A REVIEW OF—"AERIAL PHOTOGRAPHIC INTERPRETA-TION AND THE SOCIAL STRUCTURE OF THE CITY" by Lt. Col. Norman E. Green

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THIS paper illustrates a sociologist's approach to urban analysis. It also presents an interesting mathematical proof of accuracy of determination of dwelling type and delineation of land-use from aerial photography.

I most certainly agree with the author that quantitative data on population can be determined by using aerial photography. My experience has shown that by studying relatively uniform neighborhood units in conjunction with ground sampling, very accurate demographic data can be assembled.

No one seriously doubts that some correlation between social and physical patterns exist. However the use of such broad correlation as a scale for determining socio-economic patterns from density and type of dwelling is a dangerous over-simplification.

Some elements, such as population, water consumption, and electric power use, tend to follow type and density of structure fairly closely, but other items, such as occupational status and income, vary from neighborhood to neighborhood, even though density and roof-cover observable in photography remain the same. Racial characteristics do not necessarily bear a measurable relationship to density and type of dwelling. Residential desirability is likewise dependent on other factors not determinable from aerial photography.

My reasoning on these points is illustrated with two photo illustrations, correlated with appropriate area studies.*

* The area studies corresponding to location and time of photos are:

Photo 1.—Technical bulletin No. 5. Residential Neighborhoods—Marylands National Capitol Park and Planning Commission—March 1956.

Photo 2.—1950 Census of Washington.

PHOTO 1.—DWELLINGS IN SUBURBAN WASHINGTON NEIGHBORHOOD AREAS 1, 2, 3 (entirely single dwelling) are almost uniform in appearance, size of roof, density, and zoned lot size, as shown in the photograph.

Family size, water and power consumption are fairly uniform but each area represents a different occupational status and income range.

Area A, Viers Mill Village.—This is a neighborhood subdivision with average income of $3,500 to $4,000. New homes cost $7,000–$9,000. Service, transportation and "blue-collar" government employees predominate.

Area B, Wheaton Woods.—This is a neighborhood subdivision with average income of $5,500–$6,500. New home values are $13,000 to $15,000. Occupants are mainly white-collar governmental employees.

Area C, Connecticut Avenue Estates.—Income average $7,500. New home values $15,000 to over $20,000. White-collar, governmental and professional occupations predominate.

Despite uniform appearance in photo these areas differ considerably in residential desirability.

PHOTO 2 —DWELLINGS IN CENTRAL WASHINGTON (NORTHWEST AREA)

Single-dwelling row houses predominate. Negro families occupy the homes in the lower portion of the photo, and white families occupy dwellings in the upper portion. The area is undergoing a shift in racial composition from white to negro which in no way is related to existing types of structure.

Not brought out in this study is the value of using air photos to determine number, type and relative distances of community facilities as an important element of neighborhood desirability.
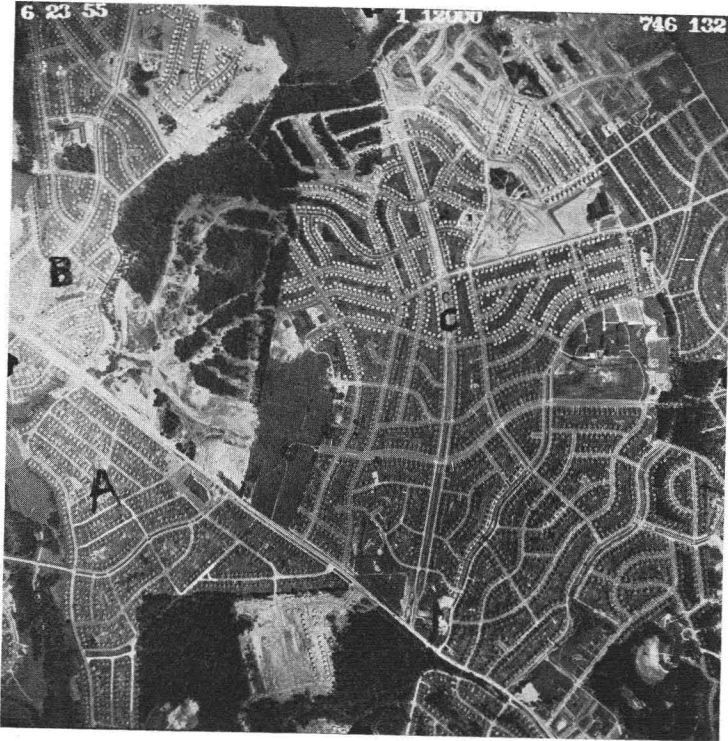
Photo 1

Photo 2

COMMENTS ON MR. WITENSTEIN'S REVIEW OF, "AERIAL PHOTOGRAPHIC INTERPRETATION AND THE SOCIAL STRUCTURE OF THE CITY"

LT. COL. NORMAN E. GREEN

Mr. Witenstein's comments are very much appreciated, particularly because, as an urban sociologist, I have long recognized the desirability of close working relationships with city planners and administrators. This need would seem to to be of greater importance when the parties concerned have mutual interests in the applications of photo interpretation to their special field in urban analysis.

Since I do not have copies of the two photos to which Mr. Witenstein referred to illustrate his points, I will give only a few general reactions to certain of his statements. First, we begin with the premise that there is *a* correlation between urban physical and social structure. As my reviewer indicates, probably few people would seriously question this. However, the important point here, which I have tried to develop in my research. is that if the photographic information is to have predictive value for deriving the "unseen" social structural information, we must determine through empirical study both the *nature* and *degree* of this socio-physical connection. Thus, when these complex relationships are defined as precisely as possible, for example, for American cities, we would be able to obtain a great deal of important urban demographic and social data directly from the photographs, without having to make costly ground surveys.

In these terms, it is a misinterpretation to state that, ". . . the use of such broad correlation as a scale for determining socio-economic patterns from density and type of dwelling is a dangerous oversimplification." On the contrary, the Guttman scale, to which reference is made, is an excellent analytical model for defining very complex interrelationships, knowledge which is required for gaining maximum predictive power from the physical variables observable in the photographs. Further on this point, Mr. Witenstein indicates that I used density and type of dwelling as the only physical variables in constructing the residential-desirability scale for determining social structural information. As stated in my paper, I used *four* photo-data items, the other two being, zonal-location and land-use characteristics. Each of the four items was trichotomized, making a total of *twelve* physical structural categories comprising the scale of residential desirability.

In my Birmingham, Alabama study, summarized in this paper and referenced by footnote, this scale of residential-desirability, as a predictive instrument, accounted for 78 per cent of the variation in socio-economic patterning in that city. Thus, in spite of a quite surprisingly high and statistically significant correlation, we note that the scale leaves 22 per cent of the variation unaccounted for. Therefore, Mr. Witenstein is quite correct. There are other variables, probably associated with residential-desirability, which would account for the remainder of the variation and socio-economic patterning.

Sociologists know that such intangibles as "sentiment and symbolism" or "historical inertia" are important factors affecting a city's internal spatial pattern. But these can not be measured on aerial photographs. To improve our photo interpretation techniques in urban socialanalysis, therefore, we need to discover additional physical-data categories observable in the photographic image and also correlated with social-data categories. Mr. Witenstein makes a worthy suggestion in his reference to community facilities, although this is partially covered in my land-use characteristics item. It bears further investigation. At any rate, we can hardly expect perfect correlations of this nature, nor do we look for any set formula for describing urban social-structure. However, my experience convinces me that photo interpretation is an entirely feasible method for studying demographic and social characteristics of the city.