961

BY WALTER R. MILES

IN DOCTOR GESELL, PH.D. and M.D., psychology and pediatrics were blended in a strong and attractive personality who became a distinguished leader in the scientific investigation of the growth potentials and patterns of the human infant. He founded The Clinic of Child Development at Yale in 1911 and was its director until 1948, when he became professor emeritus. This clinic functioned primarily as a research center by operating as a service organization. It thus won the confidence of many parents and achieved fame in the greater New Haven area. Many parents gladly brought or sought to bring their young at scheduled periods for the Gesell tests and measurements that would result in the scientifically established norms for infant development. This lively research unit was associated with the Department of Pediatrics of the Yale School of Medicine and under the creative leadership of President James R. Angell later became a division of the Institute of Human Relations in 1929. Ten years later Dr. Gesell and his staff were annually producing a score of publications while conducting follow-up examinations on about 175 cases, with referrals from different agencies and persons of 600 to 700, mostly of preschool age, and 1,000 or more guidance and observational contacts centering on nursery children. The effort to study objectively human infant growth had thus taken on man-size proportions and was exerting nationwide influence.

Arnold was born June 21, 1880, in Buffalo County, Wisconsin,

in the town of Alma, the county seat, located on the western edge of the state, which is the eastern bank of the Mississippi River. About twelve miles northwest from Alma the Chippawa River, a Wisconsin waterway, joins the Mississippi. Alma, with no sister settlement on the other side of the river, was a two-story town. There was one long Main Street right next to the river and a parallel Second Street notched out of the bluff sixty feet higher up. Village life was observed from the riverside and the hillside points of view. This location provided hills for coasting and climbing and the river for sailing and swimming. Moreover, there was a good-sized riverboat with a big steam whistle that signaled events of interest at the dockside for both adults and children. Rafts of logs from the Chippawa and elsewhere were floated downstream and groups of loggers in their spiked boots wandered here and there, especially from one saloon to another. The boats often carried Negro roustabouts from the South and sometimes their show-off play provided great fun. There were drunkenness, accidents, occasional drownings, and many other exciting things to see. There were the occasional public funerals, at which children and adults marched around to view the remains of friends or strangers. Of course there were churches and schools. Alma was not a bad town; it was a vital, vivid, small stage where the drama of life was played right in the open for all to see and hear at close range. The northerly latitude, the hills and rivers, made the seasons distinct and interesting as a stage backdrop.

In his autobiography[1] Gesell comments on his life as a child in this thriving upper Mississippi River town. "Strange and sobering things kept happening as though they were part of the normal course of existence. None of these experiences was overpowering; but cumulatively they left a deposit in impression, which sensitized a background for my clinical studies in later life."

Born and reared in Alma, Arnold was the eldest of five children.

[1] *History of Psychology in Autobiography*, ed. by E. G. Boring, *et al.* (Worcester, Mass., Clark University Press, 1952). IV, 123–42.

He had two brothers and two sisters. Considering what he was to become and to undertake in his professional life, fortune had favored him. He had the panorama of human development unfolding before him and was in most intimate relationship with it. His temperament was such that he performed or shared in this closely knit family, without distaste, many of the duties of caring for his younger siblings. These intimate associations apparently influenced his own future.

Arnold's father had a strong interest in the education of his children, and his mother is said to have been an unusually successful teacher in a difficult elementary school. There was a local high school of good repute in Alma. The principal, who was held in great respect by the Gesell family, seems to have been a stimulating educator. Arnold was graduated in 1896. At the commencement exercises, in place of a program consisting only of speeches, some demonstrations were given. Arnold was one of the demonstrators. By electrolysis he filled a test tube with hydrogen, which he then ignited to produce a flash-bang climax. For his encore he had designed, with help from the village blacksmith, a large electromagnet, made in the shape of a horseshoe, its heavy winding connected to the local dynamo. The keeper for this magnet was an old-fashioned flatiron. The device was firmly fastened at a suitable height, the current was turned on, and the flatiron was suspended upside down, held by the magnet. And then, it is reported, the demonstrator grasped the flatiron's rugged handle with both hands and gently lifted his feet off the stage.

On occasion teachers' institutes were held in Alma and as Arnold was now sixteen and had the ambition to become a teacher he requested and was granted the privilege of attendance. Thus he became acquainted with Mr. C. H. Sylvester, the state institute conductor, and a friendly relationship developed between them. Sylvester gave Arnold a pocket microscope and accompanied him on a nature study trip to the high bluffs back of Alma, opening up a new horizon for this Wisconsin lad.

Arnold, born forty years after Wisconsin entered the union, seems to have adopted the state's motto, which was one word: Forward. When he learned that Sylvester was to be on the faculty of a new institution, Stevens Point Normal School, just then being developed among the pine stumps of Portage County about 120 miles east of Alma as the crow flies, he managed to get there and to enter the school. He liked his studies and the institution offered him good opportunities for development. He was captain of the second-string football team and editor in chief of the school paper, *Normal Pointer,* and won a series of local, state, and interstate oratorical contests. Sylvester, who had maintained his interest in Arnold, was his mentor, suggesting and supplying summer reading material. Among the courses Arnold took at Stevens was a stimulating one in psychology under Professor Edgar James Swift, a man who had been trained at Clark University and who in due course was to direct Arnold to Clark University and G. Stanley Hall. Arnold was graduated from Stevens Point in 1899.

Since a career as a high school teacher was Arnold's goal, he accepted a position in the Stevens Point high school as teacher of U. S. history, ancient history, German, accounting, and commercial geography, and coach and referee of football. However, this conglomerate teaching experience did not satisfy his intellectual drive. He resigned at the end of the year and took refuge, by means of a still longer journey from home, in Madison and the University of Wisconsin, which had been founded in 1848. History having been his strong subject, he turned especially to courses by Professor Frederick J. Turner, a leading student of the Western movement. Under Turner's stimulation he wrote a senior thesis entitled "A Comparative Study of Higher Education in Ohio and Wisconsin." He also took one or more courses in psychology with Professor Joseph Jastrow, who had been one of the early students at Johns Hopkins, and who had started a laboratory of psychology at Wisconsin in 1888. After two years at the University of Wisconsin, from which he received the B.Ph. degree in 1903, Arnold Gesell became prin-

cipal of a large high school at Chippawa Falls, Wisconsin, and had a very successful year with what he described as "a body of lively students." For the next two years, with the help of a tuition scholarship, he attended Clark University. The stimulation of Professor Swift at Stevens Point had by now changed his goal.

Clark University had gone through critical experiences in the years soon after it opened in 1889. Its income was drastically lower than had been expected. A large proportion of its faculty left when offered much higher salaries by President Harper, who was trying to recruit a staff for Chicago University. There was almost no money for plant development at Clark. However, its students and graduates were of excellent quality, due largely to the distinguished leadership of President G. Stanley Hall. Five years earlier Hall had organized at The Johns Hopkins University a department of psychology including a laboratory. He emphasized in his lectures and in the studies he directed the investigation of the abilities and mental traits of children. In Hall's case it had taken a long time and a great many shorter or longer contacts with professors and institutions, both at home and abroad, before he could settle on a field of study that he thought was practical and appropriate for the new age of science in which his life had been cast. His searching may be summarized in his own words:

> As my second stay abroad drew to a close and I had no prospect of a position I became, again, very anxious about my future, thought much of studying medicine and entering upon the practice of that profession, and finally decided that neither psychology nor philosophy would ever make bread and that the most promising line of work would be to study the applications of psychology to education. With this in view, and also with the desire to see something of the great men in other institutions, I spent the last months of this period in travel and in visiting schools.[2]

A glance through Hall's bibliography from 1882 to 1902, which numbers slightly over one hundred references, shows more than

[2] *Life and Confessions of a Psychologist* (New York, D. Appleton and Co., 1923), p. 216.

forty that relate to studies of childhood, its development, and the proper education of children. Thus he earned a reputation as having founded a new science, "child study." He demonstrated the breadth and importance of this field and succeeded in communicating this interest to his graduate students. Gesell's doctoral thesis was in this tradition, a research on jealousy, and he was awarded the Ph.D. degree at Clark in 1906. Gesell's loyalty to and regard for President Hall were very great. Many years after graduation he characterized Hall's genius in words that deserve to be quoted:

> Hall was the acknowledged genius of the group at Clark. Although the term genius is often over-used, we can safely apply it to his intellect. True genius may be regarded as a creative developmental thrust of the human action system into the unknown. Hall embodied such thrusts, almost inveterately, in his thinking and in his teaching. He had, in addition, an empathic protensity to revive within himself the thought processes and the feelings of other thinkers. This same projective trait enabled him to penetrate into the mental life of children, of defectives, of primitive peoples, of animals, of extinct stages of evolution. What if he could not verify his prolific suggestive thrusts, what if he seemed unsystematic and self-contradictory, what if he exaggerated the doctrine of recapitulation—he nevertheless was a naturalist Darwin of the mind, whose outlook embraced the total phylum, and lifted psychology above the sterilities of excessive analysis and pedantry.[3]

Science, like a fever, is communicated by personal contact.

For two years after completion of his doctorate at Clark University Gesell seemed to be looking for the right opportunity to work in the direction of his stirring interests and at the same time make a living. However, he had not yet settled on a specific professional objective. For a year he was an elementary school teacher and settlement worker at East Side House in New York City and incidentally was able to study an adult who suffered from delusions of a grandiose character. This study resulted in a publication. The following year (1907–1908) he went back to his home state as instructor in psychology at the State Normal School of Platteville in

[3] *History of Psychology in Autobiography*, ed. Boring, IV, 126.

Grant County near the southwest corner of the state and only some sixty miles from the University at Madison. At Platteville Gesell had his first opportunity to consolidate his teaching around a single subject which at the same time was new and much talked about. He had come from one of the most lively centers where this new science flourished and therefore he had many interesting facts and research results to communicate.

Gesell, who had been guided to Clark University by Clark graduates who were teaching in Wisconsin, would doubtless have remained, as they had done, in his native state, had it not been for an offer from the Los Angeles State Normal School. He was informed of this opportunity by Dr. Lewis M. Terman, who had been one of his fellow graduate students at Clark. The library facilities in the State Normal School at Los Angeles were unusually good, the teaching load was not very heavy, and there were stimulating associates including Terman, who was professor of psychology and pedology. Among Gesell's fellow teachers were Everett Shepardson, Wayne P. Smith, and two well-trained women, Jessie Allen and Beatrice Chandler. He acquired an orange grove near the school, built himself a bungalow, and on February 18, 1909, married Beatrice Chandler. In the summer of 1909 he and his wife spent some time in the east at a famous school, the Pennsylvania Training School for Feeble-Minded Children that had been organized in 1896 by Dr. Lightner Witmer, who was still its director. Witmer, a Leipzig Ph.D. of 1892, was now a member of the faculty at the University of Pennsylvania. His psychological clinic at Philadelphia was the first of its kind. The Gesells also spent some weeks reviewing the work at the Vineland Training School at Vineland, New Jersey. Here Dr. Henry H. Goddard, a Clark Ph.D. of 1899, was director of psychological research and was adapting and using the tests of Binet in a pioneering program of research on feeble-minded children. Gesell marked this visit at Vineland as the beginning of his professional interest in backward and defective children. Later he was to collaborate with Dr. Goddard in direct-

ing a summer course in the New York University summer school for the specialized training of teachers of backward and defective pupils.

During his second year of teaching at Los Angeles, Gesell became increasingly aware of his need for a better background from which to consider the problems having to do with backward children. It seemed to him this need could best be met if he knew something about medicine. Therefore he took the bold step of determining to broaden his education by attending medical school. He spent the year 1910–1911 at the University of Wisconsin, devoting his efforts principally to the study of human anatomy and histology. At this time Yale University was in the process of developing a department of education and had chosen Professor E. C. Moore, previously superintendent of the Los Angeles public schools, as its head. Moore invited Gesell to become an assistant professor of education in the newly formed faculty. It seemed a highly desirable move. Gesell accepted and was able to arrange to teach his courses in the graduate school at Yale and at the same time carry on his work as a medical student in the Medical Department. There he came into contact with Yandell Henderson, the noted physiologist, Russell Chittenden, the famous chemist, and George Blumer, in clinical medicine. Dr. Blumer, Dean of the Medical School, was very sympathetic with Dr. Gesell's plans to study retarded children and provided him with a room in the New Haven Dispensary. It was thus that a psychoclinic for children was established in 1911, and this constituted the beginning of the Yale Clinic of Child Development. The first paid assistant was Margaret Cobb Rogers. Dr. Gesell continued with his medical course and received his M.D. degree from Yale in 1915.

In the human race, development and achievement crown the multiple activities of growth and living. Progress is not uniform for all. Some are weak, some strong. There are the gifted and the handicapped, all products of genetics and environmental factors in life's laboratory. Dr. Gesell had matured a point of view and a be-

lief that this complex picture of human development could be better understood if scientifically analyzed; therefore he undertook to deal with what might be called the pathological aspects as represented in the subnormal child or the handicapped who were in schools or in special institutions. He had the capacity to interest others in his point of view and to inspire some who were in a position to administer educational institutions and funds for education. Shortly after he had earned his medical degree he was promoted to a full professorship in the Yale Graduate School with the condition that he could devote part of his time to serving as school psychologist for the State Board of Education of Connecticut. This was a unique professional appointment. He spent much time visiting rural schools for the purpose of identifying handicapped pupils and with the cooperation of teachers he worked out individualized programs enabling such children to make better progress. This led to the organization of special classes for these pupils, not only in city school systems, but also in county homes for dependent children.

In 1918 Dr. Gesell undertook a mental survey of the elementary schools of the city of New Haven and, having brought this to a conclusion, wrote a report entitled *Exceptional Children and Public School Policy,* which was published in 1921 by the Yale University Press. No doubt this had much to do with the development of an excellent system of special classes in New Haven which had been placed under the direction of Miss Norma Cutts.[4] The results of the earlier survey had been published, and Dr. Gesell prepared a manual entitled *What Can the Teacher Do for the Deficient Child?* The Governor of Connecticut in 1919 set up a Commission on Child Welfare. Dr. Gesell was a member of this group and prepared portions of a two-volume report dealing with the status of handicapped children and advancing formulations for legislative

[4] Professor Norma E. Cutts, Ph.D., was supervisor of a department of psychological tests and measurements for atypical children in the New Haven public schools from 1918 to 1947.

consideration. This weighty report was influential in creating sentiment for the subsequent formation of a Division for Exceptional Children under the Connecticut Board of Education. These community and state activities in which Dr. Gesell participated as a leader, and which required a great deal of time and effort on his part, exemplify his devotion to human welfare. They also gave him insight out of which grew a point of view from which to proceed in the activities of his later life. Through these experiences he came into contact with other trained individuals interested in clinical psychology, most of whom did not have a background of medical training. He became a member of a society organized in Baltimore in 1918 which called itself the American Association of Clinical Psychology. It did not survive very long, but the American Psychological Association, after much pulling and hauling, did set up a Standing Committee on Certification of Consulting Psychologists.

Work at the Yale Medical School continued and progressed. Dr. Gesell was seeing children by appointment and, in general, making each defective child an opportunity for study. Presently there came to his notice the remarkable physical and mental correspondence demonstrated in a pair of highly gifted twins. All these cases seemed to his mind to indicate strong evidence of profound, vaguely understood mechanisms of development, and his attention and interest gradually turned to the period of infancy and the preschool years. After careful and repeated observations he came to feel that more progress might be made by emphasizing normal infancy rather than backwardness. In the era of the First World War those in charge of elementary education sometimes referred to the preschool child as "no man's land." However, Dr. Gesell boldly walked into this area and in 1923 brought out *The Preschool Child from the Standpoint of Public Hygiene and Education.* Dr. Gesell states that his purpose now was "to define normative criteria which could be used in the diagnostic appraisal of normal, deviant and defective infants." He was not especially interested in the psychometry of intelligence per se, but rather in the diagnosis of the total

developmental status as expressed in motor, adaptive, language, and personal-social behavior patterns. His approach was and remained essentially comparative. He would take two pairs of normal infants of different ages into the clinic to demonstrate to the medical students. The children would sit on their mothers' laps, side by side. Before them were tables of suitable height on which various objects had been placed. In a short time the infants were reacting appropriately to the comparative occasion and simultaneously displaying their developmental disparity. This innovation was both pleasing and instructive to the students. It is not surprising that after some time a record of these clinics and of the observational work associated with them was put into shape for publication in a substantial book illustrated by 200 action photographs. It happened that the American Library Association, for the Committee on International Intellectual Cooperation of the League of Nations, chose this volume for inclusion in its list of thirty-seven "most notable books published in 1925." The child actors and actresses did not play to an empty house. A foundation patron appeared. There were generous grants from the Laura Spelman Rockefeller Memorial, and, later, from the Rockefeller Foundation, the General Education Board, the Carnegie Corporation, and, in the 1950s from the American Optical Company. Dr. Gesell has reported that all of these grants "created not only an opportunity, they created conditions of intellectual freedom for the research staff and director. In not a single instance was there the slightest interference, direct or indirect, in our research methods or objectives."

A clinical observer of the behavior of others usually recounts in words what he witnesses and attempts to chose terms that are both specific and graphic. A supplementary sketch or drawing greatly assists in clarifying meaning. Photography and motion pictures brought new possibilities in the conveying of scientific information. Dr. Gesell was abreast of his time in realizing the potential usefulness of these resources in studying growth and action in infants, using both slow-motion photography and time-lapse presentations.

The moving picture, employed in an unobtrusive manner and in naturalistic circumstances, could record the morphological aspects and help define the lawfulness of the moments of action in a behavioral episode; when these sequences were pieced together the film could present to other observers a whole developmental epic. Gesell recognized that cinematography by itself "bakes no scientific bread, but as a tool for psychological research its potentialities are inexhaustible." He began in 1924 to make some use of this facility in a small laboratory of the Yale Department of Education which was in a building at 28 Hillhouse Avenue. He was fortunate in securing the cooperation of the Pathé Review and carried out a first photographic survey of stage-by-stage development of the preschool child from early infancy to school entrance. Although it then was necessary to use arc lights, the infant subjects did not seem distracted. The resulting film record was entitled "The Mental Growth of the Pre-School Child" and a book of the same title was brought out, as mentioned above, in 1925. The clinic was growing and needed more room. Fortunately, in 1926 it could be moved to a more spacious and homelike location at 52 Hillhouse Avenue; it was moved again in 1930, this time to quarters built especially for it, in the Yale Institute of Human Relations on Davenport Street by the Medical School. Here it maintained a vigorous research and service program under Dr. Gesell's direction for eighteen years.

Increased budget support and the removal of the clinic to new quarters made it feasible to remodel the laboratory and studio arrangements. Significant among these improvements was the design of a blind to hide the cameraman and his scientific cohorts from the subject being studied. In this Dr. Gesell had the collaboration of Professor Raymond Dodge, a specialist in visual problems, who was a member of the Institute, and of Professor Henry Halverson, research associate in experimental psychology and a member of the clinic's staff. They worked out the theory and then built and installed a one-way vision observation dome. It had the contour of an astronomical observatory dome and was formed of finely perforated

material painted white on the inside. It could be rotated and there was a narrow slot that permitted lateral to vertical positions of the camera. The subject inside could not see out. Observers on the outside, in the half-darkened room, could readily watch and record what was going on inside the dome. A Pathé 35-millimeter camera was available; in place of the arc lights Cooper-Hewitt lamps, which gave soft, cool illumination, were installed.

Dr. Gesell was successful in attracting a staff with diversified training and considerable experience. Helen Thompson, Ph.D., was Research Associate in Biometry, giving particular attention to developmental examination methods and monitoring these in regard to standard procedures. Catherine S. Amatruda, M.D., was Associate Research Pediatrician. Diagnostic examinations were conducted by Burton M. Castner, Ph.D., Elizabeth E. Lord, Ph.D., Ruth W. Washburn, Ph.D., Marian Putnam, M.D., Frances L. Ilg, M.D., and Louise B. Ames, Ph.D., all experienced in clinical aspects of child behavior.

During the four years at 52 Hillhouse Avenue the primary program was to record and analyze the normative progression of infant development. When an increase in resources became available in 1930, a new member, Alice V. Keliher, Ph.D., was added to the staff to supervise a parallel naturalistic survey of the infant's daily life, under domestic conditions, with the mother present and caring for the child. This required arranging a homelike studio unit also equipped for 35-millimeter motion picture recording. This program, continued for two years, focused on the daily behavior of the baby: sleep, waking, feeding, bath, play, bodily activities, and social behavior. The films, stenographic notes, and other protocols made in the naturalistic survey and also those made for the normative progression program constituted the large body of source materials available for analysis and summarization. These results appeared in a two-volume work entitled *An Atlas of Infant Behavior* published by the Yale University Press, 1934. The normative volume presented the clinic's results for typical trends from age to age. The

other volume was devoted to the naturalistic behavior and was a compendium on individual differences in infants.

Dr. Gesell was fortunate in having married a brilliant woman with professional training, who had taught child psychology and who was a cooperative adviser and critic, following his work with interest and enthusiasm. They had children—a daughter and a son—and two grandsons and three granddaughters. These were not used as models or clinical subjects in the photographic dome. The daughter, Katherine, was graduated from Vassar and before she was married assisted in the compilation of the pictorial volume entitled *How a Baby Grows*. The son, Gerhard, was graduated from the Yale Law School and became an active attorney in Washington, D. C. Dr. and Mrs. Gesell's residence on Edwards Street in New Haven was a place of charm and sociability. As host and hostess they were both hospitable and generous, and many graduate students and medical students were frequently their guests. When the Institute of Human Relations was established at Yale, Dr. Gesell was in a pivotal position, since he belonged to the medical school and also to the graduate school, to pediatrics and to psychology. The Gesell home was consequently a place where students and young faculty from these different groups met each other and exchanged ideas. There was no one-way vision screen or cinema camera.

In the suite of rooms occupied by the Yale Clinic of Child Development in the building constructed for the Institute of Human Relations, one-way vision screens constituted a novel feature. The inside wall of the children's play-nursery in the basement was such a large screen, designed by Dr. Gesell and made of perforated sheet metal. The side facing the children was decorated by painted scenes appropriate for a kindergarten. Behind this long screen was a dark hallway in which researchers and visiting spectators could sit or stand. If they remained silent, the children were oblivious of their presence. Cooperative visitors were welcome. A large number of parents and others spent pleasant, instructive hours in silently

studying the spontaneous behavior of young children. Many parents rather unexpectedly through this means came to know their children's social reactions better, and henceforth were not quite so dogmatically proud of them. Observation through a lace-curtained window has long been practiced to satisfy curiosity and to pamper gossip. Among the parents of New Haven the Gesell window may at times have served a similar social purpose when observers knew who was who.

As might be expected, since Dr. Gesell's interest was wide-ranging, he devoted some time to the study of the infancy and domestication of farm animals and of pets. Dogs have been bred from infancy by willing and attentive generations of men. Nevertheless, as Dr. Gesell points out, the significant conclusion to be drawn is that the plasticity of even a gregarious beast is specific and selective and has not the capacity to make possible any rapid or radical alteration of character. His study of Kamala, the wolf girl, resulted in an article and also a book. He concluded that a human child adopted by animals represents an unusual kind of human conditioning, which does not call into question the grade and degree of plasticity in man. Much better comparisons, Gesell felt, could be made between the young of monkeys or apes and young human children. He went to considerable trouble to establish such correlations and in this matter had some consultations with his colleague, Robert M. Yerkes. He worked out a table of comparison between the Macacus Rhesus and man which seemed to show that, in spite of some lack of muscular control, the young monkey's development after birth progresses so rapidly that by the tenth week observers consider it fairly mature in all but the sexual activities. In some areas the Macacus showed progression in a day that the human infant would require a month to attain, a precocity ratio of 30 to 1. Gesell found such examples as the following: the monkey holds his head up steadily and gazes about at five days, the infant at three or four months; the monkey follows a moving hand with its eyes at six days, the infant at three or four months;

the monkey attempts to crawl at twelve days, the infant at nine months; the monkey is weaned at seven weeks, the human infant at six to twelve months. While Dr. Gesell was working on these matters he did not have at his disposal infant chimpanzee subjects. He made attempts to gather material from the literature and found that the human child at eighteen, twenty-four, or thirty-six months is usually solving some of the problems similar to those that mature chimpanzees under experimental conditions had been reported to solve. He concluded that it was questionable if mental age equivalents could be well established, since there seemed to be a basic difference in the behavior manner that ruined the comparison.

Fraternal twins, and especially identical twins, have always been objects of vivid interest. There are many traditions about them and numerous scientific studies of them. It remained for Dr. Gesell to conceive a new method of making use of twins to study the relationship between maturation and formal training. He called this "the method of co-twin control." In 1927, in collaboration with Dr. Helen Thompson, he undertook a comparative study in which two highly identical twin girls were observed from early infancy to determine, first, their developmental correspondence and, second, their developmental divergences, as these might be affected by training confined to one twin. These identical twins, T and C, showed a great degree of similarity which was established by elaborate and repeated examinations later documented in publications. At the age of 46 weeks twin T was trained daily in climbing a stair that had five treads and after seven weeks was able to perform the coordination complex in 26 seconds. Twin C, at the age of 53 weeks, without any previous training or experience, climbed the stair unaided in 45 seconds. Then twin C was trained for two weeks and at the age of 55 weeks required only ten seconds to accomplish this task. Twin C was at the age of 55 weeks far superior to twin T at 52 weeks, even though T had been trained for seven weeks in the beginning. These results, supported by minutely analyzed motion-picture records, seemed to lay bare important relationships between

learning and maturity. This method of co-twin control claimed wide scientific attention and was adopted by others working in this general field.

Dr. Gesell was a potent leader in making clear the important relationships that may exist between medicine and psychology and he did much to establish the point of view that psychology is comparable to physiology as a fundamental or partner of medical science. The developing human body is subject to profound laws of growth and an adequate clinical science must be founded upon good principles and methods of developmental diagnosis. It was cheering to Dr. Gesell that in 1935 the American Board of Pediatrics established the field of Growth and Development as a basic requirement for specialty certification. By the Gesell type of persistent study, research, and publication, the evolution of preventive medicine moves forward in its service to man.

By the late 1940s there had developed a demand for postgraduate training in the methods of developmental diagnosis. The Yale Clinic was in a position to do something about this through establishing medical externeships for physicians specializing in child psychiatry and pediatrics. The clinic had a sufficiently diversified out-patient clientele to afford ample variety for observation and diagnostic teaching. Dr. Gesell and his staff organized a systematic two-year course that involved cinema studies and full-time clinical observations and reports and was designed as a standard requirement for specialization in this field. A number of externes from the United States and abroad were so trained. Widening of the horizon for responsible departments of pediatrics may be considered the crown of Dr. Gesell's life work. Through his tireless efforts he had brought new light, careful surveys, and some systematic understanding to what had formerly been a vague and rather dark no man's land. He had promoted a strong campaign to educate doctors, teachers, parents, and the public in the science of human development.

The traditional life calendar rules for academic retirement oper-

ated at Yale as elsewhere. Dr. Gesell reached this descending stairway at the end of June 1948, but he knew where to go and what to do and had the physical and mental vigor to carry on. Fortunately, others were aware of this, and he was invited to become a research associate in the Harvard Pediatric Study under the director, Dr. Francis McDonald. This study had been organized to foster better understanding of the developmental view and concept for those who were supervising child health work for numerous groups of G. I. families in Cambridge, Massachusetts, under the aegis of Harvard. Dr. Gesell was associated with this activity from 1948 to 1952. And there was a second opportunity that came to this Emeritus Professor who had demonstrated his ability to see where others had groped for light. This was a two-year research grant labeled "For the investigation of the developmental aspects of child vision." Naturally, visual perception had not been entirely neglected in former investigations at the Yale Clinic of Child Development. Sustained visual fixation, early eye movements, eye-hand behavior, and tests of visual skill had been included in routine scientific appraisals. Also, Dr. Gesell had personally made a four-year study of the mental growth of a blind infant, but vision as such was a worthy field for a correlated intensive effort and Yale University generously extended its facilities for this purpose. Two skilled researchers in visual optics were added to the staff to make objective determination by various standard optical instruments and other analytical procedures. Thus several developmental trends were carefully mapped for a score of age levels from birth to the age of ten and the findings were analyzed, interpreted, and published as *Vision: Its Development in Infant and Child.*

As a student, Gesell was distinguished and had been elected to Phi Beta Kappa, Sigma Xi, and other select groups. As a scientist who made the bold attempt to cultivate both psychology and medical pediatrics, he easily qualified for membership in more than the usual number of professional associations; probably this reduced the chances that he would be elected the president of any one of

these societies. However, of the six main national professional associations to which he belonged he was elected president (1952–53) of the American Academy of Cerebral Palsy. He had been elected to the National Academy of Sciences in 1947 at the age of sixty-seven; his teacher, G. Stanley Hall, had been elected in 1915 at the age of sixty-nine.

How can such a man as Arnold Gesell, whose thinking, work, and vision were always projected forward, reach a life's terminal? The best ending is to see others take up the course. And so it was that in 1950 former staff associates of the Yale Clinic brought about an independent organization, the Gesell Institute of Child Development, incorporated to continue this field of endeavor, and found a location on Prospect Avenue, New Haven. There Dr. Gesell, who for twenty years was Attending Pediatrician at the New Haven Hospital, gave of his counsel to the end of his days.

KEY TO ABBREVIATIONS

Am. J. Dis. Child. = American Journal of Diseases of Children
Am. J. Med. Sci. = American Journal of the Medical Sciences
Am. J. Orthopsychiatry = American Journal of Orthopsychiatry
Am. J. Psychiatry = American Journal of Psychiatry
Am. J. Psychol.= American Journal of Psychology
Am. J. Publ. Health = American Journal of Public Health
Ann. Am. Acad. = Annals of the American Academy of Political and Social Science
Arch. Neurol. Psychiatry = Archives of Neurology and Psychiatry
Child Health Bull. = Child Health Bulletin
Childhood Educ. = Childhood Education
Conn. State Med. J. = Connecticut State Medical Journal
Genet. Psychol. Monog. = Genetic Psychology Monographs
J. Am. Med. Assoc. = Journal of the American Medical Association
J. Appl. Psychol. = Journal of Applied Psychology
J. Comp. Neurol. = Journal of Comparative Neurology
J. Educ. Res. = Journal of Educational Research
J. Genet. Psychol. = Journal of Genetic Psychology
J. Home Econ. = Journal of Home Economics
J. Natl. Educ. Assoc. = Journal of National Education Association
J. Pediat. = Journal of Pediatrics
Ment. Hyg. = Mental Hygiene
Ped. Sem. = Pedagogical Seminary (In 1924 became Pedagogical Seminary and Journal of Genetic Psychology)
Psychol. Bull. = Psychological Bulletin
Psychol. Rev. = Psychological Review
Sat. Rev. Lit. = Saturday Review of Literature
Sch. Soc. = School and Society
Sci. Mo. = Scientific Monthly
Yale J. Biol. Med. = Yale Journal of Biology and Medicine

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