



ON URBAN POPULATION DENSITIES:  
SOME SOCIOPETAL AND SOCIOFUGAL COMPONENTS OF HUMAN INTERACTION

by

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ABSTRACT

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Submitted to the Department of City and Regional Planning, Massachusetts Institute of Technology, on May 21, 1965, in partial fulfillment of the requirements for the degree of Master in City Planning.

Research in animal and human behavior is used to investigate the relationship of processes within the individual and between individuals as affected by population density. Correlations are found between interaction density (social pressure), and the product of interaction frequency (rate of interaction) and interaction content (intensity of interaction). Strong correlations are found between population density and interaction density in animals. In humans, however, such correlations are difficult to establish because of the existence of various societal and psychological structures that define the likelihood and significance of many interaction situations.

It is suggested that some relationship may exist between these structures and population density, thus providing for the emergence of complementary societal and individual types in accomodation to population densities, which may be a result of ecological factors. One personality variable -- degree of individuation -- is examined in more detal. Suggestions are made for further study.

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"I was gratified to be able  
to answer promptly, and I did.  
I said I didn't know."

Mark Twain  
"Life on the Mississippi"

## INTRODUCTION

This study will search for relationships between human behavior and population density. To do this, greatest emphasis will be placed on the spatial components of behavior, viz:

1. Sociopetal: forces tending to decrease distance between individuals
2. Sociofugal: forces tending to increase distances between individuals.

In order to examine the interaction between individual and environment, we need to list those properties common to all living organisms<sup>1</sup>:

1. All organisms manifest spontaneous activity, and a genetically programmed sequence of growth, stability, and decline
2. All organisms have a limiting membrane, the intactness of which is essential for the maintenance of relative constancy of the internal environment. A continuous exchange of substances between the two environments takes place across this membrane, assuring continuation of internal processes and, within limits, exclusion of noxious substances.

<sup>1</sup>G.L. Engel, "Psychological Development in Health and Disease", Saunders, 1962.

3. All organisms have the capacity, within limits, to adapt to environmental changes, thus the degree of variance from the normal within the internal environment is kept to a minimum and relative constancy is maintained.
4. All organisms have the capacity to reproduce and thereby to continue the species. Implicit in this fact is that some behavior is both self-regulatory and species or group-regulatory.

Before proceeding, we also need to consider various aspects of "the environment", viz:

1. The habitat: the physical environment, vegetation, water, climate, prey species, predator species, other species.
2. The social environment: other members of the same species as one's own.

Our emphasis will be upon systems within the individual as they interact with systems within the social environment; we shall also examine the relationship of both of these systems to the constraints established by the habitat. It will be seen that these systems can often be analyzed in terms of sociopetal and sociofugal components; this will give our study the spatial aspect we seek.

There is very little hard data and solid theory on the effects of density on human behavior. For many species of animals, however, considerable data exists on how individual systems and social systems are related to the habitat through density-dependent mechanisms. But



this information by itself could provide no more than interesting analogies to human behavior. In order to proceed, we turn to psychoanalytic theory with its emphasis on the biological basis of human behavior, and on the relationships between individual systems and social systems. We can also examine the behavior of primitive man to assist us in making the transition.

To recapitulate: the study of animal behavior will enable us to identify certain processes which link density with individual and aggregate behavior. The translation to modern man will be attempted through the study of primitive man and through psychoanalytic theory. Once this has been done, we will examine what data exist on the effect of density on human behavior. Finally, we will attempt to integrate this material into some hypotheses concerning the behavioral consequences of population density in man.

While the planner ultimately manipulates the physical environment and physical density, he does so with respect to the social environment and social density. We shall attempt to show that interaction density (social pressure) is directly proportional to the product of interaction frequency (rate of interaction) and interaction content (intensity of interaction); we would then like to know the following things about these variables and their relationships:

1. For a given species, what levels of interaction density are optimum, and why? What differences exist between species, and why?
2. What are the components of interaction content? How are individual systems and social systems related by way of content?
3. What controls can be exercised by a species over frequency and content in order to maintain interaction density as close as possible to optimum levels?
4. How do physical elements influence frequency for a given population density?
5. What correlations, if any, exist between interaction density and population density in animal and human populations?

It will be shown that answers to these questions exist for many species of animal, while for man himself we know very little about the direct effects of density. We propose then to begin with animal behavior.

ANIMAL BEHAVIOR

Population Control

The latest information available to us<sup>3,4</sup> suggests that animal spacing is related to population processes, and that increases in density lead to feedback mechanisms which regulate population growth in response to overall increases in social pressure or interaction density. Thus while food supply, predation, disease, and climatic factors set absolute limits on population size -- for a given species within a given environment -- mechanisms operating within the species itself tend to hold numbers considerably below this upper limit.

It appears that animals most often compete not directly for food, but for social rank; animal spacing is then determined by a network of dominance-subordination relationships<sup>5</sup>. The major determinant of social rank and animal spacing is intraspecific aggressiveness, i.e.: aggression between members of the same species. Presumably this factor of intraspecific aggressiveness has evolved over time to "fit" a given species to a given habitat (and food supply) by determining spacing<sup>6</sup>;

<sup>3</sup>J.J. Christian, "Endocrine Adaptive Mechanisms and the Physiologic Regulation of Population Growth", in Mayer and Van Gelder, eds. "Physiological Mammology" Vol. I; Academic Press, 1963.

<sup>4</sup>D.D. Thiessen, "Population Density and Behavior: A Review"; Texas Rep. Biol. Med. 22: 266-314.

<sup>5</sup>F.H. Bronson, "Agonistic Behaviour in Woodchucks"; Animal Behaviour 12: 472-478.

<sup>6</sup>G. McBride, "A General Theory of Social Organization and Behavior"; Univ. of Queensland Papers (Fac. of Vet. Sci.) 1: 75-110.

at least it has been shown that animal spacing increases as food supply decreases<sup>7</sup>.

Competition for social rank may confer the control of territory, or it may be for access to females, for membership in a group, or for inclusion in a breeding or nesting colony. Subordinate animals would thus be excluded from optimum conditions for themselves and their young, if they bred at all - this would of course directly limit population increase. From the point of view of population dynamics, however, it does not seem to matter what animals compete for -- just so they compete -- because the competition itself is stressful, and this stress acts directly to reduce the rate of increase through decreased resistance to disease, lowered reproductive performance, faulty maternal behavior, alterations in the fetuses of crowded mothers, delayed or blocked maturation, etc.<sup>8,9</sup>. We can sum this up by stating that as density rises, social pressure rises, leading to decreases in density; i.e.: increased density leads to increased interindividual stress, which leads to increased intraindividual stress, which leads to a favoring of functions related to individual survival, which leads to lowered reproductive performance, which leads to decreased density.

<sup>7</sup>V.C. Wynne-Edwards, "Animal Dispersion in Relation to Social Behavior"; Hofner, 1962.

<sup>8</sup>Bronson and Eleftherion, "Adrenal Responses to Fighting in Mice: Separation of Physical and Psychological Causes"; Science 147: 627-628.

<sup>9</sup>Christian and Davis, "Endocrines, Behavior and Population"; Science 146: 1550-1560. Also Christian, op cit, Thiessen, op cit.

"Consequently, reproductive function declines measurably in the face of a need to maintain a constant internal physiologic state in the presence of adversity"<sup>10</sup>  
Thiessen<sup>11</sup> relates these conservation-withdrawal patterns to the general stress theory of Selye.

The reader has now been introduced to current thinking on the relation of animal behavior to population dynamics. Before this material will be useful to us, however, we shall have to examine the mechanisms involved in somewhat greater detail.

#### Local Societies

There is a tendency for many species of mammal to form into partially isolated interbreeding populations or societies -- as opposed to the alternative of homogenous or random spacing throughout the habitat<sup>12</sup>; Allee<sup>13</sup> argued that small interbreeding units connected by occasional emigrants would provide the most rapid rate of evolution. It has also been argued that these local societies exist to:

1. Stabilize the population's numbers with respect to the capacity of the habitat.

<sup>10</sup>Christian, op cit.

<sup>11</sup>Thiessen, op cit.

<sup>12</sup>G.S. Carter, "The Theory of Evolution and the Evolution of Man", in: A.L. Kroeber, ed. "Anthropology Today", Univ. of Chicago, 1953.

<sup>13</sup>W.C. Allee, "The Social Life of Animals"; Beacon Press, 1951.

2. Keep the population informed of its numbers<sup>14</sup>.

Wynne-Edwards cites as proof of the evolutionary importance of these local populations the fact that banding of migratory fish and birds shows a high degree of stability of these local societies over the years.

It is apparently within these local societies that the members learn to compete for social rank with a minimum of stress and bloodshed. At normal densities, adults raised together since weaning can coexist with a minimum of strife; but introduction of "strangers" causes an increase in the incidence and severity of fighting, sharp drops in population, blocked pregnancies in inseminated females, etc.<sup>15</sup>. Sexual and child-rearing behavior is also learned, through social interaction in some species<sup>16</sup>. Other authorities<sup>17</sup> have observed these additional advantages of aggregation into local societies:

<sup>14</sup>Wynne-Edwards, op cit.

<sup>15</sup>Bronson and Eleftherion, "Influence of Strange Males on Implantation in the Deermouse"; Gen. Comp. Endocrin. 3: 515-518. C.H. Southwick, "Peromyscus Leucopus, An Interesting Subject for Studies of Socially-Induced Stress Responses"; Science 143: 55-56.

<sup>16</sup>W.A. Mason, "The Effects of Environmental Restriction on the Social Development of Rhesus Monkeys", in: C.H. Southwick, "Primate Social Behavior", Van Nostrand, 1963. H.F. Harlow, "Basic Social Capacity of Primates", and "A Study of Animal Affection" in: Southwick, op. cit.

<sup>17</sup>M.D. Sahlins, "The Social Life of Monkeys, Apes, and Primitive Man", Human Biology 31: 54-73. N. Tinbergen, "Social Behavior in Animals", John Wiley, 1962. Mason, op. cit. W. Etkin, "Social Behavioral Factors in the Emergence of Man", Human Biology 35: 299-310. Hebb and Thompson, "The Social Significance of Animal Studies", in: G. Lindzey, ed. "Handbook of Social Psychology", Addison Wesley, 1954, McBride, op. cit.

mutual defense against predation, search for food, mating, care and training of young, coordinated hunting of prey, and security, reassurance, and companionship. This list is of course a composite one, not all items applying to all species.

Let us summarize our observations to date on the spacing of animals of a given species:

1. Forces causing animals to assemble seem to be related to security and reproduction.
2. Forces causing animals to disperse seem to be related to competition and aggressiveness.
3. Intraspecific aggressiveness seems to be related to processes adjusting animal numbers to the food supply in order not to destroy it and themselves through overpopulation.
4. Therefore: animal spacing and animal sociality is related to both cooperative and competitive processes in the interests of species survival.

The mechanics of animal cooperation and competition can best be seen through analysis of dominance-subordination relationships, which is our next topic.

### Social Rank

We have previously observed that intraspecific competition in animals is stressful, and that stress in many species results in lowered reproductive performance. Thus for the purposes of population control, animals may compete for utilities, or for symbols, or both; the device

most often used is social rank, or the establishment of dominance-subordination relationships. This is the first order of business when two animals meet; it may involve actual fighting, but the issue is in many species settled by threat and bluff. Experiential factors are definitely involved; Bronson<sup>18</sup> states that social rank is the product of a combination of: basic aggressiveness, age, experience, "and probably, in part, pure luck".

Let us now examine the types of dominance relationships that may exist. The classic linear form is the peck-order, as described here in roosters by Davis<sup>19</sup>:

"In a flock of roosters one is boss and pecks all the others.

Another is second and pecks all except the boss. The others arrange themselves in an order. The peck-order remains stable for long periods of time. A stranger usually is forced to the bottom place; generally the rank reflects seniority and vigor."

In a pyramidal form of structure several individuals may occupy the lower ranks or strata<sup>19</sup>; the dominant male may be "backed up" by a small clique with whom he shares females and leadership<sup>20</sup>; and the

<sup>18</sup>F.H. Bronson, The Jackson Laboratory, Bar Harbor, Maine. Personal Communication.

<sup>19</sup>D.E. Davis, "An Inquiry Into the Phylogeny of Gangs", in: E.L. Bliss, ed., "Roots of Behavior"; Harper, 1962.

<sup>20</sup>Washburn and DeVore, "The Social Life of Baboons", in: C.H. Southwick, op cit.



organization may take the form of center-periphery-and outcastes<sup>21</sup>. Another type of dominance is found in large nonherding or field population and is the result of agonistic interactions between neighbors having adjacent or overlapping home ranges<sup>22</sup>; in this case it is not realistic to use the term "social rank" with its usual connotation of a rather definite location in a hierarchy, and Bronson speaks of "relative rank" which is defined as "the relationship between the number of neighbors dominated by an individual compared to the number who dominated it"<sup>23</sup>. Another non-hierarchical type of dominance is exhibited in large breeding and nesting colonies as a result of pair contacts among neighbors. While locations are not all equally desirable, and peripheral ones are likely to be attacked and destroyed by other members of the colony<sup>25</sup>, there is nonetheless no hierarchy in the conventional sense, but only division into the included and the excluded.

<sup>21</sup>K. Imanishi, "Social Behavior in Japanese Monkeys", C.H. Southwick, op. cit.

<sup>22</sup>F.H. Bronson, "Some Correlates of Interaction Rate in Natural Populations of Woodchucks"; Ecology 44: 637-643.

<sup>24</sup>F.H. Bronson, "Agonistic Behaviour in Woodchucks"; Animal Behaviour XII: 470-478.

<sup>25</sup>V.C. Wynne-Edwards, op cit.

What makes one animal dominant over another? McBride<sup>22</sup> speaks of an individual's "social dimensions", "social mass", and "force field"; he has based a theory of animal spacing on these concepts which we shall discuss later. He also cites studies which showed that injections of testosterone propionate caused hens to move up the peck-order through increased aggressiveness, and ringdoves to increase the size of their territories. McBride also finds that sex and age are an important factor in determining social rank; he finds it useful to define four "castes" in order of decreasing social rank:

1. Adult males
2. Adult females
3. Young males
4. Immature animals

Greatest competition for dominance will be between members of the same caste, but some competition may take place between castes, so that eg: some adult females may be dominant over some adult males. This organization varies from one species to another<sup>23</sup>. The concept of caste enables us to realize that eg: much courting and infantile behaviour serves to suppress intracaste aggressiveness and to release intercaste affiliative or nurturing behavior<sup>24</sup>.

<sup>22</sup>McBride, op cit.

<sup>23</sup>Davis, op cit.

<sup>24</sup>Tinbergen, op cit.

Dominance seems to be attractive; McBride<sup>25</sup> notes that young male moose after weaning would often attach themselves to an older bull moose; this has also been observed in baboons<sup>26</sup>. Others<sup>27</sup> have observed with chimpanzees that when aggression towards the handler is met with punishment, friendship would often be offered, whereas timidity would more often elicit further attack or hostility. McBride<sup>25</sup> states that "a frightened animal is attracted to the highest-ranking animal, even when the latter is the cause of the fear".

Acceptance by a dominant animal may raise the social status of the subordinate:

1. Young male monkeys approaching maturity are expelled to the periphery by the dominant central males and prevented from re-entering<sup>28</sup>. However, if a peripheral male is accepted by a dominant female, he may be allowed to remain by the central males<sup>29</sup>.
2. The young of dominant females tend to be dominant over other young. They are raised near the leaders and are more likely

<sup>25</sup> McBride, op cit.

<sup>26</sup> Washburn and DeVore, "The Social Life of Baboons", in Southwick, op. cit.

<sup>27</sup> Hebb and Thompson, op. cit.

<sup>28</sup> Etkin, op cit. C.R. Carpenter, "Naturalistic Behavior of Nonhuman Primates"; Penna. State Press, 1964. C.B. Koford, "Group Relations of Rhesus Monkeys", in : Southwick, op. cit.

<sup>29</sup> K. Imanishi, "Social Behavior in Japanese Monkeys", in: Southwick, op. cit.

to be taken care of by them<sup>29</sup>.

3. A male baboon may achieve dominance through his relationship with other males who support him when challenged<sup>30</sup>.
4. A female jackdaw takes the rank of her mate<sup>31</sup>.

Dominance, however achieved, confers many benefits of high survival value to the individual; it also increases the probabilities that the individual will be able to mate, and to rear his young under optimum conditions. Dominant animals seem more immune to social stress, as measured by adrenal weight and adrenocortical activity<sup>32</sup>.

In many species, animals of low social rank are denied access to females<sup>33</sup>. Dominance confers feeding priorities in many domesticated species<sup>34</sup>. Animals of low social rank may be forced to the periphery where losses from predation are higher<sup>35</sup>. Animals of low social rank are generally the first to emigrate, thus facing greater hazards

<sup>30</sup>Washburn and DeVore, op cit.

<sup>31</sup>Tinbergen, op cit.

<sup>32</sup>See eg: Bronson and Eleftherion, op cit., Thiessen, op cit., Christian and Davis, op cit.

<sup>33</sup>R.C. Carpenter, "Social Relations of the Gibbon", in: Southwick, op cit. Sahlins, op cit. Etkin, op cit. J.B. Calhoun, "Population Density and Social Pathology", in Duhl, ed., "The Urban Condition".

<sup>34</sup>McBride, op cit.

<sup>35</sup>Bronson, personal communication, McBride, op. cit.

in unknown territory and with lessened chance of finding mates<sup>36</sup>. Dominance relations between the leading (alpha) male in adjacent gibbon troops tended to determine precedence between groups in disputes over territory<sup>37</sup>. Dominant female rabbits maintained control of burrows while subordinates lived and bred in unprepared surface shelters<sup>38</sup>. In colonial species, access to sites in breeding and nesting colonies is determined by dominance relationships<sup>39</sup>.

Whether the dominance mechanism has a "purpose" in the evolutionary sense seems to be in question. If we define social stress in terms of competition for social rank -- as various authors have done<sup>40</sup> -- then it is obvious that social stress would be reduced by the establishment of stable dominance hierarchies. A species thus organized could devote more energy to the search for food, defense against predators, care of young, etc. Apparently natural selection has favored those individuals and species which can compete in the least stressful manner; let us now examine some aspects of fighting in animals.

<sup>36</sup> Davis, Christian and Bronson, "Effect of Exploitation on Birth, Mortality, and Movement Rates in a Woodchuck Population; Journ of Wildlife Man 28: 1-9. E.S. Deevey, "The Hare and the Haruspex, A Cautionary Tale"; Yale Review XLIX: 161-179.

<sup>37</sup> Carpenter, in Southwick, op cit.

<sup>38</sup> McBride, op cit.

<sup>39</sup> Wynne Edwards, op cit.

<sup>40</sup> N.E. Collias, "Aggressive Behavior Among Vertebrate Animals" in: Bliss, op cit. McBride, op cit. Tinbergen, op cit. Mason, op cit.

### Fighting and Animal Spacing

Many authors<sup>41</sup> have approached the subject of intraspecific fighting with a spatial emphasis. Since McBride has carried this work farthest, and is perhaps least known to the reader, we present it in some detail. McBride begins with analogies from electromagnetic theory, speaking of the "social mass" of an individual (a measure of social rank), and of the "social force field" that surrounds him. The strength of these force fields varies with the time of day and year, i.e.: with the competitiveness of the activity being engaged in; they are weakest during the night and strongest during feeding, mating, and nesting. The force field operating between two members of the same species determines the distance they will customarily place between each other, and is a function of:

1. Social position of dominant animal.
2. Social position of subordinate animal.
3. Past history of contact between the pair.
4. Size of group containing the pair.

This force field is highest in front of the face, and is super-concentrated in the glance, ie: head-angles and distance in hens are inter-related, viz:

<sup>41</sup>McBride, op cit. H.P. Hediger, "The Evolution of Territorial Behavior", in: S.L. Washburn, ed, "The Social Life of Early Man", Aldine, 1961. R. Sommer, "Studies in Personal Space"; Sociometry 22: 347-260. E.T. Hall, "Adumbration as a Feature of Intercultural Communication"; Amer. Anthropologist 66: 154-163.

1. Hens more than 30 inches apart show only a slight tendency to turn their heads so as to avoid each other's faces.
2. Between 16 and 30 inches, the tendency is very marked.
3. At less than 16 inches, they turn beak-to-beak in an offensive or defensive position.

McBride cites a similar pattern among adult turkey males, where a dominant bird may turn and look at a subordinate (who then turns and moves away), but never vice-versa.

When a subordinate comes within a dominant's force field, various forms of propitiating behavior may be called for:

1. Flight
  - a. In confined populations, token avoidance may be substituted for flight. In pigs and fowls, the aggressive drive of the victor may be dissipated by the subordinate turning away his head -- though he may still receive a token nip or peck.
2. Submissive behavior, in which intercaste parental or sexual responses are partially released, thus dissipating aggressiveness. This may take the form of a full or partial sexual crouch (hens, apes) which may be followed by full or token mounting by the dominant, regardless of sex. Or a pseudo-infantile distress squeal may be given, as in pigs. In cattle, the lowering of head and eyelids may also communicate submissiveness.

- a. In this connection, McBride notes Guhl's finding that aggressiveness and submissiveness, as well as the male and female sex drive, are mediated respectively by androgen and estrogen.
3. Asocial behavior, in which the subordinate intruder asks to be ignored, by feigning sleep or feeding, or by self-grooming.
  4. Non-agonistic contact behavior; this can take the form of play or of social grooming. Play is usually initiated by the subordinate animal, in dogs by tail-wagging.

McBride calls the above behavior "integrative mechanisms", and describes how they are learned in the socializing process:

"Animals have a great deal of instinctive or programmed behavior -- they finish writing their programs in the socializing process. They then stick very rigidly to these social behavior responses. However, if they are reared in isolation they have no such rigid programs and abnormal behavior becomes common"<sup>42</sup>.

Animal spacing seems to be a sequence of threat and reassurance by the dominant and subordinate animal respectively; Hall<sup>43</sup> calls the sequence one of approach-threat-appeasement. The degree of crowding

<sup>42</sup>G. McBride, personal communication.

<sup>43</sup>Hall, op cit.



that will be permitted is a function of intraspecific aggressiveness -- which is presumably related to available food supply.

While McBride's emphasis is spatial, Calhoun's<sup>44</sup> is temporal....

"The ultimate process is really not numbers, but the number of interactions per unit time and their degree of satisfactoriness to the individual<sup>45</sup>"

Individuals in a population of the same species have certain needs, gratification of which requires interaction with other individuals. Need states between individuals may or may not be synchronized, however, so that responses may be either facilitating or frustrating. The probabilities of a facilitating response vary with the rate of interactions, which is a function of group size. The temporal aspects of density are also referred to by Duhl<sup>46</sup>, Meier<sup>47</sup>, and Spitz<sup>48</sup>. The common thread is that an interaction between two individuals is a transaction which requires a minimum length of time to be processed; stress is caused by the appearance of signals or cues calling for the

<sup>44</sup>J.B. Calhoun, "The Social Use of Space", in: Mayer and Van Gelder, op cit. \_\_\_\_\_ "The Ecology of Aggression: Its Relationship to Frustration and Social Withdrawal"; paper presented to the 1962 meeting of the Amer. Assoc. for the Advancement of Science. \_\_\_\_\_ "Population Density and Social Pathology", in: L.J. Duhl, op cit.

<sup>45</sup>J.B. Calhoun, personal communication

<sup>46</sup>L.J. Duhl, "The Human Measure: Man and Family in Megalopolis", in: Duhl, ed, op cit.

<sup>47</sup>R.L. Meier, "A Communication's Theory of Urban Growth"; M.I.T. Press, 1962.

<sup>48</sup>R.L. Spitz, "The Derailement of Dialogue: Stimulus Overload, Action Cycles, and the Completion Gradient"; J. Amer. Psychoanal. Assn. 12: 752-775

initiation of a new operation before the current one is completed. To use the terminology previously proposed: interaction content is not a variable, and interaction density has fixed upper limits; therefore breakdown ensues if interaction frequency rises to excessive values. Animals cannot ignore each other (manipulate content to adapt to changes in frequency); but content for humans is a variable -- a function of ego-defenses<sup>49</sup>. Thus the simple stimulus - response model is inappropriate, and our interest shifts to asking which of an array of stimuli will the individual select to respond to; what strategies and criteria will be employed in order to reject and process information?<sup>50</sup> We will return to this discussion later.

Bronson<sup>51,52</sup> examines some components of social pressure (interaction density) in woodchucks, and finds seasonal fluctuations in intra-specific aggressiveness, with the peak around the spring mating season. Bronson<sup>52</sup> relates population density and social pressure as follows:

"Population density should be an important parameter in determining the rate of contact between animals, while the level

<sup>49</sup>R.A. Spitz, personal communication.

<sup>50</sup>D.E. Berlyne, "Conflict, Arousal, and Curiosity"; McGrall Hill, 1960. J.G. Miller, "Sensory Overloading", in: Flaherty, ed, "Psychophysiological Aspects of Space Flight"; Columbia, 1961, R.L. Meier, op cit.

<sup>51</sup>F.H. Bronson, "Some Aspects of Social Pressure in Woodchucks", Phd. Dissertation, Penna. State University, 1961.

<sup>52</sup>F.H. Bronson, "Some Correlates of the Interaction Rate in Natural Populations of Woodchucks": Ecology 44: 637-643.

of aggressiveness should determine how the animals react when in contact with each other"

"Aggressive interaction rates were found to be more dependent upon seasonal changes in aggressiveness than upon density"

Let us summarize our examination of fighting in animals:

1. Animal interaction always contains a competitive element.
2. The intensity of the competition varies between species, and within a specie depending on the activity being engaged in.
3. In the socialization process, animals learn to carry out competition with a minimum of physical injury, through the utilization of ritualized threat and propitiation behavior<sup>53</sup>.
4. Animals are not able to reduce social pressure through reduction in the intensity of competitive interactions as population pressure rises. This would defeat one of the purposes of intraspecific competition, which serves to reduce reproductive performance in response to increases in population pressure.

<sup>53</sup>C.H. Southwick, "Behavioral Ecology of Howling Monkeys", in: Southwick, op cit. Life, "The Private Life of Primates", Feb. 12, 19, 1965. Tinbergen, op cit. Wynne-Edwards, op cit. McBride, op cit.

We have suggested that man, unlike animals has various mechanisms for reducing social pressure through reduction in interaction content; we shall examine these devices later. First, let us examine territorial behavior in animals.

### Territorial Behavior

The precise meaning of "territoriality" is that the location of a competitive interaction will tend to influence the outcome, so that whether an animal attacks or flees will depend on whether another is entering its territory or whether it is entering another's territory<sup>54</sup>; (see Tinbergen for an example of this in the stickleback). In this discussion, we propose to use the term to refer to the defense of a holding; as such it relates to the process of animal spacing through the establishment of dominance-subordination relationships. Davis<sup>55</sup> gives a good illustration:

"Many species possess a territory, which is usually defined as any defended area. Let us consider a typical territorial species such as the song sparrow ----- The male arrives in a suitable breeding area in the early spring and promptly signals his presence by singing and by patrolling the area. Soon he

<sup>54</sup>Tinbergen, op cit. Bronson, "Agonistic Behavior in Woodchucks"; Animal Behavior XII: 470-478. C.R. Carpenter, "Territoriality, a Review of Concepts and Problems", in: Carpenter, op cit. McBride, op cit. Davis, op cit. Wynne-Edwards, op cit.

<sup>55</sup>Davis, op cit.

sets boundaries to his territory with reference to adjacent males. Each bird defends his area by song, threats, or even fights. Sometimes an individual loses a contest and leaves the area to try to establish a territory in another place. When the females arrive, they select a location (which includes a male), and pairing and nesting begin. The defense of the territory gradually wanes during incubation and feeding periods; but if a new brood is started, the male again vigorously defends his territory. Most of the nesting and feeding activities take place within the territory."

Sea birds often compete for limited space in a breeding or nesting colony; in this case they are unable to stake out territories on the sea itself, and Wynne-Edwards<sup>56</sup> feels that the colonial mechanism evolved as a control on the number of birds who will fish in the vicinity. Seals may also have this practice.

Territorial demarcation is practiced by many species; it is an invitation to others (of the same species) to keep out. This warning may or may not be heeded, and social rank will determine the outcome in the latter case. Visual, olfactory, acoustical and tactile means include tree-scratching, urine depositing, bird song,

<sup>56</sup>Wynne-Edwards, op cit.

and slime trails respectively<sup>57</sup>. The stickleback identifies his territory by means of some prominent feature and will shift if it is moved.<sup>58</sup>

Home range refers to the area where an animal will customarily be found. Calhoun<sup>59</sup> cites studies demonstrating initial hyperactivity in a strange environment and avoidance of a strange field. A certain amount of strangeness is sought, however. Bronson<sup>60</sup> found that size of home range in woodchucks varied directly with social rank; subordinate animals possessed smaller areas over which dominant animals had the right of trespass. Home range area and adrenal weight were inversely related.

Group defense of territory has been observed in many species<sup>61</sup>. The young seem to learn the extent and use of their group's territory as part of the socialization process. There is little intermingling between groups, and contacts between groups at the boundary are generally competitive and antagonistic. When McBride<sup>62</sup> removed the fence between two flocks of the same inbred line of domestic hens, fights occurred between individuals of the two flocks, and an open

<sup>57</sup>Hediger, in: Washburn, op cit. Wynne-Edwards, op cit.

<sup>58</sup>Tinbergen, op cit.

<sup>59</sup>Calhoun, "The Social Use of Space", op cit.

<sup>60</sup>Bronson, "Agonistic Behavior in Woodchucks", op cit.

<sup>61</sup>Carpenter, op cit. Sahlins, op cit. Southwick, ed. op cit.

<sup>62</sup>McBride, op cit.

area or 'no man's land' developed along the old fence line. Few birds crossed this line during three weeks' observation.

Carpenter<sup>63</sup> finds territorial behavior to be universal from fishes to primates. Its purpose seems to be to spread out the population and thus perhaps to regulate its numbers relative to the ecology; combined with social organization it also reduces social stress. Territoriality is therefore a manifestation of animal spacing, as discussed above<sup>64</sup>.

#### Summary

Animal spacing in the species we have studied appears to be the resultant of sociofugal and sociopetal vectors which act to adjust a species' population to its habitat. The sociopetal forces are related to security, reassurance, reproduction, and rearing of the young. The sociofugal forces are related to intraspecific competition for social rank, for space, for membership in a breeding group, etc.

No animal species that we have studied appears to be able to increase the productivity of its habitat through organizational and technological innovation; this skill seems to be reserved to man alone<sup>65</sup>, who can deal with increases in density by utilizing human

<sup>63</sup>Carpenter, op cit.

<sup>64</sup>Eg: McBride, op cit.

<sup>65</sup>Sahlins, op cit. Hebb and Thompson, op cit. Etkin, op cit.

labor as a commodity<sup>66</sup>. Because of this, the world could support perhaps as many as 50 billion people if food supply were the only constraint<sup>67</sup>.

Experiments with confined animal populations show that even with a superabundance of food, social stress increases to pathological levels in many species as densities rise; this phenomenon appears to be associated with the intensity of intraspecific competition for space and social rank<sup>68</sup>. Some species can tolerate higher densities than others, however, owing to lower levels of intraspecific aggressiveness<sup>69</sup>, and/or to more highly developed social skills<sup>70</sup>. We would like to know whether these observations apply to man, and to his responses to changes in density; let us turn first to studies of primitive man.

<sup>66</sup>P. Radin, "The World of Primitive Man"; Grove, 1960.

<sup>67</sup>R.L. Meier, "Concerning Equilibrium in Human Population"; Social Problems VI: 163-175.

<sup>68</sup>Christian and Davis, op cit. Thiessen, op cit.

<sup>69</sup>C.H. Southwick, "Peromyscus Leucopus: An Interesting Subject for Studies of Socially-Induced Stress Responses", Science 143: 55-56.

<sup>70</sup>McBride, op cit. McBride, personal communication.



PRIMITIVE MAN

Introduction

If we contrast primitive man with the subhuman primates, we see that the major technical advances are the use of speech and fire, (and later, domestication of animals and cultivation of plants); examples of walking upright, terrestrial living, tool-using, and omniverousness can be found among other species<sup>71</sup>. There were also major socio-economic and biological innovations as well:

1. Modification of the human female to continuous sexual receptivity.
2. Modification of the male to monogamous and paternal type, (perhaps also found in wolves).
3. Modification from individual foraging to group hunting and food-sharing, (also found in wolves).
4. Modification of communication from that based on the here-and-now, to "time-binding" symbolic communication able to evoke images of past, future, and out-of sight.
5. Development of symbolic and material culture as an experience-pool capable of being stored, transmitted, and enlarged.

<sup>71</sup>E.W. Count, "The Biological Basis of Human Sociality"; Amer. Anthropologist 60: 1049-1985. Etkin, op cit. Sahlins, op cit. Washburn and De Vore, "The Social Behavior of Baboons and Early Man" in: Washburn, op cit. C.O. Sauer, "Sedentary and Mobile Bents in Early Societies, in: Washburn, op cit.

6. Economic division of labor by sex and the establishment of the family on this basis.
7. Development of kinship, and extended kinship, thus allowing some intertribal permeability and confederation.
8. Tempering of dominance relationships in favor of cooperation and reciprocity.
9. Development of a semi-permanent home base for young, pregnant females, sick and aged, food-storage, fire and possessions; (prototype found in wolves).

Some authors<sup>72</sup> lay heavy stress on the economic basis of human social organization in explaining the contrast between man and the other primates. In this view, man -- a group hunter -- had more in common with wolves than with the other primates.

"In the transition from subhuman to human society, cooperation in subsistence activities became the dominant cause of solidarity, avoidance of enemies a secondary cause, while sex became simply a facilitary mechanism."<sup>73</sup>

As noted in the previous section, man's response to increased density might thus be quite different from the other species studied, in that he could turn it into an asset - at least as far as food supply was

<sup>72</sup>P. Radin, op cit. Etkin, op cit. Sahlins, op cit.

<sup>73</sup>Sahlins, op cit.

concerned -- by organizing for greater productive efficiency<sup>74</sup>, first in hunting and fishing, and later in the domestication of animals and cultivation of plants.

### Social Rank

Monogamy, and cooperation in subsistence activities, appears to have led to a tempering in the severity of dominance-subordination relationships, and to a favoring of sensitivity to interpersonal relationships within groups; the random spacing of young may also have been a contributory factor<sup>75</sup>. Dominance seems now to be based more upon knowledge -- of game movements, of ritual, of location of water, of warfare tactics -- than upon sheer aggressiveness. Social control appears to be based more on custom than on dominance relationships<sup>76</sup>.

### Territoriality

Territorial defense is continued in man, though competition now appears to be between groups rather than between individuals within the group.<sup>77</sup> Fighting in defense of territory appears to have become

<sup>74</sup>Radin, op cit.

<sup>75</sup>Count, op cit.

<sup>76</sup>Washburn and De Vore, op cit.

<sup>77</sup>M. Bates, "Group Cohesion and Territorial Restriction", in : Kroeber, op cit. Hediger, op cit. Washburn and De Vore, op cit. Wynne-Edwards, op cit.

much more severe; Bates<sup>78</sup> cites evidence that the chief cause of death in Pleistocene Man was man himself. Territorial demarcation may also have survived in the display of magical devices about the dwellings and grounds "to ward off evil spirits"<sup>79</sup>. Intermarriage between tribes may have led to a lessening of territorial exclusiveness<sup>80</sup>; confederation of semi-autonomous local units, and periodic assemblies to renew laws and customs, are also noted<sup>81</sup>.

#### Population Control

We have noted that many animal species exhibit density-dependent checks on their rate of increase; the general assumption among demographers seems to be that no such mechanisms exist in man<sup>82</sup>. It well may be that terrestrial, puny man with his greatly extended infantilism had survival potential for just this reason. On the other hand, an extensive list<sup>83</sup> can be made of practices which would affect recruitment rates, though just how great their effect was is

<sup>78</sup>Bates, op cit.

<sup>79</sup>Hediger, op cit.

<sup>80</sup>Sahlins, op cit.

<sup>81</sup>Calhoun, "The Social Use of Space", op cit. Wynne-Edwards, op cit.

<sup>82</sup>Eg: D.O. Cowgill, "Transition Theory as General Population Theory"; Social Forces 41: 270-274.

<sup>83</sup>Bates, op cit. Wynne-Edwards, op cit. Spengler and Duncan, "Population Theory and Policy"; Free Press, 1963.

debatable<sup>84</sup>. Such practices included:

1. Extended lactation (inhibiting ovulation); intercourse taboos during lactation.
2. Delay of marriage: expensive ceremonies, ordeals, delayed acknowledgement of maturity.
3. Abstention: incest taboos, celibacy, taboos associated with pregnant and menstruating females, homosexuality.
4. Coitus interruptus.
5. Mutilation and sterilization.
6. Abortion, child-exposure, infanticide.
7. Human sacrifice, head-hunting, cannibalism, Ver Sacrum, other ritual killing, perhaps battle itself.

We have encountered no proof of whether or not these practices were density-dependent. Wynne-Edwards<sup>85</sup> seems to believe that they were, observing that many contemporary primitive societies appear to be well-fed and healthy.

#### Summary

We have been able to uncover no evidence of the effects of changes in density in primitive man, more specifically in relating it to social

<sup>84</sup>J.M. Beshers, "Population Processes in Social Systems"; (in preparation).

<sup>85</sup>Wynne-Edwards, op cit.

stress and population processes. Group defense of territory by partially-isolated local populations is exhibited in a form very similar to many subhuman species. The dominance-subordination mechanism no longer seems to be related to population control, and is highly tempered in severity. Some population-limitation mechanisms exist, of undetermined effect. With this background, we turn to psychoanalytic theory for what light it can shed on human behavioral variables and parameters which might be responsive to population density.

PSYCHOANALYTIC THEORY

"I can't explain myself, I'm afraid sir,"  
said Alice, "because I'm not myself, you see".  
"I don't see", said the Caterpillar.<sup>86</sup>

Introduction

Psychoanalysis has as a major assumption that many human desires, and the controls used to keep them in check, never become a part of conscious mental functioning;<sup>87</sup> thus an individual's behavior may be in conflict with his conscious goals or stated beliefs. These unconscious desires are of a sexual and aggressive nature (the "id"); repression begins with the infant, who has a poorly-developed concept of the distinction between wishes and deeds. In addition, the child's dependence on his parents is so total that he feels he dare not run the risk of displeasing them<sup>88</sup>. It is also felt by some that the young child believes his parents capable of knowing his innermost thoughts. Therefore, unconscious (id) desires are opposed by unconscious ("superego") fears of retaliation or punishment. The concept of what is socially-acceptable behavior, then, includes not

<sup>86</sup>L. Carroll, "Alice's Adventures in Wonderland", chap. 5.

<sup>87</sup>C. Brenner, "An Elementary Textbook of Psychoanalysis"; Doubleday, 1957.

<sup>88</sup>G.L. Engel, "Psychological Development in Health and Disease"; Saunders, 1962.

only control of what one does, but also of what one wishes to do; many of these controls are unconscious. Conscious evaluation of alternatives and consequences in terms of conscious criteria is an aspect of "ego" functioning; but perhaps a major task of the ego is to arbitrate between the excessive demands of the id for gratification, and the excessive demands of the superego for perfection. The ability or inability of the ego to achieve a reasonable balance in a given situation gives rise to four basic ego states: (1) normal self-esteem, (2) elation, (3) anxiety, (4) depression-withdrawal<sup>89</sup>. Recovery of normal self-esteem is achieved by a process of bringing one's aspirations within reach of his abilities; this is an important aspect of ego functioning.

The above paragraph represents a very brief statement of some major psychoanalytic concepts; we would now like to expand on them for the purposes of this study. Before proceeding, the reader should be reminded that psychoanalysis has its origins in biological medicine, and its theory was developed primarily in the clinic rather than in the laboratory. In addition, both practitioner and patient have been predominately Western, middle-class, and urbanized. Psychoanalysis is thus not a self-sufficient theory of all aspects of cognitive development or of human interaction. There is perhaps an

<sup>89</sup>J.M. Mackenzie, "Psychodynamics and Psychotherapy of Depression"; Psychosomatics I (4): 1-7. G.L. Engel, "Anxiety and Depression-Withdrawal: The Primary Affects of Unpleasure"; Int. Jour. Psycho-Analysis XLIII: 89-97.



over-emphasis on the individual, apart from the group processes which also influence behavior. We shall return to these topics later.

### Object Relations<sup>90</sup>

The living system has the capacity to maintain its internal environment within fairly constant limits, (dynamic steady state) through a process of self-monitoring, and through transactions with the external environment to secure needed supplies and eject noxious substances. The organism requires systems that tell it what it needs, and systems that make sure these needs are obtained; in the human infant, this includes the ability to communicate needs to others. With this background, we can make a restatement of the two major categories of id mechanisms:

1. **Libidinal Drives:** the biological need for relationship and body contact, for experience with other humans in the interests of survival, growth, and reproduction.
2. **Aggressive Drives:** the biological need to incorporate and assimilate objects in the external environment for survival and growth, and to resist or overcome forces which are injurious or interfere with the securing of vital supplies.

<sup>90</sup>Except where noted, the source for what follows is: G.L. Engel, "Psychological Development in Health and Disease"; Saunders, 1962.

It has been found that the human infant's needs are not only physiological, (nutrition, temperature range, cleanliness, etc.), but psychological as well; the latter are usually grouped under the term mothering: contact, warmth, massage, and simple early communication. We thus describe two poles of feeling in the neonate (newborn):

1. **Dynamic Steady State:** relative balance or comfort, supplies adequate and needs relatively fulfilled.
2. **Discomfort or Unpleasure:** above conditions are not met; this leads to initiation of behavior aimed at restoration of the dynamic steady state.

These two poles of feeling are related to the basic sleep-waking cycles of the neonate:

1. **Sleep (digestion):** from deep regular sleep through irregular sleep to drowsiness.
2. **Awake and active (ingestion):** from alert-inactive through alert-active to crying.

The human infant cannot take care of all his needs, and is therefore highly dependent upon his objects; "object" refers to needed things in the environment (often people), objects thus are the focus of drive-energy. Because of her primary rôle in need gratification, the maternal figure is the infant's most significant object; through transactions with her a number of important developments take place:

1. Through repeated cycles of separation and reunion, the infant begins to perceive of self and mother as separate

entities. This is the beginning of identity formation, and of ego boundaries.

2. Through repeated cycles of discomfort and satisfaction, there develops feelings of ambivalence about oneself and one's objects, viz:
  - a. "Good" (satisfied, comfortable, etc.); "good self-good mother".
  - b. "Bad" (unsatisfied, uncomfortable, etc.); "bad self-bad mother".

Thus the mother -- and also the child's own body -- exist for the child both as a satisfying and frustrating object.

3. Ambivalence -- toward oneself and others -- leads to the need for reassurance and reinforcement as a basic component of human interaction, stemming from:
  - a. The wish to be worthy, to be loved, to be appreciated; not to be inferior or unworthy.
  - b. The wish to be good, to be loving; not to be aggressive, hateful, and destructive<sup>91</sup>.

Not only is "bad" behavior punished, but "good" behavior is rewarded; the child thereby learns to delay, modify, or even renounce some of his own wishes in order to retain a satisfactory relationship with his objects.

<sup>91</sup>J.M. Mackenzie, op cit.

The desire for approval is formulated by Zetterberg<sup>92</sup> in terms of group processes. Control of antisocial behavior can therefore be brought about by the individual in two ways:

1. Internalized Controls: memories of parental rewards and prohibitions lead to reinforcement of some behavior and suppression of other behavior by the individual.
2. Externalized Controls: the individual tends to modify his behavior and beliefs in the interests of group approval, especially when such modification is consonant with his favored self-attitudes and when membership in a particular group is highly valued.

The degree to which controls are externalized or internalized can vary between individuals and between cultures and subcultures. For example, the following tendencies have been imputed to the American lower classes<sup>93</sup>:

1. Demand externalized controls
2. Rigid and rebellious with respect to authority
3. De-emphasize individual identity
4. Low self-esteem and ego strength
5. Less inclined to internalize social inhibitions

<sup>92</sup>H.L. Zetterberg, "Compliant Actions"; Acta Sociologica 2: 179-201.

<sup>93</sup>Hollingshead and Redlich, "Social Class and Mental Illness"; John Wiley, 1958. T. Langner, "Life Stress and Mental Health"; Free Press, 1963.

The degree of internalization of control leads one to the "inner-directed" -- "other directed" typology of David Riesman; we would expect the former to be somewhat uncomfortable in crowds, and the latter to be somewhat apprehensive of privacy. We shall return to these questions; first we examine the process of formation of the superego.

### The Oedipal Conflict and the Superego

Much of the emotional interest of infancy is invested in the various workings of the alimentary tract; during this period the child learns to renounce some of his (phantasied) autonomy in order to retain satisfactory relationships with his objects. As the mouth and bowels recede in importance, interest in sexual matters increases; curiosity about anatomical differences and speculations as to their significance are believed to be of great importance between the ages of three and five, and perhaps earlier. Somewhere toward the end of this period, these stirrings of sexuality become focussed on the parent of the opposite sex, and the parent of the same sex is seen as a rival. Hostile phantasies toward this rival can be quite intense, (slaying of the giant, killing of the wicked witch, etc.); and fears of retaliation by the powerful rival can be equally great, (castration anxiety, etc.).

During this period the child, of course, retains his need for the love and support of both parents; he also becomes aware of his own sexual immaturity and precocity. He becomes aware that he is an "apprentice", so to speak, and that full participation must be deferred

until some time in the future. This awareness, coupled with various punitive phantasies, leads to resolution of the Oedipal situation along the following lines:

1. De-sexualization of feelings toward the parent of the opposite sex, (onset of the "latency" period).
2. Internalization of the punitive rival as the "superego"; this is a continuation of the internalization of parental disapproval mentioned above. Certain desires become associated with feelings of guilt, shame, self-reproach, and anxiety; they may even be barred from consciousness, let alone from actual performances.
3. Internalization of the powerful competent rival as "ego ideal". The wish is to become like the rival in order to do what he does: ("identification").

Termination of the Oedipal period should find the child -- at about age six -- with the foundations for the formation of a set of goals and attitudes appropriate to his sex. He should also have begun to learn to renounce his antisocial impulses in order to achieve harmonious relationships with his environment. Intellectual and social development should come increasingly under conscious (ego) control. These developments will all be shaped, however, by the internalized system of rewards, punishments, and aspirations formed in early childhood through interaction with the parents.

### Adolescence

The Oedipal period represented premature stirrings of the desire for independence and mastery; with adolescence, the struggle is resumed. Resurgent sexual feelings must find socially-acceptable outlets; the manifest increase in physical size and strength makes control of aggression a serious issue also.

Because the adolescent must begin to achieve independence from his parents, he is less willing to rely on them for guidance; in fact, he may begin to question (on the surface, at any rate) all that he has received from them. New models for behavior, and new philosophies, are adopted, often in rapid succession.

The true significance of adolescence will vary with class and culture. For the adolescent with 4-12 years of education still before him, true economic, sexual, and intellectual independence is still a long way off. For such a child, adolescence has much in common with the earlier Oedipal period; this appears to be the meaning of the 'psychosexual moratorium' described by Erikson.<sup>94</sup>

### Adulthood

As will be shown later, the degree of individuation and independence expected of an adult may vary from one culture to another. In the West, the adult is expected to have a well developed sense of personal identity, (as husband or wife, as parent, as productive member

<sup>94</sup>Quoted in Engel, op. cit.

of society, as citizen); a clearer conception of oneself and one's own needs leads to the capacity to sense and respond to the needs of others. The adult is expected to have the confidence and capacity to maintain contact with reality, to tolerate normal opposition and frustration without regressing to earlier modes of gratification, and to find acceptable outlets for sexual and aggressive drives.

To a rather large degree, then, the adult is expected to function as a self-monitoring system. As a result of the rewards and prohibitions experienced through past interaction with (1) the family and (2) society at large, "good" thoughts and behavior lead to self-approval, and "bad" thoughts and behavior lead to self-reproach. These self-evaluations are reinforced by interactions with others<sup>95</sup>, but the psychoanalytic emphasis is on the internalized (self-monitoring) aspects of these motivation systems.

Psychoanalytic theory can perhaps be accused of an overemphasis on processes within the individual, to the neglect of the social matrix within which he exists. Moreover, the distinction between individual and group has perhaps been too much taken for granted; studies of psychiatric phenomena in Japan will make this problem more explicit.

<sup>95</sup>Zetterberg, op. cit.



## Japan

Caudill and others<sup>96</sup>, in studies of Japanese mental patients, have attempted to relate symptomatology to cultural and environmental patterns. Caudill, an American psychoanalyst and anthropologist, has considered the relationship of this material to various issues in psychoanalytic theory, including issues related to ego-psychology, and to identity formation.

Caudill and Doi<sup>97</sup> distinguish between primary and secondary narcissism in the infant. Primary narcissism refers to the wish of the infant to be loved passively, to be cared for, to be treated as a passive object whose needs will be responded to and fulfilled; it also seems to refer to a condition of oneness with the world. Secondary narcissism involves a sense of self; a major impetus to its development in the infant seems to be the unwillingness or inability of the maternal objects to satisfy primary narcissistic longings:

"If the world does not love me enough, I have to love and gratify myself."<sup>98</sup>

<sup>96</sup>W. Caudill, "Anthropology and Psychoanalysis: Some Theoretical Issues," in: Gladwin and Sturtevant, eds, "Anthropology and Human Behavior"; Anthro. Soc. Wash., 1962. \_\_\_\_\_ "Patterns of Emotion in Modern Japan", in: Smith and Beardsley, eds, "Japanese Culture"; Aldine, 1962. \_\_\_\_\_ and Doi, "Interrelations of Psychiatry, Culture and Emotion in Japan", in: Gladston, ed. "Man's Image in Medicine and Anthropology". Schooler and \_\_\_\_\_, "Symptomatology in Japanese and American Schizophrenics"; Ethnology 3: 172-178 \_\_\_\_\_, "Around the Clock Patient Care in Japanese Psychiatric Hospitals: The Role of the Tsukisoi"; Am. Soc. Rev. 26: 204-214.

<sup>97</sup>Caudill and Doi, op. cit.

<sup>98</sup>Caudill, "Anthropology and Psychoanalysis: Some Theoretical Issues", op. cit.

The aggressive element in secondary narcissism should be noted: the infant whose needs are not met promptly can become quite angry; he must learn to control this anger in order to maintain a satisfactory relationship with his objects.

The primary narcissistic needs of the Japanese infant are quite well met. Caudill and Doi<sup>99</sup> cite studies showing that:

1. Japanese babies are seldom alone, and cry very little because of the quick response of the mother to their initial protests.
2. The average age for completion of weaning from the breast is two years.
3. 50% of urban mothers and 75% of rural mothers continue breast-feeding beyond 10 months of age.
4. The last (or only) child sleeps with the mother until age five, or more; the middle child until age four, and the first child until age three.
5. Mother and child bathe together until approximately age seven.

Elsewhere, Caudill<sup>100</sup> has compared some developmental consequences of two different patterns of permissiveness in child-rearing:

<sup>99</sup>Caudill and Doi, *op. cit.*

<sup>100</sup>Caudill, "Anthropology and Psychoanalysis, etc."; *op. cit.*

"At this point the infant probably "does" two sorts of things, although he is not, of course, aware of this "doing" as such. He indicates his wishes to be cared for by these outside objects, and he becomes vaguely aware of himself (as a precursor for what later will develop into secondary narcissism). The response of the mother, influenced by what is expected and valued behavior in her culture, to these two states of the infant is highly important for the course of the development of internal dynamics. On the one hand the infant can be picked up whenever he cries, fed and fondled, and treated as a passive object whose needs will be responded to and fulfilled by the mother. On the other hand, the infant can be left alone when he cries, fed at specified times from a bottle, and encouraged to learn to take care of his own needs as quickly as possible.

"The child's predominant reaction in the first situation is likely to be to respond to such care with indications of pleasure, and to develop an attitude in which he expects to be cared for passively. In this situation his passive object relations carry greater force than the push toward a secondary narcissism. And, if this sort of interaction between mother and child continues fairly constantly over the months and even the years, the child is not likely to exercise adaptively in this first situation his own aggressive drive as much as he might in the second situation. Certainly, even in the first situation, he will exercise to a

degree his growing mastery of the external world and of his body,.... but he will not become over-involved in infantile aggressive power manipulations with the mother since the wish for the passive object relationship, and its gratification in fact by the mother is the stronger force. The child's reaction to the second situation in which he is left alone and fed at specified times, is likely to be to respond by increasingly skillful use of himself in crying, demanding, and so forth, until he gets what he wants. The narcissism implied in this, and the aggression, are adaptively used for his ends.

"I do not mean that either of these mothers or children are pathological since either situation could well be within normal limits, although, of course, either situation could also be carried to extremes. But, even within normal limits, if one situation or the other is maintained consistently by the mother -- that is, either the child is passively cared for and interdependent with others as objects in an increasingly sharply differentiated sense, or the child is actively trained to do for himself and not to rely heavily on interdependence with others -- one would expect to end up with different results. Specifically, as the child grows and develops, the competitive aspects of the Oedipal conflict should be muted in the first situation, particularly if the father in essence relinquishes the mother to the child and acquiesces in the child's interdependent and long-maintained relation to the mother; and the competitive aspects of the Oedipal conflict should be

accentuated in the second situation, especially if it is culturally expected that the father will be competitive with the child for the mother. Further, sex identity and role differences between male and female might well be muted in the first situation, and accentuated in the second -- the more so if the independence training of the child is phrased in terms of "be a boy" or "be a girl", or if the child himself learns to utilize his sexual attributes and role in the ongoing struggle to get what he wants."

Later in the same selection, Caudill discusses the relationship between child-rearing and culture:

"Schematically, and in the spirit of hypothesis at this point in my understanding, I would summarize the major emphases in character formation in Japan as follows. In the early stages of infancy (in the traditional oral stage) there is a great deal of gratification given to the Japanese infant in almost all spheres of behavior. This would begin the development of a very close attachment to the mother, and of a sense of trust in others, for the Japanese child, but this would also tend to lay the ground for a future "never fully satisfied desire to amaeru (to be loved passively)," and for a chronic mild depression and nostalgia in later life concerning the loss of childhood gratification.....

"At a somewhat later point, perhaps around two years of age (in the traditional anal stage), individual autonomy and mastery are not so much valued in Japan as are the development of collateral relations and a sense of sharing. During this period the ground is

laid for an adaptive use of shame in later life, but the negative side of this process often results in a heightened sense of suspiciousness, hoarding, and undue sensitivity.....

"Still later, perhaps around four years of age (during the traditional period of Oedipal conflict), the problem arises of beginning to resolve earlier ties to the parents. This task is taken up again at puberty, and an active genital mastery is, of course, a general goal in human behavior. But, genital primacy in all its "glory" seems to be overstressed in the United States. There is less of this urgency in Japan -- perhaps almost the opposite. For the son, the mother does not so much encourage his maleness in a genital sense, as she says that he should please her and please father. The son's identification is possibly a good deal more with the mother in pleasing father, than it is with the father in competition for the mother because, in a very real sense, the son is not in competition with the father as the mother is his, and she will stay this way as long as he does not intimate any directly sexual claim upon her. A male child does not have to give up his mother in Japan in the way that the operation of social roles forces him to do in the West.....

"If, in Japan, the son can retain the mother into adulthood by a process of splitting and repressing his erotic wishes, the daughter's sexual wishes for the father can be avoided if she stays as a girl -- that is, if she stays childish.....

"In the post-Oedipal period, for both boys and girls, latency would seem to be prolonged in Japan, and one of the main tasks of latency -- the psychological separation from the parents and the establishment of a personal identity -- is made more difficult, as I have stressed throughout this discussion, because of the strong interdependency between people."

We would say that the Japanese handle dependency feelings well, and that self assertiveness is somewhat atrophied. There is a definite muting of the sense of personal identity, of sexuality, of the controlled use of aggression, and even of maturation itself. Japanese are likely to speak of interpersonal relations in terms of "absorption", "melting into", or "fusing with" the other person(s).<sup>101</sup> Japanese schizophrenics are much more likely to have been physically assaultive than their American counterparts; assaults are most likely to be directed against other members of the family, and in the case of male patients, against the mother in particular.<sup>102</sup> The dominant school of psychotherapy in Japan (Morita therapy), has as a goal "to take things as they are"<sup>103</sup>; the comparable goal in the West is the realistic evaluation of, and fullest utilization of, one's potentialities -- including one's aggressiveness -- in the achievement of one's personal goals. Both systems stress the need for object relations and adjustment to the

<sup>101</sup> Caudill and Doi, op. cit.

<sup>102</sup> Schooler and Caudill, op. cit.

<sup>103</sup> Caudill and Doi, op. cit.

society, but the Japanese seem to place less emphasis on personal identity, individuality, etc. Attitudes toward privacy also seem to differ:

"There is much to be said for the theory that this low evaluation of individual privacy is linked with the general preference for group, over individual, action and responsibility which characterizes Japanese society if compared with the 'individualistic' West".<sup>104</sup>

The author of this thesis was led to speculate that the group-personality would include many externalized group controls and supports that we in the West consider to be an individual concern, i.e.: internalized. If so, would not privacy be somewhat threatening, rather than desirable? Caudill was asked to comment on this formulation, with the following response:

".....I was particularly struck by your question in relation to the Japanese asking: 'Is it for instance fair to say that privacy would be abhorrent in a culture where control of aggression was a group function and the individual superego was weak'. This question raises a lot of issues that we cannot discuss here -- I am not sure whether control of aggression is a group function, or whether individual superego structure is weak in Japan. Nevertheless, in the area of family life Japanese do not seem to value physical privacy very much, there is a playing down of aggression between family members, and I do

<sup>104</sup>R.P. Dore, "City Life in Japan"; Univ. of Calif. Press, 1958.



feel that the external controls are stronger in Japan relative to internal controls in the matter of superego structure.....

It is quite clear that even though Japanese have less physical space per person available in their homes than do Americans, the Japanese prefer to crowd together in sleeping more than is necessary in terms of the limits of space they have available"<sup>105</sup>.

These comments, together with Caudill's other work, suggests that certain personality variables may have spatial correlates; it suggests that while relationships between population density and behavior may be much more complex and intertwined with other variables in humans than in animals, psychoanalytic theory may be helpful in suggesting ways in which density and behavior may be interrelated, and why. Psychoanalytic concepts might also indicate how alternate personality types and societal types could emerge -- *ceteris paribus* - under the influence of population density. In a later section of this study, these speculations will be dealt with in greater detail.

## SOME CORRELATES OF POPULATION DENSITY

### Man vs. Beast

As noted earlier, the behavioral programs governing animal interaction are a partly-inherited, partly-learned amalgam of cooperative and competitive responses which establish animal spacing for a given species, through such mechanisms as social rank, territoriality, etc. Because animal communication is limited, the major constituents of these behavioral programs must be inherited; thus within the span of a few generations at least, it is unlikely that any significant modification of behavioral responses can be accomplished either by the individual or by the species.

The reader will recall that animal spacing, intraspecific aggressiveness, and available food supply were found to be inter-related in the species studied. In the case of man, however, the numbers of people per employed resources may set in motion various economic and cultural modifications which will change the resource's capacity to support people<sup>106</sup>; thus man's relationship to the habitat is significantly different from that of other species. Material from studies of animal populations may have little applicability to humans for other reasons as well; a detailed comparison of the components of the interaction model should make this clear.

Population and propinquity: Unlike animals, man constructs walls, fences, multi-level buildings, paths, roads, etc. It follows that the

<sup>106</sup>Hauser and Duncan, "The Study of Population"; Chicago Univ., 1959.  
Radin, op.cit.

degree to which people are brought into contact with each other is a function not only of population density, but also of visibility.<sup>107</sup>

**Interaction:** An "interaction" can be defined as any form of response by one individual to the presence of another. In animals such responses are automatic if the preconditions of situation and distance are met. In humans, the capacity to ignore each other is very great, and thresholds can be raised considerably by training. Therefore the existence of high population densities is no assurance that all these people will actually be interacting, even at the most minimal level.

**Interaction Frequency:** The relationship between population density and interaction frequency in humans is not a direct one. The probabilities that interaction between any two individuals in a population will encompass more than simple avoidance responses would seem to be related to the probabilities that at least one of them assumes an identity to the other. This probability would be directly proportional to the number of times they meet within a given time period, and inversely proportional to the total number of individuals met within the same time period. If this reasoning is correct, it follows that interaction

<sup>107</sup> Festinger, Schacter, and Back, "Social Pressures in Informal Groups"; Harper, 1950. H.J. Gans, "Planning and Social Life: Friendship and Neighbor Relations in Suburban Communities"; J. Am. Inst. Planners 27: 134-140. C. Hartman, "The Limitations of Public Housing"; J. Am. Inst. Planners, Nov. 1963. I. Rosow, "The Social Effects of the Physical Environment"; J. Am. Inst. Planners 27: 127-133. A.F.C. Wallace, "Housing and Social Structure"; Phila. Housing Auth., 1952. M.W. Webber, "Order in Diversity: Community Without Propinquity"; in: Duhl, ed. op.cit. K. Lynch, "Site Planning"; MIT Press, 1962.

frequency is low when population densities are low, but it is also low when population densities are high; highest values of interaction frequency as a function of population density will then occur somewhere between the two extremes, perhaps at the scale of what is usually called "the neighborhood".

**Interaction Content:** While animals have little or no control over their responses to each other in a given situation at a given distance, such observations have little relevance to man. We have already noted the malleability of the human personality, and his ability to ignore. The relationship between human population densities and interaction content is also not at all clear, because while there may be a strong inverse correlation between interaction content and interaction frequency, the relationship between interaction frequency and population density is probably an inverted "U" curve, as noted above.

**Interaction Density:** Social pressure in animals is directly proportional to population density; in experimentally confined populations, social pathology is thought to ensue when the interaction stimulus load exceeds the channel capacity of the individuals of that species. There seems to be no reason why population density and social pressure in humans should be directly related, owing to man's ability to ignore, and to filter incoming stimuli through such devices as social class, stereotypes, etc. Furthermore, it is by no means impossible that channel capacity itself can be increased through training.

### Population Density and Human Behavior

The possibility of accumulating data on humans in which population density is the only variable is highly unlikely; the author has conducted such a search through the sources listed in the bibliography. Studies of the urban lower classes<sup>108</sup> reveal significant behavioral differences from the middle class, but the epidemiological contribution of such factors as room overcrowding is by no means clear, especially in comparison with the probably more important "morale" and "opportunity" factors.

There is no evidence that a major factor behind the move to the suburbs is the desire for lower population densities per se; what is usually mentioned is a desire for space, privacy, property, greenery, homogeneity, and perhaps status.<sup>109</sup>

The conclusion that seems inevitable from the material examined for this thesis indicates that the relationship between human population

<sup>108</sup> Riessman et al, "Mental Health of the Poor"; Free Press, 1964. Longner, op.cit. Hollingshead and Redlick, op. cit. J.S. Plant, "The Personality and an Urban Area", in: Hatt and Reiss, op. cit. W.F. Whyte, "Street Corner Society"; Chicago, 1943. H.J. Gans, "The Urban Villagers"; Free Press, 1962. Wallace, op. cit.

<sup>109</sup> C. Bauer, "Do Americans Hate Cities"; J. Am. Inst. Planners, Winter 1957. T.B. Brademas, "Fringe Living Attitudes"; J. Am. Inst. Planners, Spring 1956. Gans, "Planning and Social Life, etc.", op. cit. Gans, "The Balanced Community, etc.", op.cit. R. Kaunitz, "Suburbia, The New Adventure"; J. Am. Inst. Planners, Spring, 1956. R.A. Lamanna, "Value Consensus Among Urban Residents"; J. Am. Inst. Planners, Nov. 1964. Willmott and Cooney, "Community Planning and Sociological Research: A Problem of Collaboration" J. Am. Inst. Planners, May 1963.

densities and behavior is difficult or impossible to establish; thus inferences drawn from studies of animal populations, while thought-provoking, provide little in the way of solid theory. It does not follow from this, however, that human population densities have no relevance to welfare, as we shall see.

### Density and Welfare

One consequence of the increase in real incomes is likely to be an upgrading of standards of comfort and amenity, and this may well include an increased desire for privacy, freedom from noise and disturbance, etc. If the increase in purchasing power is accompanied by a decrease in working hours, there will be an increase in the importance of leisure activities and the facilities associated with them. The changing nature of "work" (from physical to mental labor) may have other consequences as well;

".....On the other hand, those who live in the suburbs could conceivably be people who receive a great deal of arousal potential in their work, associated, for example, with anxiety-producing uncertainties or conflict-ridden decisions to be made. In this case, they might prefer to have more stable and predictable environments during their leisure hours."<sup>110</sup>

The spatial implications of these social, economic and technological changes include the following:

<sup>110</sup>D.E. Berlyne, Dept. of Psychology, Univ. of Toronto; personal communication.

1. Newer forms of recreation will often require much more space per person: contrast water-skiing with tennis or chess, for example.
2. Man's capacity to create acoustical nuisance has increased enormously in recent years, thanks to such things as automobile horns, power lawnmowers, motorboats, television, and hi-fi. While many acoustical correctives are available, perhaps the most effective and reliable is still the inverse-square law<sup>111</sup>, which means lower densities.
3. While the evidence is inconclusive, the desire for a private house and garden may be a manifestation of real human needs and satisfactions, in addition to the acoustical considerations mentioned above. Such benefits might include the amenity of light, air, and growing things, the security afforded by property ownership, a re-emphasis on the family, etc. Another sort of benefit is often discussed under the category of "choice", which we take to mean stimulus-selection, self-administered levels of arousal, etc. Paradoxically, the desire for neighborhood homogeneity may be included here: by holding many variables constant, people may actually be aware of more diversity, rather than less.<sup>112</sup> One may be able to interact more fully with a more predictable, less "stimulating" (in terms of information load) environment.

<sup>111</sup>R. Newman, Bolt, Beranek, and Newman; personal communication.

<sup>112</sup>H.J. Gans, "The Balanced Community: Homogeneity or Heterogeneity in Residential Areas"; J. Amer. Inst. Planners 27: 1276-184.

The conclusion that is suggested by the material examined for this study is that while in man there is no demonstrable relationship between population density, stress, and behavior, human welfare is related to population density through the space-consuming characteristics of a society's preferences and pleasures. One topic -- the preference for privacy -- merits closer attention.

#### Density, Privacy, and Individuation

Comparison of psychiatric phenomena in Japan and in the West, led to the suggestion that there might be a correlation between individuality and attitudes toward privacy. Fried<sup>113</sup> has suggested that just as there are individual personality types, there may also be societal types: he then describes the complementarity that may exist between the two:

"Some societies allow little room for independent goal-definition and individuality and, through tradition and group observability, maintain relatively clear and specific role definitions and minimal-maximal performance expectations. Socialization is directed to conformity, to compliance with group expectations, to the rewards of consensus, to the comforts of being like others. Conflict, curiosity, responsiveness to challenge are universal propensities and must be 'isolated' from daily roles by means of displacements, projections, and omnipresent group regulation through constraint or cohesion. As a consequence, there is little opportunity for the development of independence and initiative and little encouragement

<sup>113</sup>M. Fried, "Social Problems and Psychopathology" in: "Urban America and the Planning of Mental Health Services"; Group for Advancement of Psychiatry, Vol. 5, Symposium No. 10.



to the differentiation of ego resources and ego controls. Under these conditions, a highly developed ego organization is maladaptive, except in circumstances that provide extensive opportunities for mobility out of the group or which require leadership roles.

"Those societies or societal subgroups that emphasize the importance of autonomous behavior, of independent choices among alternative courses of action, and of initiative in changing external circumstances to meet inner desires, must allow wide latitude for the exercise of personal goals and of internal controls. All efforts of socialization are directed to the 'development of the ego even if, in immediate behavior, it involves non-conformity and strain. The expression of personal goals and the manifestation of inner resources for goal achievement, anticipation, planning, mastery, and ambition are necessarily rewarded and often can justify a wide range of otherwise deviant behaviors. The proliferation of external restrictions or rewards is viewed as potentially dangerous for, in fact, they tend to undermine the functional significance of internal mechanisms as sources of constraint or esteem."

The one system tends toward ego-diffusion and societal regulation; the other toward ego-differentiation and personal regulation. There is at least a surface resemblance between these two systems and the "Eastern" vs. "Western" view of psychiatry; this typology is not in conflict with studies of American ethnic subcultures.<sup>114</sup>

<sup>114</sup>W.F. Whyte, "Street Corner Society"; Chicago Univ., 1943. H.J. Gans, "The Urban Villagers"; Free Press, 1962. Fried and Gleicher, "Some Sources of Residential Satisfaction in an Urban Slum"; J. Amer. Inst. Planners 27: 305-315.

We might then speculate that individuals and societies could be typed in terms of the degree of internalization of certain behavioral variables, viz:

1. Controls

- A. Internalized: self-esteem or self-reproach result from a matching of one's behavior and impulses against personal norms developed as a result of primary group experiences. (self-punishment and self-reward).
- B. Externalized: self-esteem and self-reproach result from a matching of one's behavior and impulses against group norms. (group punishment and group reward).

2. Goals

- A. Internalized: achievement-oriented. Goals are related to an idealized concept of the sort of person one wishes to become. Future orientation.
- B. Externalized: sociability-oriented. Desire to maintain continuing satisfactory relationships with the group. Present orientation.

3. Ideation

- A. Internalized: carry out dialogue with self using verbal concepts, images, phantasies, etc., in the interests of reconciling aspirations with actualities and abilities.
- B. Externalized: establishment of norms, levels of aspiration and achievement, etc., results from interaction, observation,

and communication with the group.

4. Establishment of reality
  - A. Internalized: perceptions and cognitions less susceptible to modification by others!
  - B. Externalized: perceptions and cognitions more susceptible to modification by others!
5. Identity
  - A. Internalized: personal identity and ego differentiation
  - B. Externalized: group identity and ego diffusion.

We could then define "individuation" as the "degree of internalization"; the more internalized, the more individuated.

Consideration of observations among the Japanese would lead to the speculation that the desire for privacy would bear an inverse correlation with the degree of individuation. While this is little more than a hunch, sensory deprivation experiments<sup>115</sup> indicate that more self-contained and self reliant people can stand deprivation longer than can the more sociable types who seem to need the supportive presence of other people; admittedly, this is an extreme form of "privacy". Actual verification would require sufficient data on many cultures to enable us to:

1. Type them in terms of individuation.

<sup>115</sup>Cameron, et al, "Sensory Deprivation", in: Flaherty, ed, "Psychophysiological Aspects of Space Flight"; Columbia, 1961. Goldberger and Holt, "Experimental Interference with Reality Contact: Individual Differences", in: Solomon et al, eds. "Sensory Deprivation"; Harvard, 1961.

2. Analyze living patterns in terms of density preferences, as opposed to patterns imposed by environmental constraints.

Sufficient anthropological data may already exist to make density-individuation comparisons among the following societal types:

1. Hunters
2. Fishers
3. Farmers
  - a. Live on farm
  - b. Live in town or village

Such verification will not be attempted in this study. Nonetheless, in light of the material which we have examined, it does not seem inconsistent to speculate that there may be a connection between population density and personality, and that where population density is high, certain aspects of individuation are likely to be low.

Future studies might search for relationships between ecological factors, population densities, complementary societal and individual types, and degree of individuation. It is apparent that the structure of a situation will exert a major influence on what sorts of interactions will take place, how they will be defined by the participants, and therefore, what effects they may have. What remains to be learned is the degree to which these structures themselves may be the consequence of cultural adaptations to population density which, in this view, would be considered an exogenous variable determined primarily by ecological factors.

Finally, if these speculations are found to have any value, one can then begin to examine the possible effects of the population explosion on the sorts of personality types and social structures that will be most adaptive to future conditions.

### Conclusion

Animal population studies have been found to bear little relevance to the behavioral effects of population densities in humans. Population density is relevant to human welfare through the spatial implications of preferred residential and leisure patterns. A possible inverse relationship between population density and individuation was hypothesized but not tested. Suggestions for further study and verification were made.

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