

## Healthy Cities

The city, the urban environment, seems to be a necessity.

We have rising populations.

Development is a necessity.

The form of development, however, must acknowledge contexts,  
the environment.

There is an effectiveness and efficiency  
in combining human effort and skill;  
there is an effectiveness and efficiency  
in meeting collective human need;  
both dependent upon a kind and degree of density.

Two principles suggest ranges of human population density:

- 1) There is no habitable space for human life  
without habitable space for other life forms  
upon which human life is dependent:  
for necessary oxygen,  
for necessary water cycling,  
for necessary food,  
for necessary energy fixing and  
for necessary processing of human ablatives and excrements.
- 2) Communication technology makes it possible  
to combine human effort of certain kinds, to certain degrees,  
effectively and efficiently, without immediate proximity.

Communication technology makes coordination  
and remoteness possible.

Communications is one of the alternatives to transport,  
moving information instead of people or bulk.

These two principles imply localizing production  
in terms of local needs.

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Each person or set of persons needs  
as their most immediate environment,  
sufficient numbers and numbers of kinds of other life forms  
to meet their dependencies.

This "other life forms" factor is balanced and offset  
by the diversity and variety of human production  
which may be required  
to coordinate the kinds and numbers of human skills and efforts.

Robotics is a factor, automation, in general, is a factor.

With miniaturization, reliability increases.

Whenever and wherever we move information to affect control  
instead of force to implement control, we miniaturize.

How does man and how do other warm-blooded animals  
maintain a body temperature higher than that of the surrounding air?

In the eighteenth century the speculation was  
that elevated body temperature  
was maintained by friction and fermentation.

Now we know it is oxygen that makes this possible.

Oxygen is a necessity, an essential to life, for that reason  
- to support an elevated body temperature.

All the tissues of the body respire.

Oxygen is transported to the tissues by the arteries.

Carbon dioxide is carried back to the lungs in the veins.

Carbohydrates, fat and protein are oxidized to produce heat.

Energy intake and energy output balance.

All organisms must have an effective  
and efficient way to obtain oxygen and to discharge carbon dioxide.

It is an essential of external respiration.

External respiration is an essential to cellular respiration.

The external respiration system  
provides the branching flow pattern required.

Carbon dioxide is a product  
common to the break down of all organic nutrients.

The break down of organic nutrients occurs in cellular respiration.

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It is in the cells that the organic nutrients from the digestive system  
converge with the oxygen from the external respiration system.

Plants depend upon diffusion to provide the essential gas exchanges.  
This is because the low rate of metabolism in plants compared to animals  
and the low requirement for oxygen in cellular metabolism by plants.  
Animals, however, due to their high rate of energy use,  
depend upon specialized structures for external respiration.

The planned urban environment  
needs to be an extension  
of the specialized structures of external respiration.

There are branching convergences from the lungs  
to the nasal and oral orifices.

The path to the organisms (other life forms) upon which we are dependent  
and the paths to light upon which those organisms are dependent  
must be acknowledged and accounted for in the space we inhabit.

Architecture or planning which goes heedless of the biological essentials  
is superficial, if not inhibiting to life and life processes.

Healthy Cities must acknowledge the biological dependencies,  
the ecosystemic relationships  
between human life and other life forms.