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## INFANTS OF A FORAGING PEOPLE

"When he is born an infant is far from being a *tabula rasa* . . . from the start there is a marked bias to respond in special ways to several kinds of stimuli that commonly emanate from a human being—the auditory stimuli arising from a human voice, the vocal stimuli arising from the human face, and the tactile and kinesthetic stimuli arising from human arms and body."

John Bowlby

*Attachment and Loss*

"My belief is that a child is innately wise and realistic. If left to himself, without adult suggestion of any kind, he will develop as far as he is capable of developing."

A. S. Neill

*Summerhill*

Along the northern half of the border between Botswana and South-west Africa, extending east and west for about 100 miles and ranging north into Angola, live a nomadic people most of whom hunt and gather for a living, and have always done so. They refer to themselves as *Zhun/twasi* (often referred to as !Kung Bushmen, or, simply !Kung), which may be sensibly glossed as "the real people." In recent years they have been the subject of meticulous and stimulating research in social anthropology (Marshall, 1960, 1961, 1965) and of less intensive research in physical anthropology (Tobias, 1966) and health and nutrition (Bronte-Stewart, *et al.*, 1960).

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"The real people" are short, averaging about five feet in height, lean, muscular, light-skinned, large-buttocked, with flat as opposed to prognathous faces, kinky hair growing in separated tufts rather than in a continuous mat, high, plump cheeks and rather Oriental-looking eyes. They are distinguished in these and other details of physique and physiology from the surrounding black African peoples, and are considered by racial typologists to be part of a separate race, usually called Khoisan. (This name combines the respective words for "person" in two of the numerous Khoi-san languages.)

According to archeological and historical evidence available, populations ancestral to the modern-day Khoi-san peoples once occupied all of Southern, East Central and Eastern Africa, and parts of Central Africa. Roughly three thousand years ago the larger, darker-skinned, iron-using, agricultural peoples of the Sudan began moving Southward through the Great Rift Valley of East Africa, the only North-South corridor accessible to human movement on a large scale, supplanting the native Khoi-san peoples by, apparently, a program of conquest followed by eviction or domination or assimilation. Before the arrival of white invader-colonists, these Bantu conquerors occupied all of Southern Africa. The whites, mainly of Dutch, English and Portuguese descent, initiated various plans of conquest including, incidentally, the sporadic, but quite deliberate, extermination of the Khoi-san peoples. The latter occasionally redoubled the rage of the settlers by fighting back. But they mainly dwindled.

Today they exist in only a few weak, backward, isolated pockets, in the least accessible corners of Southern Africa, their trials evidently far from over. They are being impressed as counter-insurgents into the service of imperial armies and, thanks both to their extremely low political consciousness and to their history of oppression at the hands of Bantu peoples, they are easy prey to the blanket divide-and-rule policy of the white minority oppressors.

The *Zhun/twasi* are a specific linguistic and cultural subgroup of the Khoi-san peoples, numbering roughly ten thousand of the total of roughly fifty thousand. Those *Zhun/twasi* who live in Northwestern Botswana, an independent African state, are free from the disturbances mentioned in the last paragraph and, in spite of long contact with Bantu cattle-herding peoples, maintain a completely distinct way of life which has probably not changed very much in many thousands of years.

They live in an ecozone classed as semidesert, in villages or camps of roughly thirty people in which each nuclear family has its own

small, temporary grass dwelling. The feel of an empty village-camp is nothing so much as delicate: eight or ten grass houses shorter than a man's height and about as wide, arranged in an elliptical ring a hundred or a hundred and fifty feet long, with small openings in the grass for doors, all facing centrally, and a small grey blotch in front of each where the fire was. A full village, say, at evening, is, of course, animated and noisy. Children are playing or singing and dancing or arguing in the central part of the camp. All fires are lit, with adults sitting around them, cooking and talking. Some fires have only individual married couples or women alone, others collect half a dozen people, depending on various people's inclination to visit. The desire to be alone is respected but found puzzling by most people. No-one lives in the band except by a close blood or marriage tie to someone else in the band. You go through life in virtually constant contact with your relatives.

The feel of the people, once one gets to know them, is anything but delicate. They are tough, resilient, funny, bawdy, bright, capable, gentle but sarcastic in most relations, down-to-earth, unromantic, independent and individual in character and inclination, but deeply needful of human succorance and affiliation.

Their subsistence ecology is complex and flexible in strategy and technique, but their technology by Western standards is extremely simple. The men hunt with the bow and arrows poisoned by a substance found in certain insect larvae, or with spears and dogs, or trap small animals and birds with a twig and string noose type of arrangement. The women gather nuts or berries or dig for roots with a sharpened, polished digging stick. They alter many aspects of their style of making a living in accord with the richness of the year, the movements of large game, and the changes of the seasons. There is much inter-band variation, but average diet consists of about half vegetable foods. They worry about meat and the gamble involved in going after it, but vegetable foods are always available within a few miles' walk. They are nowhere near the edge of starvation, their diet is well balanced, and they have at least as much leisure time as the average middle-class American (Lee, 1968). Nevertheless, the natural elements and the vagaries of water and food availability have a patent and extensive influence over their lives.

The research in infancy and early childhood to be described is part of a five-year multidisciplinary study of the Botswana part of the popu-

lation which extends previous research, emphasizing subsistence ecology (Lee, 1968), health and nutrition (Trusswell and Hansen, 1968), population genetics, demography, child training, and archaeology. The theoretical perspective of the project is that of the evolution of human behavior, and its goal is the discovery of selective forces that may have acted during the Pleistocene, and their possible effect on behavior evolution.

The present research in developmental ethology aims at a general description of infancy and early childhood among the Zhun/twasi. The necessarily small sample size makes it possible to examine very diverse aspects of early behavior and development, including neonatal reflex capacity and behavior, the growth of primary attachment and separation, cognitive and motor development in the first eighteen months, and the growth of peer directed social behavior during what corresponds to our American "pre-school period." The methods used include cognitive testing, simple experimentation, neuromotor assessment, physical measurement, and, most important, systematic and casual observation of mother-infant pairs and groups of two-to-five-year-olds in their natural setting. Such observation is easy and rewarding in a society in which everyone is outdoors most of the time and the inside of the small houses is open and accessible.

The general goals of this research are multifold, and include the following:

- 1) description of infancy and early childhood in a very foreign culture, using techniques of investigation as closely as possible similar to those that have been used in describing the same developmental periods in the United States and England, so that
- 2) the effects of an early experience much more radically different from any that can be artificially generated in an experiment on Western infants, practically or ethically, or by crossing class lines, can be delineated and separated from
- 3) the possible universal features of human early experience, behavior and development, which this research proposes (not *confirms*; *proposes*) and from
- 4) possible racial difference which can, *to some extent*, be established by observations and tests of newborns;
- 5) the description of infancy and early childhood in a foreign culture which is by no accident a hunting and gathering, or foraging culture, in fact one of the last remaining exemplars of the way of human

life which occupied human beings very thoroughly for upwards of a million years, or, for all biological intents and purposes, the entire experience of man on earth; which is by no means to say that the Zhun/twasi are exactly like what people were like a hundred thousand years ago, or any other time during the Pleistocene; only that they are more like that than the urban families which are the typical subjects of infancy studies, and more like that than, for that matter, anyone else, apart from a handful of other atavistic survivals.

The implications of #5 above are:

6) that we should be able to delineate *some* of the selective forces influencing the evolution of human infant behavior, maternal behavior, early development, early experience, and the sequelae of all these things in adult life, and

7) these findings should guide us in our effort to understand the behavior of infants and mothers and the growth of ability and personality in advanced technological societies, since the latter are nothing more than the very meagerly adjusted products of hunting and gathering cultures confronting an instantaneous, relative to the total of human history, eco-revolution. It will answer definitively *none* of the following questions: what are the basic capacities of babies and mothers, what is natural for them, what is easiest for them, what is bad, what is progress, what is sacrificed to progress; but it will cast some light on all of them.

While many different theories have provoked the various aspects of the research, the theory we are using to make sense of them together is natural selection. This perspective has organized the research along two major lines of inquiry. First, what items and patterns of early behavior and development can be said to be present in a sample of infants very disparate in culture, physical characteristics and subsistence ecology from the one in which they were first observed? The answers to this question will help to establish a species-specific ontogeny and early behavior catalogue for man, so that he can be assigned a place in the phylogeny of such catalogues. Second, what is it about the hunting and gathering way of life, which dominated more than 95% of our species' history, that has given the observed developmental patterns and behaviors adaptive value? What evidence can be found of selective forces which may have acted on maternal behavior, infant behavior, and developmental patterns during man's long foraging experience during the Pleistocene?

The results of the first few months of this research, reported below, are preliminary and non-quantitative. They consist of the impressions we have gained from our first efforts to apply instruments and codes for assessing behavior which were designed to describe infants and children in Western societies. They deal only with the most coarse similarities and differences. Except for the data on fear of strangers, the descriptions are based on observations of eight newborns, eighteen infants in the first year and one half, and ten children between ages one-and-one-half and five, living in four small villages distributed over about one hundred miles.

**Prenatal selective effects: birth, family planning, and eugenics.**

Zhun/twa women are remarkable for the equanimity and independence with which they approach pregnancy and childbirth. There is no medical supervision of pregnancy or delivery, and there are no midwives or other expert native persons traditionally concerned with birth. A woman is very much on her own. When the first uterine contractions begin, she simply leaves the village alone or with one or more other women. The delivery is completed in the bush a short distance away. If the infant lives, she returns with it to the village.

She may resume her normal activities at once, or rest for a few days, depending on her inclination and condition. There is no ritual lying-in period before or after delivery. The infant is not put to the breast until the colostrum has run out, and he may be nursed by another lactating woman or simply wait for two or three days until his mother's breasts engorge with milk.

The Zhun/twasi believe that the foetus is formed by the union of semen with menstrual blood, and they abstain from sexual intercourse during menstruation in an effort to avoid pregnancy, and also because it may "make a man sick." In addition to this error, two successful methods of population control have been reported by Zhun/twa informants.

The first is post-partum abstinence from sexual intercourse for periods varying from two to fifteen months. Here also, the conscious effort to avoid another pregnancy is supported by the belief that sexual relations during this period are injurious to the man.

The second method, which many Zhun/twasi report to have been

practiced commonly until recent years, is infanticide. This was accomplished by burial of the infant within seconds after birth, probably before it breathed. Infants reported to have been abandoned in this way include those born too soon after a sibling (provided the latter was still alive), one of a pair of twins, and certain instances of malpresentation and malformation, such as breech birth, or absence of limbs or ears.

With the exception of the last-mentioned use of infanticide, all these population control measures have the same rationale in the folkways: a woman cannot nurse more than one infant at a time, and in order to grow strong and healthy an infant should nurse for at least two to three years. A mother's only responsibility is to the infant alive and growing, and therefore births must be well spaced.

Another possible source of pressure for birth spacing is that a woman out gathering cannot routinely carry two infants in addition to sometimes half her own weight in bush foods. Therefore an infant should be able to walk some distance without tiring or fussing before his mother bears another child. As Bowlby (1969, citing personal communication from J. W. Anderson), has pointed out, an apparently well-coordinated two-year-old can decline into neuromotor chaos as soon as mother is up and moving. One Zhun/twa three-year-old with a three-month-old brother pestered his mother and her gathering companions incessantly with his begging to be carried. One morning his mother decided to leave him at the village with his father and grandfather and go gathering with the baby only. Before she had walked one hundred yards his wailing brought her back again, and she didn't go gathering that day.

In addition to these deliberate efforts there is some evidence that lactation itself may reduce the likelihood of conception (Birdsell, in Lee and DeVore, eds., 1968: 243). Thus the Zhun/twa prolongation of lactation for reasons of health and growth may inadvertently help space births.

The practice of abandoning breech presentations was eugenic in purpose. When we asked what would happen if such a baby were kept, one man said, "People would talk about it and say it had no sense because it was born backwards." Research on infants delivered after a breech presentation has demonstrated large departures from the normal pattern in intensity of certain leg reflexes during the first ten days (Prechtl, 1961). Sequelae of these signs are as yet unknown, but

breech birth is generally considered dangerous by obstetricians. According to a basic obstetrics text,

In breech delivery possible trauma is fracture of the thigh, ruptured spleen or liver, fracture of ribs, fracture of the humerus, rupture of the cords of the brachial plexus, as well as serious cerebral damage (Rhodes, 1967: 228).

Whether the Zhun/twa belief about breech presentations is a matter of coincidence or of quasi-scientific tradition is open to speculation, but the latter seems not beyond the capacities of people who have discovered the two genera of indigenous beetles that make effective arrow poison. Malformed infants were abandoned because they were "not good" and because "people wouldn't like them." Zhun/twa informants say the practice of infanticide has died out as a result of the threats and advice of Bantu and Europeans.

Normal infants of either sex born three years or more after their siblings are as desired and precious to men and women as anything in their lives. A new infant born at an opportune time does not restrict a woman's life, it expands it, drawing attention and help to her from everyone around. A woman of child-bearing age without an infant on her hip or toddling behind her most of the time is an unusual and somehow awkward sight. Barren women are profoundly sad and ill-adjusted, from the Zhun/twa point of view as well as ours. They seem always to be looking for something to do.

#### Biological background of development.

*The reflexive capacity of the newborn.* One aspect of the research involved a fairly detailed study of behavioral capacity and response in newborn Zhun/twa babies. Briefly, this research has revealed no major departures in newborn reflex capacity from the typical European pattern. However, it has revealed differences in the way this capacity is taxed by experience.

For example, most newborns (East African, European, or Zhun/twa), will after the first few days, when placed in the prone position, exhibit some effort to lift the head and move it from side to side, and show crawling movements in the legs. Most also, when held in the upright position, will exhibit stepping responses to appropriate stimulation of



the feet. Infants on their backs, in cribs, have little use for these patterns, long considered quaint and useless signs of the immaturity of the nervous system. Zhun/twa newborns, however, are carried in a sling, which keeps them upright and pressed against the mother's side. No clothing separates the infant's skin from his mother's, and one typically sees sleeping babies with faces pressed into the mother's flesh. From time to time, either spontaneously or in response to postural changes of the mother, the newborn will press his arms against her and twist his head from side to side, or, using his legs as well, twist his entire body. These movements, the components of which are the same as the elicited movements mentioned above, may function to reduce the necessity for the mother to adjust him, and may even prevent him from smothering in her skin.

*Vegetative activities.* "Demand" feeding in America means feeding the infant when he cries, and this conception of it developed because crying is the only signal that can be perceived at the distance mothers in Western society often maintain from their infants. Zhun/twa infants are certainly fed when they cry, but more often long before they cry. The mother, with the infant against her skin, or in her arms, can literally feel his state changes. She makes every effort to anticipate hunger. Waking up, moving, gurgling, the pucker face, the slightest fret, a change in the rate of breathing—any of these may result in nursing. No strict diaries have as yet been kept, but infants through at least the first year are nursed many times a day (twice an hour would be a conservative estimate) for from thirty seconds to ten minutes each time. It would be most sensible to describe Zhun/twa infants as *continual feeders*.

Maintenance of temperature and state is facilitated through skin-to-skin contact with the mother's body. Whenever it is cool, or when



there is a breeze, mothers are very reluctant to break this contact. They are also fairly careful about keeping infants out of the sun for the first two or three months but since they are often in light shade, or part of the infant's body is exposed to direct sun at times, there is no sunlight "deprivation." Babies on the mother's side asleep are constantly rocked by her walking and by the movements of her ordinary activities. When the baby is small enough his body is rocked by her very breathing.

Elimination has no social consequences for Zhun/twa infants (though it does for problem "bedwetters" in later childhood). Before he can crawl easily the infant routinely urinates and defecates in someone's lap. Usually he is not even moved until it is finished, and it is cleaned up with no comment whatever. Gradually, as he acquires control and mobility, he is told to leave the house, and, after he is walking well, to leave the village. In many observed episodes no infant or child has ever been in the least upset in connection with elimination, nor, for that matter, has any adult.

#### Milieu of development in the first year.

From the first weeks of life Zhun/twa infants, when awake, are carried not on the back, but on the hip or side in a sling contoured to support the back, buttocks, and thighs, leaving the head, arms, and in older infants, the lower legs, free. In connection with this posture, it is worth noting some remarks of Gesell and Amatruda concerning the six-month-old sitting up:

His eyes widen, pulse strengthens, breathing quickens and he smiles when he is translated from the supine

horizontal to the seated perpendicular. This . . . is more than a postural triumph. It is a widening of horizon, a new social orientation (1947: 42).

Zhun/twa infants are held in this position virtually from birth. The horizontal is almost unknown to them during their waking life. From their position on the mother's hip they have available to them her entire social world, the world of objects (particularly work in the mother's hands) and the breast. The mother has immediate easy access to the infant. When the mother is standing, the infant's face is just at the eye-level of desperately maternal ten-to-twelve-year-old girls who frequently approach and initiate brief, intense, face-to-face interactions, including mutual smiling and vocalization. When not in the sling they are passed from hand to hand around a fire for similar interactions with one adult or child after another. They are kissed on their faces, bellies, genitals, sung to, bounced, entertained, encouraged, even addressed at length in conversational tones long before they can understand words. Throughout the first year there is rarely any dearth of such attention and love.

Nor is access to the world of objects in any way restricted, although there are no infant toys. Infants are always swiping at, grasping and manipulating beads and other objects hanging around the mother's neck, or playing with, or just staring fixedly at some object or work in the mother's hands. When they can sit alone and begin to crawl the entire natural world is open to them—sticks, grass, rocks, nutshells, insects, dung, and the ubiquitous sand—and they exploit it just as Western infants use toys, with the difference that nature never gets boring, and yet is somehow orderable. Furthermore, because all objects and work belonging to adults exist on the ground, infants are never restrained from exploring them, or separated from them by tables, cupboards, or other barriers. Exploration is actively encouraged by adults and such objects are often used to distract fretting babies. They become regular targets for the phrase "look at that" by the second week.

#### Infant signalling and adult responses.

Crying, the pucker face, and sub-cry vocalizations are the infant's most powerful survival weapons. They appear on the first day of

life and remain important items in the behavior repertoire throughout early childhood. While sound spectrographic analysis might conceivably reveal differences between Zhun/twa infants' and Western infants' crying, the naked ear does not. It is the same intensely unpleasant sound that one wants to hear stopped immediately. The rhythmical cry and the pain cry, described for infants in Boston (Wolff, 1969), are easily differentiated, the latter being much longer for the first few cries, higher in pitch, and arrhythmical. They as well produce different responses. While rhythmical crying in infants over one-year-old produces no response in anyone but the mother or caretaker, one observed instance of a pain cry in a four-year-old (the boy had burned himself) elicited orientating reactions from everyone in the village and approach responses from a dozen adults. It is not the case, however, as Wolff found for American infants (1969), that mothers are very variable in their responsiveness to rhythmical crying, either in speed or style. Zhun/twa mothers never ignore rhythmical crying during the first year, whereas Wolff's mothers often did, at least temporarily. This is partly because one or more walls routinely separate infant and caretaker in Boston, while here infants are never alone in a distant room. The crying is much more disturbing to the caretaker and to everyone else.

If the infant is with a caretaker other than the mother, the caretaker will make a brief attempt at quieting and then carry the infant to the mother. Unless the infant is completely satiated the mother almost always responds by trying to nurse him. Mothers never use objects other than the breast as pacifiers. If nursing is ineffective or partially effective, rocking and singing are the next responses, often with the infant pressed, front-to-front, against her chest and shoulder. Often the singing is done loudly into the infant's ear in an effort to drown out other stimulation. Sometimes, when fretting first begins, the mother will say "Unh-unh, unh-unh" (meaning *no*) repeatedly and rhythmically, or talk loudly but pleasantly into the infant's face in an effort to distract him. During the course of these efforts, she will try nursing several times, and often the infant must be partially quieted through rocking and singing before he will nurse. If he does not quiet in a few seconds, she will rise and walk him while rocking, singing and nursing, and maintain a distance of at least twenty feet from the group she was sitting with when the crying began.

Some common causes of crying are hunger, over-stimulation (including being played with too much), frustration in pursuit of a goal,

and "wind." Since infants are unclothed and soiling tended to immediately, wetness is never a cause of crying. At about five months, offering an interesting object emerges as an effective way to stop crying.

Smiling appears in the first few days of life, though not quite in its mature form. But people recognize and respond to it as smiling, with announcements to each other, laughing and increased social and physical stimulation of the infant. By at least the second month people try repeatedly, with some success, to elicit social smiles by bouncing the infant or stroking his cheeks with simultaneous face-to-face interaction. Positive vocalizations are treated with similar, though not as intense, interest.

### The growth of mother-infant interaction.

By the time an infant can crawl away from his mother (around 8 months) and begin to explore the world alone, he has developed two important patterns of social behavior: first, a strong attachment to his mother as a specific person; second, that at least incipient fear of strangers. He is born with the basis of social behavior. His crying draws his mother to him and produces responses in her that relieve his distress. His hunger and oral reflexes result in interaction with her breast, and his skin-to-skin contact with her gives him warmth and tactile comfort. His interest in complex, changing, noisy things makes him look at his mother's face. By smiling he can make her smile and vocalize, or even make his surroundings explode with human sounds. By dint of these powers he is a social animal at birth. But he is not capable of attachment, which takes several months to develop. From the point of view of selection, attachment must be fully developed by the time independent locomotion begins, so that following and flight to the mother will develop simultaneously with crawling and walking. A young child lost in the bush would be subject to thirst, hunger, freezing temperatures in winter, and the predation of leopards, lions, hyenas and other carnivores, of which even adults are afraid. Attachment is top priority adaptive behavior from the time the first exploratory creep is taken. By European standards, as indicated by all proximity-maintaining behaviors, Zhun/twa infants are strongly attached to their mothers, and it may be this very attachment that makes possible the exploration of so hostile an environment.

Considerable attention has been given in recent years to describing the behavior patterns that make up attachment (Ainsworth, 1963; Bowlby, 1969). These patterns, covering a broad span of levels of development and levels of behavior description, include the following: visual-postural orientation; rooting and sucking; crying and stopping of crying; smiling; non-cry vocalization; grasping and reaching; separation anxiety; approach; following; greeting; climbing and exploring; burying of face; use of the mother as a base for exploration; flight to the mother; clinging. When these behaviors occur more often in relation to the mother than anyone else, attachment, by Ainsworth's definition, has begun.

All these patterns have been observed in Zhun/twa infants during the second half-year. But listing all these behaviors and giving them a label does not make an explanation of the growth of attachment. While Bowlby's (1969) "ethological" formulation—which greatly de-emphasizes the role of feeding and reinforcement learning—is very helpful in terms of what to look for, it is somewhat confusing in terms of the etiology of attachment behavior, at least in Zhun/twa babies. This is probably because (in observable, not theoretical, terms) nursing is a manifestly important part of their lives and of their relationships to their mothers. The frequency of nursing and freedom of access to the breast from birth to weaning are very high. The first instance of the use of the mother as a base for exploration occurs when, by the second month, the infant stares at interesting sights while relaxed by suckling. At five months he may vocalize continually while nursing and from time to time be answered by his mother. By eight or nine months he begins to fondle the free breast while nursing, and though this behavior is persistent and not entirely gentle, most women in no way discourage it. It continues until weaning, which, if the mother does not conceive again, may be as late as six or eight years. Nursing is an experience engaging the whole body, associated with extension-flexion movements in the legs and pelvis, moving skin-to-skin contact with the mother, sometimes dramatic state changes, the pleasure of sucking, and the assuagement of hunger. As the infant passes through the second year, it gradually becomes the one reason for approaching the mother's body, for which the approach is never refused. Finally, all attachments of any kind between Zhun/twa *adults* involve continual giving and receiving of food. Perhaps feeding is an unimportant aspect of attachment in England, or even in Uganda, but here it emphatically is not.



In assigning an important role to feeding I do not mean to rule out other factors already mentioned; I want to stress one factor that has been de-emphasized in recent theorizing. I am suggesting that both the innate features of social behavior—crying, interest in faces, smiling—and reinforcement learning, with not only feeding, but also warmth and tactile stimulation as reinforcers, contribute to the growth of attachment during the first half-year.

### The growth of responses to strangers.

Between seven and nine months of age, Zhun/twa infants (like their Western counterparts) who formerly have played happily with anyone, develop a discriminating uneasiness in the presence of strangers. With a kind of Hebbian perspicacity, Zhun/twa mothers see it as a sign of wisdom. The fear of strangers (also called "stranger anxiety" and "eight-months anxiety") has been a popular subject for research in developmental psychology (e.g. Ainsworth and Wittig, 1969; Morgan and Ricciuti, 1969), and its etiology a subject for extensive theoretical controversy (e.g. Bowlby, 1969). It is of interest to ethologists because it is the earliest instance of agonistic behavior, and because it has the apparent adaptive function of removing the infant from a potentially dangerous, or at least unknown, individual.

The reaction is markedly more extreme than what we are familiar with in Western infants, often characterized by immediate loud screams, headlong flight to the mother, clinging and nursing, even though she is only a few feet away. Clinging and nursing may be maintained for as long as the stranger is close by. (Compare the mild responses of one-year-olds to a similar test in America: Ainsworth and Wittig, 1969.) The fear is more difficult to overcome, sometimes requiring days of familiarity, giving of food, entertaining, and so on, with the active co-operation of the parents. It also persists much later in development. The response to strangers reported for British pre-school children by Blurton Jones (1968) of presenting the stranger with an object has never been observed among Zhun/twa children of a comparable age in any context. There is no approach at all until familiarity has been established.

There are several possible explanations for these differences, but the simplest is that Zhun/twa infants have much less experience with strangers. Western infants, or at least the urban ones that have been the subjects of most studies, see or meet strangers many times a day, and so their fearful responses to strangers in general and to any given stranger habituate more quickly. Though Zhun/twa infants do see some strangers, as people move from camp to camp, it is only a tiny fraction of the number Western infants see. To Zhun/twa infants the class of strangers, as well as the individual stranger, is strange.

From an adaptive viewpoint it is worth noting that Zhun/twa children between eighteen months and five years spend considerable time playing together on the *out-skirts* of a sedentary camp, though never out of the earshot of adults. This pattern of social behavior may produce a selective advantage for fearful responses to strangers beyond the first eighteen months. (This is a different order of explanation. It does not remove the problem of etiology, i.e. the developmental mechanism through which natural selection gets translated into child behavior.)

The distribution of several specific fearful responses may be of interest. The flight response appears as soon as the motor capacity for flight exists, and it invariably carries the infant not only away from the stranger, but to the mother. Like the crying response, which emerges earlier, it functions to bring the infant and mother together, and not merely to separate the infant from the stranger.

Clinging to the mother is a common component after nine months. It is also a component of non-fearful attachment, appearing during nursing and in other attachment contexts from the first few days, and a component of the infant's posture during certain kinds of transport by around the same age.

Nursing is commonly associated with visual fixation of the stranger's face by infants who, when not nursing, immediately avert. This is an instance of the use of the mother as a base for exploration.

Mouthing of the hand is a very common response in older infants who show no other scored behavior, fearful or positive, but seem to be trying to make up their minds, or perhaps just "waiting it out." This may have a function similar to nursing at a lower level of arousal, but it in no sense derived from nursing, since hand-to-mouth activity resulting in self-quieting can be seen from the first few days of life.



### Attachment, imitation, and subsistence play.

While attachment has important immediate adaptive dividends, it has some long-range ones as well, because it functions to maintain proximity with effective models of subsistence and reproductive behavior. By the end of the first year (within a few months after attachment itself develops), well-differentiated, deferred imitation (Piaget, 1962, p. 62) of the elementary components of adult subsistence activities (pounding with a mortar and pestle, digging with a digging stick, and others) appears, as does the imitation of singing, clapping, and dancing. Adults delight in these early accomplishments, and spend much time trying to encourage and re-licit them. Infants under one year of age may be encouraged to inspect and chase after, and even bite, large insects, which they gladly do.

By the second-half of the second year, autonomous exploration is well-established, two-word phrases are replacing baby noises, and infants engage in social play with slightly older children, usually in imaginative imitation of adults. The interest of both boys and girls in animals continues to expand, and by the age of five they take interest and pleasure in bothering and killing them. It is very striking that most of the component behaviors in rough-and-tumble play—chasing, fleeing, laughing, jumping, play-noise and play-face (Blurton Jones, 1967)—can be seen in Zhun/twa children annoying large animals (dogs, or cows belonging to neighboring herding people) or in their trying to kill small ones. One further component of this pattern that is not usually cited in rough-and-tumble play is the completed and often effective “object beat” (striking with an object).

All these activities take place within earshot, if not within sight, of adults, and the activities themselves are obviously child versions of

adult life. Such imitation is characteristic of British children as well, but there it is not often something the child will eventually do for a living that is imitated, but rather things like astronaut, cowboy, and soldier. Girls in both societies, though, occupy themselves with “playing house”—cooking and serving food, going to bed, and so on.

The continuous acquisition of subsistence behaviors from one year of age into adulthood is very evident among the Zhun/twasi, and imitation is a primary mode of learning such behaviors. Attachment, or the maintenance of proximity to models, makes this process possible.

### Separation and the growth of social behavior.

The attachment which insures the infant's immediate survival and enables him to learn social interaction patterns and elementary subsistence behavior must finally decline to prepare the mother for a new infant and to prepare the child for independent social interaction outside the family. The mother, the infant, and the attractiveness of the world outside the mother all contribute to the development of separation.

Exploration using the mother as a base begins by seven or eight months, at the same time that flight behaviors and the more advanced components of attachment—approach, clinging, following, and flight to the mother—are emerging. During the first half of the second year, these components combine with several earlier components of attachment—smiling, laughing, positive vocalizations—to form a new social interaction pattern between mothers or other adults and infants, usually initiated by the adult. The adult runs slowly away from the infant, eliciting the following response, then turns and makes a frightening face or noise, eliciting the flight response, and gives chase, only to turn and repeat the pattern again. The presence of smiles, laughing, and especially of clinging when the infant catches the adult before he turns around, make the roots of this pattern in attachment very plain. At the same time, the flight response derives from earliest agonistic behavior seen in relation to strangers.

This pattern, an elementary, adult-child form of rough-and-tumble play, thus derives its components from both attachment and agonistic patterns and is in an objective sense what psychoanalysts call *ambiva-*



lent behavior. It is the first tiny dent in the unequivocal indulgence of infants by adults that is characteristic of the first year. Its adult-child form continues into middle childhood, but shortly after emerging gives rise to several child-child variations.

By eighteen months to two years the child spends considerable lengths of time playing with children of two, three, four and five. At any time a village may have five such children, or three, or only one or two. They may play among themselves or with older children, who probably play an important part in their lives. For much of the time, though, their world is a kind of large playground in which adults and older children are going about their business. It differs structurally from the nursery schools of England and America in several important respects. First, there is unlimited space, and most objects of interest—sticks, grass, sand—are available in unlimited quantity. Second, there are no peers, strictly speaking, because village populations are too small for there to be, say, several three-year-olds. Differences of a year or less at this age are large and obvious to the children. They are expected to look on older children as models and objects of dependence, and on younger ones as responsibilities. For these reasons there is comparatively very little real or play fighting among children in this age group here. Rough-and-tumble play is usually either stylized, as when one child pretends to be an animal that the others are attacking, or else it takes a mild form that consists, in spite of the available space, of laughing, hugging and rolling around on the ground together. In this mild form it grades into another kind of social play discussed below.

Children are not lacking, however, in aggressive behaviors (or, by inference, aggressive feelings). They do snatch food or objects from one another, but this is mediated by the age difference. The older child either nurtures the younger one, or overpowers him; in either case there is no struggle. More elaborate fighting behavior can be seen, however, in relation to parents. Unlike the passive tantrums we are familiar with, a Zhun/twa tantrum is often characterized by beating, object beating, and throwing of objects, all directed at the mother, in addition to frowning, grimacing and crying. Mothers are quite serene as the tantrum progresses, often laughing and talking to other adults while they ward off the tiny blows. They do not respond with the immediate anger characteristic of Western mothers hit by their children, but usually allow the episode to run its course. The Western tantrum,

characterized by aimless thrashing and flailing of limbs with the same facial expressions and vocalizations, may be the result of parental "training out" of real aggressive acts. If aggression is something that can be *displaced* or *redirected*, then this difference in the acceptability of real aggression against parents may help to account for the relative lack of fighting among young children in Zhun/twa society.

Similarly, the aggressive feelings expressed in rough-and-tumble play, may, among Zhun/twa children, find an adaptively appropriate "outlet" in relation to animals. In evolutionary terms, the basic primate pattern of rough-and-tumble play has become, in part, specialized in man to serve the acquisition of hunting behavior.

One further pattern of social play is common among one-to-five-year-olds. Its components are mutual touching, tangling of legs, clinging and rolling while lying on the ground. The absence of laughing, the slowness of movement, and the unlikelihood of standing up are what distinguish it from the mild form of rough-and-tumble play. Unless it includes explicitly genital activity (which also occurs during this age period) this behavior, which might be called "gentle-and-tumble" play, is ignored by adults. Its derivation from parental attachment behavior is very apparent, both from the shared behavior components and from the fact that this play may take an imaginative form in which the older child takes the role of parent. The influence of parents as models is all-pervasive.

In later childhood gentle-and-tumble play is never publicly seen (although grooming shares several of its components). Rough-and-tumble play very much like that of British nursery school children becomes increasingly common until late adolescence. In contrast, the attitude toward animals at first becomes more serious and restrained, but the final adult pattern, with respect to game animals, at least, is reminiscent of the excitement of four-year-olds chasing butterflies.

## Discussion

Many psychologists now recognize the importance of evolutionary perspective in theorizing, but this is often limited to the view of an infant as developing *into* an adapted organism. While this is certainly true, it is sometimes allowed to obscure the fact that an infant is first of all, and at every point in his development, an adapted organism. He is first of all surviving, and in the meantime developing.

As in most populations, but especially non-technological populations, the mortality rate among the Zhun/twasi in the first five years of life is much higher than in any comparable span before the end of the breeding period. Consequently selection pressures during this period, however obscure, are very strong. Selection asks, as it were, "How well is the child surviving *now*?", and not just "What will he be when he grows up?"

The implication for Western urban behavior and development is that selection pressures, both those affecting adults and those affecting infants, have changed, and we can understand (and perhaps influence) the course of behavioral evolution by understanding the changing factors affecting species-specific human infancy.

### Conclusion

This report—fragmentary, diffuse, but hopefully emergent—has described what we have learned so far about the first five years of life among a hunting-and-gathering people, and the selective forces that may be affecting it. Certain preliminary conclusions are possible.

Indications are that Zhun/twa Bushman infants are more strongly attached to mothers and other caretaking figures during the first two years, and are cared for more intensively during this period, than their Western counterparts. This doesn't mean that they love their mothers more or that they are more loved. It only means that in terms of objective (observable and describable) behavioral criteria that have been used in research to assess attachment, they are more attached. They are more "cling-y," nurse more freely and more frequently, spend more time (much more) in physical contact and immediate proximity with their mothers, and are more dramatically disturbed by the approach of strangers.

Mothers, for their part, make themselves more continuously available to infants and respond faster and rather more subtly to their needs. They behave generally in a way that most American mothers and pediatricians and even grandmothers would call "spoiling." Zhun/twa mothers, on the other hand, would consider it very remarkable to see a woman cooking in one room of a large house with her baby alone in a crib in a room far away; to see that in the course of a day the two spend only a couple of hours in physical touch with each other; to

see that the breast is offered only a handful of times in a day, if at all. They would be shocked and then somewhat amused and finally rather contemptuous of someone who followed this advice of Dr. Spock in his latest edition of *Baby and Child Care* (Section 300: How do you unspoil?): "Make out a schedule for yourself, on paper if necessary, that requires you to be bush with housework or anything else *for most of the time the baby is awake*. Go at it with a great bustle—to impress the baby and to impress yourself. When he frets and raises his arms, explain to him in a friendly but very firm tone that this job and that job *must* get done this afternoon. Though he doesn't understand the words, he does understand the tone of voice. Stick to your busy work." (First italics mine, second Spock's.) It appears from the context that Spock is talking about a baby not much more than six months old.

A Zhun/twa woman would say words to this effect: He has no sense yet, so he cries. He wants to be picked up. You pick him up, so that he'll stop crying. Later, when he's bigger, he'll have sense, he'll understand, and he won't do that any more.

But this woman could never envision what a difficult and profoundly lonely task it is to be a mother in America. She would take it for granted that her New York or London counterpart were, as she is, interminably surrounded by a network of loving, friendly, attentive people—other women, men, children of all ages—each of whom in some manner defrays part of the human cost of tending to that baby. The all-too-typical fact of a woman at home on a cloudy day alone with two small children hour after hour after hour, an extraordinary *fact* of life in Western culture, would never enter the Zhun/twa woman's saddest imaginings. One can't take Dr. Spock to task for trying to make it easier for women to survive. Even a Zhun/twa woman would cease to criticize him if she were made aware of the fact that Spock, more than anyone, has overseen a great transition in Western child-care practice such that the experience of American (middle class) children and Zhun/twa children is more similar today than fifty years ago. But one can legitimately point out that Spock thinks within, rather than around or beyond, our current social system.

Let's follow the growth of the child a little further. Dr. Spock would predict, correctly, that when the time *finally* came, as it must, for the Zhun/twa mother to "unspoil" her baby, the child would have a very hard time separating. That time comes when the next baby is





on the way, generally between the ages of two and four, and the process accelerates greatly on the occasion of the baby's birth. As we have seen, many Zhun/twa infants experience an extended period of consternation and depression when this happens. How difficult it is for them depends, of course, on the individual mother's insight into what the child is feeling and on the extent to which she is able to involve the child with his new sibling and persuade him that he is nonetheless loved despite the fact that his mother has less time for him. One could argue that these events are very similar to Dr. Spock's advice; but one would have to grant that a two-year-old can understand the explanations, much as he may dislike them, whereas a six-month-old cannot. Unquestionably separation at two or later has problems of its own; how they compare with the trials of the six-month-old who feels himself rejected is a subject for future research, and not for the serene assurance of our Western-conditioned prejudice.

Assuming that one could freely choose between these approaches,

what might be the consequences for later behavior? This is unknown. But we can suggest some clues. Recent analysis of observations made in association with N. G. Blurton Jones of the Institute of Child Health in London, comparing children between the ages of two and five years among the Zhun/twasi and the English, has indicated a curious reversal of the infant pattern in this older age group. In the two-to-five period maternal nurturance and general nurturance are significantly higher in English children, whereas maximum distance from the mother is greater in Zhun/twa children (the English observations were done outdoors in parks in fine weather with other mothers and children around, to enhance comparability to the Zhun/twa situation). In addition, the English children had more face-to-face interaction with mothers, whereas the Zhun/twa children had more with children.

The resolution of this apparent paradox may be aided by reference to the research findings of child psychologists concerning the attachment and dependent behavior of American children (reviewed by Maccoby and Masters, 1970). In the first place, the kind of split we see between the English and Zhun/twa children is not uncommon; in general, some children tend to be child-dependent and not adult-dependent, whereas with others the reverse is true. That is, the two factors are inversely related to one another (*ibid.*, p. 119). A shift toward child-dependency occurs with age in American children as well, but it seems to be happening earlier in Zhun/twa children. There are also indications that adult-dependency is more passive than child-dependency.

Also, one of the most consistent findings of various researchers into the effects of child-care patterns on children's behavior holds that *rejecting* behavior on the part of the parent leads to more adult-dependent behavior in the child. Because the patterns that make up attachment behavior are so ingrained and so persistent in early infancy, so difficult, as Dr. Spock cautions, to extinguish, it is likely that infants whose mothers follow his advice experience some feelings of rejection. (It should be noted that Spock mothers are among the *least* rejecting in American society. Only in comparing them with Zhun/twa mothers might baby conceivably find them wanting.) Since adult-dependent behavior is intensified by maternal rejection, the relatively more rejecting behavior of Western mothers during the first two years may help to account for the fact that the bond with the mother seems to be stronger during the later age period, at the expense, perhaps, of interactions with children.



Conversely, the more indulgent and stronger bond in the earlier period in Zhun/twa infancy may be the very thing that makes possible the earlier transition to child-dependent behavior. This finding is what would be predicted by the work of Erik Erikson, the major theorist of psychosocial development of our time; namely, that the establishment of *basic trust* in early infancy—the possibility of developing the feeling of total reliance and total predictability of the caretaking environment—that upon this is premised much of later development, particularly the two succeeding stages in which develop *autonomy* and *initiative*, respectively. These two stages coincide with the age period of our two-to-five-year-old observations. (Erikson, 1953) Experimental studies of one-year-olds (Ainsworth and Wittig, 1969), showing that exploratory behavior is maximal in the presence of the mother, may reflect the same behavior in microcosm—the assurance of the mother's presence and relation provides the basis for autonomous action.

If the adult-dependent pattern persists in the English children, one can speculate that it develops a better fit with the excruciatingly *vertical* (bureaucratic) organization of Western society, and that the Zhun/twa child-dependent pattern grows easily into the *horizontally* organized Zhun/twa social system, based completely on mutual aid and exchange and completely lacking in authoritarian institutions—political, religious, economic or military.

If further research and analysis indicates that a move toward the Zhun/twa pattern of child-care is warranted, it need not present any challenge to the progress of women's liberation. It does, however, challenge the tendency of people in general to avoid the responsibilities of child care. This tendency has been dramatically plain in a comparison of foraging times with our own. Recent history, which has shoved children into chimneys and mines and factories and then, benignly, locked them in jail-like spirit-smashing schools, should alert even our own dulled survival instincts to the fact that children are in grave danger from adults. With day-care centers becoming more common, we must be not merely vigilant, but brilliantly creative. Day-care centers can improve and enrich childhood while liberating men and especially women, or they can impoverish childhood while accelerating all the progressive disasters of the modern world. The Zhun/twa lessons are: don't trouble yourself about spoiling babies; babies are meant to be spoiled; and: use children; perhaps the most fatuous waste of the Western world is the waste of the nurturant talents of

children. This waste is created by throwing children together in peer groups with the following effects: 1) the very youngest children (under age three) have great difficulty relating to one another, a problem completely obviated by putting two-year-olds with, for example, four-year-olds; 2) for older children it precludes the possibility of learning baby-and-child care (so that college-age people have often never held a baby); 3) the genius they have for teaching one another is completely lost; and 4) consequently intensifies the chaotic conflict of generations by creating an artificial confrontation between adults and children with no older children as intermediaries.

A day-care center, instead of being an isolated unit like the traditional nursery school, might be attached to a school or a factory or a set of offices so that children would have access to people of all ages. Such a center would simulate to some extent the Zhun/twa situation. One can envision, for instance, a three-year-old spending some days in the day-care facility at his mother's place of work, and some at his father's with periodic access to one or the other parents throughout the day. Facilities could be professionally administered but have as workers students from local high schools or even junior high schools (one draws back from suggesting that *elementary* school children should care for younger children, although this possibility is taken for granted in almost all "backward" areas of the world). A course in child care, with practical "laboratory" experience in an ongoing day-care center, could be offered or required in high school. The main problems of all these futuristic solutions is the difficulty of insuring continuity in the child's human experience. To find genuinely satisfactory answers, it will be necessary to think more broadly, in terms of restructuring the design of work, residence and child care in our culture so as to achieve some kind of human continuity in space and time—in other words, to recover parts of the human cost we have incurred for the technological progress of the last hundred centuries.

At the same time, we need to experiment in creating with what we have; we can't be relentlessly utopian in the face of a total culture emergency. Communes, open schools, properly run day-care facilities, all of these will be helpful toward getting back what we've lost. We need to remember just two things: children need environmental richness, an endlessly variable, accessible, and self-renewing world, to challenge and answer the sparklings of their universal genius. This is the point of the quote from A. S. Neill: the genius is always there,

but it is almost always pulped by the dullness and sadness of experience.

And they need love. This is the point of the quote from Bowlby: *by their natures* they need love. If this is not obvious to you from your experience with them or from your own memories, you may consider that it is now scientifically proved. The quotes from Bowlby and Neill are not contradictory but complementary: if the love is there, not smothering or restricting, but always there to come back to, to rely upon, then the genius unfolds; the miracle of genuine growth occurs. You can learn this from knowing children. You can learn it from reading child psychology. You can learn it from living with African hunter-gatherers. You can learn it from watching animals.

For now, *this final note is of the greatest importance: The results of this research do not at present constitute evidence warranting an immediate and sweeping change in child-care policy.* They do warrant a broadening of perspective, a greater open-mindedness as to the natural range of possibilities. Like all worthwhile research into the patterns of very foreign cultures, they peel back our cultural blinders, even if only a little way. They provide a mandate for future research, which will, ultimately, open some paths for us.

\* \* \*

*To the sacred memory of Gerald Mitchell Henderson, who taught and lived, with a relentless sarcastic optimism, for the expansion of human possibilities, this essay and all the work on which it rests are affectionately dedicated.*

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