

ETHICS AND THE NEW CONSERVATION

AN INVESTIGATION INTO AREAL LAND-USE

SAMPLING EFFICACY: VANCOUVER,

BRITISH COLUMBIA

AN INVESTIGATION INTO AREAL LAND-USE
SAMPLING EFFICACY: VANCOUVER,
BRITISH COLUMBIA

by

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B.A.(Hons.), Lancaster University, 1967

AN EXTENDED ESSAY SUBMITTED IN PARTIAL FULFILMENT
OF THE REQUIREMENTS FOR THE DEGREE
MASTER OF ARTS

in the Department
of
Geography

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SIMON FRASER UNIVERSITY

June 1971

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Degree: Master of Arts

Title of
Extended
Essay:

An Investigation into Areal Land-Use
Sampling Efficacy: Vancouver, British
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ABSTRACT

Various studies in Geography require a quantitative analysis of one or more phenomena spatially distributed over the earth's surface. A case in point is urban land-use, where the acquisition of data is often done by sampling. Few works are available which discuss the efficiency of sampling the areal coverage of the components of urban land-use.

This paper illustrates a selected area of Vancouver, and investigates the efficiency of areal sampling based on two specific criteria: a sample matrix developed from the average block size as indicated by a planimetric map; and a sample matrix developed from the average size of land-use colour coding. Efficiencies of three sample types on both matrices are investigated: a random sample; a stratified random sample; and a systematically uniform sample.

It has been found that the most accurate results are obtained by using a matrix pattern based on average colour code size, and that a systematically uniform sample proved to be the most accurate sample type.

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ACKNOWLEDGMENTS

I wish to thank Dr. Michael C. Roberts for the advice and encouragement purveyed to me during the preparation of this paper. Additionally, I should like to take this opportunity of expressing thanks to others who have enabled me, in one way or another, to present the two extended essays. To my Senior Supervisor and friend, Dr. 'Tom' Peucker, I owe a special thank you; a household composed of 'Prescilla', Faith, and David, provided a pleasant space in which to live; R. Brian Sagar deserves special thanks; Len Nelson and Gill Brady, Departmental Cartographers, gave of their time in order to convince me that I could draw; the award of a President's Research Grant from Simon Fraser University made the summer of 1969 a solvent period; and Maryse Ellis typed both papers.

INTRODUCTION

The discipline of geography often involves a quantitative analysis of one or more phenomena spatially distributed over a specific universe. Since total data acquisition is often a long term and expensive procedure, the use of sampling techniques is being used more and more in this discipline.

It has been said of geography that its purpose is "to provide accurate, orderly, and rational description and interpretation of the variable character of the earth's surface." [1] Sampling procedures have thus been designed in order to overcome the vexing problems of accurate areal coverage.

Land-use studies often deal with heterogeneous populations, and accurate generalisations are commonly required. Understandably, many sampling methods have been devised so that only a part of the area of interest is observed, but in such a way that the sample can accurately estimate those aspects of the area which are being reviewed. In land-use studies, sampling procedures provide an alternative to complete, and costly enumeration.

Geographers Berry and Baker pose the question: "What kind of geographic sampling procedure appears to be most useful, and how may it be applied?" [2]

This is an often-aided remark, for geography has no set rules or extensive reference works which present case examples as representative of such questions asked. Presented with such a situation, this paper attempts to test certain sampling procedures on urban land-use, and the results are discussed in terms of the relative efficacy of each sampling method.

STUDY AREA AND PROBLEM

Selection of Study Area

The area taken for study was a rectangular section of the 'West End' of Vancouver, British Columbia, and measuring 0.7 square miles in extent. The location of this area is indicated by Figure 1; Figure 2 indicates the respective boundaries by street name, and also illustrates the land-use of the universe selected. Necessary control data were available for the area in published map form. [3]

Final choice of such an area was decided upon after bearing in mind that such a case study should present an area for analysis representative of other such urban areas, and containing as many land-use categories as might be found in such regions of urban gestation.

Definition of Terminology

Land-use is taken here as a "three dimensional term denoting the status of land, in relation to community physical artifacts and their characteristics that reflect the living, working, and recreational components of the social unit." [4]

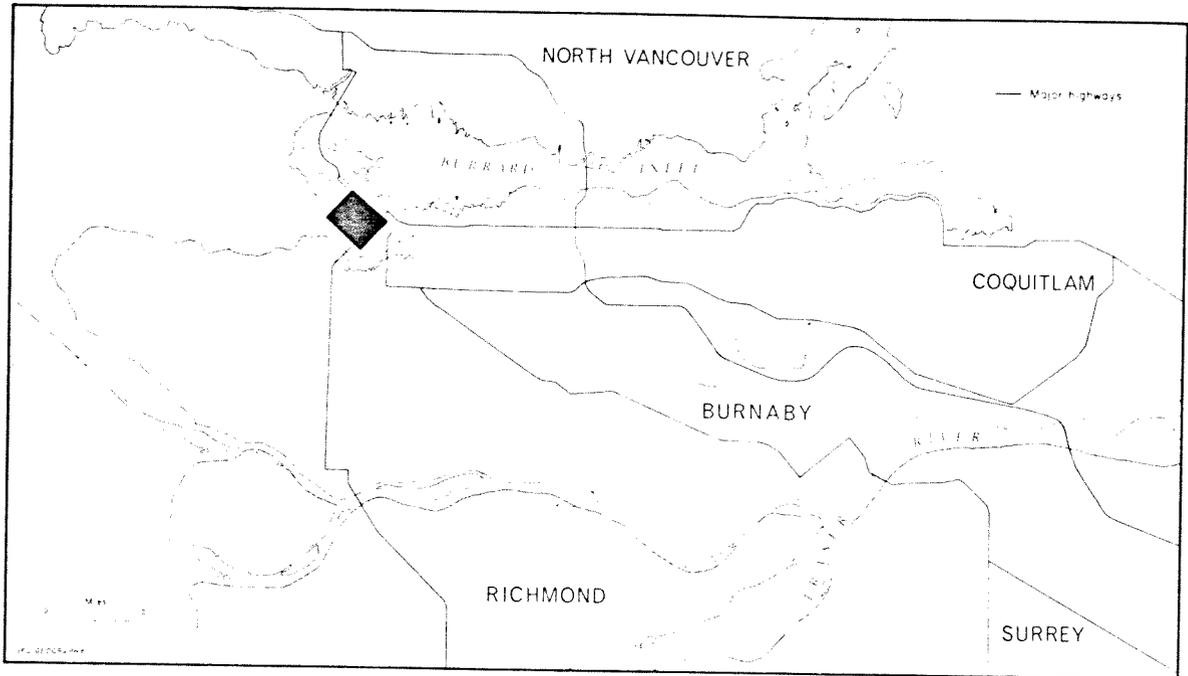
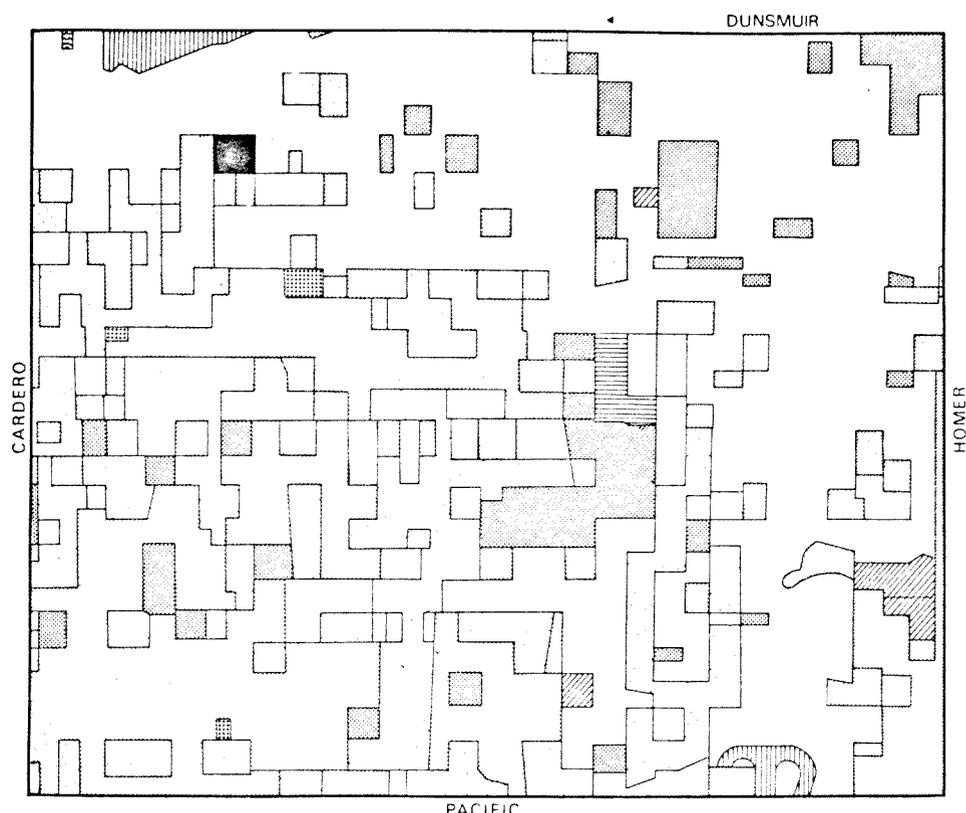


Figure 1 Location of study area [black sector]



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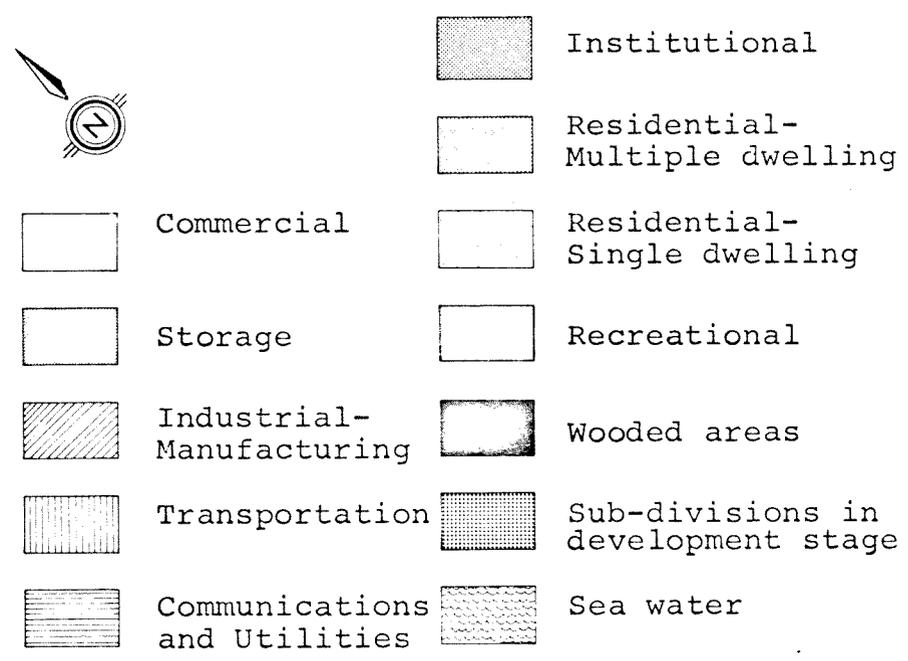


Figure 2 Land-use of study area

The Problem

The presented paper is an exploratory attempt at sampling land-use from existing land-use maps. Two types of grid pattern were superimposed on these maps for the purpose of supplying the sampling units which were used in the actual sampling procedures.

THE LITERATURE

To pose certain objectives requires reasoning for their choice. Sampling, and geographic-sampling literature is obviously far reaching. The emphasis here is to apply certain notions stemming from this literature--for, the test of a suggestion should be its applicability and validity and, too, its ability to raise further questions. Consequently, this paper stems from a desire to study smaller areas as indicative of larger ones, or as Blaut states:

At the macro-scale, geographers deal with spatial phenomena for the entire earth. Because inquiry and generalization at this scale is difficult, the researcher has sought to study small areas in such a way that results are indicative of larger regions. [5]

Blaut deals with micro-geographic sampling more on a micro-regional scale and related to agricultural geography. His work, therefore, is not totally applicable to the case of land-use sampling [6], but his ideas are there to benefit from. Of more recent date, Berry and Baker [7] deal with sampling procedure and its applicability to land-use estimates in a more relevant manner. Their work deals not only with the basic nomenclature, but with the types of sampling procedures, and includes a case study of land-use sampling in an area somewhat approaching Blaut's regional-cum-

agricultural survey. Steiner [8] details an area of 1,875 square miles, rather an awkward leap, in micro-scale context for, after all, land-use involves urban land-use and no megalopolis has yet reached such illusive dimensions.

Areal unit sampling is a question of the location of spatially distributed and heterogeneous phenomena. In this light the rigorous study by Holmes [9] is more germane to the problem at hand. With Holmes, the selection, application, and design of plane-area sampling techniques is thoroughly investigated.

The spatial segregation of phenomena is of utmost importance. Haggett and Board [10] have shown that the accuracy of sample-based estimates of land-use varies with the proportion of the area covered by the phenomena, and with its fragmentation. Cochran [11] has used random sampling for determining the proportion of rare characteristics in any one area. The areal determination by means of such a sampling method for, say, small parks in an urban area is likened to searching for a needle in a haystack. Yates [12] discusses, somewhat pragmatically, several problems in designing sample procedures for a variety of geographical phenomena. Bunge [13] has played with similar sampling techniques, but calls the required planimetry tedious, and remains somewhat doubtful as to its accuracy. [14] The author of this paper found, after a multitude of planimeter manoeuvres, that accuracy to the fifth decimal place was of common recurrence.

Attempts have been made with a host of sampling designs. Berry [15] has tested a variety of sample types in order to determine their efficiency in land-use sampling. Haggett [16] has likewise compared the efficiency of a variety of sample types in determining woodland cover. Krumbein [17] discusses a variety of designs which might be useful in geological and other studies.

Such sampling designs are based on the categories of area, point, and line. The areal unit is the one adopted here, not that points or lines should be disregarded. All methods have their own merits and demerits [18] although, as the problem has been previously defined, examination of such merits or demerits is not the contention of this paper.

DESIGN OF SAMPLE

SAMPLE GRIDS

Since the planimetric map of the selected area was composed of city blocks and fractions of irregular, pre-defined units, the sample method was areal in nature. As such, a sample grid could incorporate not only individual shape, but size and integration. Also, in order to facilitate the location of such areal samples, and to further aid in the breakdown of the universe, a grid (or matrix) system was developed. Two separate grids were so developed, both based upon different criteria and, in both cases, each areal unit was numbered separately in order to identify its location throughout the sampling process. Such numbering was mechanical, and is not reproduced herein.

Grid One

Because the published planimetric map was coloured according to land-use, grid one was constructed on *average block size*, as indicated by the map. Average block size is taken here as incorporating contiguous road systems, as they were coloured according to neighbouring block useage. Any boundary between two adjacent land uses was indicated on the published map as a central boundary along the road system.

Checking of the map revealed there to be three major block sizes: square in the west; oblong in the central section of the universe (oblong axis running east-west); and oblong in the east (axis running north-south). Figure 3 (A) shows the grid pattern of one hundred and twenty six units constructed from the published map.

Grid Two

A grid was developed and based on the *average size of land-use colour coding*. Such areas were planimetered in order to obtain the average size for such units. Figure 3 (B) illustrates the developed grid pattern of six hundred and twenty one units.

SAMPLE TYPES

Three sample types were utilised, and all of these were performed on both sample grids. The three types used were as follows:

1. Random Sample: Based on the axiom that all sampling units are located according to chance, and are not influenced by personal judgment. [19]
2. Stratified Random: Based on a breakdown of the universe, and then selecting a random sample from each of the strata established within the sample grid.
3. Systematically Uniform: Based on choosing sample units located by means of consistent spacing. The choice of every other unit is thus almost free from individual judgment. (Except, of course, for location of the first areal unit).

The previous three sample types were performed on both grid patterns, and Figures 3 (A) (1, 2, and 3), and (B) (1, 2, and 3) illustrate, by means of dot-out units, those areas so taken by the above procedures, and utilised for further measurement. In all cases a fifty per cent sample was taken. [20]

SAMPLE MEASUREMENT

In order to make the published land-use map more legible, the sector taken for analysis was enlarged four times. The image was then redrawn, used for measurement, and an identical cartographic copy is presented herein as Figure 2.

The measurement of unit area was performed by the use of a planimeter [21], and this necessitated several manoeuvres:

1. Measurement of the total area selected for study.
2. Measurement of the actual area of each individual land-use category within the universe.
3. Measurement of the units existent as a result of the three sampling procedures on both grid patterns.

The measurement of the total area of the universe was a simple procedure whereby the boundaries of the universe were planimetered and the resultant figure converted into a fraction of a square mile. A planimeter reading for a square mile was known from the published map, and the figure so obtained was divided into the reading obtained after

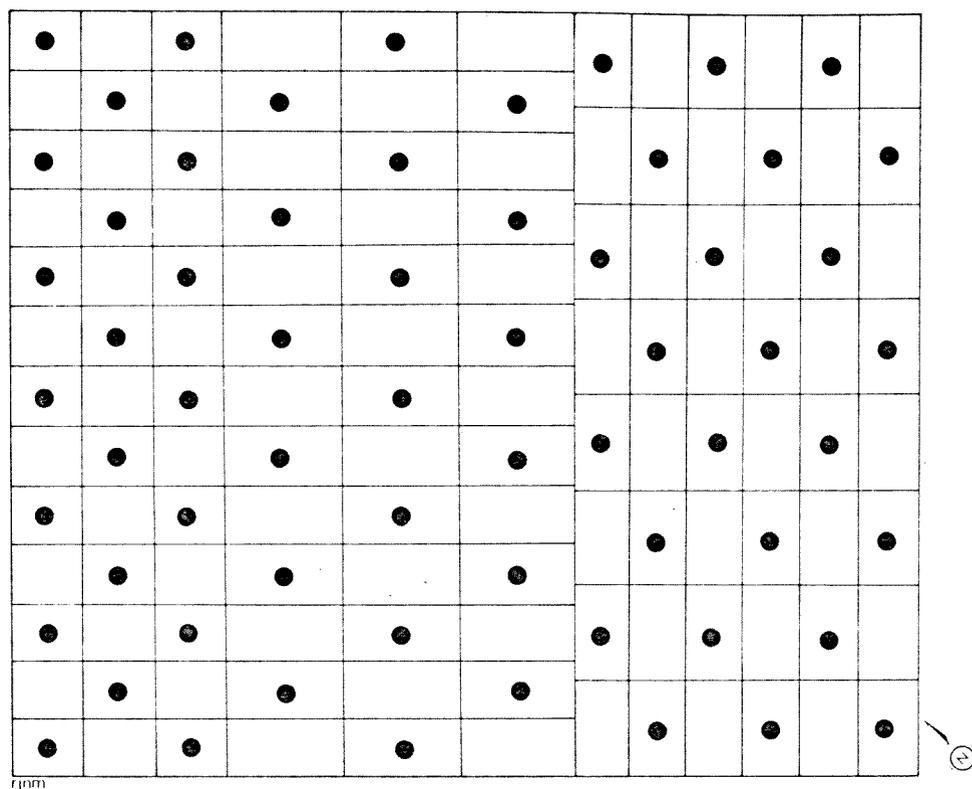


Figure 3 (A) (1) Grid One, showing the distribution of systematically uniform sample

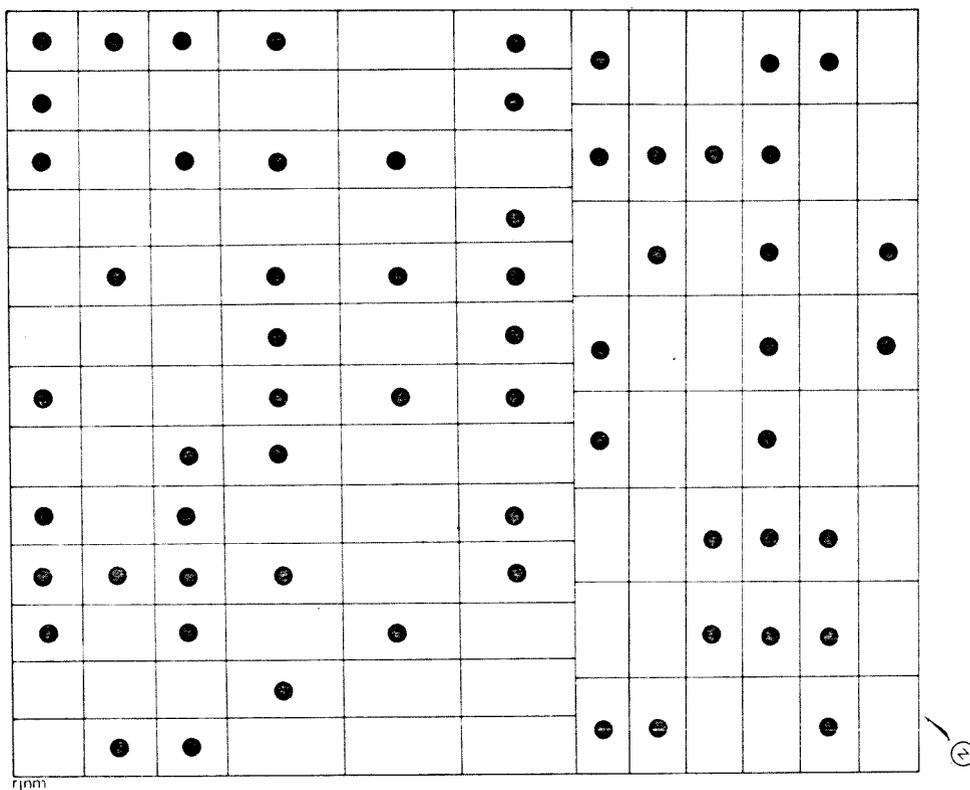


Figure 3 (A) (2) Grid One, showing the distribution of random sample

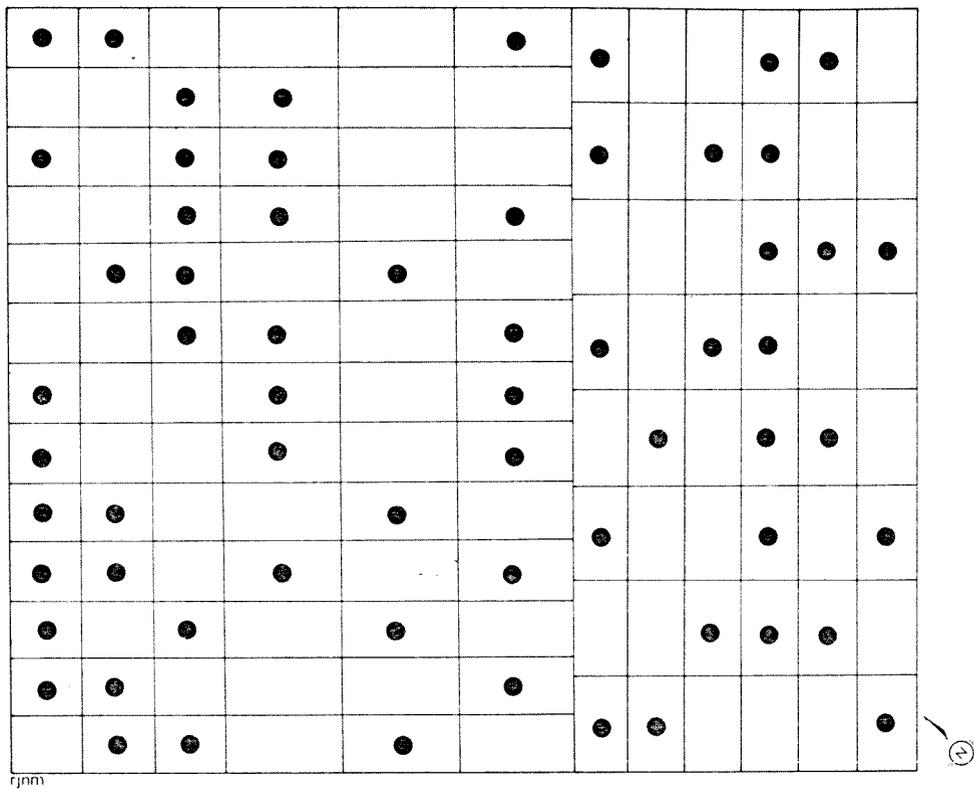


Figure 3 (A) (3) Grid One, showing the distribution of stratified random sample

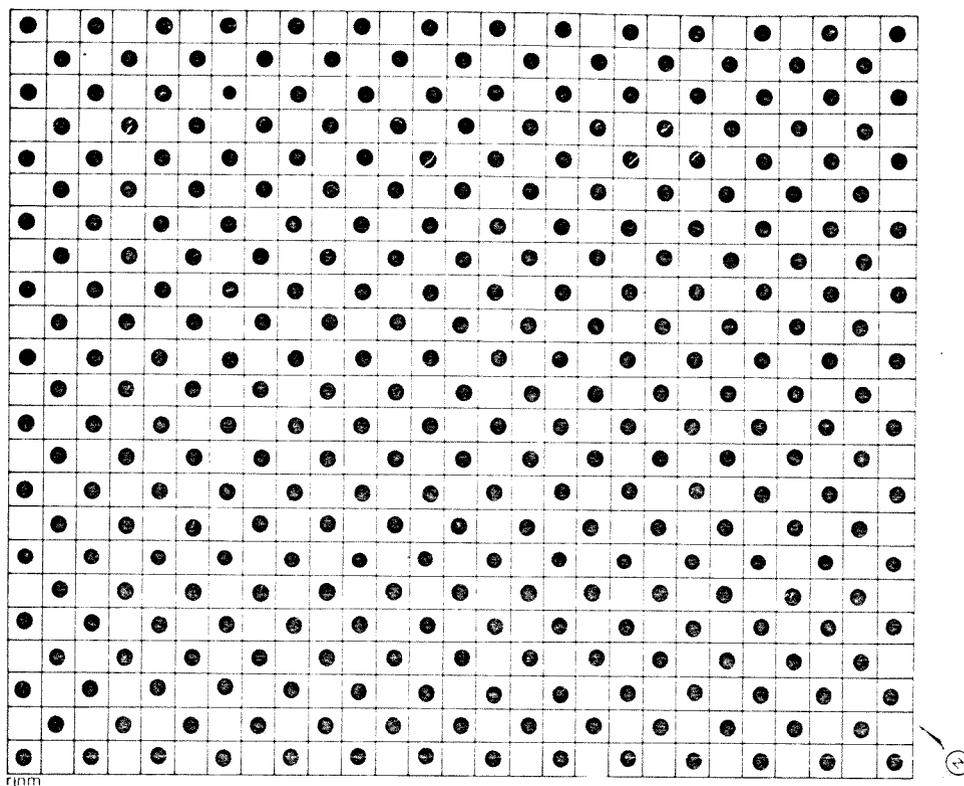


Figure 3 (B) (1) Grid Two, showing the distribution of systematically uniform sample

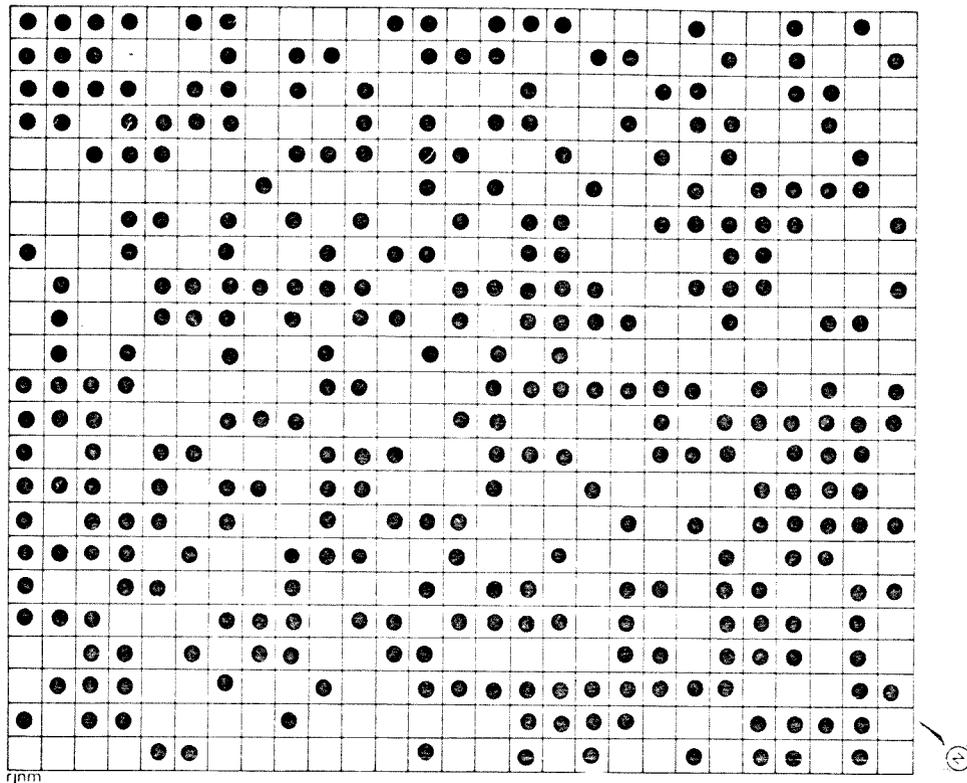


Figure 3 (B) (2) Grid Two, showing the distribution of random sample

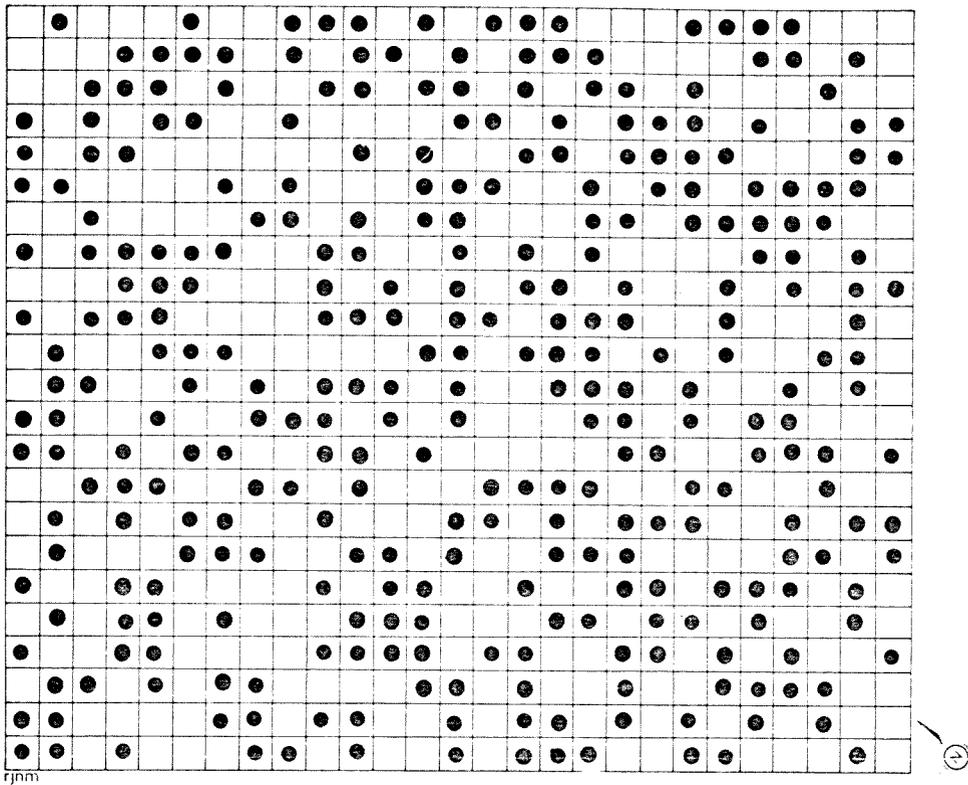


Figure 3 (B) (3) Grid Two, showing the distribution of stratified random sample

traversing the boundaries of the study area. Subsequent measurements, and summations thereof, were converted in similar fashion so that the enclosed Tables indicate all areas in fractions of a square mile.

Measurement of the actual area of each individual land-use category within the universe was a question of summing all readings for the land-use type, and converting the figure into a fraction of a square mile. This was repeated as many times as there were land-use types.

Measurement of the units existent as a result of the three sampling procedures on both grid patterns involved six major performances. Each sampling type was taken separately and a record was made of the individual land-use types measured in the required sample units. Total areas for each land-use were then summated from the recorded individual figures, and converted into fractions of a square mile. This procedure was, therefore, repeated six times on a total of one thousand, one hundred, and thirty four areal units.

Answers to two immediate sampling problems were required, and the questions posed now follow:

1. Which of the two areal units chosen seem more accurate?
2. Which of the three sampling procedures chosen for both areal units seem more accurate?

RESULTS

The results of all measurements are summarised in Tables 1, 2 and 3. Table 1 gives the actual area, in fractions of a square mile, of each land-use category, and also indicates the area of each category as a percentage of the total universe. Table 2 illustrates the measurement for Grid One; Table 3 illustrates the measurement for Grid Two. The data recorded in all columns is given to as many decimal places as possible, thus allowing replication by other researchers.

Both Tables 2 and 3 show the areal measurement, in fractions of a square mile, for each specific land-use category under the three sample types named in columns 2, 5, and 8. Columns 4, 7, and 10 indicate the area as a percentage of the total area recorded under each sample type. Columns 3, 6, and 9 indicate the error of sample measurement, for each individual sample type on each land-use category, as a percentage of the total area recorded. It should be noted that, in columns 2, 5, and 8, the area for each type indicated is the total for each land-use under a fifty per cent sample, and the figures, therefore, are in the order of half those for the actual areas indicated in Table 1. Similarly, the percentage figures are related to the summated areas resulting from each sample type. Needless to say, it is the percentage rating, as a function

TABLE 1

ACTUAL AREA OF LAND USE CATEGORIES (IN SQUARE MILES),
AND PERCENTAGE OF TOTAL AREA

LAND USE CATEGORIES	AREA*	%
Commercial	0.2888482	40.3318
Storage	0.0197440	2.7659
Industrial- Manufacturing	0.0060329	0.8424
Transportation	0.0068555	0.9572
Communication and Utilities	0.0038391	0.5361
Institutional	0.0550274	7.6835
Residential- Multiple dwelling	0.1717550	23.9821
Residential- Single dwelling	0.1560329	21.7869
Recreational	0.0037477	0.5233
Wooded Areas	0.0016453	0.2297
Subdivision in Development	0.0023765	0.3318
Sea Water	0.0002742	0.0383
Σ TOTAL AREA	0.7161787	100.0000

* Measured in square miles.

TABLE 2

AREAL MEASUREMENT FOR GRID ONE (AVERAGE BLOCK SIZE)

C O L U M N				
1	2	3	4	5
LAND USE CATEGORIES	RANDOM SAMPLE*	ERROR %	% ACTUAL AREA	STRATIFIED SAMPLE*
Commercial	0.1592322	9.87	44.7470	0.1505484
Storage	0.0059415	- 65.11	1.6697	0.0099634
Industrial- Manufacturing	0.0005484	-446.65	0.1541	0.0030165
Transportation	0.0042048	19.0	1.1816	0.0027422
Communication and Utilities	0.0034735	45.08	0.9761	0.0027422
Institutional	0.0367459	25.6	10.3262	0.0225777
Residential- Multiple Dwelling	0.0895795	4.74	25.1734	0.0892139
Residential- Single Dwelling	0.0498172	- 55.62	13.9995	0.0560329
Recreational	0.0030165	38.27	0.8476	0.0017367
Wooded Areas	0.0013711	40.39	0.3853	0.0018282
Subdivisions in Development	0.0016453	28.25	0.4624	0.0003656
Sea Water	0.0002742	50.33	0.0771	0.0002742
Σ TOTAL AREA	0.3558501			0.3410419
Σ % ACTUAL AREA			100	

* Measured in square miles.

TABLE 2 (continued)

C O L U M N				
6	7	8	9	10
ERROR %	% ACTUAL AREA	SYSTEMATICALLY UNIFORM*	ERROR %	% ACTUAL AREA
8.64	44.1437	0.1510055	3.47	41.7805
5.64	2.9215	0.0109689	9.17	3.0349
4.76	0.8845	0.0033821	9.96	0.9358
- 19.03	0.8041	0.0031993	- 8.13	0.8852
33.33	0.8041	0.0008227	-135.54	0.2276
- 16.06	6.6202	0.0294333	5.66	8.1437
8.33	26.1592	0.0933272	7.13	25.8219
- 32.8	16.4299	0.0644424	- 22.19	17.8300
- 2.76	0.5092	0.0028336	33.26	0.7840
57.15	0.5361	0.0008227	- 0.92	0.2276
-209.51	0.1072	0.0009141	- 31.19	0.2529
52.37	0.0804	0.0002742	49.54	0.0759
		0.3614260		
	100			100

* Measured in square miles.

TABLE 3
AREAL MEASUREMENT FOR GRID TWO
(AVERAGE COLOUR CODE SIZE)

C O L U M N				
1	2	3	4	5
LAND USE CATEGORIES	RANDOM SAMPLE*	ERROR %	%ACTUAL AREA	STRATIFIED SAMPLE*
Commercial	0.1571298	8.1	43.8856	0.1514625
Storage	0.0074954	- 31.69	2.0934	0.0075868
Industrial- Manufacturing	0.0021938	- 37.48	0.6127	0.0028336
Transportation	0.0054845	37.52	1.5318	0.0032907
Communication and Utilities	0.0030165	36.37	0.8425	0.0035649
Institutional	0.0267824	- 2.71	7.4802	0.0314442
Residential- Multiple Dwelling	0.0909506	5.6	25.4021	0.0893967
Residential- Single Dwelling	0.0617002	- 26.42	17.2326	0.0646252
Recreational	0.0016453	- 13.88	0.4595	0.0025594
Wooded Areas	0.0012797	35.74	0.3574	0.0007314
Subdivisions in Development	0.001828	-549.31	0.0511	0.0003656
Sea Water	0.001828	25.05	0.0511	0.0001828
Σ TOTAL AREA	0.3580438			0.3580438
Σ % ACTUAL AREA			100	

* Measured in square miles.

TABLE 3 (continued)

C O L U M N				
6	7	8	9	10
ERROR %	% ACTUAL AREA	SYSTEMATICALLY UNIFORM*	ERROR %	% ACTUAL AREA
4.66	42.3028	0.1546618	6.64	43.1963
- 30.1	2.1190	0.0089580	- 10.19	2.5019
- 6.44	0.7914	0.0027422	- 9.98	0.7659
- 4.14	0.9191	0.0041133	16.68	1.1488
46.16	0.09957	0.0017367	- 10.51	0.4851
12.52	8.7822	0.0261426	- 5.03	7.3015
3.95	24.9681	0.0877514	2.15	24.5086
- 20.7	18.0495	0.0680987	- 14.54	19.0197
26.8	0.7148	0.0021938	14.6	0.6127
- 12.48	0.2042	0.0010055	18.2	0.2808
-224.97	0.1021	0.004570	-160.03	0.1276
25.05	0.0511	0.0001828	25.05	0.0511
		0.3580438		
	100			100

* Measured in square miles.

of the summated areas, that in all cases is the subject for further discussion, and which, either separately or collectively, indicates the relative efficacy of sample type on the two grid patterns under a fifty per cent sample count.

The percentage of actual area occupied by each land-use category shown on the published map has been compared, graphically, to the percentage error for the three types of sample performed on both grid patterns. Figures 4 and 5 illustrate this relationship for grids one and two respectively.

Perusal of these graphs indicates that the larger the area, the less is the error incurred. Similarly, the smaller the area, the greater is the sample error. The variations in graphical sinuosity show that not all the sample types are as equally erratic; the variance between the tortuous random sample and the less tortuous systematically uniform sample is immediately apparent.

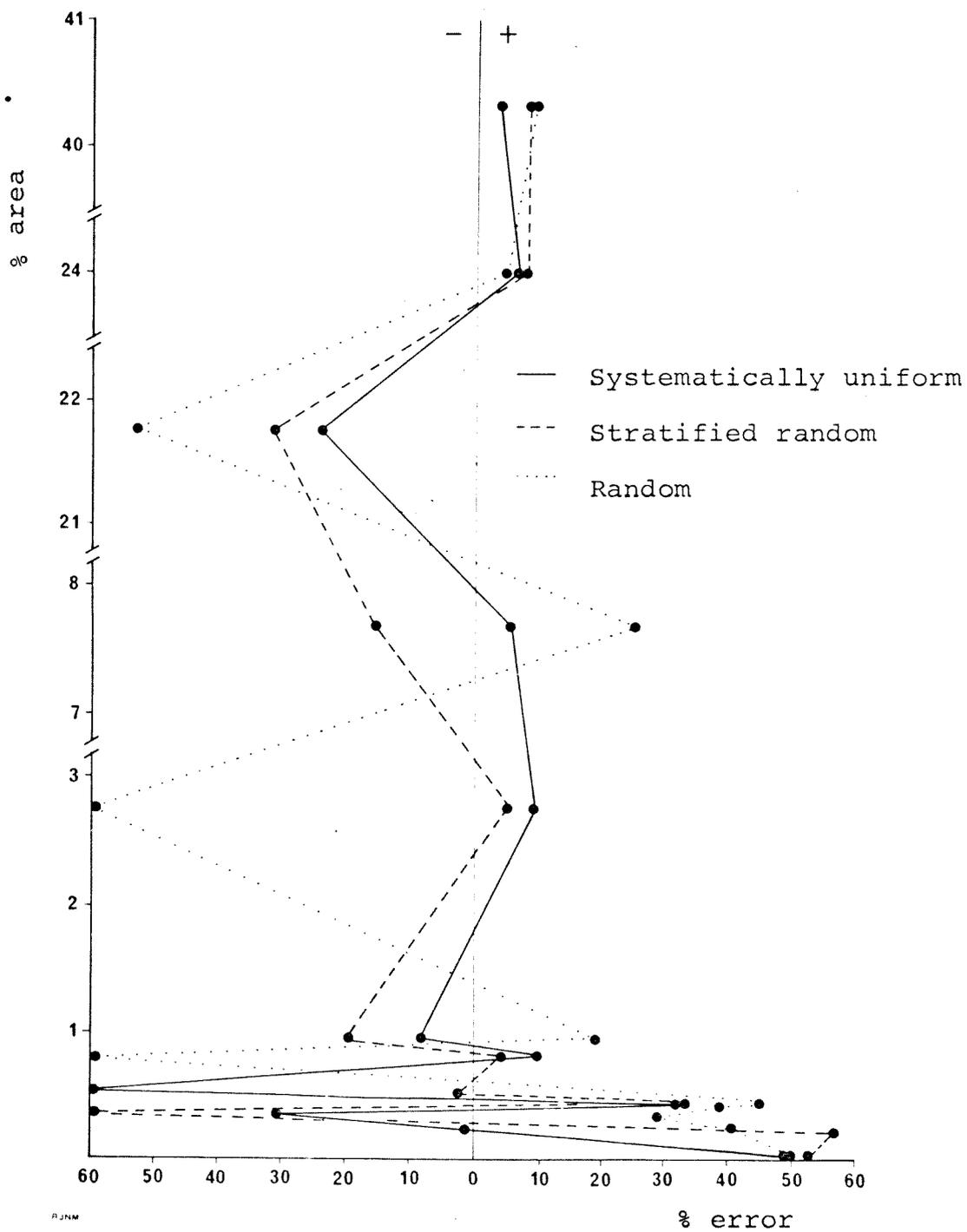


Figure 4 Percentage of actual area against percentage of error for the three sample types performed on Grid One

CONCLUSION

Under a fifty per cent sample it has been found that *the most accurate results are obtained by using a grid pattern based upon the average colour code size, as constructed from the published map.* This accords with the common statistical inference that the smaller the areal sample unit the greater the accuracy will be. This reasoning could, of course, be taken to such an extent that one would be eventually sampling miniscule areal units, and the time so spent would defeat the purpose of the exercise in terms of achieving a rapid, yet accurate, sampling procedure.

In terms of the sample type, the results show that, of the three types used on both grid patterns, *a systematically uniform sample type proved to be the most accurate.* At the other end of the spectrum, the general inaccuracy of the random sample type is noted as being common to both grid patterns.

With regard to the results, and with respect to the relative efficacy of sample method, it is noted that a systematically uniform sample performed on an average colour code grid pattern produces desirable results. If speed, and slightly less accurate results are required, then the same sample type performed on the average block size grid pattern produces satisfactory results.

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20. Obviously it would have been useful to repeat this process using an array of percentages. However, this was beyond the immediate range of the study.

21. The planimeter measures areas in a self-adjusting manner, giving the first three figures on a linear scale, and the fourth figure on a vernier scale.

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by

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B.A. (Hons.), Lancaster University, 1967

AN EXTENDED ESSAY SUBMITTED IN PARTIAL FULFILMENT
OF THE REQUIREMENTS FOR THE DEGREE
MASTER OF ARTS

in the Department
of
Geography

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SIMON FRASER UNIVERSITY

June 1971

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Title of
Extended
Essay: Ethics & The New Conservation

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ABSTRACT

Man-environment relationships are forced to function in a temporal continuum, and the related expression of conservation philosophies have been and remain multifaceted. This paper investigates the importance and changing role of one approach facet in the overall viewpoint of conservation: namely the ethical component in what today may be termed the New Conservation.

Conservation and attendant ethics have travelled various, and often devious, highways. As such, considered herein is the evolution of man-land ethical workings through to the contemporary movement which emphasises rationality over emotionalism, ethics over economics, and ecology over engineering.

On the assumption that there is a growing sum of human wants and a limited capacity of the earth to entertain them, this paper examines the ethics involved in the so-called 'environmental crisis'--where a questioning of priorities; a concern with population growth; a questioning of the efficacy of economic systems; and a plea for the safeguarding of ecological systems are all influenced by the unfortunate consequences of moral arrogance, and engineering mentalities.

Since the name of the game is human survival, it is suggested that man should become more conscious of his place in nature, more aware that there are no readily available lifeboats onboard the 'spaceship', and more morally committed to a philosophy that will avert an odyssey into crisis.

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ACKNOWLEDGMENTS

The effusion of encouragement and guidance from Dr. Timothy O'Riordan is immensely appreciated. From moorland walks with my Father, Maternal cautionary tales, and the conceptualisms of *Mentor* E.J. Harrison, this paper also benefits. Finally, to N.A.B. who made spaceship earth far from gloomy: thank you.

*Nature's polluted.
There's a man in every secret corner of her
Doing damn wicked deeds.*

*The concern is not with nature alone,
but with the total relationship
between man and the world around him.
It's object is not just man's welfare
but the dignity of man's spirit.*

Thomas Beddoes (1824) quoted in Bernarde, M.,
Our Precarious Habitat, (New York: Norton, 1970),
p. 326.

Lyndon B. Johnson (1965) quoted in The Population
Challenge, United States Department of The
Interior, Yearbook 2, (Washington: Government
Printing Office, 1966), p. 76.

INTRODUCTION

The intellectual input which we need to take to the conservation and management of natural resources, or indeed to the total matrix of our spaceship earth, is vast, but could be summarised as follows: economic, social, ecological, political, technological, scientific, judicial, aesthetic, philosophical, and ethical. At the same time as being involved in the overall viewpoint [1], or the core of conservation, such approaches must be viewed individually, together, and in various permutations, as dynamic factors. This necessitates the appreciation that man-environment relationships are perforce to function in a temporal continuum. The ways in which man has perceived, and acted with regard to, his milieu are ever changing, and with respect to looking toward the future, this is no less an exception.

The purpose of this paper is to outline the importance and changing role of one approach facet: namely the ethical viewpoint in what, today, may be termed *The New Conservation*. This new wave may be seen as a vigorous socio-political movement, the likes of which "tends to emphasise rationality over emotionalism, ethics over economics, and ecology over engineering." [2]

A traditional fault in some conservation movements has been to dismiss, if not ignore, perceptive qualities

and more emotional attributes, in order to entertain more axiomatic contracts with nature. As such, the search for the necessary ends has often produced something far removed from the immediate ethical satisfaction of those individuals involved with the end result. Our environment is just as capable of being overtrodden by the insatiable economic desire to balance supply and demand curves, as it is to be pervasively humanised into an aesthetic collection of pleasantries. It has been suggested of economics, for example, that "the whole concern with resource use should be viewed as subsumed within economic thought." [3]

Conservation, however, requires an obligatory choice, and a disciplinary useage of the approaches utilised. Understandably, the approaches as outlined above have been used with some variance, and with some alternating magnitude. Perhaps this is because the mechanism of identifying environmental goals, criteria, and policies, is so multifaceated that the decision-making process is stymied by its own "science of muddling through." [4] Perhaps too, the decision-making process is "determined by public viewpoints resulting from a combination of social, political, and economic forces that are difficult to identify." [5]

It is not the purpose of this paper to discuss the problems of decision-making in conservation or resource management, nor is it opportune to analyse each of the

various approaches as previously listed. The purpose here is to discuss the maturation of a new set of values; values which the new conservation takes as being less anthropocentric, and far more humble in conjunction with man-environment relationships. Such values are involved with the physical/biotic world, the man-built world, and the social world; the summation of which is the spaceship earth upon which a questioning of priorities ensues.

'Spaceship earth' is a terminology which has received a recent proliferation in useage. The description has an origin with spaceflight, where an enclosed life-support system and passenger/s are protectively projected through the cosmos. This paper treats such a description as an analogy to such a voyage, and considers that spaceship earth, as a system, has a total milieu composed of a set of objects and resultant relationships which are changed, or modified, by the behaviour of the system.

Consequently, in a world that can no longer be regarded as an "illimitable plane", but instead as an enclosed sphere, moral codes are in need of adjustment. Such changes are involved in the transition between a "cowboy economy" of the past [6], where man participated with exploitations, violence, and the unequivocal 'good' of production and consumption; to the "spaceman economy" of the *not* too distant future--one may argue that it is upon us *now*--where, earth *is* a spaceship with limited resources and depositories for

effluence, and one in which both inputs and outputs must be carefully ordered and managed; a matter which is by definition of global, not parochial, concern.

Walter Hickel, Secretary of the Interior of the United States, has expressed that

an entirely new element is penetrating into the thinking and planning of the American people At stake is man's very habitat and also man's mind and soul. We are awakening to an entirely new set of values . . . let's welcome this reevaluation going on in the soul and spirit of the nation. [7]

The new conservation is an awakening of the intellectual integrity, imagination, abstraction, and pragmatism of man. At last we may be able to gauge this civilisation's fidelity by its ethical, environmental parameters, for ethics are far from being chimerical, they are reciprocal to man's role in changing the face of this earth.

However, the new conservation movement might pay heed to the warning that it is the "essence of a contractually constructed constitution that it defines a social and ethical utopia. Utopias tend to turn themselves into crusades." [8] Nevertheless, the time is propitious not only to undertake an ethical revolution, but to make the spaceship earth shipshape. This paper, therefore, entertains the promulgation of the new conservation doctrine.

EARLIER CONSERVATION AND ATTENDANT PROPHEETS

The chronology of man's impact on the environment has often resulted in utilisation, exploitation, and the occasional extermination of animal, vegetable, or mineral resources. Attendant morality has been involved with the sequence of resource raids, the effusion of hindsight wisdom from critics of such action, to the commencement of various actions in order to stem such perturbations where they disrupt the interdependent and integrated systems of the globe.

In recent history, the chronology of such impact upon the environment has been manifest in North America from the time of the Pilgrims' landing, through to the peculiar characteristics of American society often bent on the frontier ethos of discovery, cultivation, and capitalisation of territory, to the evolution of a 'grass roots democracy'. In Europe such activity has run the gamut of invading armies, forest depletion, 'game mania', and the industrial revolution.

On both sides of the Atlantic, the nemesis of early conservation interpretedly evolved as a somewhat negative guideline; an aim to preserve, and to prevent the formulation of waste; a guideline which only later evolved to entertain the continuing sustenance of the various components of the

environment. The criticism voiced of private exploitation, the upsurge in conservation, and the avoidance of waste through better management, was *pro bono publico*; resources were to be developed for the many, not for the profit of a few. [9] Progressivism's search for equality ignored the sustenance of resources in their own right.

Such thoughts of conservation were tangential to the whole environmental issue, held only by a few interested individuals, and subservient to industrialisation, mercantilism, and technology--the often blamed progenitors of the current 'environmental crisis'. Conservation doctrines became confused; they evolved at a time when nature was regarded as a commodity fit only for conquest, and where the environment which might be conserved was a segmentalised milieu beyond the limits of settled areas, and existing as separate from, and for the benefit of, the populace.

Emergent from these activities were several individuals condemning the ill-effects of expansionism upon the environment. Such men might be considered as the prophets of conservation, for the non-egalitarian society treated them as elitist and separate to the expansionary cause, or as Jeremiahs articulate in prophesying doom.

The stir of conservation was given a fillip by Thoreau who, in the 1850's, gave Americans an appreciation for preservation; an appreciative idiom far removed from the exploitive characteristics of the time. The 'myth of super-

abundance' was challenged by Marsh who, in his classic 1864 publication, *Man and Nature/The Earth as Modified by Human Action*, established the fundamental principles of conservation, and rejected the notion that resources might be exploited without contemplating the future. It should be noted, however, that Marsh still held an anthropocentric view for, as Lowenthal [10] points out, he preached for the future of man, rather than simply for the preservation of nature.

Muir followed suit in criticising the expansionary ethos and the search for profit, in suggesting that the "devotees of ravaging commercialism seem to have a perfect contempt for Nature and, instead of lifting their eyes to the God of the Mountains, lift them to the Almighty Dollar." [11] Others drew attention to the plight of individual resources, such as in the case of Pinchot who, in the 1890's, publicised the 'problem' facing the nation's forests. Pinchot's plea, however, was concerned with the negation of waste in respect of renewable forest resources, so that better management and scientific harvesting would reap benefits for mankind. As such, the plea was not for the preservation of forests *per se*. In fact, the origins of American conservation were quickly compartmentalised into such categories as forest management, soil and water conservation authorities, and so forth; it did not involve the conservation of resources for their own sake.

Since the government did not entertain environmental considerations as an important priority, the 'conservation movement' only slowly gained momentum, and was identified with the interests of a few enlightened individuals. [12] No major 'land-ethic' evolved until the actions of President Theodore Roosevelt (who was influenced by Pinchot) and, more specifically, not until the persuasions of Leopold in the early 1900's. Such persuasions were first printed in the *Journal of Forestry* (1933), and later incorporated into the text of *A Sand County Almanac* (1949). This book diffused the 'land-ethic' principle, in which land was seen to be a "community to which we belong," and one to "use with love and respect."

The first wave of the conservation movement was, therefore, primarily intellectual, naturalistic, and stewardship-oriented in format. Following this, the second wave appeared after the dustbowl dilemma, and after the political and public arenas had more confidently overcome the thought-consuming traumas of the so-called cold war period. Conservation following the second world war was widened--as is evidenced by multiple-use schemes such as undertaken by the Tennessee Valley Authority, and later still by the increased awareness and greater publication of problems concerning the environment; a partial epitome of which is expressed in Carson's *Silent Spring* (1962).

The overdue revolution in western man's concept of

his place in nature came with the second phase of the second wave; a phase incorporating an ecological renaissance, and a view towards more 'total' conservation, in what was being vividly described as a hungry world.

The third wave which, in the context of this paper, is referred to as the New Conservation, emerged in full force as recently as 1968. The ethical components of this new wave have, however, a much longer history, but the quick upsurge in environmental awareness is a phenomena for which the start of the 1970's will be remembered. Suddenly, the environmental crisis has become public business for, as Marx comments: "after years of indifference, the press suddenly decided that the jeremiads of naturalists might be important news, and a whole new vocabulary (environment, ecology, balance of nature, population explosion, and so on) entered common speech." [13]

To such nomenclature one might add the encompassing terminology: environmental crisis; a terminology which means more than pollution. However, the new conservation should not be accepted as an easy "turn on" to such phraseology "as if we face a cosmic-scale problem of sanitation . . . what confronts us is an extreme imbalance between society's hunger--the rapidly growing sum of human wants--and the limited capacities of the earth." [14] To this contemporary turning point, one needs to consider some wider reflections of ethics and the new conservation movement.

ETHICS AND THE NEW CONSERVATION

An ethical attitude is required, in which the proper conservation of the natural resources of every country is regarded as a moral duty.

[15]

The cerebral manipulation of *principia ethica* has, by definition, been incongruent and congruent in varying degrees with the discourse between man and his environment. Thus, the practice of such morality has not, and does not, always invoke a responsible relationship between man and his milieu. Throughout the extended period of man-environment relationships a variety of policies and polemics have thus ensued.

Man's impact upon nature, and nature's impact upon man, have involved, or given rise to, a variety of ethical parameters. Primarily these are due to the fact that all of man's activities are staged on a set of objective reality; a reality which is composed of the total landscape. Consequently, as an observer of the play, and as an active participant, man has construed a variety of ethical considerations which have been, and still are, far from static.

The new conservation is presently partaking in a further evolution of man-land ethics. However, before an investigation into what the new conservation entails, an insight into the recent, and not too recent, man-land ethical workings is necessary. Simply this involves a distinction

between the vigour of anthropocentric beliefs, and the humbler beliefs of human sensitivity and philosophical naturalism. Such a distinction is, unfortunately, clouded by an element of moral arrogance.

Man in the environment during ancient and medieval times practised ethical theory which was, to all intents and purposes, teleological. Socrates and Plato diffused the notion that man, being the focal point of the milieu, should consider how he might live well (without any deep regard for environmental tamperings). Indeed, this datum was nurtured throughout the entire Hellenistic period before the birth of Christ. Following this period ethical theory was imbued with the notion that man may make himself the lord and master of nature. This is amply evidenced by the biblical doctrine that one should "have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth." [16]

It can be argued of course that orthodox Christian arrogance is tantamount to moral arrogance, and that it is to this doctrine that the new conservation movement is opposed. Certainly this doctrine is equivalent to the theme of man against nature, a theme which the new conservation treats as totally outmoded [17], and one which has been considerably responsible for many an environmental crisis. As White comments:

We shall continue to have a worsening ecologic crisis until we reject the Christian axiom that nature has no reason for existence save to serve man Since the roots of our trouble are so largely religious, the remedy must also be essentially religious, whether we call it that or not. We must rethink and refeel our nature and destiny. [18]

Remedial measures started to evolve with changes in ethical theory; particularly being resultant of evolutionary ethics [19] and with the development of existentialism. Whilst Huxley suggests that the development of moral consciousness is part of the evolutionary process, the fact is that the growth of awareness of moral values is accordant with the level of civilisation. Thus, the ethics of man-environment relationships become more evolutionary and mature, and allow a broadening of the ingrained doctrine of man as dominant, so that "the practice of that which is ethically best--what we call goodness or virtue--involves a course of conduct which, in all respects, is opposed to that which leads to success in the cosmic struggle for existence . . . it demands self-restraint." [20]

The broadening of ethical theory, whilst still permitting man to rise above nature, allowed, through the tangential development of humanistic psychoanalysis, a display of reasoning, self consciousness, and moral conscience. [21] Furthermore, the development of existentialism by Kierkegaard [22] more concretely established the levels in which man functioned: namely the aesthetic, the ethical,

and the religious. Previously these functions were blurred. Existentialism thus gave rise to a turning point in man-environment relationships--a turning point from which the new conservation benefits, for what one 'sees' can, by intuition, be good or bad. As such, "the beauty of nature is its conformity to our understanding, and that conformity is something originally imposed upon it by our intuition." [23]

This developed ethic greatly enhances the value man prescribes his environment; a value which considerably heightens human sensitivity and philosophical naturalism. This is a part feeling of the new conservation ethic, and one which "without losing our sense of great human destiny and without intellectual surrender, we must affirm that the world is a being, a part of our own body." [24]

A further part feeling of the new conservation derives itself from the development of situation ethics where man, a part of the world, takes each moral problem as being unique, and one which must be decided upon individually in relationship to the conditions in which the problem exists. For, "the question of good is posed and is decided in the midst of each definite, yet uncompleted, unique and transient situation in our lives, in the midst of living relationships with men, things, institutions and powers, in other words in the midst of our historical existence." [25]

The new conservation is presented with a world situation to which situational ethics need to be applied.

This spaceship earth is the stage for the ethics of zero population growth, a questioning of priorities, a questioning of the efficacy of our economic system, and a plea for the safeguarding of our ecological systems. [26]

Within the partial aura of: 'the world as a being, a part of our body'; situation ethics; a revival of Christian compassion; and the romanticism of nature; the new conservation takes its place. It is added to considerably by the morals subdued from transcendentalism and pantheism. The movement is thus evocative to the New Left, a socio-political stand which is immensely different from the traditional Left based on the older values concerning exploitations of nature. This traditional Left was previously referred to as orthodox Christian arrogance, an arrogance which permeates the individualistic morals of persons exposed, or even belonging to the New Left. Thus, not only is there an expression of moral arrogance, but of socio-political pluralism.

The new conservation is, then, part of the ethic of the New Left. Adhering to such a 'cause' may be those who are motivated into action without really knowing why it has been brought about. Nonetheless, "the unorthodox but constructive and quasi-religious attitudes expressed by members of the so-called New Left and the hippie movements may well help save our environment." [27]

This hippie ethic, albeit partially composed of a bastardised mock belief of Zen Buddhism, extols the virtue

of a fascination for nature, and a general reverence for life. Certainly this is related to the earlier transcendentalism--a moral, if not mystical, justification of individualism experienced by, say, David Thoreau at Walden Pond, or by such practitioners of landscaping as 'Capability' Brown. Certainly such feelings are related to the naturalism and land ethic as evoked by Aldo Leopold. Leopold eloquently suggested that whilst any ethical consideration should not prevent the alteration, management, or use of resources as they may be required, the least that should be considered is the affirmation for their continued existence in a steady state of moral well being and harmony. [28] Likewise, the new conservation benefits from the moral obligation in stressing the importance of working with nature, rather than against her. [29]

Thus the stage is set for the new conservation; a technological spaceship earth to which "the applications of science must be guided, managed, controlled, according to ethical principles and in the light of our most profound understanding." [30] Let us now return to the dilemma of the environmental crisis, and investigate some of the viewpoints and ethics concerned with zero population growth, a questioning of priorities, a questioning of the efficacy of our economic system, and a plea for safeguarding our ecological systems.

THE NEW CONSERVATION: WHAT IS REALLY INVOLVED

The new conservation involves morals, visions, and changing values and attitudes with regard to man and the environment. To the more pessimistic it involves a radical adjustment of acts to ends in order to further the prolongation of life. Involved is far more than the classical desires of conservation and protectionism.

Indeed, the new conservation ethic is meristic. Kates [31] has communicated three metaphors for the aura of survival: Doomsday Earth; Spaceship Earth; and Simple Earth. Either an individual's metabolism is functioning in a world that is 'already dead', or where the destructive button has already been pushed; or, as previously discussed, life is destined to be computed and ordered, and earth's materials recycled; or one partakes in a 'communitarian dream', in which God, man, and nature are not hierarchically disposed, but where the unity of all matter is paramount.

Part of the emerging polemic behind the new conservation was encapsulated in a draft resolution to the United States Congress:

The Congress finds that the domestic tranquility, the national security, and the general welfare of the United States are threatened by an unprecedented, swift, and pervasive deterioration of the American environment, and that the blessings of liberty to Americans today and their posterity are threatened . . . in ways that are destructive to the economic productivity and the esthetic satisfaction It is the intent of Congress that the policies, programs, and public laws of the United States be interpreted and administered in a manner protective of the total needs of man in the environment. [32]

Unfortunately, the dissemination of such a Congressional resolution meets the countercurrent of those, on spaceship earth, who are "travelling first class (and) are, without thinking, demolishing the ship's already overstrained life-support systems." [33] It is to the amelioration of such increasing demolition, and the arrogant, orthodox thinking of certain groups and individuals that the new conservation is aimed.

The Ecological Boomerang

The extension of the new conservation ethic is an outgrowth of the process of ecological thought. Rules and conduct are quickly sensed when dealing with ecological considerations since principles, direction, prediction, and appraisal are common traits of such a discipline.

George Perkins Marsh, in a study of the Vermont valleys, suggested of the "disturbing" aspect of man that the concomitant result was a destruction of the balance

which nature had established. The moral issue is strong, for "wherever man plants his foot, the harmonies of nature are turned to discords." [34] The laws of nature have thus been disregarded. *Nudis verbis*: man is bad; nature is good. Francis Younghusband, in a similar vein to Marsh, has expressed that "there are two types of Landscape (which) are tolerable--one where man has never been; the other where he has achieved harmony." [35]

The new conservation's plea for a safeguarding of ecological systems can therefore be seen as a moral obligation in stressing the importance of working *with* nature, and stems also from the irreversibility of man's tamperings with the physical milieu. Man is an indivisible and intimately related component of the system--indeed, the total ecosystem. [36]

With the realisation of the fact that man's actions are indivisible with nature, and with a more intimate fusing of an ecological and a philosophical ethic, what were at one time accepted as privileges are now taken as *obligations*. Such man-land obligations should be seen as incorporating cooperation.

Traditional conservation doctrines preached for the reallocation of resources over space and time, and for the betterment of all men. An element of cooperation and obligation was partially built in as well. The new conservation goes further, in that it stresses an obligation to

our children, to all future generations, *and* to the grizzlies; it is concerned, above all other factors, with *survival*. No longer can we take the privilege of tampering with some wilderness area, and pass the problem off with the notion that the indigenous inhabitants will survive in a zoo, Alaska, or the Himalayas. Such action is like regulating eternal life to heaven--some men may never get there to enjoy it. [37] The plea for survival embraces all corporality.

This necessitates the appreciation of the ethic that there is a limitation on the freedom of action in the struggle for existence involving a differentiation of social from anti-social conduct [38], so that there is a social approbation for proper actions and a social disapproval for improper actions. Called for is a new sense of moral conduct.

'Primitive' societies may well have simple, yet strong and clearly defined, moral sanctions in respect to man-milieu relationships. In our 'developed' society moral environmental conduct has been considerably dissolved by industrialisation and all that it entails. Only now are we seeing the propagation of moral sanctions: Ralph Nader's campaigns; anti-litter campaigns; an increased feeling of uneasiness against those responsible for anti-social, environmental perturbations, *et al*. Debate can, however, be entertained: is the family with ten children being 'anti-social' on 'Doomsday Earth'?; how *do* we define anti-social? Additionally, an element of moral arrogance might be at play. I will come back to this point at a later stage.

Spaceship Utilitarianism

The new conservation entails an element of utilitarianism. Utilitarianism is not a bad thing. Not only is it a source of wisdom, because it makes more orderly the weighing of advantages and disadvantages, but more especially because persons capable of thinking as utilitarians are among those who are most likely to ask about the consequences of practices and proposals. Without utilitarianism prejudiced dismissal of certain environmental parameters is rampant.

The wisdom of utilitarianism is not in any particular conclusion about the ends of action, but a questioning about what are the ends, and how are they related? Placed in the matrices of decision-making this often results in problems, for the range of ethical values, subjected to utilitarianism, will rarely coincide because one has to consider the personal attitudes of decision-makers, opinions as to what others might prefer, and opinions as to what others should prefer.

Engineering Mentality

One of the less pleasant intrusions into the finer ethics of the new conservation is the concept of an engineering mentality. Such a mentality has variously been expressed as "rape", "the Disney Imperative", and "the Corps of Engineers: the public be damned." [39] The engineering mentality is

analogous to the assumption that a canyon, flower, or a ground hog have never been known to thank someone for preserving them. Such a mentality is coupled with a disrespect for nature as an 'it', rather than a 'thou', and a moral arrogance to the effect that nature can be 'improved'--often to the financial benefit of a chosen few. Attendant engineering vocation is often an ill-assumption that what is being done is in the public interest. Whilst such a feeling may be quite genuine, it is with the *total* effects of engineering policies and projects that the new conservation is concerned.

The morals of philosophical naturalism are often missing in the engineer, or in those whose thoughts are so inclined. It is by this lack that the engineer has become the 'whipping boy' of the new conservation. Perhaps too, "nobody in engineering thinks enough about the quality of the human environment . . . because they haven't been taught to think that way." [40] As such, those obsessed with this mentality really do not care whether they wipe out a part of the ecosystem, or impertinently suggest that they can enhance it. On the 'development' of Mineral King in California, Walt Disney has been quoted as saying: "I thought it was one of the most beautiful places in the world, and we want to keep it that way It is going to be a pleasure to make it even more attractive." [41]

Pursuant to this code is the treatise of replacing nature by artificiality, and creating further artificiality to overcome the problems resulting from the first replacement.

Tell an engineer that his dam will destroy a salmon run and he will meet that problem with a fish ladder. Tell him that his fish ladder will create another problem, and he will deal with that--but never by abandoning the fish ladder and certainly never by questioning the existence of the dam. [42]

Likewise, it is the engineering mentality which, in the first place, is responsible for ludicrous dreams of drowning the Grand Canyon for ever. Perhaps if these provocateurs could acquaint themselves with the area in question, and become more aware of the consequences of their actions, a change in attitudes and actions might ameliorate the exasperations of the new conservation, and better coagulate their moral code to that of the contemporary movement. Technological capability is not necessarily congruent with environmental stability.

Efficacy of the Economic System

A revolt is taking place against previously formal, deductive reasoning, and empirical data, so that we think less of profits and more of human betterment in the light of what is ethically pleasing. It was suggested earlier that economics considers itself as being 'pre-eminently

qualified to solve value problems.' The assumption being that "the discipline of economics is central to progress on these problems, for it is economics alone that can formulate these problems in terms to which they must finally be reduced, namely the balancing of our varied desires in these matters against the cost of satisfying them to varying degrees." [43]

It can definitely be ascertained that environmental deterioration has paralleled the progression of Gross National Product, and that the present economic conditions not only make it difficult to solve environmental problems, but they in themselves have aided the creation of these problems. Changes in attitude toward the efficacy of the economic system are called for by the new conservation. These changes require a new set of values; values which have become thoroughly engrained in western man as his *genre de vie*. To the first class passengers on spaceship earth, these new values may be difficult to stomach. Even if such values are accepted, such values necessitate payment; payment which may involve a personal price in order to extirpate the no deposit - no return societal syndrome. The very least that such an ethic requires is a questioning of what is produced, and how it is disposed of. Keeping up with the Jones', and the concept of recycling are intimately related.

All too often, the economist takes a pecuniary stand--measuring dollars versus dollars, or dollars versus the

quantifiable extra market. In the context of man/environment relationships, consider the deterioration of human health as sympathetic to environmental deterioration, and where the economic impacts of human maladies are commonly collated by the economist. Whilst respiratory carcinomata are evaluated in dollars [44], no economist goes far beyond the horizon of absolute values and measures the psychic cost of, for one, the Los Angeleno's stinging eyeballs. Absolute values of such tangibles as property depreciation receive more weight than the intangible costs paragraphed by the new conservation-- all be these costs difficult to measure.

Criticism is being voiced to the fact that the economic milieu has often played an all too important role in past decisions and, as such, certain ethical qualities have been omitted from final implementations. Certainly, economic principles *can* aid our environmental decisions, provide more of an integrated and/or model approach, provide us with the capability of making cost-benefit studies, and help us to undertake a materials-balanced approach in order to maintain environmental equilibrium. [45]

Sex and 2.0 Children

The parallelism between environmental deterioration and the rise of GNP can be equally met with the statement that such deterioration is at its worst where human popu-

lation density is greatest. Relating this problem to the new conservation elucidates the upsurge in moral thought concerning the already detonated "population bomb." [46] A rethinking around the challenging problem of gross human numbers is therefore evident, and a new moral choice is upon mankind. For, "personally I am far less interested in guessing how thickly mankind can be amassed on this planet and still survive than I am in the optimum quality of existence for those that do." [47]

To many observers, what in all respects is an irresponsible multiplication of people calls for a change in moral attitude toward population control; an attitude running the gamut of birth control methods, to the number of offspring one should procreate, to the question of aborting those which are not required. This ethic transgresses the tricky boundary of theological thought, more especially that which is expressed in the 1968 encyclical, *Human Vitae*. Even in a non-ecclesiastical framework, this ethic is problematically involved in permeating moral sanctions, or fiat, into suburban bedrooms.

The new conservation calls for the eradication of a 'right' to have children; in its place, the decision to have offspring is a *privilege*. This has manifested itself in various chapters of Zero Population Growth; a movement which extols the ethic that potentiality is greater for a few children than it is for unnecessary increments.

Universal concern surrounds the populace boom, and it is not common to the developing countries alone. Indeed, an extra child in a developed nation is perhaps an even greater pressure on spaceship earth for he will demand the goods and services of the culture into which he is born. Witness the fact that there already exists a "happy-go-lucky way of keeping 80% of the (world's) resources for 20% of the people." [48] When added to the temperamental issue of world peace, a new population ethic is certainly overdue.

Environmental Litigation

The recognition of the right to a decent environment does not merely right wrongs done to a segment of society, it can save the whole society We merely need a ringing decision to ratify this existential fact of life. [49]

The command of the new conservation that certain things ought to be done is a moral law. To act, or not to act, with respect to such a moral law is at the mercy of the attitudinal vicissitudes of the individual or group. In order to make sure that what ought to be done is done there has, in very recent months, been an incredible proliferation of environmental litigation. Moral law has become a law in the legal sense. In many ways, the regulation of activities through various legislations has satisfied the "ringing decision", and has brought (and is bringing) considerable changes to

the judicial scene. The new conservation requires the involvement and protectionism of available legal response, albeit 'an umpire decision' [50] in many cases.

There have always been laws for violations of certain environmental codes. Most, however, have been parochial health and sanitation codes, or historical rights such as in the case of riparian sites. The recent proliferation has specifically caused jumps in

private lawsuits to protect environmental issues;

Prosecution and other enforcements brought about by a public agency for violations of laws and regulations governing the environment;

Private citizens, either alone or with organisations and pressure groups, acting against a public agency to protect certain environmental interests, or to stop a project which allegedly has, or will have, adverse environmental effects. [51]

Consequently, a wayward mark has been reached in further steering the efficacy of economic and other activities. Continued proliferation of court activities is bound to be associated with the new conservation, and the desire to rid ourselves of unnecessary environmental externalities.

The Vexing Moral Questions Concerning Priorities

Environmental implications ushered forth by the new conservation unfortunately have to compete with all the other demands placed upon man's resources. A crisis of

priorities is participatory in the making of spaceship earth shipshape. The new conservation is only *one* component in the matrix of priorities, and its ranking in terms of the priority list varies according to the individual or group. Such variance in rank value is partly due to awareness, affluence, and personal or group interests. Other than environmental imperatives, the list is enormous: social programmes involving the plight of the poor, the city, and education; military expenditures; foreign commitments; governmental expenditures at the various heirarchial levels; law enforcement, etc., to name but a few.

This involves the vexing question of ethical valuing, so as to justify different choices in different situations. Ethical considerations in the light of such priorities are a warning against 'putting first things first' and, more particularly with the ethic of the new conservation, a warning against momentary preferences for things that have no lasting value. The spaceship decision-maker finds himself compelled to make ethical judgment. At stake are a myriad of considerations which include, among others:

Who receives the benefits, and who pays the costs?

Is the distribution of costs and benefits in accordance with public policy?

Is such a distribution in accordance with the principle of justice?

Questions of priority therefore involve the standards of casuistry and moral idealism. Questions are further complicated by the aura of a technological society; a society which is partially incapable of renouncing technological carcinosis. As Carter comments: "for many, the SST has become a symbol of misplaced priorities and a tendency to design environmental standards to fit machines, rather than vice versa." [52] The new conservation is thus an important *tour de force*, which is a necessary participant in what Reich calls (and titles his book) "the greening of America." [53]

Above all such choices, the new conservation loudly cries for the ultimate priority:

It is no longer necessary to plead for conservation on . . . compassionate grounds only. The preservation of the diversity of life and the integrity of the ecological systems of the Earth are absolutely essential for the survival of man . . . the name of the game is human *survival*. [54]

The Pervasiveness of Moral Arrogance

Permeating all the issues of the new conservation is moral arrogance. This haughty quality has been pointed to in various areas of the preceding discussion. The indivisible, arrogant conception of man is reflected "above all of human consciousness, as whole unique--as an entity distinct from, and potentially independent of, the rest of nature." [55]

Additionally, moral arrogance is reflected in the attitude that everybody 'out there' can be cursed for promoting an environmental crisis, whilst in the mind of the individual he, himself, is certainly not to blame; an assumption that he is merely a spectator, not an active attribute entwined in the behaviour of the system.

If an egalitarian man-environment relationship is to succeed, then such moral arrogance needs to be deleted from the cerebral manipulations of *homo sapiens*.

Eschewal of moral arrogance is often claimed by the engineer, lawyer, economist, population ecologist, and environmental scientist alike; it unfortunately *remains*. Indeed, arrogance is as common to the artisans of environmental studies, as it is to the masses who commute by feculent automobiles, and ride bicycles during the weekend.

SPACESHIP ODYSSEY: TOWARD A CONCLUSION

He will manage the cure best who foresees what is to happen from the present condition of the patient. [Hippocrates] [56]

The new conservation is both a programme of action and a philosophy, and this paper has attempted a broader application of the new conservation's ethics.

The dilemma between the present and the future, exploitation versus developmental attributes, initiative and national or global interest, right or wrong, beautiful versus ugliness and/or functionalism, and so forth, are contemporary questions facing conservation on spaceship earth. Inhabitants of this planet must find the relevant importance of each problem, and examine it in terms of what is ethically pleasing--as well as what is economically, politically, ecologically, and socially expedient. Paraphrasing Leopold: a correct decision within the new conservation is correct when its aim is to preserve the integrity, stability, and beauty of the spaceship community. The decision is wrong when it does not entertain this ethic.

Communication needs to be formulated in order to reach those uninitiated groups and individuals, so that they may become more conscious of their place in nature, more aware that there are no readily available lifeboats onboard

the spaceship, and more morally committed to a philosophy that will avert an odyssey into crisis.

Without the consideration of ethical parameters man is going to eventually divorce himself

from the earth, and in this divorcement he is losing contact with the elemental and spiritual things, his sense of oneness with the environment We must (have a) point of view involved with such inherent needs as freedom, human dignity, and happiness. [57]

To many, the new conservation is thus the *elixir vitae*.

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