

Piaget, Jean

**a**bout a quarter of a century ago, when the eyes of science were focusing on the vastness of space and the minutest particles of matter, American educators began seeking new guidelines in preparing children for the new era. Psychologists studied the processes of learning but their experimental subjects were rats and mice. Meanwhile, on a lakeshore in Switzerland, a tall, stoop-shouldered man with horn-rimmed glasses and a meerschau pipe had for years been studying children.

Since 1920 Jean Piaget has asked the age-old question: how does the human mind acquire knowledge? He approached the philosophical question in terms of the

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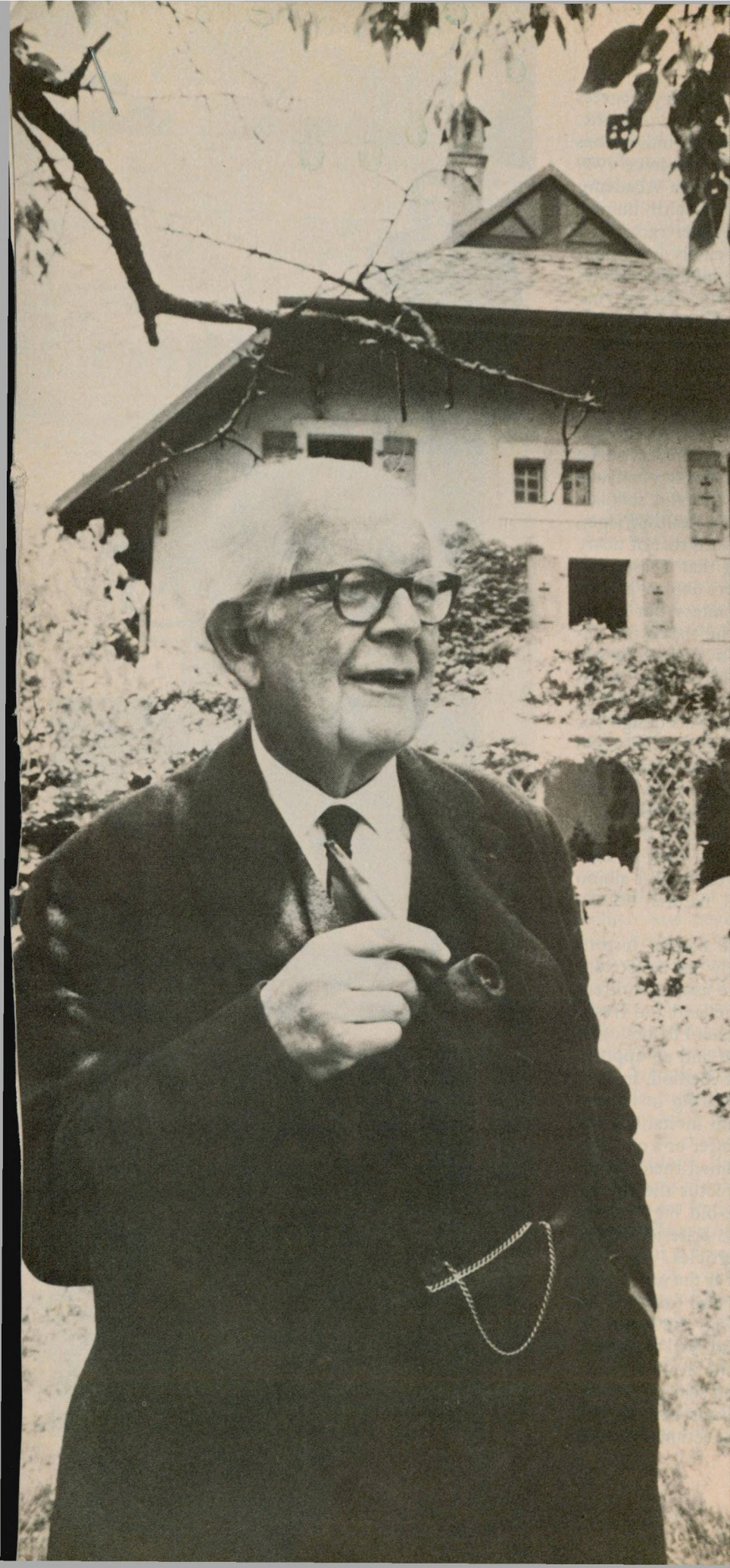
MD PERSONALITY

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mental processes of childhood. The result, described in some 40 books and 500 published papers, is a still controversial model of the human mind and its intellectual growth from birth to adulthood.

Jean Piaget's impact in psychology has been enormous, especially in the United States where his students have spread through most major university departments of psychology. Many rank his schema of intellectual growth with Sigmund Freud's edifice of the emotions; others class him with Freud and Albert Einstein as one of the three great revolutionary thinkers of the era. His critics are equally vocal, and when he was asked what he does when the philosophers do not follow his psychology and the psychologists fail to understand his philosophy, he replied: "I wait."

Between 1936, when Harvard made him an honorary doctor at its tercentenary, and 1970 when Yeshiva University similarly honored him, Piaget has gath-



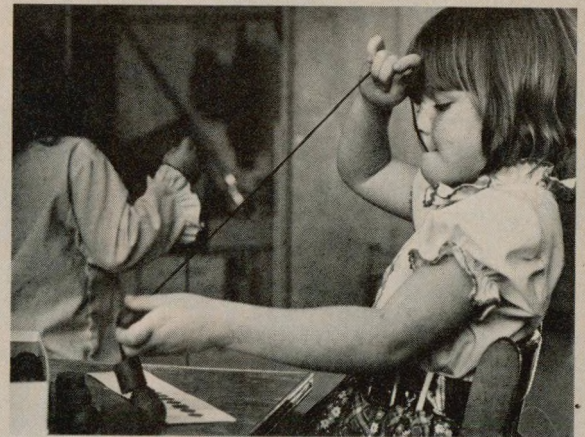
ered seven science prizes and 26 honorary degrees and professorships on both sides of the Atlantic. He has delivered endowed lectures at universities and institutes throughout the world and since 1949 he has been a member of the New York Academy of Sciences. He accepts his honors with humor, reminding his admirers that he has never received a degree in psychology: his doctoral thesis at the university of Neuchâtel in 1918 was on mollusks. Nonetheless, two years ago he received the first international award for psychiatry of the Kittay Scientific Foundation and received the accolades of distinguished psychiatrists who told him that his models of a child's mind provided major keys to the understanding of neurotic and schizophrenic disorders.

**BOY SCIENTIST.** Jean Piaget was born on August 9, 1896, at Neuchâtel, the son of a medievalist who mistrusted much of what passed as history and was pleased that the boy did not follow the same scholarly path. His mother had poor mental health; Piaget, tracing his own growth as he has traced that of many other children, counts it significant that in escaping from the troubled home atmosphere into a private world he found his refuge not in fantasy but in the scientific world of facts. For this he thanks his father's critical mind and example of systematic work.

The boy's first interest was mechanics, and when he was still too young to be allowed pen and ink he wrote a pamphlet in pencil describing his design for an "auto-vap," a cross between a wagon and a steam locomotive. He roamed the Neuchâtel lakeshore studying shells, fossils, birds; his next effort, in ink, was a book on "Our Birds," which his father dismissed as merely a compilation. His third try achieved publication: he was ten and in his first year of Latin school when a one-page note on a part-albino sparrow was printed in the local natural history journal.

This success and a letter to the natural history museum asking permission to study its collections after hours won him an invitation to assist the director, a specialist in mollusks, with the land and freshwater shells; his reward for after-school labors came in specimens for his own collection and an apprenticeship in malacology and scientific method. In 1911 his articles on mollusks began appearing in natural history journals, which brought him invitations for talks with fellow scientists and the offer of a curatorship in Geneva's museum. He declined them all, finally confessing to the museum director the embarrassing fact that he was a 16-year-old high school student; the director, finding age no criterion of excellence, continued to publish his articles.

Although he still pursued science at the university, a series of "crises," as he called them, between his 16th and 20th years turned him from the future in zoology on which he was already so well-launched. His adolescent struggle took philosophical form: he confronted first the conflict between science and religion, in which his devout Protestant mother had reared him; then he sought a connection between





*Professor Piaget, top, on his way to his office. Children in the Piaget curriculum engage in interests that assist in understanding seriation and classification, opposite center, that enable them to discover the results of coordinated action, opposite bottom, that help them understand kind and quantity, above, that promote interrelated thinking.*



biology and the mystery of how the mind acquires knowledge. He read and wrote so intensively that his health suffered and he was sent for a year's rest in the mountains. On reexamining his youthful writings of this period, Piaget found in them the germination of ideas that guided his life's work.

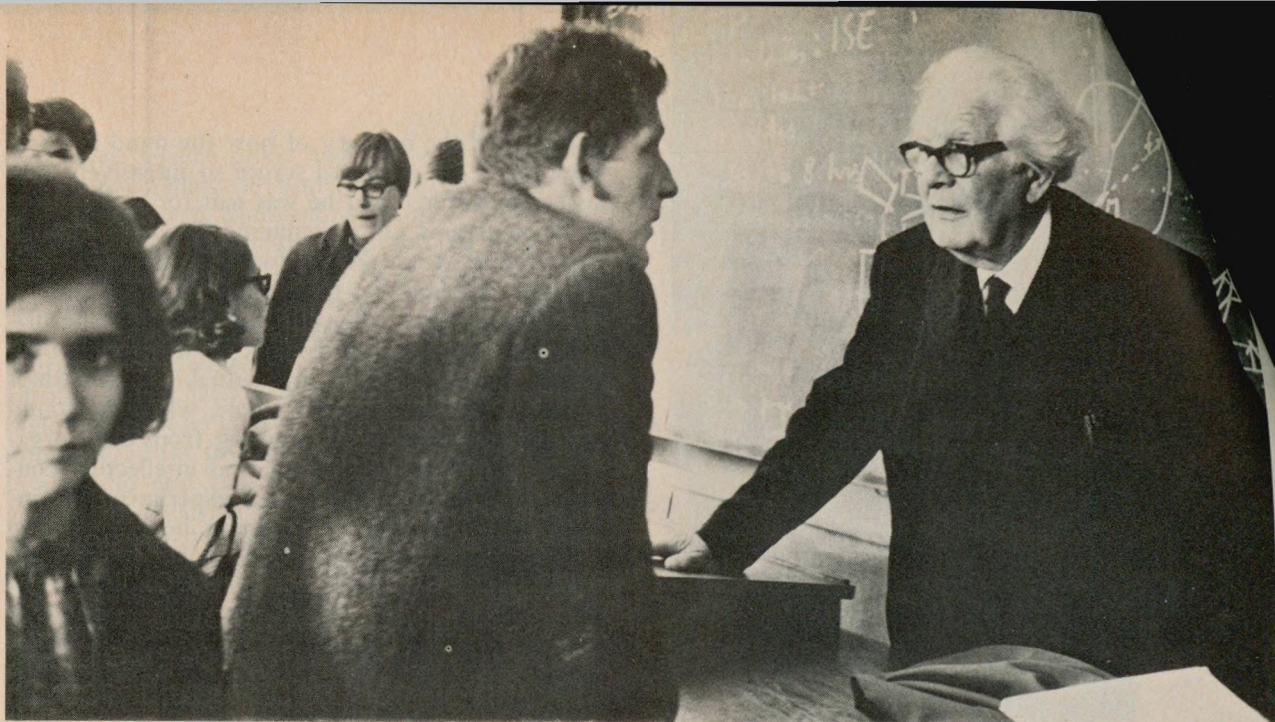
The philosophers disappointed him: their speculations had no experimental basis. He devised his own system, based on stable and unstable relationships between the parts and the whole, which he found logically applicable to everything from cells, organisms, and societies to moral and intellectual concepts. Unwilling to submit his experimentally untested system to scientific criticism, he wrote it into a philosophical novel *Recherche*, published in 1917.

**EXPLORER.** The next year, with his doctoral degree in hand, the 22-year-old explorer of the mind went in search of experimental methods by which he could test his embryonic structuralism in relation to cognition. Psychology now seemed to him the key, but in Neuchâtel psychology was still an academic offshoot of philosophy and had no experimental laboratory. He went to Zurich, where he both taught and worked in psychology laboratories and at the Bleuler Psychiatric Clinic, incidentally becoming acquainted with psychoanalytic theory and hearing Dr. Carl Jung lecture, then on to the Sorbonne where again he took courses in psychiatry. There Théodore Simon, Alfred Binet's collaborator, offered him the job of standardizing the Burt reasoning tests in the Binet laboratory in a Paris grade school.

Piaget began the project with little enthusiasm but he soon became absorbed, not with psychometrics but with the children's answers, especially the wrong ones. Adapting the psychiatric interview techniques he had learned in Bleuler's clinic in Zurich, out of which later developed the Piagetian "clinical method," he began his lifelong search into the processes by which children acquire and organize knowledge.

Two years of exploration into the child's mental world, done with the Burt test questions and with stimulus situations that he devised, resulted in four published articles and an invitation to the Institut Jean-Jacques Rousseau at Geneva as director of studies. He took the post on a trial basis, planning to devote about five years to child thought and then return to the construction of a psychobiological epistemology. But awaiting him were an eager group of students, a school full of children in the institute's Maison des Petits ready-made for his work, and an institute director, Eduard Claparède, who willingly gave him a free hand; he had discovered not only his field of work but his scientific home.

Between 1921 and 1925 he produced a series of experiments that made him internationally famous before he reached the age of 30. The publication in 1924 of *The Language and Thought of the Child*, the first of five books reporting these experiments, brought him criticism but also began the stream of invitations to speak at universities and professional



*Professor Piaget in discussion with a student at Geneva before his retirement from his active teaching post.*

meetings that has continued for a half century.

This acclaim made Piaget uneasy: he saw the books not as a final statement but rather as a preliminary map for further explorations. His self-critical eye also saw that he had drawn his conclusions up to that point from children's verbal expression without regard to behavior. He later returned to the children of middle years, from 7 to 12, when they are able to engage in logical "concrete operations" with actual objects but cannot yet express the logic of these relationships in words.

Even before his experiments had been fully published he had begun to remedy the omission with observations of child behavior under his own roof. During these richly creative five years he had married Valentine Châtenay, who had been his student assistant from his first year at the institute. In 1925 their first child, Jacqueline, was born; a second daughter Lucienne arrived in 1927 and a son Laurent came in 1931.

Father and scientist became blended in the Piaget nursery and his experimental play with his own children gave him priceless insights into the basic steps in adaptation during the preverbal first two years of life. Some of his discoveries of these years are now imbedded in child-development literature: that in the infant's self-centered world out of sight is literally out of existence; that young children play and talk beside but not with each other; that babies of eight-to-ten months attracted by an object remain gazing at the hand that held it, and only at a later stage of growth do they look for the object.

**CHILD MIND.** In the Binet laboratory school Piaget had discovered that to normal children under the age of 11 or 12 some of the simplest reasoning problems presented difficulties never suspected by adults, and in 1929-1939 he returned to this age

group to pursue their concepts of number and quantity. He found that at three or four a child believes that a tall narrow glass contains "more to drink" than a short wide one, that six coins in a row are more than the same six in a pile, that a lump of clay rolled out in sausage shape contains more clay than the same lump molded into a ball. At six or seven he begins to take not one criterion, such as the height of the liquid, but several into account, as does an adult: this is learning by integration, a process in which new criteria are integrated with the old ones in making a judgment. It also involves a basic step in reasoning: the child has seen the same amount of liquid poured from the squat glass into the tall one; Piaget called this the acquisition of "conservation."

Growth also occurs by substitution: the young child believes that the sun and moon follow him when he walks, that dreams come in through the window while he sleeps, that anything that moves is alive and that inanimate objects have feelings and intentions, for example, the table on which he bumped his head meant to hurt him. With more experience he substitutes his new knowledge for the old.

Moral judgment in particular grows by substitution, as Piaget discovered by telling children such stories as this one: a boy helping his mother trips and breaks a dozen cups, and another boy reaching for forbidden jam in a cupboard breaks one cup. Young children felt the first boy deserved severer punishment because he broke more cups, a judgment based on the amount of damage done or, in Piaget's terms, objective morality. Older children found the second child more to blame because he had been deliberately disobedient, an expression of subjective morality based on the culprit's intentions.

Another story elicited judgments about lying: one boy told his mother he had seen a pink elephant

in the street to a monkey organ-grinder's while another reported he had made a score on a test when in fact it was 65. Young children thought the first boy's lie was worse because it was "bigger"; older children said the elephant story was merely to amuse people but the test story was meant to deceive and therefore more reprehensible.

Piaget's discoveries came at a time when the social scientists were sharply divided on the question of nature versus nurture: the British and especially the Americans were environmentalists, seeing the individual as a product of his experience; they defined learning as behavior modified by experience and their outstanding achievement was the behaviorist school of psychology. The Europeans held that heredity was the determinant, a belief that became distorted into Nazi racist doctrines but also led to the Gestalt school with its emphasis on the organization of experience by the innate mental structures of the individual.

Piaget took a middle path: some early experiments with mollusks suggested to him that heredity and environment acted reciprocally, and in his work with children he saw the same interaction taking place in mental growth. Children's early conceptions about purpose and motivation in inanimate objects also struck him as similar to the animism of primitive man: these ideas could be neither inherited nor learned in the traditional sense but could be explained as spontaneously evolved by an organizing mind acting on perceptions of the external world.

His work in Zurich had interested Piaget in psychoanalysis, and in 1922 he read a paper on dreams before the Psychoanalytic Congress in Berlin, where he met Freud. For a time he used Freudian theory in interpreting childhood myths. He also studied Gestalt theory, with which he shared the doctrine that the mind acts on information from the environment instead of merely accepting it like a photographic plate, but he decided that the Gestaltist structures, while adequately describing perception, did not extend to reasoning, or what he called logical operations.

As his formulations became more complex, Piaget turned to mathematics, especially group theory, and expressed his models in logicoalgebraic form. But his base remained biological as it had been from the beginning. He saw the balancing function of organisms, or homeostasis, as extending to psychological structures as well, and he distinguished between stable and unstable equilibriums, reversible and irreversible steps in mental growth.

Summarizing the complex Piagetian models are four principles of growth. First and simplest is the principle of integration and substitution, in which new concepts develop by adding to or replacing the old. Second, with conservation, comes the ability to distinguish between appearance and reality. This remains on the concrete level through the middle childhood years, then gradually extends to the symbolic or language level. Adolescents begin to appreciate

metaphor, irony, the double meanings of puns and wordplay: such classics as *Alice in Wonderland* and *Gulliver's Travels* are simple adventure tales to younger children but have satiric and social significance to teenage readers. Formal logic, the next level above the logic of action, also develops during adolescence.

The third Piagetian principle is that the mind does not merely copy reality but organizes it: the simplest example of this is the patterns seen in cloud formations. Finally, many kinds of learning occur not in response to reward and punishment but spontaneously and without conscious intention, for example, in remembering as opposed to memorizing; in this principle Piaget again emphasizes his concept of thought as a positive but unconscious action.

Many experimental psychologists dismissed Piaget's early work as unscientific and criticized his apparently haphazard explorations into the child mind by simply talking to children, although in fact his experimenters have a year's training in the techniques of framing questions without suggesting answers, and following an answer with counter suggestions



*Piaget with animals by Etienne Delessert is from How the Mouse Was Hit on the Head with a Stone and Discovered the World, a book for 6-year-olds.*

to test the subject's conviction. When his findings began to be taken seriously in the United States, his doctrines of the unconscious organizing activity of the mind and of learning without the motivation of reward ran counter to the environmentalist and behaviorist schools. Since then many of his studies have been repeated by other investigators with more precise procedures, achieving significantly similar results; also, many Piaget tests are in use by educators to evaluate their own procedures and by psychologists as a possible basis for a new intelligence scale. But much of his work is still so little understood

that he is invoked as authority both for formal education in the preschool years and for unstructured methods based on play.

On his visits he is usually asked what he calls "the American question": if learning proceeds by stages, cannot these stages be accelerated? He answers that it takes a kitten three months and a baby nine months to learn that the object that has been hidden from view behind a screen is still there, but the child is capable of going much farther in learning than the kitten and so perhaps the nine months have not been wasted. He suggests that each stage may have an optimal time, dependent on both the individual and the subject matter, and that to discover this will require more research.

**HALF CENTURY.** Early in his 50 years at the Institute, Piaget rose to the directorship; he reorganized



*At a conference at the University of Houston, Piaget chats with Professor of Psychology Dr. Richard Evans, left, and Dr. Bärbel Inhelder, Piaget's associate.*

it on its affiliation with the university, where it now corresponds to a department of psychology, and in 1955 he founded the International Center for Genetic Epistemology, his term for the developmental aspect of cognition. Funds from the Rockefeller and Ford Foundations and the Swiss National Foundation for Scientific Research contribute to the center, which is also under the Geneva university aegis.

His professorial appointments proliferated so that for periods he was teaching at Neuchâtel, Lausanne, and the Sorbonne, as well as at Geneva, and his courses embraced psychology, sociology, the philosophy of science, and the history of scientific thought, in addition to his special field of experimental psychology. In 1929 he became director of the International Office of Education, sponsoring annual conferences of educators from some 45 countries; when UNESCO joined in sponsoring these meetings, Piaget became president of the Swiss UNESCO commission, a co-director of the department of education and a member of its executive council. When the Swiss Society of Psychology was founded, he served as its president for the first three years; he

has been president of two and a member of 20 international societies, co-editor of two Swiss and six foreign scientific journals. Each year he traveled abroad to give lectures, read papers, accept awards, and exchange ideas with his foreign colleagues.

Meanwhile the experiments that were central to his work continued without interruption, with the help of devoted assistants: he explored children's concepts of numbers with A. Szeminska, of physical quantity with Bärbel Inhelder, of space and time with E. Meyer. The study of time concepts grew out of a discussion with Einstein, whom he met in 1931 at Davos and again in 1953 at Princeton when Piaget spent three months at the Institute for Advanced Study.

The stream of publications also continued, reporting on his infant studies with his own children, and on numbers, time, space, "spontaneous geometry," ideas of chance, logic in young children and adolescents. The *Etudes d'Epistomologie Génétique*, begun in 1957, came to 30 published volumes by 1973.

When asked how he has managed to accomplish so much work, Piaget answers that he is a worrier by nature and work is his relief from anxiety; he has also said that he cannot think without writing. Through most of these years he spent his vacations in a secret mountain retreat, writing; he has also maintained throughout his life the daily habit of a long solitary walk after lunch, after which he continues working.

The study in which he works is large but so filled with books and papers, stacked on shelves, on ranks of tables, and interspersed with pots of Alpine plants, that mountain climbing skills are needed to reach a wanted book. Yet Professor Piaget knows every book's precise location. He travels light, with two small bags, across oceans and continents, but with a hidden, collapsible third bag for collecting new varieties of *Sedum*, the tiny Alpine plant, his only known hobby besides children. His fatherly affections extend to the Institute where, according to his friend Professor Gilbert Voyat of New York's City College faculty, Piaget created not only a unique research center but an extended family.

Since his retirement Piaget's teaching and administrative posts are divided among three persons, one of them Professor Inhelder who has been his collaborator since 1938. He still holds the directorship and takes an active part in his own creation, the International Center for Genetic Epistemology, where psychologists gather from around the world each year for a symposium on their progress in epistemological study. In the United States the Piaget Society, founded at Temple University in 1971, is establishing a collection of his works, and Professors Willis Overton and Hans Furth are editing a *Yearbook of Developmental Epistemology* in collaboration with the society.

**SUMMING UP.** By Professor David Elkind of the University of Rochester: "After becoming acquainted with Piaget's work, teachers can never again see children in quite the same way as before." 