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Untitled Epic Poem on the History of Industrialization

by R. Buckminster Fuller

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R. Buckminster Fuller
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BUCKY FULLER'S NOTEBOOK

By Russell Davenport

An architect is a man who works in wood, brick, steel, and other materials that do not visibly move when they are put together. That is, his medium is static. Richard Buckminster Fuller has practiced architecture in this conventional sense, but it is not what he really means when he talks about "architecture." His field, as he himself described it, is the architecture of things in motion. Bucky's structures, or concepts, are built of motion—the motion of life, of wheels and other waves, of the Gulf Stream, of the earth, of electrons and civilizations, of stars and students. His attempt is not to make a static object appear dynamic through artistic design. His constant effort is rather to seize, for one fleeting static moment, the dynamics of the universe.

The items extracted from Bucky's Dymaxion Notebook and his other writings (chiefly *Nine Chains to the Moon,* Lippincott, 1933) are such moments. They are brief glimpses—some important, some trivial—of a moving universe composed of powerful variables. Most of the selections are purely factual; but some are frankly bold estimates of things almost immeasurable, rough guesses that send shafts of light into the darkness of conventionalized thinking. Our little collection is not intended to add up into a significant whole, for indeed that "whole" is not yet entirely apparent even to Buckminster Fuller. For the Fuller universe is still in the process of growth and formation. But if these assorted guesses and facts can suggest a new type of thinking, a new dynamics of human progress, they will have served their purpose.

All this may sound somewhat formidable. The fact is, however, that Mr. Fuller is anything but a formidable character. He is as lovable as a Teddy Bear. No one ever calls him "Mister" for long—or Buckminster, or Richard. Bucky is just about right. With his round face and his eager brown eyes peering out at you from strong glasses, he looks like a rather large gnome—an affable genie, such as might appear if you rubbed Aladdin's Lamp. A little on the stout side nowadays (though he has lost twenty

pounds by giving up all forms of alcohol for the duration of the war), he is nevertheless strong and stockily built. Which is perhaps why he is such a good sailor. Bucky is a hardened sailing yachtsman, of the deep sea variety, and is never so happy as when he is buffeting a big sea with a wheel—or better, a tiller—in his hand.

He was born in Boston in 1895, the son of an old New England family and great-nephew of the illustrious Margaret Fuller, friend of Emerson. He went to Harvard, and in World War I served in the Navy as Ensign and Lieutenant U.S.N. In 1928 he coined a new word—Dymaxion—to describe his own basic approach to human progress and invention. At his own factory in Bridgeport he designed and built the first Dymaxion car, and succeeded in producing three before his funds ran out. This car, with its engine in the back and a single rear wheel (used for steering), was the basis of our present ideas about the automobile of the future, years ahead of anything of its kind. Then came the Dymaxion House, the most radical feature of which was that it was suspended from a pole-like structure rather than being set on a foundation. Just before Pearl Harbor, Mr. Fuller had simplified this house to such a point that the Dymaxion Deployment Unit could be mass-produced and erected for $700, and completely furnished for another $700. He has also designed a complete bathroom which can be mass-produced and set into any house for about $800. You would find him expert on copper, the stock market, credit, alloys, the Einstein theory, solid geometry, physics, and especially the physics of motion. And needless to say, loving boats, he has designed them.

In his *Elegy in a Country Churchyard,* Thomas Gray spoke of "mute inglorious Miltons" who might be buried there. If there is anything mute or inglorious about Bucky Fuller—and our civilization is still too young to be sure—it would be as a Leonardo da Vinci. His mind has the scope and daring of Leonardo, who happens to be known to the ages for his painting, but who was really a scientist and a prophet. Buckminster Fuller does not paint. He does, however, write poetry. The conventionalized literary critics might object to his versification, just as conventionalized architects object to his Dymaxion House. But the truth is he is not a poet in words, he is a poet in science.

He is in fact the prophet of an utterly new age—the age of scientific man—the age in which the human race, highly educated to the basic principles of science, will live *functionally,* and work and govern itself *functionally,* in accordance with the aims that it wishes to achieve. This is the age that follows logically from the industrial revolution of the nineteenth and twentieth centuries, the infinite expansion by science of man's

horizon, which has led to such confusion and bewilderment as has characterized the last decade. It is the age when men will seek to end forever the misery of unemployment, ignorance, frustration, famine, and maybe even war. It is the fashion to say that such an age is impossibly remote. According to Bucky Fuller's lights it is just at hand. Here we have some of the gleanings of this synergetic oracle from Bear Island, Maine.

1. In two decades, from 1920 to 1940, the productivity of agriculture in the wheat belt increased from .14 acres per man hour to .24 acres per man hour, or nearly 100 per cent. In the same two decades, college enrollment more than tripled, from 460,000 to 1,400,000. The number of scientific employees in industry quintupled from 6 to 32 per 100,000 population. The power of the microscope, which enables man to study the microcosm, increased ten-fold, from 3,600 magnifications to 40,000 magnifications. And the number of telephone messages that could be carried on one double circuit increased 40 times from 12 to 480.

2. The pipelines of the United States carry twice as much tonnage as all the motor trucks put together.

3. The total surface of all the bearings in the world, used in industry, the automobile, and all moving parts, is about 1,000 square miles.

4. The power loss to the U. S. due to the reciprocal friction of these mechanical surfaces is about 94 per cent of the total national energy income in fuels and water power. So we are as yet far from efficient.

5. There are more than 10,000 alloyed metals in current industrial use. There were but a handful of alloys before World War I.

6. In the decade from 1925 to 1935 the United States consumed 256,000,000 tons of steel scrap as against only 200,- 000,000 tons of new iron ore.

7. Only 15 per cent of all copper ever produced in the world has been lost. The remainder—27,000,000 tons—is all in use.

8. This basic pile of copper had made a long journey through the entire evolution of industries, from copper pots, to copper fittings for sailboats, to steamships, to railroads, to electric utilities, to airplanes, to industrial electronics.

9. A worker can develop 1057 kwh (kilowatt hours) of work a day. At the present average wage rate in Little Steel, this costs about $8. On the other hand, a kwh developed by a dynamo in the electric power industry costs $.006, when produced from fuels, or approximately $.003 when produced hydraulically. Paid at this rate an American worker would earn from $.0014 to $.0028 per day. This is 1/15 the going rate of 2i/>c to 5c a day for manual labor in many parts of China.

10. There are many $50,000-a-year executives in the United States. If they were paid at the hydraulic power rate, each would have to develop 16,500,000 kwh per annum, or the equivalent of a 2,000 kw hydro-electric turbo-generator running 24 hours a day for a full year.

11. The said $50,000 executive is paid at a rate which assumes that he is the equivalent of four 1,000-horsepower motors powering a Boeing Flying Fortress when turning up at full roaring speed in a non-stop flight of 110 trips around the world at the equator within one year.

12. The effect of industrialization is to make the world man lives in increasingly ephemeral—i.e. less mass. Industrial man continually does more with less, always approaching (but never reaching) the goal of doing everything with nothing.

13. Thus, a small brick Colonial-type house weighs about 200 tons, whereas a prefabricated wallboard house weighs only 25 tons. Future four-room houses, using alloys, will weigh as little as one ton, will thus be easily air deliverable and transportable.

14. The “ephemeralization” of motive power has taken place under our eyes. A freight locomotive weighs 100 pounds per horsepower delivered at the track. An automobile engine weighs 13 pounds per horsepower. Modem aviation engines deliver more than one horsepower for every pound of materials used.

15. The measure of a society’s industrial advancement is not dollars, but its use (consumption) of energy. In 1939, the last measurable year, the United States consumed enough energy (from mineral fuels and water power) to produce 746 quadrillion foot-pounds of work.

16. It is estimated that one man, besides carrying his own weight, can do 150,000 foot-pounds of work in an eight-hour day, a total of 37,500,000 foot-pounds per year.

17. Reduced to human terms, the U. S. consumption of energy, therefore, would provide the equivalent of the work of 20,000,000,000 human slaves. It is thus correct to say that our industrial plant provides us with that many mechanical slaves, or 153 slaves for each adult man and woman. In addition, of course, the inanimate slaves are more serviceable than human slaves would be.

18. This exceeds by far the per capita slave-power of even the Roman Empire. By contrast, in 1939, Great Britain had only 41 slaves per capita, France only 35, Germany only 27, Africa only 5, and Asia (without Japan and China) virtually none at all. The average for the entire world, including the United States, was only 17. Since then, of course, Germany's mechanical slave power has greatly increased. The figure shows how efficiently she uses her slave power for war, and how inefficiently we have as yet used ours.

19. Nevertheless, it is clear that when a military victory can be won, the demonstrated ability of our society to create and harness mechanical slaves for the use of the common man will open the way to a new era in which these slaves will be multiplied and the common man emancipated.

The revolution has come—
set on fire from the top.
Let it burn swiftly.
Neither the branches, trunk, nor roots will be endangered;
only last year's leaves and
the parasite bearded moss and orchids
will not be there
when the next Spring brings fresh growth and free standing flowers.
Here is God's purpose—
for God, to me it seems, is a verb—
not a noun,
proper or improper;
is *articulation,*

not the art, objective or subjective;
is *loving,*
not the abstraction “Love” commanded or entreated;
is *knowledge dynamic,*
not legislative code,
not proclamation law,
not academic dogma, nor ecclesiastic canon.
Yes, God is a verb,
the most active,
connoting the vast harmonic
reordering of the universe
from unleashed chaos of energy.

(R. Buckminster Fuller …“No More Secondhand God.” [Ful63])

Part I.

The speed of the "Twentieth Century Limited" roaring by an observer at its trackside may be reduced to a snail-like crawl not by the observer's throwing a stop signal ahead, which causes the engineer to throttle down, but simply through the seemingly irrelevant act on the part of our observer of zooming aloft in a pursuit plane.

From this aeronautic viewpoint as the horizon increases, the relative speed of the train through the observer's world is diminished.

Thus do aviators regain daylight after the sun has set.

So in super perspective to us do the stars,

moving at thousands of times the speed of the "Twentieth Century" seemingly hang motionless in the night sky.

From, let us say, a fifty-thousand foot sky vantage, do events in the making, unpredictable

from man's usual earth level viewpoint, become readily predictable—the flood lands ahead

which the train approaches.

But even as we after sunset regain the sun by flying aloft, so may we regain observation of events seemingly

long past to the man in the street;—at least, gain accurate record

of the outstanding causes and effects of those events—

of a many-mile wake in the water soon to resolve.

Thus may we well comprehend that since the important causes and effects never were visible in historical scale to the man at earth level, his recording of history was of necessity naive,—legendary,—and full of fanciful misemphasis on back-eddy flotsam edging the main streams.

But our sky-vantage reviewing is summarily accompanied by a sense not only of slow motion of the events enacted, but also of relative belittlement in trend significance of any precise time of impact, or any direct agency act,—in the consecutive push-over flows,—to the greater import of the over-all happenings themselves; and to the clearly tracked passages of past and hither ward trends of over-lapping causes and results which interplay to the horizon.

And it is from this fifty-thousand foot elevation on a particularly clear "North West" day that we review the portentous entry of INDUSTRIALIZATION into the U.S.A, cosmos outwardly around whose whole horizon lies the rest of the world.

Part II.

During the first half of its history the characteristic achievement of the embryonic United States of Northern America was political.

It was the GREAT EXPERIMENT in freedom of thought and expression which drew three million pioneers to it for a new way of life, and new opportunity;—despite ulterior motives of land patent schemes.

Nothing did the successive exploiters baggings of bright eyed families of colonists know of the complete massacres that had befallen their falsely billed

"ground breaking" predecessors

at Head Tide

Pemaquid, Popham, Castine, Wiscasset, Fox Island, Monhegan, and Bath in Bay of Maine Royal Company grants!

So frightful to home subjects and financially devastating to shipbuilding investments and empire exploitation would news of these massacres have proven to be,—if reported back home,—that fourteen long years of such human under-plowing were officially shushed so that 1620,—instead of 1606,—the king's original granting year,—is popularly known as the Pilgrim's premier.

But quite serenely—as the sun draws a billion tons of water each day unseen into the sky there to appear as beautiful clouds which in turn raining down maintain life on earth—by similar indirect cultivation a great quality came to America.

Because pioneering cannot abide action through fear the *achievement* vacuum drafted automatically and unnoticed a pure longing-dominated basic genetic ingredient from out the mixed fear and longing motivation-conglomerate of the older world into America.

In prosaic economics however the achievement unfolded as the net result of *agricultural and craft ingenuity* under highly cooperative measures essential to hard pioneering survival.

Not only building each other houses, tilling each other's fields, these free individuals also gave their lives freely for others.

Would fight their way through thousands of miles of wilderness to save one another.

Thus on the American frontier, these three million pioneers from Europe miraculously multiplied their numbers not just through mating but by the conservation of brotherhood to a twenty-three million living population between the years 1600–1850 despite a high rate of mortality.

During the second half of U.S.A, history, that is, from about 1850 to the present, and especially during the twentieth century, its characteristic achievement has been INDUSTRIALIZATION.

During this period thirty-five million people ferried across the Atlantic in the new steamships to the U.S.A.'s citied shores for survival betterment.

This second phase is indeed the logical outgrowth of the first. It represents the fulfillment, or the partial fulfillment, of the opportunity that men came to seek.

Towards that opportunity for a period of 340 years *three hundred and seventy million native born* offspring of from one to ten generations

of the original

thirty-eight million total migrants

to the United States portion of Northern America have each in some measure

made contribution:—

grand totalling, numerically,

four hundred and eight million individuals of whom one third are even now

much alive.

But genetically the blood of the U.S.A, is three parts to one of the original pre-revolutionary freedom loving and fearless virulent pioneer fluid, and nine to one native bom despite visible enormity of immigrant slums, a fact which world politicos fail to grasp

though often stunned by its backfire.

Part III.

The second half of U.S.A, history the period of Industrialization,—is in itself subdivisible into three main parts: 1850–1890

1890–1920

1920...1940.

Each, it is to be noticed,

is shorter than the period preceding, just as the first and second halves of U.S.A, over-all history were 250 and 90 years respectively due to the time telescoping effect of the compounding speed of intercommunication.

This compounding growth speed is caused by the elimination

of the frictional barriers of rumor and untruth thus allowing far flung events and data of scientific history interactively to associate

out of the integrating history of which the whole phenomenon of INDUSTRIALIZATION is mostly evolved but partially fashioned.

Throughout all known history of any life on earth this telescopic effect is continuously observable as interactive and interdependent.

The telescoping is trend warp and woof inherent in the phenomenon life ever distorting perspective for the unwary,—that is ;—for the energy blind and cosmically heedless.

Period one of industrialization 1850 to 1890

is that primarily devoted to laying railroad tracks and to stringing telegraph lines and to provision of

coal, steel, and copper, thus to do with virtually no consideration of conservation of tonnage or effort.

During this period the older arts of cotton manufacture, iron casting, and forging, crafts and age-old agriculture share the American stage.

The people do not think of the railroad and telegraph or even of the mills

as representing the birth

of an entirely new economic phase of life.

They think of these changes as normal adjuncts to a primarily agricultural and craft economy—the only basic one they have ever known.

Part IV.

Period two of U.S.A. Industrialization 1890 to 1920

is one of the sometimes mild, sometimes hilarious awareness of something new and vastly rich

involved in the ever growing industry.

But this period is primarily one in which the growing giant was not led by scientific management but by opinion, often brilliantly shrewd, but nevertheless simply opinion—and wild guessing.

The probabilities of good fortune in almost any individual enterprise were exceedingly high, and reputation as a guesser far outranked reputation as a rationalizer.

While there were certain exceptions and most important ones, to this guessing and opinion, particularly in the case of Henry Ford, which had their roots in this period, these newer and over-lapping characteristics of industrialization do not float to the top until the end of the period,—a period well named, the *Gay Nineties.*

Contributory items in the Gay Nineties to enrichment of our composite national Kudos (Kudos: an abstract alloy of economic, civil, and cultural abilities, heat-treated by reliable performance) are such superficial yet indicative items as: the exchange of U.S. emissaries with foreign capitals graduating in 1890 from "ministers" to "ambassadors"; the Columbian Exposition bringing a WORLD'S FAIR to Chicago in 1893;

winning by the U.S.A, of the first reestablished Olympic games in 1896 to lose that title again only once in the nine successive games of the next forty years;

The Wright brothers' invention of the airplane in 1904; the unflagging 70-year yachting supremacy over England,—professional "Queen of the Sea"; and in 1908

the U.S. being the first of many competing nations to reach the North Pole, a great thermo-dynamic victory for industrial man who thus tentatively extended environment control to the outermost limits of the *visible world.*

Attainment of this geographical absolute (for the South Pole was conquered immediately thereafter) thenceforth caused frontiersmen subconsciously to direct primary discovery effort into the non-sensorial realms of physical phenomena.

The vast non-sensorial physical realm was contactable only by the disciplined mind and subject to conquest preeminently by the brain instead of by muscle though requiring even greater fortitude and skill.

This epochal trend shift of man was immediately punctuated by the first militant phase of world civil war,—1914–1918, but was not to be recognized tactically by man as a pivotal factor of first magnitude in his history,—equal, for instance, to the invention of the number zero,—until the second militant phase of world civil war,—1937–1940.

In this same Gay-nineties economically certifying U.S.A, arrival at international culture parity, seniors of England's peerage, statecraft, and economic affairs, espoused American beauties—"Gibson girls," and their wealth—Mammoth Store Joe Leiter's gal became Vicereine of India as Lady Curzon;

and Consuelo of the railroads,—Duchess of Marlboro;

and Miss Wall Street Zimmerman,—Duchess of Manchester;—belles it is to be noted not from the Royal Feudal "South" but from the hard-boiled industrial North.

Suddenly in the 1920 dead end of the "nineties" for the first time in U.S.A, history preponderant immigration ceased and a net population outflow commenced of funded world travelers thus closing the books of ingredient measurement for the new social alloy of high world industrialization brewing in the U.S.A, retort.

Part V.

Strictly speaking
period three of the U.S.A. Industrialization,
1920 to 1940
in turn breaks down into
four telescoping sub-divisions:
1920–1932
1933...1937
1938–1939
1940.
The first was “quantitative,”—
(“flaming youth”):
the second “qualitative,”—
(lugubrious New Dealing
of a mixed pack
of bright new cards
and dirty old ones):
the third “paradoxical,”
(ominous and phoney):
the fourth “exquisite,”
(the teleologic tunnel.)
Panics once generations apart
had accelerated in recurrence to the threshold of a continuous high frequency blur bespeaking race schizophrenia and specie suicide blitz
or
a clean new world.

In the first of these four sub periods of the last twenty years the U.S.A, suddenly aware of its exalted position in world affairs, through its willy-nilly elevation to the role of “creditor nation” thrust upon it at the period outset, recognized that INDUSTRIAL-IZATION had indeed become the overwhelming characteristic of the U.S.A, economy well overshadowing agriculture

in common and private wealth making;—which was not slighting to agriculture but an unexpected admission of industry’s thenceforward dominant role.

Yet it never occurred to U.S.A, leaders business or governmental to question the adequacy of the traditional hay-seed accounting system to cover this entirely new way of living upon the cumulative fruits of science, whose increments could only be such abstracts as speed, health, precision, knowledge, satisfaction, and happiness.

So in this first period,—1920–1932,—of world civil war armistice the U.S.A, phlegmatically consolidated its gains as main world supplier during the 1914–1918 open fighting in which high speed quartermaster role it had been forced by emergency to acquire a multitude of new ways of producing, chemically, electrically, synthetically.

The majority of these new ways and new products had heretofore been accumulated, tabled, pigeon-holed, or outrightly suppressed as hobbies and gadgetry, or fantastic nuisance to lucrative inefficiency over a period of fifty long years.

Wherefore: post war business re-possession of industry was widely marked by grief and chagrin, amazement and incomprehension, not as much by returning soldiers

(the popular notion)

as by the old time proprietors and bankers (with brilliant exceptions

such as Dupont and, once again, Ford), because their former comely properties had swollen to harem-queen dimensions and acquired wanton, trackless, wireless, high flying ways.

That there were advantages involved never penetrated their heartbreaking, nor deflected their one-way thinking and wishing.

Self-helpless old-fashioned business was forced to call in the services of some new kinds of doctors whom the bankers were recommending, professional *Trouble-shooters,* they called the milder homeopathic variety;

Liquidators, they called the surgeons among them.

These brusque opportunist doctors were an odd breed of pre-war academic engineer more expert at detecting the butter side of its bread than the trend directions of science.

The breed had been frustrated

by war unleashed progress

too rapidly pole-vaulting over stupid timidity to incorporate its anaemic suggestions in the new panorama.

The breed's swollen inferiority complex gained sadistic satisfaction as it encouraged vulnerable confidences amongst the first forming ranks of industrial science and technology researchers and artist inventors, by showing its "engineering" credentials then two-facedly wielding the financial scimitar.

Having wrought havoc within the properties of the befuddled old owners, and strafed valiant struggles of vision endowed pioneering engineers, as the merger tactics of bankers required, (be it noted the same dismay and confusion tactics as constitute the opening barrage of the Nazi) they next made their retaining fees permanent by re-introducing themselves to their “clients”

in the role of “Public Relations”;—counsel, required by mysterious intricacies of the new industrial pattern.

This particular new kind of public relations counsel is not to be confused with the many innocuous varieties of assistant vice presidents in charge of receiving secondary callers on management presidents; nor with any employee of any advertising agency, nor again with free lance promotional copy writers; nor with any of the small fry space hounds, stunt stooges, or promotional men,—no matter how ambitious,—who have not attained major power in extra-legal industrial intrigue.

For this special invisible behind the board chairman yama yama an appropriate name is “publicitor.”

Part VI.

The new publicitor alchemy consisted essentially of playing the power of advertising appropriations,—a corporation gun nuzzling trick;

and of precipitating vertical merger,—

not dissimilar to Capone's protective association; and also kicking the bosses upstairs—high out of the way.

For these old fogeys were too high minded about American business principles;

about honorable seniority rights and that kind of mush.

The war had made them soft in the head.

They had become too fraternal.

However, the publicitor innately lacked the creative mind and knew it intuitively,—if not admittedly;

and furthermore was focusing attack essentially on the fear potential of actual or prospective clients so he next adopted a classical scheme for keeping his ammunition well stocked against privy council requirement.

The scheme was to watch all artists and listen to original thinkers and for every creative expression articulated by them to devise a reflection model which though equally as glamorous in surface appearance as the original was actually reversed in face and also completely lacking in substance. The reflection models they then presented with an alchemist's wink to the client.

The publicitor knew by experience that, though the client never heard of the original thinker until the latter had stopped original thinking, nevertheless when the publicitor failed thus to intercept the artist's broadcast gifts, the client always intuitively stumbled upon, stamped on, and threw down the flush, as many of the new creative compositions as were popularly good enough to threaten any out for man from under the client's hard won position of certified man exploitation,—(albeit preferably by classically benevolent exploitation).

It is his glimpse into the cosmic warehouse of unlimited potential outs for man which of course precisely inspires the original thinker to articulate his anonymous creations.

This was a waste of good by-product material, said P.R. (short for publicitor) because the client could also recognize painlessly in the Publicitors' reflection model all the hypnotic, though de-ovaried, features inherent in the artist's virginal offering such as would stimulate popular exploitation like a mechanical rabbit of progress giving the tumultuous run around to the human longing for betterment; —by fake streamlining, for instance, that increases resistance.

Thus would the Publicitor and all his handymen;—his pseudo da Vincis;—industrial designers and prostitute writers;—always be certain

of hitting the Jack Pot and wearing the laurels while the clients safely enjoyed being the patrons of art. What a wow!

The Publicitor had also

the slickest of theories regarding monopoly not evident earlier when the big stick was cracking down

on U.S.A, domestic trusts.

It was evident, said P.R. if you wanted to make money instead of human progress,—that vulgar St. Vitus affliction,—that world encircling monopolies would counterbalance the profit consuming insatiable obsolescence

caused by irrepressively advancing standards in the home market;—

where you yourself spent the dough and where always dwelt the world's greatest suckers to ape you.

Distance, indeed, lends enchantment in more ways than one and what a corporation did abroad would be outside the inquiry scope of the government of any one country,—as well as of minority stockholders, —and foreign wars would conveniently reduce price lowering scrap surpluses;—slap-me-down boys ring-around-the-rosy pockets full of cash.

"Furthermore," said the Publicitors, "this is the biggest of big game hunting of all time and the chips to be kicked around will have to be large,—and 'bluest of the blue.'

No, no, no! and a no, no, no!—Never make things simple when you can make them complicated."

When corporate merger had effected sufficient acromegaly,—an uneuphonious, even awkward, word,—meaning paralysis due to sheer bulk of head hands and feet,—

(a much worse affliction than elephantiasis) the Publicitors

self-endowed themselves further with unblushing omnipotence in the detection

and interpretation of

public taste, consumer appetites, and national mental capacities, without protest from their hom-swaggled clients;—without recourse or even quits-rights for the tolerant enough even if wise cracking public.

The only remaining authority over these Public Relationers was vested in bankers and the sole banking criteria as to the Publicitors' self-announced fitness was profits, enormous, immediate, though at obvious expense of the future.

But the future looked lousy anyway to the bankers who cogently opined they had might just as well cash in their "position" and be off to the South Seas or equivalent escape.

For the professional banker,—was now a sartorially unctions sanctimonious automaton,—ethically trained to unquestioning acceptance of questionable standards involving momentum

of loyalty

of hand-picked youngsters

of preferable sapling classification

head swimmingly flattered

into acceptance

of superior gentlemen's responsibilities.

This was another publicitor scheme for shifting the debt blandly to the widows and trusts,—no feelings hurt.

Wherefore the banker crop of the twenties

was banker only in name;—a hot-house, white-calla hybrid of the former wild tiger lily exuding soft negatives fertilized never

with an imaginative "yes."

But the hybrid super sensitive intuitively knew that it was useless

to try to keep up the game forever with negatives.

And that when the debt wheel stopped spinning the heavy steel ball had to settle on somebody's number.

As the wheel slowed down the bad debts thus consolidated into one heavy pellet rolled into the U.S.A's government number and though the government unwittingly had broken the bank of international privateering to the exclusive credit of the commonwealth it collected four I.O.U. dollars for every one in hard cash.

Though the government now owned the bank as time limited trustee of the people no one would risk further playing with Uncle Sam at the head because the ground rules on public domain prescribed betting only with one's own personal cash.

Though the Publicitors had themselves counseled short sale by their clients, through the I.O.U. trick and also counseled default in delivery easily condoned by foreign debt bankruptcies while tutoring the public to hum to itself "Never sell America short";—nevertheless by perversity of fate, the profits to Public Relations, for subsequently making a regular business out of relentlessly taunting the government with responsibility for selling that bounced-back national future

developed so richly in the next period,—'33-'37,—as to threaten the survival of democracy by camouflaging the main issue

relative to the latter's survival.

The main issue

was how to arrange

scientific launching and topsides outfitting for high seas utility

of the super dreadnaught industries,

grass bottomed, barnacled, and rusting in dry docks of fallacious security

on inland lake shores of attempted monopoly.

Though excellent dreadnaughts if knowingly handled, they were beached by the obsolete scheme which concentrates its efforts

on the making, interpreting, finessing and baiting of law, instead of on

efficient wealth making, both common and private. Wherefore every third cog

of the industrial interservice mechanism was stripped, crushed or jammed by the persistent refusal of business to improve, replenish or even to filter the lubrication specifications and service accounting.

The would-be monopoly players through mistaken confidence,—because of skill at the law game, and direct and indirect patronage control, of bench and solicitor,—had vainly hoped to exploit the dreadnaughts; —which otherwise they would not have allowed fatuous science and technology to build, certainly never if they had foreseen that only science could profitably command them.

But this lesson the super gangster politicos now of international genii proportion, inevitably induced by the vacuum drag of the gross inefficiencies and frictions entailed were soon to teach P. R. and his generation changed clients by the unprofitable method of progress by destruction.

Unfortunately more of that later for the broader and deeper trend exploration.

Suffice it to say for the chronicler's nonce by way of proving the camouflage excellence at which it's self-evident

P. R. is tops;

that sum totally in popular memory the major characteristics

of the round dozen of years,—1920–1932,—were *boom* (quantitative) then *stop.*

They had a song in the '20s

"Baby fa' down and go boom."

However there were two healthy new twigs of this period remaining after the old leaves fell to enrich compost and loam.

They were

(1) a cleanly accomplished infinite confidence engendering

called-shot

flight by man

across the treacherous

cold North Atlantic

no hat and two sandwiches;

and

(2) a whisper that sung round the world as a young man hey-hoed

softly to millions irrespective of where

and great lunged Caruso died.

Part VII.

In the unpremeditated evolution which goes right on willynillying the outs for mankind this first armistice period was, however, quite validly themed "quantitative," for it displayed no lack of proclivity for ever increasing mechanical efficiency; though the proclivity was patently prejudiced.

Efficiency of immediate money making at source or in processing, was the petty fixation,—and though petty nevertheless responsible for man's acquisition of literally big things—giant presses, mammoth shovels, titanic mills, transcontinental pipe lines galore.

And though uncomprehending its fated fulfillment of any important function in the vast over-all historic design this twelve year span

proved to be the period of major development of plant and structure

for an ultimately to be successful industrial economy.

The period specialized on "producers' goods," inherently of large tonnage,—over one hundred and twenty-nine billion slowly revolving debt-dollars worth (representing 74% of the total public and private pawn ticket) which caused all the managers to feel unduly important and falsely secure, because the bankers who sponsored them had inferred that the money was theirs.

It swole the heads even of engineers, who in the second armistice period, '32-'37, together with lawyer vice-presidents were fast being substituted for the Kentucky colonels as executive heads of industry.

Thus were the new managers found easy prey by the Publicitors who effectively "suggested" that the managers keep their fine technical eyes fixed on the vast internal corporate mechanics leaving the "treacherous" external relations to P. R.

Thus did P. R. misassume

that at last it had a clear stage on which unmolestedly to do its act

and a seemingly perpetual stooge deluxe,—the government interference boogey man,—"that treacherous guy in the White House." Oh-oh.

But with the plant completed

the period 1932–1937

witnessed the unforeseen shift from a "heavy" to a "consumer's" goods domination of industry, which shift, though a most evident raison d'etre of industrialization, was of sufficient popular surprise to elicit the phrase

"forgotten man."

And that man

was distinctly a horror to P. R.

who tried to nose him

back into oblivion

with streams of red paint.

But the Publicitor's cheap brand of lacquer only stuck to some cooties and fleas whose inferiority complex was *thrilled* at their sudden dramatic visibility.

So from 1933 to 1937

with marked efficiency in "consumer" productions characterized by ever increasing output of ever increasing quality in ever shorter periods of time, the industrial gains were literally instrumented

by *instruments* of control rather than by adding new heavy equipment.

—Those damned engineers!—

And here was *another* unexpected event to P. R. and the heavy-economists.

Of these miniscule *instruments* which hundred-folded the output of giant machinery, the photo-electric cell is most typical.

And so in this period

because affairs were going so hay-wire research was grudgingly returned to its 1917 assignment at industrial stroke-oar.

Then why the bust of 1938 if this assignment spelled an "ultimate" of Industrialization?

Part VIII.

Full explanation
of the ‘38 crash
forms a multiple factor equation
with certain long brackets
of political X, Y, Z’s to the Nth power
of international copper cartels
and tin committee’s quotas
and rats surreptitiously leaving the ship
but a broader cause
may reassuringly be observed
from our 50,000 foot viewpoint.
That broader cause
was that the principle
of Industrialization
had thus far in history been developed
to hybrid full bloom
only within the United States of Northern America;
and in dynamic fulfillment of evolutionary balance
the principle had now to be fully applied
to the rest of the world;—
before the world could settle down into peace and order
on the new plateau
a fact neither evident nor cultivated as such for its honorable own sake
by either U.S. business or government.
However, the particular detonating factor that derailed man’s equanimity train temporarily
was the non-scientific surrealist art
of our pals, the Publicitors
who were now developing
world decentralized manufacture
to prove that their 1929 failure
with world monopoly
“monorailing”

was only caused by the fact that their first trial section of single rail was not long enough.

And the '38 crash came when the Publicitors pulling up the last piece of parallel rail in the world

(at the same time swelling up traffic

by a war emergency scarecrow)

unwittingly invoked the "dynamic balancer" to all such importantly lopsided designs. For, as the human industrial express hit their first section

of new world single rail

and careened into the panic ditch again, within the Publicitor's scarecrow itself

there appeared

the dynamic balancer

which he had unwittingly invoked.

In lieu of a new parallel rail

on which to get the human train running again the scarecrow demonstrated

that unlike the multi-wheeled vehicles

of Democracy's mixed party support it could indeed run on the single rail at least in quasi human fashion by use of a gyroscopic stabilizer, called National Socialism,

or *Totalitarianism,*

a vast scientifically managed

direct producer-consumer integration—individual and collective,—

with government as sole entrepreneur;—a fast spinning efficiency scheme of super-super monopoly.

And the scarecrow's Public Relationers,

Gayda and Goebbels

thus enabled to defy gravity

and anything else it pleased them to defy began to centrifuge vituperance

which far outranged and out-spread radially

the pot-shot hand grenades of the Public Relationers of the world-wide privateering monopolies who were only accustomed to dealing with their own artificial barrages and in sub-caliber practice on big guns, having no real enemy in monopoly to enforce step-keeping with time.

So P.R. was at last afraid for its own skin and was about to secretly Anschluss with its own frankenstein creation and had indeed made vital commitments when the again "forgotten man" bemusedly taking inventory of his own great industrial strength as demonstrated within the U.S.A.

said, "Hey there, P.R., where are you going?"

He said this in several ways:—objectively, by post-card telegram and survey; subjectively, by stubbornness, or perverse condescension or downright boredom and quite a bit of telepathic wrist twisting.

Amazed by this unexpected worm turning yet encouraged by the naivete of Democracy's questioning and admiringly impressed by the "inventory of power,"

Public Relations surprised itself by answering,—speaking editorially *for man,* of course,—in that resonant staccato of the documentary film voice, "We are going to fight the Totalitarian Dragon, who threatens Democracy."

P.R. thought of course that *man* would proudly take arms and thus save not only P.R.'s own skin for having challenged the Dragon, personally, as it were, by advance tentative proxy, but also afford P.R.'s clients a swell incidental profit in one way or another despite limiting fences erected by man;—that *arch* Damn Fool.

But man taking his new creative abilities seriously frowned on the destructive suggestion and refused to "fall in line," (a military expression.)

P.R. now out on a limb decided to take affairs in its own hands even though the grab be painfully patent to a frustrated few artists and scientists.

Thus the Publicitor and his financial backers, his clients and handymen now alone in the world

had everything to lose even if nothing new to gain and the broadcasts grew martially stentorian;—almost noble;—were it not for that undertone despised by the U.S.A, ear,—notes of fear push pushing too hard and too self-interestedly.

And even before consciously detecting that fear Uncle Sam's nephews didn't care anyway for the cut of the Dillon Reid uniforms or for the oomph of Kuhn Loeb's martial music for another phenomenal thing had happened.

The telescoping effect of industrialization had advanced the *average age* of U.S.A, man by fifteen years during the twenty-two year armistice so that a middle aged man stayed precisely middle aged though the years themselves were advancing and the extra years were flung to youth and the aged and for the first time in history *yesterday* was still too realistically *today* for man in his prime to be easily re-booby-trapped.

Especially was this true of U.S.A, man who was only idealistically involved. He remembered, for instance, the many thousands of veterans once the fair headed boys of 1918 deprived of an honorable soldier's death even of jobs and of friendships despised and homeless rounded up like rats on Metacombie Kay where God with a Florida hurricane tidal wave quenched forever the fire that seared their unloved forgotten vice tortured souls;—and this was but one item played way down by publicity.

But if in turn the Totalitarian monopoly grows too singularly lopsided for one of many possible reasons to work happily in our, as popularly viewed, bi-polar world of black-and-white tall-and-short night-and-day right-and-left-foot intuitive balancing progression

(which bi-polar counterpointing with its overlooked third part the middle, or resultant of forces self-started Democracy;—) then as sure as man has two eyes and it takes two people to make a baby, another party will come along and another and another

"So why all the shooting?" say the U.S.A.'s. More precisely than that if Totalitarianism grows too lopsided

to synchronize socially with the three-phase numerical and electrical balancing of the atomic world's proton, electron, and neutron;

or with the three point landings of our modem dynamic technology;

or with engineering's three legged basic structural stability and triangular trussing by segregated satisfaction

of isolated articulating push-pull forces:—in the tripartite terms of which world peace

and its economic language must of scientific necessity be freely fashioned then will the Totalitarians also invoke the inevitable dynamic balancer.

And how,—is for the nonce inconsequential.

Other reasons enough for the '38 panic will be discussed later, but for the moment it suffices to note that the U.S.A, was, after all, only the chief ways-and-means laboratory of fate during the first half of the twentieth century in the ever Westward curve of civilization.

And in this continentally isolated laboratory Industrialization as a fulfillment of the urges and surges of all history and its people had now come to first fertile fruition.

And the U.S.A, populace was not destined or even temporarily licensed by God through any reasonable concept of man to a role of dog-in-the-manger with that fruition.

That is not the way of Industrialization, which, as we shall see later is universal or nothing.

So 1938–1939
third armistice period
was fraught with world-affairs awareness
in which people were learning geography
as never before
coordinating sound and sight names
with places and people
first in the Orient
then all over Europe
and then South America
(it had studied East Africa
in the two years preceding).
And the 1939 business activity pull-up
was intimately connected
with world supplying
and world airways linkage
and not with special personal gain
to the U.S. profit economy.
The U.S. profit economy,—
as separated out from Industrialization,—
was neither politically, economically, mechanically, nor in any conscious sense
(let alone conscientious)
geared to the part
of beneficient
world deliquescence.
Rather the U.S.A.
business economy
played the shrewd fool.
Witness the continual stock market frustrations.
Witness its panicky Fascistic plotting.
Witness its division against itself in war mongering.
Witness its unfitness

for the war it promoted.

Those true commonwealth earnings are only to come

when the U.S. unfalteringly

steps out

into its world leadership role

sponsoring Industrialization peacefully,—for man's own sake,—wherefore let us research the character, anatomy and philosophic meaning of Industrialization.

Part IX.

The inherent
the *social* meaning of *Industrialization*
is not well understood
not because it is difficult—
only because it is so comprehensive.
The form of its ultimate
design and behavior pattern
has probably been clearly envisaged by few even amongst those
who have served it most willingly.
It seems least of all understood
by the professional
painters, architects, novelists, and clergy,
who have seen the price that men have paid for it, without understanding what they were paying for. Wherefore sometimes
painting Industrialization with AWE
mostly have the artists painted it with PAIN.
The *economic* meaning of Industrialization is simple. It is the augmentation
of the integrally bom power
and mechanical effectiveness of the individual in the struggle to conquer and derive satisfaction out of his precast, involuntary environment.

This augmentation is achieved by industrialized man in many ways, and of the mechanics of the augmentation, more later, but economically analyzing, it may be said that:—

man achieves it as *a worker* because the tools of modem industry enormously increase his power of doing work.

(And one of the problems of our time is that the worker gets insufficiently paid for this increase in power.)

He achieves it as *a capitalist or owner* because of the endless opportunities offered for the development of new tools in the competition of tools.

(But also one of the problems of our times is that individual owners' opportunities are being curtailed.)

And he achieves it *as consumer* because he can buy, for the dollars gained by a limited number of hours of work, any number of tools or extensions to use for his personal satisfaction

(or profit, abstracted for later use) or for the development of his faculties.

(And a third problem of our day is that so many are disenfranchised from even limited hours of work, with whose interpolated pro rata share

of the addition to commonwealth provided by their work they might otherwise buy.)

Any one, or all three of these economic roles may be filled by the individual.

But by and large

despite common misapprehension

the historical uniqueness of Industrialization, is not as much economic as *social.*

First taking roots in Western Europe

while the Pilgrims to America were breaking ground Industrialization's social significance

lies first in its *cooperative requirement* of individuals

considered either as producers or consumers.

This cooperative characteristic of Industrialization is neither optional nor voluntary

as in the case of the early American pioneers but constitutes a basic principle without which it cannot exist.

It may be stated as a scientific tenet that *Industrialization* involves *at minimum*

the simultaneous work of three people for its sole virtue lies

in the leverage principle involved

in the dynamic balance of specialization mentally coordinated

upon a central fulcrum of knowledge which can out-produce the efforts of any equal number

of non-specialized, non-coordinated, non-informed Jack-of-all-trade individuals.

A corollary is

that the more people coordinated in simple specialization as producers, and comprehensively as consumers, the more efficient will be the total phenomenon—Industrialization.

Therefore Industrialization cannot develop without at least tacit standards of performance.

Though standards so flexible that they may be limitlessly refined or become ever more inclusive,—because they are dynamic,—they are nevertheless standards that are more cosmically inviolable than morals or man-made laws.

Though rarely discussed, these standards are so certainly assumed by every individual in an industrial society that each may dare to relax vigilance over his whole broad survival problem and thus be free to concentrate his best effort

in performing the specialized contribution for which he is by heredity and experience at the time best adapted

towards the superior productivity of the team as a whole.

Only through such certification

of superior production and welfaring results may the costly acquisition

of the high speed tools

both of producer and consumer

and vast inanimate energy harnessing (weighing and measuring many thousand fold the integral faculties of the individual) be justified.

No individual may unaided accomplish a railroad system, an automobile (and the highway implicit to the automobile) or an electric lighting net-work of more than toy proportions and characteristics.

The individual can hue wood and fashion a chair by himself and this handicraft he has performed for centuries, but craft skill is ever less numerically essential to the total industrial population and organization pattern due to cooperative specialization in mechanical extension.

Informed skill has replaced *craft skill* and the only scarce factors in high industrialization,—besides comprehension of the phenomenon itself, by society in general are combined ingenuity, experience, imagination,—an unshakable faith in a god of orderly meaning,—and the will to sacrifice self for others in setting the pace,—advancing the standards of performance and evolving the new standard prototypes worth mass reproducing.

However,

man unconcernedly sorting mail on an express train with unuttered faith that

the engineer is competent,

that the switchman are not asleep,

that the track walkers are doing their job,

that the technologists

who designed the train and the rails

knew their stuff,

that thousands of others

whom he may never know by face or name
are collecting tariffs,
paying for repairs,
and so handling assets
that he will be paid a week from today
and again the week after that,
and that all the time
his family is safe and in well being
without his personal protection
constitutes a whole new era of evolution—
the first really “new”
since the beginning of the spoken word.
In fact, out of the *understanding*
innate in the spoken word
was Industrialization wrought
after milleniums
of seemingly whitherless spade work.

Part X.

As key to understanding of Industrialization to a vitally useful degree one must comprehend the concept of *the mechanical extension of man.*

This concept starts with recognition of the scientific fact that the human ensemble is a compound mechanism and process, immeasurably superior in designing nicety to that as yet demonstrated by man, yet of the same school of technique as that maintained by the cosmic spearhead forces of contemporary science.

In this concept, for instance, the arm, hand, and finger assembly is a twenty-eight-jointed grappling crane, with integral thermo-couples and telephones at all points plus a self-lubricating and resurfacing system good for 70 to 100 years if well handled without going to the machine shop for repair. Likewise, the human ensemble contains a myriad of chemical plants, electronic convertors, et al, adding up in toto to encompass every mechanical and scientific phenomenon known to man as existing anywhere in the universe.

That this can be handled in a package of seven pounds F.O.B.

with free surprise premiums of special *family traits* thrown in weightless is so super remarkable even to the most experienced technologist that he still fails willingly to classify it with such gross machinery

as that which he himself contrives to build externally, objectively, consciously, preferring to sidestep the issue by filing it for the continuous nonce under topics,—"vaguely mystical." The scientific structure and process concept of human beings

is eschewed by artists as being "mechanistic" but paradoxically it is these artists who are themselves mechanistic rather than the scientists who hold strictly with this philosophy.

This paradox of mistaken philosophic allegiance or leaning may be enlighteningly amplified by pursuing the scientific concept.

First it must be admitted, because the test has been made over and again in hospitals, that life *weighs* nothing. This is proven by the fact that humans as they die, scaled as they cross the borderline, lose no measurable weight.

Only one familiar perquisite is lost, and that is the most uniform characteristic common to man be he

Negro, Eskimo, Nazi, or Hollywood, English, Japanese, Malayan, or Jewish, and that is his *temperature,*— 98.6 Fahrenheit under the skin when in normal health, old or young, male or female, in the tropics, the antarctic, or New York City, on mountain top or submerged in the ocean.

Heat is one manifestation of energy, which like light, another manifestation, is a radiant wave motion integrally involving pure time and energy which compound as *motion* or *speed*— ergo the terms,—the "quick" and the "dead."

Energy, say some scientists, may possibly be proven to have weight, - mathematically,—by infinite inference,—but the point is still moot.

The fact does remain, however, that no quick human being other than the anatomy student, and briefly the undertaker, stone cutter, and florist is vitally interested in abandoned human mechanisms though by habit of association tenderly thoughtful about their disposition.

The fact remains true despite even the ghouls;—

metallurgists tell us
that the annual U.S.A.
post mortem gold mining
in tooth fillings and wedding rings
out produces the mining
from original ore bodies.

Though Roman soldiers in the madness of blood spilling are documented as having "employed" corpses, and "fiends" are periodic news, repugnance over those thoughts in sufficient to close the argument that: —

the *real entity life*
which alone had *common meaning* and aught of any vital importance to living you and me
is non corporeal.
Moreover, the eye itself
does not *see*
any more than does a television set.
It is life alone that sees
by *means* of sun originated light reflected from the surfaces of external objects refracted through the eye lens and telegraphed to the brain
via the nerve cables

and analyzed spot for spot for the specific
frequencies, intensities, and wave lengths of each respective light spot
by the brain's scanning mechanism whose filmed picture
is cut and continuitied at will
by the mind and ego.

But the brain,—the last tangible in the system,—is a central station mechanism as *lifeless* as a cathode ray anaylzer or a telephone switchboard minus operator.

One may even lose one or both eyes and keep on living—lose hair, teeth, a hand and two legs; in fact, in the course of a period sometimes estimated to be as short as seven years, undergo replacement of every tissue cell of the human ensemble from the inside out, but still continue in *identity* with the designating *life facet* label with which the original completely replaced flesh and bone *being* was identified,—that is with the name,—John, for instance.

"John" may be ten re-generations within the same identity even though the tenth bears no greater resemblance to the first, than does a chipmonk to a donkey,—two eyes, two ears, mouth, tail, and four limbs.

It is as though "John" metaphorically were born in a single room cabin on a farm on the south west corner of Fifth Avenue and thirty-fourth street in New York City in 1850, the event unwitnessed by you and me, —yet duly registered with the public ken by a notice in the newspaper;—whereby "John" legally existed.

And as John grew up his father added a large wing to the house, which was piecemeal replaced by rooms of a tavern operated by John which tavern was later on completely replaced by the Waldorf-Astoria though John never left the premises.

For he took a job as "superintendent" of the new building and switched from his old rooms to a temporary building "shack" always within the same space, while the old major exterior and its arterial system were being replaced by the newer.

And in like manner John later got a job as night watchman in the Empire State Building and transferred to it without leaving the premises when the Empire State replaced the old Waldorf in an eighteen month major surgical case.

And if, in the meantime, as the actuarians indicate as "probable," "John" became a dual personality by marrying;

and a multiple personality by having children and grandchildren,—unseen to us outside the premises,—you can understand how difficult it is for us to know just who
is making the answers

to letters and telegrams sent to "John," at Fifth Avenue and 34th Street, N.Y.C., U.S.A. Year Fifteen Quadrillion and One.

And even on the telephone or through the door slightly ajar, which is a close as we may ever get to him, you can't be certain that you are not listening to an excellently recorded transcription of "John" or of one of his kinsfolk, or possibly of one of his heroes or of the untraced legend of God knows who,—

adopted consciously or

even subconsciously by John when too lazy to think for himself.

But country shack or

Empire State exteriors were both tours de force,

as were also John's blue suit, his overalls, and his integral flesh covered self-replacing industrial ensemble, of the phantom dweller continuity which we have oversimply designated as "John."

Chemists point out that at cost not over ninety-eight cents worth of basic chemical elements are involved in "John's" fully grown integral dwelling structure and shell and its industrial subsidiaries.

Physicists point out that John's mechanism considered as an engine

in competition with the electric dynamo can translate but $4.21 worth of energy (intaken directly or indirectly

from the sun and other stars, whence exclusively

comes all life and growth upon earth) into useful power output

as effective work

within his whole life time at 1940 retail rates for electric current in New York City.

Incidently sub-cosmic technologists and Public Utility business men speak of steam and gas engines improperly as "prime-movers." Only life, that pre-sensory entity in its most infinite abstraction,—called God by us,—which infinite abstraction (together with the exclusively star emanating radiation of the energy spectrum:—X, Gamma, infra-red, ultra-violet, cosmic, light and heat, and probably other rays as yet undiscovered all first articulating as God's faculties at one hundred and ninety-eight thousand miles per second) is not earth born;

and is that which by photo-synthetic chemistry first builds up John from miligram ovary to two hundred pound man and cyclically replenishes him; and alone in due course motivates John,—himself seemingly,—to organize and motivate engines;—this life can alone be logically accredited in strict scientific sense with any prime-moving.

Thus it may be deduced as inherent in the *mechanical extension of man* concept that where others have failed the scientist has by progressive elimination of all the entity categories with which he is sufficiently familiar to identify as known processes or dynamic interactions that *life*

while not isolatable as an "it is,"—
at least *is not*
the gross physical mechanism
which it extensively builds
and employs,—
here on earth.

Part XI.

And that “it” isn’t

is what your poet-painter has been trying to say by vainly writing of what love is what hate is

and what a rose,—

or any continuing process group identified with *life,*—

is.

Paradoxically the poet’s preoccupation with describing the indescribable and his disdainful neglect of the physical for what it precisely is worth allows him to fall

into the psychological nature-trap tended by those who exploit such illusory preoccupations with pragmatic glee.

That is they exploit him by dealing in fish which only the poets can catch with their creative imagination nets.

The pragmatists have only to stand by with their baskets infra-visible

to the ultra rangeing spectrum of the poets, as the latter throw the caught fish aside, shimmering, flapping, and vital, disdaining for the moment of even thinking of consuming such beauty,—and only intent on casting again.

But between fishing trips our poet must buy those fish again from the merchants, smoked, grilled, or hashed.

Thus are the poets kept poor, poor in eats, while rich in potential.

Poor poet eating with one hand while writing his book with the other is constantly positing disproval of the love *abstraction* which he weaves by identifying life only with the corporeal mechanism of ordination.

And what the poet wrote which may live down the ages was much more of his living soul than was the hand of the body which moved the pen.

Anyway it is very interesting,—and artist, if you must be favored in your insistance that her legs *are Sylvia* and the hand is man, then also you must agree that his eye glasses must also be man.

And also his chair devised but two thousand years ago as an extension of the monarchial fanny by Mediterraneans for mobility purposes while their Eastern cousins still sat on the ground.

The eyeglasses and chair are

neither fungus, nor flower, nor rock outcropping. They are phenomena that exist in the world only because

man was there first.

Therefore it follows

that whether we hold with the artist's or with the scientist's concepts it is inconsequential

to the resultant under consideration

for either way

the *mechanical extension*

is still an articulated part of "man" whether the extension be of organic or inorganic substances or only an ephemerally vibrated air word electrically transcribed;

or "canned" for tomorrow.

Part XII.

Human mechanisms are not unique in comprising these externally extended devices instrumental to life for it is a characteristic shared by all organic phenomena in varying degrees, as for instance the plant's annual bloom or the snake's skin sheath.

Nor does the human "being" have any unique principle represented by integral physical characteristic except a highly developed brain and nervous system to differentiate him from other organisms.

And man's brain and nerve system,—rather than being special,—is one of multiplicity of focus and concomitant unit mediocrity in cause and effect articulations of the human integral mechanics.

We have said that only in degree both quantitatively and qualitatively,—is man fundamentally differentiated from other life invested organizations, yet we also know that the degree does *not apply* to integral size, strength or swiftness, at all of which man is just average.

Whales run to tens of tons
trees to hundreds,
bacteria eats at man's flesh,
dogs outrun him,
mosquitoes out maneuver him.
Looking further therefore
the *differential degree* of man's supremacy is found to exist only in the extent
and refinement
of development
of the *mechanical extensions*
of man's integral mechanisms,—
and in the extended
precision and magnitude of
articulated cause and effect,—
by life
which is central to both,—and equally a characteristic respectively of
the integral and extension mechanisms.

The pencil and the cup are extensions of man's hand to perform specialized functions which he may but crudely perform with the hand itself.

In the same relationship is the eyeglass to the eye.

But the degree goes further for man could not hold hot coffee in his hand nor sterilize foods manually for his mediocre integral digestive system.

Therefore *in degree*

these mechanical extensions

have in many cases become so *relatively* superior as to reach superior proportion and by their employment man may be said, with relative accuracy, to perform functions which he could *not* perform *at all* without mechanical extensions, such for instance as flying or sampling the temperature within a molten ore furnace or even of the sun and other stars almost precisely.

Part XIII.

Of first special interest regarding the development of these mechanical extensions, as we pursue man's *differential* degree of survival supremacy, is the characteristic

of *intermittent employment,*—

a *frequency* qualification,—of the various extensions.

As examples of intermittent employment:—it is to be noted that

man does not write or drink (as a rule) throughout twenty-four hours of the day, therefore he need not encumber himself with a pencil bound on

to his index finger,

nor with a mechanical cup extension

of the integral grappling crane

during the non-writing and non-drinking balance of the "time."

But he does have *constant* necessity to see when awake,

and if his integral eye lenses are annoyingly defective he wears glasses about sixteen *hours* each day.

Birds and many other living specie of higher organisms also have intermittently employed mechanical extensions, for instance:—the bird's nest, an extension of the womb function, required only once a year, is abandoned and flown back to annually.

The same with the beehive and the bee, and the wasp and its streamlined inverted mosque; the fox and his burrow.

But possibly most interesting as a *"timed" extension* example, involving degrees of advanced and delayed action, is the spider's net and the spider.

That beautifully engineered radial suspension device literally oozes out like nylon from the integral body glands of the spider, becoming separated from it at will at the proper tactical *moments while* weaving that "cum laude" designed diaphanous yet hurricane-proof dew jewel clustering

dynamic geometry projection in webbed survival extension.

In precisely the same manner, the sky writer at twelve thousand feet in the blue valves off and on

his letter making white smoke, from his mechanically extended aeronautical glands writing the signature

at the Publicitor's relayed behest and by stratosphere proxy, of Mr.

I. J. Fox,

who, by devious mechanical extension in identical survival procedure reason or no

weaves his sales net in the sky, of a sunny day,

and his ethereal radio net in the night sky,—decoyingly hovered through

by his fire-fly, airplane flown, moving type, letter lights,—even as the spider;

later to wrap up his ensnared victims and extract the life *juice*.

However, in the human case, that *life juice* is fortunately an abstracted extract;—a green ink extract engraved on fine paper

called money by man:—a civilized symbol-extract a token extension attesting commonworth of its bearer whose effort super to self-perpetuation has been turned to *commonwealth* account increasing mutual survival probability.

Or the "juice" is possibly even more abstract,—is simply a pure *time credit* extension mentally noted by those concerned involving only imagination "cracking" and an intelligence amplified human work unit "fractionation" mutually satisfactory to intersurvival accounting without question of death imposition;—except for the animal whose pelt was involved and relatively of the trapper whose hazards were underrewarded.

But fur is now being synthesized out of inorganic materials in a manner superior to "nature" so far as human use is concerned.

And that brings us reasonably to comprehension of the degree to which man alone qualitatively and quantitatively has developed this mechanical extension ability;—to now far beyond any other living specie.

Physically attesting this super degree it may be recognized by this mechanical extension concept, that a U.S.A, man is today and, to the best of our knowledge, in all time as yet not only the largest of all mobile creatures,—but also, by far the most versatile.

For each U.S.A, man has now extension members comprising nine and a half tons of steel and twenty-two tons of concrete, but without that concomitant loss of mobility of the formerly privileged pharoah when similarly tonnaged under his pyramid.

For the U.S.A, man's demountable shell is sometimes a ninety-mile-an-hour, one-and-a-half ton affair on four pneumatic tires.

Sometimes it is a four-hundred-mile-an-hour two-ton, science-sculptured jewel;

Sometimes a thirty-knot seventy-thousand-ton fish form. Sometimes it is a billion-ton skyscraping pinacle within which he elevator-rockets ad lib, and he can whisper clearly around the world

and God only knows how far out into space.

And he differs in cross-bred operational specie characteristic from a contemporary *European* or an *Asiatic* man far more widely than
any bird differs from any whale.
For instance, as compared
with any other man in the world he has ninety-nine per cent
of all existing plumbing connected bathtubs.
These mutual extensions
must be averaged not only to population number
but also to literacy
and erudition qualifications of the population
and to the latter's teleologic facilities
in books, and universities
in sciences and the arts
in all of which the U.S.A.
per capita differential degree
is enormously greater at present.
The supremacy of U.S.A, man
as a universal industrialized prototype
bespeaks great world doings tomorrow,
as the many attain
to the advancing U.S.A, standards.

However, common not only to all men but to all organic life at first remove from life itself, is the simple protoplasmic cell, master of photosynthesis by which star energy is physically translated directly or indirectly through storage devices into the mechanics integral and extended which comprise and differentiate each and every species and each never identical individual mechanism of life's expression of intense interest in its limitless potential.

Part XIV.

But man has developed this U. S. A. degree of Mechanical extension to any importantly superior measure over any other human species only recently—only since 1914. And only since 1850, has man anywhere developed it to important degree over any other life species.

That is only since the day when Darwin with his eyes focused only upon the integral mechanisms of living things with the limiting vision of *absolute* law makers who put the political-economy cart before the science horse made pronouncement of his *law* of "the survival of the fittest."

The classical example of Darwinian law was that of the birds who fed at a small lake, which gradually receded year after year due to polar ice-cap recession or whatnot, and whatever the birds found as special sustenance to their species receded slowly with the water's level.

As the water level sank deeper into holes in the ground only the birds with the longest beaks could reach it, and the others of necessity died off.—Then the surviving long beakers intermarried, having no other choice of spouse, and their off-spring by inbreeding of glandular electro-chemical eccentricities usually had long beaks, sometimes longer than the parents, and these latter inbred specialists outlived their contemporaries of the once long enough but now in their turn too short beakers.

But this survival progression posited the *death-birth cycle* as implicit to Darwin's greater principle—*evolution*— for none of the birds

could stretch their integral beaks to suit;—nor those of their mates, their offspring, their pals.

Though a few wild tribes of humans still provide traditionally preserved examples of attempts to stretch the integral mechanisms;—the limitations involved are at once ludicrous and obvious and may never be "fitter" hereditary properties.

And that was Darwin's basic principle and it "shook the world," as the Victorians said it and those who daringly espoused it did so sacrilegiously, for it was anti-Gospel, and as radicals of their day Darwin's disciples rightfully deemed themselves true pioneers.

But the survival of the fittest concept has been way overworked, and grossly perverted,—has been improperly evoked to "justify" many an unswallowable pill or even sheer piracy through carelessly adopted

or upper-handedly imposed

social economic precedent

which exclusively identified Darwinian law with business *pioneering.*

Of such perversion

"rugged individualism" was typical progeny.

This misappropriation of scientific "legality" to condone a sharp focus on profit for profit's sake

constantly reoccured in the industrial growth era, only prior to which period

of social emancipation adolescence

was Darwin's absolute "law"

in any broad yet strict sense scientifically *valid.*

Yet Darwin's prerequisite death-birth cycle of individuals in evolution-accounting

was strictly superimposed upon

industrial economics,—

despite utter incompatability,—

through mortgage, debt, moritorium, and bankruptcy;—and debt refund *budgeting*

by tax shuttlecocking under political duress.

But no sooner had Darwin spoken than men began in a big way to provide themselves with straws when the waters receded and pipe lines if they receded far enough and even progressively to provide survival for all not only by their cooperative pipe line extensions but also mechanically, and chemically in medicine and information,—in fact in a myriad of ways.

For the "mechanical extension" is a generic term including mathematical, chemical, and radiation extensions as well as the various spectrums.

In fact it includes all infra- and ultra-sensory scientifically contacted extensions of the micro and macrocosms and mathematical coursings of the atomic components' behaviors.

Yet the sons-of-the-sons of the Darwinian radicals with little or no infra- and ultra-sensory comprehension still "pioneered" bravely under the survival of the fittest doctrine though becoming progressively

less fit in their concept;—

and ergo in the *validity*

of their own personal enjoyment of higher standard of surviving facilities than even the mean low average, as Industrialization developed.

From 1933 to 1940

the Darwinians have cholerically demanded stay of execution of their law and its corollary

the law of “demand and supply” on the grounds that its operation had only been sanctioned for privateering purposes.

Thus have all the legal,

and academic economy Darwinians

now crawled into bed

with the rest of the forces

of reaction to Industrialization.

In that bed are also the skeletons

of British political-economists

who “dared” science to protest their first *law* of thermo-dynamics, (look it up for yourself).

It reads

“The unit of measure of energy

is the British Thermal Unit.”

It applies the divine-right of the right king to say how when and where science is true

in “practical” economics.

The first and the second

British laws of thermo-dynamics completely reverse the order, relative magnitudes, and intent of “these two” on which

“hang all the law and the prophets.”

Part XV.

Darwin was a keen man
and his contribution to science
and affairs in general
was vast.

If he had lived fifty years more,—avoiding enmeshment with academic royal societies,—he would not have made the fortuitous mistake
of citing his law to cover *all life*
or all phases of its articulation.
Thus also Newton
in his "first law of motion"
made seemingly inconsequential concession
to the economic "security" theory
by imputing absolute "rest"
to dynamic inertia,
thereby falsely certifying
"security"
as a state or condition
attainable by
the quick
as well as the dead.

Both Darwin and Newton were partially right. Though it is very probable that they said to themselves "So what the hell if we allow a little play on words to the temporal power and glory names are dead stuff anyway."

At any rate, they were right, so far as their *laws* applied to the integral mechanics of human beings, that is in an empirical sense —certainly within all the world as admittedly developed, observed, and booked up to their time.

What they lacked essentially were the concepts of "relativity" and of the "h" constant,—the infinitely inevitable *random element,*— either of which concepts would have rendered absolute "law" making scientifically impossible, and which strangely enough were implicit if not evident in Newton's calculus development and in Pascal's "probabilities."

Both the concepts of relativity and random element were increment thoughts payable to science in the 20th century for science's original devout investment and faithful interest reinvestments in Industrialization.

Rich indeed is that cosmic increment for it certifies not only infinite mystery and eventual perfection; but also eternal room for fun; essential tolerance for error; importance of romance, beauty, and nonsense, as well as of nobility in righteous perseverance and in stem sincerity at appropriate moments.

And last but not least science thereby certifies,—by these essential concepts,—room a plenty for all with automatic raison d'etre vindication by either positive or negative relative progression incitation through the very existence of each and every unique characteristic which if not clearly justified in the moment's requirements are wisely included

against inevitable necessity.

Any one character killed off here, will pop up there until realization of its integral function.

Part XVI.

Darwin had ample historical substantiation of his "law" in the dominant physical characteristics of various tribes and civilizations isolated one from the other by slow or no communication who had had to solve their special survival problems through multi-generations and frustrated milleniums,—by the eventually labelled "Darwinian" process;—suitable to the unique exigencies within each of their special areas of limited gyration.

And so in each area according to the environmental conditions of climate, wild life, and material; coloring, odors, and sounds;—and the rate as well as degree of variation;—

different characteristics

were integrally and extensively *inbred,*— just as with the long beak birds,—and certain characteristics of specialization were developed for cooperative survival effect;

deriving in broad principle from the selective division inherent in the procreative machine unit sub-assembly allocation,—half to a father

half to a mother.

Big men made good soldiers

and swift men good huntsmen—

and others good tinkers some preferable King stock and some good buffoons;

But for so many environmental reasons did special conditions develop under which *deformities* were *capitalized* it must suffice to observe

that the special racial and sub-racial characteristics which are now catalogued as Indian, Yellow, Nordic, or what not, were developed primarily through lack of, or very limited degree of, mechanical extensions.

They had, of course, stones and swords;—but monkeys also throw coconuts and forage with sticks.

But the beginnings of *Industrialization* did not occur through development by man of longer spears, bigger mugs, or any single *"greater"* personal *idiosyncratic mechanical extension;* but by virtue of

mechanical extension of a compound nature developed for many people

instead of for one

to *serve,* and be *simultaneously served by*— such as the printing press,

to which many eyes, brains, hands and minds are implicit.

To all these extensions:—the grinding mills, the cotton fabric mills;—the many peoples' *common needs;*—

instead of the needs and whimsies of overlords alone;—are also obviously implicit
and their realization of satisfaction of these needs also obviously involves
cooperative effort and faithful ordering.

These mills were early manifestations, of Industrialization's mutual and mechanical extension but earlier still were sewage and water systems. Cleanliness and orderliness were nearest to godliness they said from generation to generation.

However, far earlier »

Industrialization sprang originally from the phenomenon of the family, —from its several members their potential abilities and collective needs, which will explain if researched the essential differences between Agriculture and Industrialization.

While hunting and subsequent delayed killing of captured and then domesticated animals,—who began to pay for their board and progressively delayed the knifing;—and distant foraging of vegetable foods and their subsequent transplantation to within domestic bounds; —were all,—

in their second stage of development to come under
the routine production schedule of the home-sprung Industrialization more strictly the underroof domestic activities,

Here at home, first in caves, people moved but short distances and performed repetitive operations requiring less of muscle and more of skill that progressively jig invented many mechanical extension niceties whereby even the children could join in the rhythm and the rains and the cold caused no interuption.

These domestic arts and crafts
were the fore-runners of Industrialization of cotton and grinding mills, —and of the printing press,—which extended the words for the thoughts domestically bom in still concentration, and first articulated in symbols on walls.

The outdoor activities while also implemented by
mechanical extensions
first in the hunt and much later domestically were so subject to hazards of wild life and weather and to astronomical cycles as to perclude any routine activity; or any stored gain, for this was a hand to mouth activity, and though cooperation was desirable even of a dog when skillfully trained it was not essential.

Craftiness, craft, intuition, alertness, resourcefulness, and knowledge of the lay of the land and of nature's reflexes were the desirable and distinctly individual characteristic whether innately or by experience articulated.

Industrialization is then by nature a matemalistic development which bound by the womb to the home stored and consolidated and pyramided the gains, from support demanded in contract of mating and this included eventually consolidation of scientific data and method.

On the other hand
Paternalism is by nature
primarily concerned
with Industrialization's protection and far flung supplying;

with the animal instinct affairs, with the pack politics,—woman the patron of science man the patron of art women the patrons of justice men the patrons of fight and of course these are only generic proclivities

and emotions are now thoroughly cross bred under the aegis of Industrialization.

And herein we witness also that Industrialization is an affair apart from war which is in man's shrewd foraging trading world of animal instincts.

And even as Industrialization has grown to encompass agriculture, hunting, mining, and fishing,—so does it promise to terminate war though first implementing it to maddest absurdity.

And now in its maturer stages of development, electrical power having made possible cleanliness of industrial environment and elimination of animate engining, women's hands are again taking over in the advanced industrial applications to radio, aviation, and instrument production; and even to many stages in automobile assembling.

And that tactical factor
leads us to consideration of
another important characteristic
of these *mutual mechanical extensions*
which is the obvious fact that
their operation could be much expedited,—
(and to the expedition
the extensions were naturally adoptable),—

if power or *energy* super, or external, to that inherent within man's integral mechanism,—his personal chemical
sun energy conversion abilities,—
could be harnessed to provide

the effective effort:
but though obvious,
the objective realization of this harnessing
involved all the lifetime
of man on this earth
until yesterday.

While the superior power of other *living* organisms, such as oxen, camels, captive humans, horses, and trees, was harnessed for this purpose,—inanimate power means was also "recognized" and "comprehended" by life in the same era, and this involved again consideration of degree, for water and wind power when first used by man were already employed as power augmenters by fish and fowl innately.

Man had also been meagerly utilizing his discovery of fire-making ability in producing the *personal* mechanical extensions themselves, that is, metallic swords and armor,—the non-industrial extensions,—but these directly or indirectly were for the overlords only.

Thus as gold has been limited in modem times
to intrinsic enhancement of a few, in a like manner
was fire's functional development severely limited in its early days of man-manipulated occurence on earth. Both were earlier the mystical properties alone
of monarchs, priests, and magicians. Both were symbols of the sun and therefore by intuitive reason symbols of all power and therefore of "something" superior to man and all living things, and thus did they reason forth a God awareness ever since physically, idolatrously exploited.

But man's *slow* conquest of *fire* provided another *infinite degree* of *differential* characteristic *unique* to the human,—that of *energy* control as heat or work,—*external* to man's integral *energy,* which, manifested as *heat* or as *motion,* we earlier discovered, was all that was physically lost to the integral mechanism of man when he "died."

And so Industrialization grew uniquely as the *mutual* mechanical *scientific* extension, comprising precision controls of *energy* and *time.*

And by Industrialization and its mechanical extension you and I are both mutually and at the same time New York, Grand Coulee Dam, The T.V.A., the Washington, The New York Central, and the Sante Fe,

Route U.S.A. 1, from Maine to Key West, the stratosphere liners,—they are our mutual all-age, all-sex, all-race flesh and blood extensions.

They are us we are they and those who destroy them or falsely employ them are our enemies and the enemy of our God of the quick,—they who destroy are the proponents of friction, freezing, inertia and death.

Part XVII.

Industrialization's early manifestations found fairly ready acceptance amongst the more highly crossbred of western Europe's centers, and *ready* adoption by the newly intermating colonizations isolated over in England from the mainland.

For England once was to Europe what America became latterly, the new land across the waters to the west, the "melting pot," of the major northwestward spiral of civilization.

Industrialization flourishes best amongst crossbred peoples who as it flourishes simultaneously revert to basic and common human characteristics when the *integral* mechanical extensions'

deformities of inbred specializations are no longer necessary to survival as in the preceding age which witnessed the survival of the integrally fittest progression.

Or conversely, where and when Industrialization is found to be essential to race survival the interchangeability of extension parts of the industrial mechanical extensions permeates in principle inwardly by induction to the integral mechanics of the man.

And with Industrialization a uniformly beautiful world race emerges as does the fine chiseled head from the rough marble block certifying the god-like untrammeled beauty of a perfect human process implicit in the dynamic designing genius of the mind which had only been perverted into temporary grotesqueness by limited static environment.

And the uniformity relates happily only to the mechanical processes while individual identity of the life facet become infinitely distinctive,—that is, of course, individual in the vital life sense not in the limited individualism of "possessed special things,"—these latter are temporary, local deformations of the mechanical extension patterning.

The discovery of America and its vast resources for conversion into broad implementation of Industrialization, and the new continent's vital attraction

to a progressive medley of all races through promised hope-fulfillment or fear-elimination

brought about a rapid isolation of the advanced development of Industrialization within a new arena of optimum conditions.

This new American arena was amply blessed with potential energy,—and what had been *started* in Asia and more latterly developed in Europe and England was quickly adopted and put to work on the new continent.

Shortly after clearing the woods the settlers displaced the only other living species which threatened their new way of live survival,—the “Indians,” because, though the Indians far outnumbered the newcomers, they were mechanically extended to but minor degree by comparison.

The Americans began at once to make original contributions to the general art of Industrialization, reaching parity as we have seen with other leading industrial nations, England and Germany by the 1890s, and finally surpassing the Europeans at their own game with the events of 1914–1920 when England and Germany allowed mass production leadership to settle upon U.S.A, shoulders,—and more importantly,—upon U.S.A, crossbred genius and newly integrated knowledge.

For the ensuing twenty years the cross-breeding U. S. took wings of its own to carry the phenomenon of Industrialization to a new stage of elevation in human affairs.

Part XVIII.

The first big industrial scene on the new stage was played in a baby carriage factory in New England where Henry Ford discovered the prototype of his *moving line,*— or time design prototype for automobile production,—a processing flow design springing precisely from a vast water shed and unitary river system like the Mississippi; —compounded as design model with the chemical process and sequence principles demonstrated by the internal human mechanics, in reversed flow.

The logical outcome of this new industrial phase of bringing the work to the worker (even when the work was larger than the worker) and having the latter use his mechanical extensions in the most facile way was multifold.

Ford's time designing was eventually responsible for the "production" development of alloys, first in the mechanisms of producing machines, to make them last longer and later in the end-products themselves
to simplify the producer's
service responsibilties to users.

Alloys in turn were responsible for the abandonment of the warehouse in the production cycle.

For the alloyed metals
constantly changed by improved formula
thus rendering any extensive advance storage and production of quasi "stock" materials uneconomic;—
sometimes fatal,—
therefore the moving line's
source freshets
reached clear back
to the mines and the fields
of all comers of the globe.

This "timing" arrangement reaching clear back to the soil in turn was responsible for production and worker decentralization. The workers had to get to the sources and to the smaller fabrication factories, of decentralized sub-units manufacture, and subassembly shops.

And the *general* overall assembly lines themselves tended to detour around time wasting and uncertain city concentrations to insure the synchronized movement of such world encompassing moving lines as those logically resulting from Ford's new principle.

The latter attained a dynamic stage wherein his constantly moving inventory worth multiple millions of dollars covered the face of the earth, pausing only in visible piles of finished parts for an hour's run alongside the final assembly lines.

This decentralization

and the measure of its speed of realization was also interactively bound up with the end-product,—the automobile,

and with the automobile's combined worker-producer-consumer mechanical extension rolls whose respective mechanical extensions progressively tit for tat evoked, provoked and were dependent upon, yet made possible *road building.*

As *public* function

this "high road" *extension*

of U.S.A, man

was readily financed

by its easily collectable gas tax

as were his railroad and "high wire" extensions by toll, tax, and bond sale, (all out of man's pocket) because man was so intent in extending himself

to the mechanical ability

to go sixty miles in one hour

with his family or his produce or his household effects, kangaroo like in his pouch.

The desire was not

just for the high speed going's sake

but for speed as it effected

time limited distance

to and from *work*

(which latter is at once the most religious both rite and right of Industrialization),—and to a bettering life,—to better schools, —to sweeter air,—to quiet nights,—decentralized somewhat from early human overcrowding at necessary points of continental debarkation at least to semi-truck garden and flower fringed homes.

In the former basically agricultural world families could survive well enough on the fruits and labors of their own land and their own hands; and everyman and his family were jacks-of-all-trades and therefore highly independent of other individuals and their families, and the economic accounting system reflected the hard bitten you or me survival necessities of pioneers primarily engaged in lone combat with wild nature.

However in the newly developing industrial world survival was precisely dependent on specialization of productive and defensive effort

and concomitant progressively cooperative management of the unavoidable commonwealths inherent in the new phenomena.

And while the warring emotions of these superficially diametric forces

has caused many political ructions as the new system

came onto dominance over the old these ructions are but baby rash as proportioned to the violent impacts of the individual industrial commonwealths which mushrooming up all over the world map

were forced upon inevitable inter impact to integrate into larger unit commonwealths.

With the integrations the larger units in turn impacted and grappled with increased violence and each spread its organic roots, branches, fruit and seed further afield with the strangulation holds of giants primarily because

the you-or-me accounting system of agriculture had been carelessly adopted to instrument a system to whose cooperative necessity it was as a razor blade to a baby's digestive ensemble.

For instance in early usurious transactions developed to integrate the two systems of survival merchants underwrote the hazards of export caravans and voyages with loans collateralized by herds of cattle (Pecus-pecuniary),—*interest* in the care of which produced for the lender *increment* in *kinde.*

But as the trades involving organic and inorganic materials processed and semi-processed goods became more complicated and the geographical distances and time lags increasingly greater various inorganic metallic moneys and then inorganic mechanical extensions were substituted for the original organic collaterals and though *bearing* no natural interest in fact wearing out and ever more rapidly obsoleting, interest was nevertheless by trade tradition required.

This interest requirement started a "robbing Peter to pay Paul" chain of events impossible of ultimate pay off and vastly aggravated by profit extraction by entrepreneurs and speculative share purchasers requiring division ad infinitum, to those who put up no capital to originally implement industrialization.

This unpayable debt imposition and aggravation waxed to insufferable international proportion when the U.S.A, took over the consolidated debt in 1919 where after being kicked around every which way settled into the U.S.A. National Debt or was progressively “forgiven” as inherently uncollectable, or was sold off as bond issues of unstable governments and subsequently written off by default.

Part XIX.

This whole phenomenon of realized Industrialization, arriving "overnight" so to speak—or more accurately in the last three generations, after millions upon millions of man generations and unknown quadrillions of life cell generations, was founded of course on many millennium spanning *fore-runner* developments of and by man. And the specific *forerunners* of Industrialization were all history's scientific and technologic events.

But scientific events are continuing events,—that is they discover for man the identity of natural forces and processes which are always there in nature whether discovered by man or not, but which, once discovered, and the behavior pattern accurately charted and described, (such as the phenomenon the "law" of gravity) constitute *continuing* knowledge.

Therefore scientific events are *cumulative* as common *wealth* which *cannot* be basically dissipated.

Obviously, scientific events are also *compoundingly interactive,* and,—the *unexpected gains* of the interaction represent the *increments* of science and technology, which as we remarked earlier are automatically reinvestable only in further Industrialization whose end increment in turn is represented by an advance in the whole frontier of the standard of living.

Scientific events differ from the cyclic phenomena of days and nights and seasons and tides which just *come* and *go,*

and are of the substance of the cake which you cannot both "have and eat."

Yet these *cycles* have been more *impressive* to economists due to their sensorially vivid tradition than the ephemeral *scientific accnmnlation* which the cycles have sensorially out-loomed. Wherefore the economist's professed art of industrial interpretation has been based dominantly *upon agriculture fluctuations* rather than upon *scientific consolidations.*

Because of this counter-dynamic trend error the scientific consolidations have chaotically disrupted both the thinking and the prognosticating of the professors, who should have gradually shifted the dominance of the first to the second in synchronization with the factual events,—adequately reported and artibtrarily non-included by the economics professors,—of the absolutely new and continuously amplifying Industrialization.

These factual industry multiplying, truly scientific, technical events of our so far known all-history continuity of overlapping civilizations number, however to 1940,—not much over ten thousand master key items.

Part XX.

First basic items included in this historical accumulation of science and technology doings known by approximately accurate dates are the mathematical, geometrical, and "mechanical advantage" data,—the method of problem stating,—and the documentary system of solution procedure, all evolved by the Greeks, who probably in turn reassembled much of their basic data from that of the Hindus and Chinese, relayed to them by the Arabs, Phoenicians, and other mobiles coursing between the more static situations of civilization development in the fast growing domestic centers of women, children, merchants and mendicants god houses, warehouses and whorehouses, whose rate of population increase presaged the coming of Industrialization

that the many might each serve at their own special tasks.

These Greek and prehistoric science and technology data number in toto only around fifty items.

These were later telescoped together with approximately one hundred more objective inventions of the next nineteen hundred years.

This brings us

to the earliest colonization days in America, with a sum total of only 150 items thus far spotted

in the myriad of blank spaces of the vast basic data grid.

But during the first 250 years of the American Colonization some 300 additional basic scientific contributions were made to the grid mostly in Europe, but a few in America.

Out of this cumulative total of 450 items amassed up to 1850 the phenomenon, Industrialization finally sprang released by the inanimate power super to,—yet controlled by,—man rapidly developing through steam devices.

Industrialization's start was punctuated precisely by the invention of production steel simultaneously and independently disclosed by Bessemer in England—and by Kelley in the U.S.A, in 1860 and by invention of the dynamo in Italy in 1861.

During the seventy years between that mid-nineteenth century start of Industrialization and 1920 the worldwide science and technology basic grid tapestry was enriched by at least 1000 additional contributions, America providing an ever more copious portion of the load. And though this appeared flood-like at the moment of happening it was but a warning trickle down the spillway of the cosmic power dam.

For between 1920 and 1940 it is conservatively estimated that approximately nine thousand

basic grid items have been proven-up and woven into the tapestry.

"Science News Service" an industrial syndicate wholesaling to publishers reported thirty thousand technical innovations for that twenty year period deemed not only possible of popular news translation

but also deemed to be front page material in thousands of cases

despite rapacious political preoccupations.

Also during the last twenty years "Chemical Abstracts"

official world science gazeteer averaged an annual documentation of two hundred thousand abstracted science and technology papers submitted as original contributions to the appropriate societies and to their official publications.

And over a million inventions have been granted letters patent by the U. S. A. patent examiners in that score of years.

(These patents were granted in rapidly increasing proportion to industrial corporations by assignment

of their domesticated scientists, which attests to their increasing practical immediacy.)

Wherefore:—

The nine thousand item estimate of additions to the worldwide science and technology basic grid data represents but thirty-three per cent of the news service skim;—two one-thousandths of one per cent of the gazette's items;

and nine one-thousandths of one per cent

of the U.S.A, invention items despite that the U.S.A.

represents but six per cent of the world population.

Revised estimates prepared with proper time perspective may reveal ten times this number as meriting basic grid status in this remarkable twenty year period in which by any method of count

accomplishment of man's all history dreams of conquest of environment have been ten fold at least that of all previous history.

Even as the impact of science brought civil war to the U.S.A, in 1850 so has this flood of items brought world civil war since 1914 to adjust to the new way of life as politicians and statesmen who can usually number but a dozen such items from memory could never comprehend let alone arrange in satisfactory social adjustment order.

That many of the post 1920 erudite scintillations of the thousands not included as basic do not outrank the pre 1920 items and especially the 1850 is due to the fact that they might have been arrived at by a number of routes while the basic items could only be reached by the single hard way of prime exploration and the basics thus constitute the main headlands and lightships of the great circle courses of science in "making good" the industrial trend.

The 300 items between 1600 and 1850 are braided of three main strands which, while all partially overlapping, find their respective strand midpoints periodically occurring in chronological sequence.

And the sequence of emphasis of these centers constitutes a distinct trend pattern of mind-over-mattering, which utterly refutes all claims by capital proprietors to benevolent initiation of science's gifts to man.

The first pioneering victories of these scientists' discovery and artists' invention sequences were rewarded by inquisitional torture and death at the hands of man's fear supported god-priests.

In fact the most crucial battle of science students to wrest the fundamental right from the status quo,—the right to pursue, observe and to document nature precisely as it reveals its behavior characteristics was the 400 year battle from 1200 to 1600 between the Church and science in which the Church tried by decree laws, torture and death to prevent the lay use of the cipher in calculations.

For the cipher or zero,—brought to our civilization by the Arabs from the Hindus, along with their simple numerals and algebra,—was symbol for all the non-sensorial world soon to be popularly revealed as a natural rather than mystical phenomenon.

But the cipher *0* was also the mathematical key to positioning of numbers.

Through use of the cipher any literate person could perform calculations theretofore in our known civilization only to be accomplished with practicable facility by the priesthood who jealously controlled the abacus earliest of mechanical calculating devices.

The Church held secret the abacus along with many of all-history's scientific discoveries—some of which even today they withhold from the people by the cultivation of superstition and ignorance elimination of which would end people's vast exploitation by the organized religions the world's premier realtors albeit the religious workers are idealistically dedicated.

Known by name are only a few of those many science students who dared the inquisition in attempts to break through the intervening nineteen century veil of materialistic darkness pursuant to the great Greek contributions.

But contemporary with the beginning of American colonization the printing press had become sufficiently established to document the outlines of science. First main strand of the braiding in the 1600–1850 sequence is that of the mathematical measuring and calculating devices; —*the mind over mattering instrumentation;*— ranging from such abstract inventions

as that of the decimal system,

to mechanical inventions

such as Pascal's calculating machine;—all springing from original cosmic thinking and reorganized postulations of the human mind and thence through experimental observation eliminated or proved

through highly abstract organizations of mathematically integrated data reduced to stark objective mechanics in which pioneering such names as Galileo, Kepler, Newton,

Napier, Descartes, and Liebnitz occur.

But most importantly

these men and their devices

deal with the beginnings

of scientific comprehension of motion and its fundmental components energy and time.

And the scientific comprehension by man on earth

of these cosmic fundamentals

was in turn both sired and foaled by heavenly phenomena.

That is the knowledge sprang from super observation ability of star emanating light phenomena and the eye amplifying optical devices, which light had inspired not so much at the moment of invention through Jansen's compound microscope of 1590 (300 years after Vitellio and Roger Bacon's theoretical lens treatises and actual spectacles

and Alhazen's first lens of 1070) as through the *telescope* accidentally yet inevitably discovered in 1608 by virtue of the physical existence of the spectacle and micro lenses.

One year after the telescope's invention Galileo and Kepler, independently and immediately compounding their epochal news of proof of Copernicus' half century old theory of the true motion of heavenly bodies,—particularly of the motion of the earth,—with Galileo's pendulum invention of 1600, and his falling body studies, formulated the first reliable data on motion.

Likewise, inspired precisely by light, motion, and time dynamics the cosmic frontiersman of the 1600 to 1850 era with their epochal 300 items set up irrevocable and realistic new accounting systems for man's commonwealth ledger some as natural laws Thermodynamic and electrical, some as civil laws—patent laws advantaging both individuals and commonwealths.

The first patent law set up in England in 1624, and the Paris and Greenwich observatories established in 1667 and 1675 respectively, showed that some few in officialdom were aware that a new cat was well out of the bag whose antics might be advantageously harnessed.

But of the cosmic frontier's existence busy business and politics in general were not to become aware as constituting an *important* frontier until the pragmatists had literally reached the ends of the earth,—sensorially,—the North and South Poles,—in 1909 and 1911—as was earlier pointed out,—cosmic frontiering did not loom as the *only* frontier until the 1938 re-eruption of the world civil war caused by that very fact itself.

Following Kepler's work

Napier developed between 1614–1620 his logarithms, his complete log tables, his adding machine.

Then followed the spirit thermometer for data on energy-as-heat.

1629, '31, '35, '36 saw respectively

a microscosmic development

born with a new mathematical awareness by the explanation of negative roots;—invention of the mathematical *X and:;*— the startling discovery of microscopic organisms;

and Fermat's infinitesimal calculus.

The world was expanding inwardly as well as outwardly.

In 1637 were formulated

the first data on light refraction;

ten years later calculation of the foci of all lenses;

followed in three years by

Pascal's calculating machine;

and four years later (1654) by his mathematical-induction and

laws-of-probability.

There followed rapidly:—

In 1657 the astronomer Huygens' pendulum clock; Newton's discovery of the prismatic dispersion of light,—1666;

in 1675 the first and surprisingly accurate measurement of the speed of light;—in 1677 Newton and Liebnitz developed infinite series calculus;

in 1678 Huygens formulated the wave theory of light (not to be proven up however until two centuries later in the industrial era).

1680,—the discovery of chlorophyl, the green substance by which life most successfully stores star radiant energy,—

1682 Newton still going strong, formalized the laws of gravity;—1700 the explanation of beats, overtones and sympathetic vibrations

and in 1704 incorrigible old Newton wrote his treatise on optics.

Following Newton however this light, energy, motion, mathematics series of science went relatively quiescent for a half century though in the interim,—well sprinkled with technological interpretation of the cosmic blast,—we note the physician's pulse watch in 1707; the mercury thermometer in 1715;

light images with silver nitrate 1727; latent heat discoveries by Black 1756.

But mostly the cosmic events subside while the New World to the West vibrating to new horizon tones broke off from the Old World.

Then the series reappears in 1790 and 1800 with the discoveries respectively of the invisible ultra violet and infra red rays and the intermediary discovery of photosynthesis in 1796, by which process chlorophyl captures life on earth from the stars.

These cosmic doings were progenitors of the machine tool development in the Nineteenth Century which though anticipated in design inventions of Hero, Archimedes and Leonardo, were the necessitous working devices of astronomers such as Huygens and Roemer who needed the smooth speed of reduction gears of high mathematical precision to accomplish their heavenly tasks.

As no such devices existed

except in the show rooms of the creative imagination

these astronomer philosopher mathematical artists had to fetch them hence by objective technology themselves.

And from their own handicraft inventions the whole machine tool art and industry sprang,—again the heavens made unexpected realistic contribution; (to distinctly unappreciative man).

Second in the strand braiding comes the series formulating the science *of chemistry,*— This series begins in 1660 with Boyle's law and his "Skeptical Chemist" and runs through a century to Priestly and Sheele who made the play which was finally tagged by Lavoisier in 1776 by the successful isolation and identification of oxygen (by weight 23 per cent of the atmosphere, 50 per cent of the rock crust, and 88 per cent of all the water of the earth).

Here was world revolution of far greater magnitude within the laboratory

than on the battle field of North America.

Primed by this achievement Lavoisier finally formulated the tenets of the true science of chemistry from out the umbra of alchemy, with such nomenclature as "elements" and "compounds," to be fitted out thirty-five years later with the modem chemical notation. For this contribution Lavoisier was guillotined by the French Proletariat.

Third came interweaving the strand of development of certain mysterious behavior data undetectable without scientific method which eventually consolidated into the beginnings of *electricity,* and into the art of its use and into all its industrial ramifications, though man little knew what he was using,—(when he first confidently and enthusiastically employed it),—that behaved so reliably.

This electricity series began around 1745, with Leyden.

It runs through the work

of Volta, Ohm, and Faraday, but strings along to full fruition as an objective and established industry only with the dynamo's invention in 1860, and with light bulbs and motors towards the end of the nineteenth century well after Industrialization was under way.

Another threefold series of inventions which we may now identify as central to our own contemporary *very* "brand news," splices into the ends of that seventeenth, eighteenth, and nineteenth centuries' science and technology pigtail.

This new threefold series differed from its predecessor, however in that it comprised only intangible, invisible, soundless, smell-less;—sheerly tenuous, cosmically gossamer, threads of the *ultra* and *infra* octaves of radiant atomic relative "matter," the like o' which was discovered first

in the *electro magnetic fields.*

And in the starlight radiation.

This newly spliced in cosmic strand in the electrical sequence which grew in the ether spectrum was first carded and twisted before 1850 by Maxwell's preposterously astute calculations, out of the genius gathered laws by his intuitive dynamic sense, inspired by the fight, motion, energy, time series and ginned by him through mathematics.

Maxwell was also probably inspired by such nineteenth century items as: 1808—discovery of polarization of light 1814—the Fraunhoffer black lines in the sun's light spectrum 1839—Daguerre's photography 1843—chemical element spectrum analysis 1854—discovery of the absorption spectrum 1860—"laws" of radiation, emission, and absorption

Maxwell's assumptions were first provided with a language by Angstrom who charted in 1869 the wave length measurement pattern of all of the colors of the visible spectrum of light.

Maxwell calculated that these waves were extensible at both ends into the ether spectra,—infra and ultra,—at the infra end of which the sonic and ultra sonic wave length and frequencies fall into dimensional coincidence.

Maxwell's assumptions were proven-up twenty years later,

by Herz,—himself also one eye in the cosmic one eye on the ground,—

and later practically applied by Marconi by empirical methods and "industrialized"

by such men as Tesla, Edison, Armstrong and de Forest.

Thus the contemporary wisps of this infra-ultra-sensory strand called electronics,—

(controlled electron behavior isolated in vacuo) first objectively developed by de Forest and Armstrong are but now being interwoven

when the infra-ultra-sensory *atomic theory* threads of modem chemistry, metallurgy, and physics

which latter strand was first combed by Dalton in 1803 with his citation of the atomic theory.

Dalton's dynamic concept of matter again extending the motion concept to include the most solid of the business man's solids even his grave stone and bones was forwarded historically

by Mendelejef, in 1854

in his preposterously projected periodic table of the atoms of which forty percent were

as yet undiscovered or non-isolated

and which projection

even more clairvoyant than Maxwell's

came true in due course

in magnificent agreement with his prognostication;—

this applied super-atomics strand

is most latterly being plaited with tender fingers by our illustrious contemporary physicists;—now far too numerous to list.

These electronics and atomics strands

are now being braided together with the abstract section of the third main strand

which we described as

the light, motion, energy, time, mathematical, mechanical, instrumental series.

Today's working section of the third strand in itself breaks down into three parts.

It parts one third into

the modern machine tools

and their semi-automatic specialized progeny,—the orchestral instruments of the industrial symphony.

And these tool mechanics themselves are evolving with increased versatility into hydraulic, pneumatic, and electro-magnetic functions.

It parts one third into cosmology,—searchlight exploration of the philosophy of cosmic science itself

where the light beams now shine on the relatively unbreakable

shimmering threads of "relativity."

It parts finally into one more third,—the dawning popular awareness of the emancipating significance of Industrialization,—nurtured and insured in the advanced education and research developments

of a large portion of the U.S.A, youth—unwitted increment of the 20 year armistice.

Since 1920

the proportion of all American youth completing high school

has jumped from eighteen to sixty-five percent. It averages as high as ninety-five percent in some northern areas

where attendance is mechanically feasible.

The percentage of all youth attending college has in the same time jumped from one and one-half percent to twenty-two.

The post-graduate M.A.s - Ph.D.s, Engineers, and Science Docs of all kinds now outnumber two fold

the American Expeditionary Forces of 1917.

All three major strands are now being braided into cables, into fatigueless, non-crystalizing infinitely flexible cables of the invisible suspension bridge of the mind between man and his destiny high over the waters of exploitable matter safe over the Hell Gate of political doubt.

Part XXI.

Inventors who despair within a year because of non-appreciation of their work have something to consider in this thousand generation science and technology overall panorama, particularly of the mind over matter,—cosmic-to-abstract-to-objective sequences,—which rule each development.

They too also have something to learn who contemporarily dismiss inventions as being inconsequential because they don't "take" immediately upon announcement.

And also there is warning here for those who though sincerely acknowledging merit in inventions whose strands have not yet been spliced into the industrial cables are as yet accustomed only to observing the long spans of non realization prior to 1850 and therefore dismiss the contemporary achievement as being "a thousand years ahead of its time" and thus fool themselves

as well as do injustice to the inventor.

But more importantly such commentators passively cultivate dangerously inadequate popular comprehension of its own total social stature and latent potential;—dangerous because;—when detonated the public falls prey to the hate traps politically set to divide it against itself.

Such commentators for instance if averagely well informed often justify their time lag laziness by thinking for instance of how it remained for Watt, in 1765, to catch the 137 year forward pass of the steam engine from Worcester, made practical by interim contiguous basic developments. They forget however why it is that they remember this item;—which was:—because Watt's touchdown detonated the birth of *active* Industrialization within the old world stadium. It was a new kind of play.

Soon Watt's primary work was followed by high pressure steam, mill applications, and successful propulsion of ships across harbors, and then out across the Atlantic.

Then steam was applied to the dry land "canal boat" the overland cargo vessel wheel borne on a way of steel.

However, the steam railway, though invented in 1831 was destined like all "end"-products,—or consumer-contact inventions,—to wait for another forty years for the contiguous development of the less dramatic but absolutely essential full family of intermediary mechanical extensions the tools to make tools which had mostly to be invented outright and some to be brought up to date and all of them to be synchronized in production of and application to the major end product itself,—railroading;—and all of which involved a myraid of social and economic ways and means adjustments.

Thus railroading had to wait upon two score years of inventions of many shop and field tools and processes such as the turret lathe in ‘45 gear cutting machine in ‘53 Bessemer Steel in ‘59 milling machine in ‘61 dynamite and block-signals and the micrometer in ‘67 transcontinental trackage, air brakes and shield tunnelling in ‘69 automatic coupling of cars in ‘73 and the Civil War traffic and “defense” measures boom to break the inevitable social-economic ice jam to start the Industrial era off in the U.S.A, to a pace which was readable above the lowest marking on the world’s economic speedometer.

But from the initial acceleration it never slowed down.

Thus did steam finally provide the versatile means of placing inanimate energy under man’s mobile control where and when needed,—not just where waterfalls occurred,—to implement the milling for popular consumption of the centuries of planting of scientific contributions, in the mechanically extended brain cells of man, harvested only in laboratories, siloed in books, tools and instruments.

Thus do we witness over and again in the whole long mural that ideas first coming out of the blue pass by stages to Industrialization to sensorial objectivity;

after which the instrumental means and the end-products themselves employed or consumed by unit man individually,—all trend thereafter

again towards more with less,—ephemeralize,—
mobilize,—grow progressively and
increasingly exquisite in precision and orderliness,
faster,—less friction
more light
cosmic-to-abstract-to-objective- to-abstract-to—
back to the blue?

Part XXII.

And the only difference between the face of the earth today and millions of years ago when all the elements also existed, but as seemingly static resources, is the harnessing of energy external to man by man and man's mind-and-brain conducted marriage of energy and matter in the cathedral of time.

Man intuitively aware of the social significance of these cumulative events abolished slavery, soon after the coming of steam, precisely at the time of the invention of production steel and the Dynamo in 1858 and 1860, respectively.

Though slavery was no longer "legal" throughout both the British Empire and the United States of America, that recognition was no more than a legal discount of the future;—for only today is abolition becoming even theoretically possible of fulfilment in a realistic way. Anywhere in the world.

And that potential abolition is solely by virtue of the doings of science and industry, and not by law or other purposed forward contribution or reform of any department of political economy;—nor of the most munificent private philanthropy; nor again of the sagacity of papal encyclical, nor of the ambitious beneficence of any dictator.

The fact of the matter is that you just cannot create a potato, a baby, a book, or bicycle by legislation, demand, command, pronouncement, promise,—by endowment, or loan,—by subscription of money.

It is axiomatic

that work cannot be abolished at all;

(and certainly not by spoken or written words). Work's burden, however, can be shifted in all its gross physical requirements to the "shoulders" of inanimate mechanics.

And this shift science has already attended to in the U.S.A, to a large extent elsewhere in lesser degree by free inspiration and will, though people keep right on going through their slave paces.

Active industrialization being but three long generations old, men's habits of thousands of millions of years are not to be scrapped with the degree or the facility demonstrated in scrapping a *Mauretania,* to rework the materials overnight into a better Mauretania.

And as people have been in fact slaves by necessity throughout all time until yesterday and are still so as a majority, (even though now potentially emancipated, from a factual scientific viewpoint), they are still struggling

under a virulent slave complex particularly placed in evidence when they become nouveaux riches and become a flamboyant boss slave chained still more heavily to the most asinine customs.

Only the young bom into the new mechanics find the complex strange and its economics intolerable.

No!—generally speaking even the most liberal realists are still overshadowed by Darwin and his less than century old theory of survival only of the fittest.

Therefore the Realists fail to envisage the far greater economy involved in the *basically changed* Darwinian concept inherent in the great mutual mechanical extensions of Industrialization to which it is axiomatic that survival for all is at once both the inspirational charge and the least costly procedure of the continuance of its phenomenon;—more,—that the better the survival standards the less costly to one and all;

ergo, the more surplus wealth of environment unspent and infinitely unspendable

though enjoyment in living continuously increases, Unfortunately this has sounded so idealistic that man has reserved it for Sunday thinking thus missing its simple scientific practicality.

The “fittest” phenomenon
is still valid
but specifically and only
in the abstract categories
of management, research, and pioneering risk, and no longer as we have seen
in the matter
of security through inertia,
of physical peculiarities,
inbred deformities,
or brute strength.
Might no longer makes right all propaganda to the contrary.
The new-day abstract fittest shall attain
to the super fruits
of the advancing standards
of living satisfactions super to survival, in direct proportion to their contributions to the group mechanical extensions

of timing and coordination created out of the mind through the brain which certify ever improving survival for all.

Part XXIII.

It is not to be denied that it is a difficult matter to shift the world economic accounting system, now beautifully set up for calculation facility on a 100% oldway survival-of-the-fittest basis (involving death and debt as tactical closing dates) around to a survival of all

with relative super advancement of the fittest.

But inherent in the excruciating economic and personal pains of today is the certain change-over thereto.

In this connection Mr. Owen Young, in cogently subscribing in October '39 (a few days after England declared war on Germany) with other leading U.S.A, industrialists to federal provision of jobs for all youth albeit for most practical ulterior purposes lest certain revolution by frustrated youth occur (and the 1940 "demand" for conscription is thereby identifiable)

may now be unwittingly instrumenting full pragmatic restitution for the ills which he and Mr. Dawes

(while not themselves personally *inventing)* did *certify to* us

in their reparations "plan" of a decade ago, when they placed the thumb screws of the old accounting system on Europe-at-large but most precisely on Germany.

The most difficult part of the task of changing the accounting system centers in the fact that the old one was based precisely upon physical assets just as Darwin had indicated,—upon special integral and personal extensions only.

Whereas the new accounting system must be based upon abstracts such as *health* and *satisfaction,* the only measures of which we can meter being Time, Space, Energy, and compounds thereof in themselves intrinsically valueless except by contact and direction by the mind via brain in relative ways.

That mind brain teleologic relaying is in turn dependent upon measures of self discipline.

But these abstract effects are nonetheless the willy-nilly realistic value factors involved in Industrialization.

By detoured tracery, no less valid for its indirection, we may now comprehend the polarization to a mountain chamber in Kentucky of the world's major gold supply.

That volumetrically compact physical element is no longer either essential or even germane to integration of the production and consumption world-wise of the phenomenon Industrialization.

No, the ephemeralization of doing more with less, took gold along with tonnage and three-ton Locomobiles, and Stevens Duryeas into the limbo, whither long ago lumbered the mammoth.

Some *alloyed* index compound of energy, brainpower, and satisfaction will soon emerge representing the true intrinsic value of the abstract U.S.A. dollar upon which latter the whole international economy then bids fair to stabilize

whenever it may arrive at terms of peace which will devolve precisely

about this abstract standardization of a universal means of exchange.

(Concurrently in the laboratory gold will be set

to industrial functioning by the physicists.

Already its functional uses particularly in radiation and electronics, such as in the transmission of power by focussed or tubed radio beam are fast multiplying.)

Before passing on temporarily from the subject of the obvious need of a new and adequate accounting system for Industrialization

it is appropriate to remark that man subject to all the laws

of electron inertias

as well as their dynamics

still speaks of his "sunsets,"—sun-"sets" and worse, thinks that way,

despite Copernicus's revolutionary contribution to modem objective science in 1543.

Professors well aware of the facts will say to their lovely daughters "What a beautiful sunset my dear," and lecturers at planitariums which latter were devised to clarify man's celestial thinking, will terminate dramatically faultless demonstrations of star intercomsing by saying ingenuously to the audience "But now the stars are setting in the West and the sun is rising in the East," as they snap on the lights, "So good-bye, and thank you all."

When man finally gets around to throwing in the switch of his brain-mind circuit to provoke his thinking dynamically and objectively of the world under him revolving so that his western horizon is rising to *obscure* the sun in the evening and rolling down to *reveal* the sun in the morning then may we expect him to change from man as a certified defeat to man as a fortunate process truly "quick" instead of "dead" in operative concept.

A dynamic and abstract world dollar may then readily be propagated into certain high frequency intercoursing.

Part XXIV.

Because Industrialization's group mechanisms are large and because multiplicately inter-connected directly or indirectly with other large mechanisms, it is obscured to a certain extent that the whole key to Industrialization *is simplification*— that is Industrialization never tries to do more than one thing at a time it does many things in high frequency sequences but not simultaneously.

In complete agreement with nature's own quanta-wave strategy Industrialization may do billions of things per second but none simultaneously with a superficial effect of simultaneity or even solidity.

Industrialization finds out all that is momentarily feasible about each function, subdivides as far as possible, and solves specifically for each item respectively arraying the solutions by frequency modulation.

The time, energy, and space involved are relatively inconsequential, in Industralization.

What is consequential is man,—all men and their mind.

The latest solutions may be progressively grouped in compound with other solutions—but redundancy,—a major crime in Industrialization, —will be avoided because of the original differentiation.

This simplification calls for less and less special technique in matters of production, but does call for ever greater skill and ever more scientific thinking and coordinatedly integrated organization in evolvement of prototypes both for end-product reproduction and for reproduction tools—a law of Industrialization being that the degree of adequacy of the prototype is directly proportional to its spontaneity of mass consumption and vice versa.

Part XXV.

In a cogent sense

Industrialization is a religion, and the first ever to promise self perpetuation.

Industrialization considered as a religion is also unique in that it has no priests,—that is if we except the self-appointed Publicitors who are willing; nay eager,—nay nuts to be druid Merlins, Richelieux, Rasputins, Savonarolas, or Wolseys to anybody with enough money,—their only criteria of authority.

But the Publicitors cannot be said to sufficiently comprehend Industrialization to be considered its representative priests. They are more in the nature of being its furtively meddling buffoons.

They make it a merry religion when they get fooled;—as they always do.

Industrialization is the first religion that is realistically universal.

It thrives in cross-bred reversion to a basic universal healthier man.

It needs no written creed, nor canon, for its own dynamics are insistent.

It has no geographical limits.

It is a streamline religion for it has vacuumized people into its lead edge lift rather than its being consciously espoused by people as in all former religions.

The scientists

who are responsible for its unveiling have never pled its cause; as missionaries,—nor taken advantage of its power for personal ends, —as priests,—nor excused it, or explained it,—as laity.

For Industrialization needed no succor or support within man's physical powers to provide.

It needed only precise unveiling, that its cosmic majesty might speak silently for itself, to be tuned into by man through the realistic wave bands of scientific nonsensoriality.

In this connection resolving the broadcast into the limited sensorial band, it is to be comprehended that the automobile industry is not an industry apart from other industries as for instance the "watch industry."

The automobile industry is up to this minute INDUSTRIALIZATION itself developed quantitatively and qualitatively to its highest contemporary degree.

As such, industry centers around the automobile as the largest and most inclusive per capita consumer producer mechanical extension of U.S.A, man as of 1920 to 1940.

It is man's latest mass method of physical transport extension, beyond which he popularly extends himself only in communication which involves no motion of his integral mechanism and therefore by ever more ephemeral extension means.

The automobile considered

as constituting the momentary prime focus of Industrialization itself,

is to be observed as progressively engulfing,—in method and principle,—producer-consumer articulation of all other of man's extensions, for instance of his stove, and refrigerator.

Of course

most importantly at the moment man is, under the aegis of war grafting on his new wings within the industrial-biology laboratories and pilot plants.

In further exploration

of the canonless

industrial religion concept

it is discovered

that man in his automobile

has spontaneously developed a higher calibre of cooperative morality

than in all former history put together.

The U.S.A, man,

being broadly extended into locomotion by his automobile

experiences mutually and constantly the dual viewpoint shift from that of pedestrian to that of driver or rider.

And instead of just *theoretically* subscribing to the fact that there are always at least two valid viewpoints, he comes to a true comprehension of the fact, ergo, dawning tolerance in oldsters, native tolerance in U.S.A, youngsters.

This unquestionably is showing its effect on America's viewpoint in world affairs today after twenty years of ever increasing high speed extension.

And starting first with a jalopy as his extension man learns to know himself by adjusting his carburetors grinding his valves checking upon his this and that until he checks back finally to his integral battery and radiator.

Thus good mechanics become as nature to the U.S.A.er.

One might be inclined to think that the automobile's passe,—that both Europe and America have extensively arrived at an *air age* because of the dramatic shift of tactical world power from the water to the air just as it once shifted with world shaking force from the land to the water—a shift that began with the fall of Rome and its land legions

and ended with the hydraulic consolidations under the hand of Victoria, Queen of the British Empire.

Although this new tactical shift of vehicle and medium is epochal on the ephemeralization highway which creeps, walks, strides, hops, skips, and jumps, glides, flies, and finally telemotes via the solid-liquid-gaseous progression of elemental states in which mutability advances geometrically, the populace

of neither Europe nor America can in any sense

be as yet described

as *air borne,*

except in a rather strange special way.

That special air borne way

is peculiar to Americans only to date amongst all the world peoples for that special air way is by pneumatic tires, without whose pneumatic dynamics the automobile

its industrial production

and popular use

would not exist,

and which with a car per family

makes an American's practical environment one thousand fold larger

than that of popular man of any other continent.

The dynamic philosophy of the U.S.A, man extended at speed on the highway, needs no logic beyond that of the intuitive dynamic sense to convince it

of the cooperative necessity of sharing the road

in an ever more standard manner.

When a five-ton mechanically extended man is coming at him in the opposite direction at such speed that they must pass one another on a narrow strip of earth at the rate of 120 miles an hour, "Keep to the Right" needs no priestly dogma nor police enforcement.

"Love thy neighbor as thyself" comes naturally in America,—on wheels.

Hints on what others have fatally failed in;—hints on not “passing” on curves, at hill tops—*blindly,* are all that the American needs—“Danger air brakes” “Please blow your horn when wishing to pass” “Do not park on highway.”

And while saying by rote “Thou shall not covet thy neighbor’s wife nor his ox, nor his ass,” and wondering what would happen if they did and if by chance their neighbors might not be fresh out of the last two items,

fifty million U.S.A.ers
through this mechanically amplified means
of the automobile
in dynamic unfoldment
have empirically acquired good manners
and consideration of others in fact
as they might otherwise
never have succeeded
in a millenium of *theoretical*
lip service religion.
And that fulfills
the number one law of all religions.

Part XXVI.

Truth, and all the truth is essential to Industrialization, and axiomatically, so is free speech.

You can't sell the U.S.A.ers, now accustoming themselves to highway traffic control by airplane and radio relay, the idea of arbitrary misstatement or false propaganda.

You can't tell them that there is no car coming in the other direction when they know that probably there is.

And U.S.A.ers don't feel silly and reverently "gutless" if, having taken precautions, "nothing happens."

Those games of self-deceit and inferiority-complex chest puffing, say the U.S.A.ers, may be played by men on foot in the old static world, but not by people mechanically extended in the dynamic world of Industrialization.

Long before the 1939–40 French and British expeditionary force debacle in Europe in the path of the BLITZKRIEG Americans had learned and only by actual personal mechanical extension experience, as Europe obviously had not learned, that you can't play puss in the corner and blind man's buff with Mack Trucks let alone with fire vomiting galloping "steam rollers" of forged steel.

Those politicians and the selfish schemers who manipulate them who believe they are going to save their silly diamond or green paper chestnuts by brandishing whole industrial systems at their special personal nemeses without even taking the personal trouble to learn elementary physics, chemistry, or trigonometry, or to keep reasonably abreast of the applied effects of their latest refinements, will *never* know what hit them as they splash piecemeal through space.

Now whether the hypothesis is in itself valid or not, Industrialization, considered as constituting a *tacit religion* even for the sake of argument, provides a precise fulcrum for prying loose many fairly satisfactory explanations regarding puzzling phases of the U.S.A, and world trends, past, present, and future.

And in further justification of assuming this arbitrary hypothesis it is to be noted that many (if not all) of the most important scientific discoveries have been evoked by earnest assumption

of "fulcrum" concepts which were later discarded

it is true

as being "fantastic"

after providing

the *successful introduction* unexpectedly of a true scientific event.

However, in every such case
the latter outcome
was completely unforeseen
at the time of adoption
of the *ultimately* to be discovered to be *invalid* assumption.

For instance, there was the assumption in 1697 that fire was an element, called "Phlogiston."

This assumption by *embryo chemists*
that fire was not just a mystical phenomenon, served at least
to isolate that phenomenon
from the *known* materials present, and from the events
immediately
preceding and following
the occurrence of fire.
By thus tactically deciding upon
positive action
combustion was at least omni-circumscribed. The unknowns within the zone of isolation were thus placed under scientific scrutiny and "their" behavior catalogued.

Among those thus observing and cataloguing was Priestly who himself still assuming the "phlogiston theory" seventy-seven years after its nomination, discovered and proved by carefully measuring that an invisible "something" was *combining* with the original tangible materials burned.

He determined this because the *weight* of the isolated materials *present* was increased after the conversion by combustion. Priestly died, however, still assuming phlogiston to be an "element." It remained for Lavoisier to go farther, though Lavoisier also assumed phlogiston at the outset. He found that the combining "something" was an until then nothing-ness—air which nothingness differentiated into a plurality of associated gases at least one of which was a new and unknown element—which combining element he named "oxygen." Thus was the latter experimentally isolated.

And its isolation attainment was so important to man through the immediately useful ramifications of the discovery that it inspired Lavoisier's creation of the basic procedure, nomenclature, and tenets of modem chemistry,—so that was the end of alchemy and of the tricksters with truth ensconced in its obscurity.

And there is implicit in the story of the phlogiston episode at least one objective justification of our *assumption* that *Industrialization* constitutes a tacit “religion.”

Part XXVII.

But a religion posits a direction towards perfection of its intuitively sensed social trend forces and omniscience.

Such an assumed *willy-nilly articulation* of an overriding force would be any event in an industrial society which frustrates arbitrary attempts to stay the omnipotent hand, of its socially composite "holy ghost" trending whether such frustrating attempts be of political, cultural, business or gangster enactment.

For contemporary example, we find such a frustration in the attempt on the part of the New Deal to curtail "surpluses" of agriculture.

Secretary Wallace prevailed upon the U.S. fanner to reduce his acreage by 3!4% in 1938.

Though the curtailment was contracted for and carried out in all good faith on the part of the fanner and the acreage was actually reduced the crop of that year willy-nillied an 11% increase.

Strafing Wallace as did the tide King Canute, this "more for less" per acre characteristic of Industrialization,—unpremeditatedly occurring on society's part,—articulated itself not as a miracle but through the unexpected effects of improved chemistry and implements and ways of doing, bom of ever improving and integrating popular knowledge.

This commonwealth amplifying trend demonstrated in *agriculture* as the willy-nilly compounding increment of science posits not only the certain socialization of quantity agriculture throughout the world in the very near future, but also the ultimate reduction of acreage to "tank" dimensions with many times increased production; subject to qualitative high-earning competitive pioneering as well as quantitative scientific control despite all manner of initial political and financial shenanigans. For the dimensions involved will allow of agriculture's enclosure under the industrial roof, which ended for man his complete subservience to the elements and time.

Under the industrial roof there is no distinction of seasons or of night and day.

Time is harnessed.

And through air conditioning the controlled environment mechanical extension of man Industrialization may widen its originally limited geographical thermal zone around the world's 32° F. isotherm—the freezing line to the equator and to the poles.

Industrialization took roots in the U.S.A, precisely within the most favorable thermal zone to stimulate its growth,—that is, in New England where with extreme seasonal variations, if man wished to work at all he had to do so under cover much of the time.

And he did wish to—fanatically.

Work as we have already said was part of the budding new religion, and the right and cooperative duty and delight of the individual to work were axiomatic.

This work fanaticism was not however germane to the out-of-door South.

This industrial work religion was exquisitely involved in the U.S.A.'s Civil War in which the fate of its and the world's future was decided.

The question was whether the U.S.A, was to escape its economic dominance by a feudal and non-scientific agriculture, and its concomitant animate slavery—that dominance to be replaced by Industrialization and its eventually concomitant inanimate slave?

The cathedrals of the new religion bom in the North are to be found now stretching across the country in the magnificent horizontal and vertical lines of its highways, bridges, rails, dams, power houses, factories, silos, ore bins, and skyscrapers, whose unwitting architectural innovations inspired Europe superficially through amazed perspective upon its new forms and surfaces to establish it as a modem "order," portendingly but inadequately titled "International."

That the Puritan stock seeking a new liberty of belief that would conform universally with experience and individual rationality, should have evolved successively: Unitarianism and Christian Science, in the 1850–1890, and 1890–1920 periods, respectively, is indicative of the Puritans' tacit conception of the portending new unspoken religion—Industrialization.

For it would seem that Industrialization embodies the dynamic characteristics which though then unattaining, they sought. Recognition of this concept also completely explodes the bewildered charges of the older pragmatic religions of horrific increase in atheism in the U.S.A.

Why should the U.S.A, subscribe to formalization of this new belief, which no longer needs specious dogma nor *belief* in lieu of *realization.*

This is immediate.

And it works, if not completely, only because it has not attained full growth and transformation of the way of living.

Yes,—it is real.

This religion, U.S.A, man knows, may not be long exploited any more than it may be stayed. For he knows it works only in the direction of universal welfare instead of for perpetuation of the idiosyncrasies or pathologies of arrested development in any one individual.

Industry will give any one a ride who wants a ride, but it won't stand still except through race suicide.

Industrialization

can chuckle at the thought of anyone's setting hand upon a 100,000-volt power line.

While this religion has no priests, and no blindly believing as we have pointed out, its cathedrals have sextons—great bumble-bee industrialists who have kept the premises in constant retool-up honey-hunting is all that is necessary on their part, for Industrialization's dynamics are self re-pollenizing.

Conceived of as a religion, Industrialization self-explains the U.S.A.'s avid necessity for the news, and its quick reactions of push and pull ratchetry of the continuous events which tend to accelerate its overall growth—we have named that push pulling phenomenon—"Democracy."

Part XXVIII.

But in its coming,

Industrialization was first applied as we have seen to producer instrumentation, and latterly only to the consumer. And within the latter category we saw that it was first applied

to the *mobilization* of U.S.A, man, not for mobility's sake, but for potential ability to adjust to the flux of Industrialization's dynamic impact, first upon the world at large.

Over concentration upon this first occurring mobilization characteristic has obscured the fact however that Industrialization must ultimately impact upon that largest of man's individual mechanical extensions—his home;—the extension that will make feasible his settling upon mountain top or in any valley of delight at will.

This ultimate engagement of Industrialization has started but from the inside out.

That is, it has first chosen to implement the household with industrial accessories. Finally, it will engage even large units of the whole,—whole, bathrooms, kitchens, atmospheric and power control units,—in the end engaging the encompassing shells.

This trend is to be seen in the figures of "general" builders' contracts for dwellings. In 1900, only about ten percent of the general contract costs went to any items strictly of the industrial category, stoves, furnace, lighting, bathrooms.

This figure constantly rose in proportion to the whole—to eighteen per cent by 1917, to twenty-five per cent in the twenties, and is recently in the vicinity of fifty per cent of the whole, which promises complete Industrialization, within the reasonably near future. The technique of mass producing airplanes for the present war phase will emerge as the technique of delivering your house by parachute or the equivalent in expedition.

The coming Industrialization of housing is implicit in,—and as usual unpremeditatedly,— the hydra-like outgrowth and separation of the C.I.O. out of the older craft unionism and in the growth of the industrial organization built firmly on universal rather than idiosyncratic service. Whether this particular C.I.O. union or another which takes up its trend will carry the labor situation to a stage adaptably synchronizing housing with general Industrialization is inconsequential.

But it may safely be posited that craft unionism is on the way out and industrial on the way in—*all* the way.

Building as a true industry is,—until that time arrives,—dead

Newtonianly "static."

It is a reasonable supposition that with the coming

of Industrialization of housing

its ramifications

far greater volumetrically and time-wise than transportation's,

will more than absorb any surplus of potential workers.

This happy event,—

granted as occurring in *any* measure,—has been retarded to a considerable degree as we have earlier discovered

by lack of *bigness* in imagination,—dwarf cultivated by the Publicitors;—on the part of designers,

economists, and industrialists sufficient to appreciate the richness and beauty potential to life involved in the concept of the mechanical extension of man.

Thus an inferiority complex towards other men each fearing the others' ability so extended to get satisfaction out of life and recontributively to grow, without cost to one another and without trespassing upon each other has curtailed

what a contemporary poet has designated as "that holiest of ghosts man may ever know—the creative imagination."

Part XXIX.

VITAL STATISTICS OF INDUSTRIALIZATION

Industrialization may be delineated

in two important ways.

The first, most obvious and most frequently employed, is by *per capita annual* production *in tons or dollars.*

The second is by dynamic measurement.

The first method shows the per capita resources rates of production, and a representative sample for instance

of manufactured articles of the U.S.A, compared with the rest of the world.

But this first method constitutes a *static* measurement of the economy.

Even when it shows growth over a period of years, it does not show the *reasons* for growth or the *meaning* of growth.

For these we must turn to dynamic measurements. In dynamic measurement matter is combined with energy by disciplined brainpower.

Dynamic measurement reveals for instance

the entire trend of U.S.A, industry:—which is

TO PRODUCE MORE WITH LESS—for the SATISFACTION OF ALL MEN.

This trend appears first in terms of what might be called *perishables.*

Industrially speaking, *coal* is a perishable, inasmuch as it is *consumed* by industry for the *release* of energy;

and the energy that can be released from a ton of coal

has increased threefold in the last twenty years alone.

Therefore, *statically* speaking, a piece of coal is just a piece of coal;

but, dynamically speaking, a piece of coal may become "three pieces" in respect to performance and in respect to man's derived satisfaction.

And if that piece which has become three pieces in potential power release,—is not used until necessary, it may through new science gains become four pieces, dynamically, in potential power release,—Was this the meaning in the parable of the loaves and fishes?

This trend is even observable in food which is also consumed for the useful release of energy to operate the "integral mechanisms" of man which in turn *relay* the initial brain operation to the "external mechanism" for the amplification of force or increase in precision of ultimate work to be done.

U.S.A, man now eats recordably less, having less requirement of energy as physical *work* and less requirement of energy as integral heat to maintain the preferential thermal conditions to the best functioning of the elaborate processes of his integral mechanics, in his now atmospherically better mechanical extended and controlled environment,

yet he jumps higher and runs faster than his father

and circles the world in days against his father's year.

The trend is also visible for instance in the number of miles yielded per pound of tire rubber, increased five fold in the last twenty years. And one of the most fascinating manifestations is to be found within the oil industry where the viscosity index of lubricating oil remained at 100,

(that of the best natural Pennsylvania oils misassumed to be the best that would ever be known) until 1930—

and has since shot nearly up to 200

by synthetic molecular design of researching man. But the viscosity index has also to do, among other things,

with the life, pressure, and temperature limitations of the moving parts that are being lubricated;

also of course with the life of the oil.

Thus it is seen that the dynamic gains compound in their ramifications.

Another way to observe the dynamic trend is in the constant reduction

of manufacturing cost per ton of bituminous coal; cost per pound of electrolytic copper;

dollars per auto horsepower.

Or, to speak of cost in more human terms, in constantly reducing

automobile, railroad, and airplane deaths per passenger mile traveled, despite both increased speed and increasing population of road and rail cars and planes as well as of people;

by decreasing deaths per capita caused by infectious diseases or by industrial accidents;

and sum totally,

with *increasing* life expectancy at all the various ages

of the human beings in the U.S.A.

The high point of the charts illustrating this trend

shows graphically
what the American standard of living really is.
This is done by showing
how much more than a subsistence
is the advancing standard of living, that is by charting
what the U.S.A, man can buy
over and above the absolute necessities
for a given amount of work hours rendered to industry by him.
This will be seen to be
more than favorably comparable with such excesses of other countries.

A second way in which industry delivers more for less
is graphically illustrated in the economic behavior of what might be called the "non-perishables," chiefly the industrial metals, but also the organic materials, such as fiber, rubber.

The central factor here
is scrap material
which is salvaged, separated, and used over and over again.
The result of this recirculation is
that as time goes on
less new raw material is required to make a given weight of product.

Scrap in this sense is not "shoddy" for the pure chemical elements *iron* or *copper* may be refined-out endlessly to ingot from discarded use forms.

In fact steel scrap becomes progessively enriched to higher ultimate strength with minor alloy constituents not worth separating out.

Scrap has been a special tactical factor in recent war economy though of great economic importance throughout all old industrial countries.

In the U.S.A, for certain reasons other than war scrap is highly important.

Here copper, for instance, seems almost to have reached what might be called a "scrap-point;" that is, the scrap supply is almost sufficient to meet all present domestic non-war needs, and very little copper has, therefore, to be mined for domestic use.

Also about 90 per cent of U.S.A, domestic consumption of steel is derived from scrap.

There is enough tin in the U.S.A, recirculating cycle to constitute a larger ore body than that in the Malay Straits Settlement whence it mostly originated.

Of course, practically speaking, scrap both as "new" and as combined old-and-new metal is both domestically consumed and exported so that these statements are only true in the terms of a net *fact* accounting.

The most interesting scrap situations are as already noted those of copper and steel, (though scrap is playing an important role in all non-perishable categories), for one reason among many, that it renders basic monopoly impossible.

Scrap also places economic emphasis upon business turnover rather than upon *ownership.*

Thirdly,

industry delivers *more* for *less* by causing a given amount of non-perishable material to do more work or to be more effective.

Sometimes this is achieved

by combining it more efficiently with energy; thus the average horsepower and cruising speed of automobiles have been constantly increased, without adding weight.

In the U.S.A. 1920–1940 there has been a vast increase in the proportion of energy consumption to that of tonnage consumption of industrial raw materials.

While one may find it difficult to "see" energy as constituent in products—in a pencil, a phonograph record—the energy component is nevertheless there and grows ever larger by numerical proportion to the tangible components.

Sometimes, if not always consciously more for less is effected by a better combination of materials through exercise of brainpower.

Thus by *alloying* or synthesizing elements under varying conditions, new *stronger* alloys are evolved whereby the same basic materials acquire a strength many times that indicated by their isolated properties;

for instance, two per cent of beryllium alloyed to copper

and thereafter jointly heat treated jumps copper's tensile strength tenfold and provides a non-fatiguing metal, which however, may happily be worked before heat treatment with all the facility of pure annealed copper.

Thus also by *mental ingenuity* a two-hundredfold increase in messages per unit of telephone wires is effected.

Part XXX.

And aware of gain
in all branches of technical activities
the technologist learns constantly
to recheck for new preferential
tactical choices
in new design application
the family of engineering principles
of leverage (mechanical advantage)
stress balance,
kinetics (of solids, liquids, gases),
and thus through the behavior of elements in new structural arrangement
and dynamic balance,
under new gains
to attain ever improving solutions
of a major character
within broad categories,
such as that of "transportation."

Such a major tactical design change would be that of the airplane metamorphosed out of
the engineering elements of the auto.

Here the inventor develops a *compound* symphony of hundreds of thousands of individual inventions integrated to ultimately comprise the airplane.

With the result for instance that an airplane is evolved of the same weight, of approximately the same basic materials and same quantities thereof as those which comprise an automobile;
which moreover, with the same horsepower, will cover a hundred miles
in one-third the practical running time of the car
with one third net overall gasoline consumption.

One thousand such airplanes might readily be made from the scrap of one thousand automobiles with certain slight material addition,—by purchase offset by sales of the slight excesses in other types.

This in effect

is what the English had learned to do to advantage in scrapping an old ship which could no longer compete in efficiency and producing a new efficient one out of the same materials by expenditure of energy and brain function only while keeping people busy.

Thus does the increase in unseen energy/brain content to tangible-material content ratio constantly increase, represented by a commonwealth increase in potential performance of the mechanical extensions of man.

Finally *all these ways* of producing more with less have been compounded upon one another to cause rising curves of all sorts, not easily catalogued separately.

Thus, passenger miles per capita per annum by all modes of transport represents a smoothly ascending curve from 1850 to date, though the automobile curve rose in 1918 to take the curve lifting burden from railroads which latters' own curve, thereafter declined;

and today the flying miles are starting to rise rapidly as though soon to lift the burden from earth borne traffic altogether.

The same compounding and succession of major roles is true

with the history of telephone and telegraph message frequencies per capita, a case history in communication now joined by radio.

Analagous trends are discovered also in progressively maximum diameters of microscopic magnification;

volume of astronomical space increasingly observable;

the college enrollment percentage of the U.S.A, youth population.

These are all composite dynamic measures of Industrialization's social integration gains.

Statically speaking a business may go sour, but not dynamically.

Dynamically speaking

business is a *service* in a broad category in which the instruments are constantly improved;

that is, Wells Fargo is a member in good running order

of an *express service*

employing successively

the horse, coach, railroad, motor truck, airplanes.

Static business assumes each last stage

to be ultimate

and is always wrong.
There is a trend
of *increasing rapidity*
with which inventions mature
from initial stages
to full industrialization in the U.S.A.
It was a forty-two year lag
between the invention of Portland Cement and its designed combination with imbedded steel bars as reinforced concrete;
But that lag was in the gay nineties.
In contrast, the “plastics”
had been invented but five years
before they were first structurally reinforced.
Thus each new industrial art
rises to its place
in the ascending all-service curve with increasingly vertical trajectory.

Part XXXI.

And finally, as all the tonnage criteria have been found wanting as an index of industrialization disenfranchising measurement by material units such as tons, loadings, etc. we must look to horsepower consumption from all sources of energy and translate the U.S.A.'s and the world's effective horsepower application to equivalent "man-power" units.

This translation shows by how much every individual in the U.S.A, is augmented.

The unit of augmentation is called an "inanimate slave," and the comparison with other economies of the world and all history is staggering.

For the U.S.A, *animate* individuals now command twenty billion inanimate slaves which amount to more than 50% of all the world's rapidly increasing total (thirty-eight billion to date).

Ninety-nine percent of this extraordinary army of genii have been conquered by the human mind out of the blue in the short space of three generations.

And don't let anyone discount the ability of these inanimate slaves each one of which can not only exert an equal amount of effort to that of the lustiest human, but, superior to the human they can go in and exert it at temperatures which for instance would turn Shadrack, Meshach, and Abednego to fume or icicles.

And they can articulate within tolerances of one hundred thousandth of an inch while their masters at best are limited to sixty-fourths.

Now, looking at the world's half-and-half *industrial-agricultural economy* in comparison to the dynamic portrait of the *U.S.A, industralized economy,* these broad over-all trend curves are seen to hold true irrespective of war periods, which only accentuate or punctuate them, and there would seem to be a current rapid increase in *tonnage* outside of the U.S. ...and this trend runs counter to the *tonnage* tapering within the more highly industrialized U.S.A.

Statically appraised by economists who used only the *material* yardstick of tonnage, this divergence led to the misconception that the U.S.A, lagged during the thirties in twenty-first place in world nations "recovery."

However, an obvious dynamic inference from this is that the world as a whole is beginning to take the industrial elevator first demonstrated tonnage wise by the U.S.A, and that the latter will be forced to play the role of major world exporter—that is, business and government will be forced to play the role of major exporter—they will be forced

by the pressures of their own high development to concern themselves with world affairs on a scale not even imagined when our economy was still in the high tonnage, low energy stage.

And which way is that world tonnage flowing (net)? The answer is, to the westward.

Emope's tonnage per capita stays about in balance. This indicates high industrialization taking birth for the near billion people of the Orient.

Energy,

when its potential is built to sufficient voltage must arc over to the dominant negative, and the Pacific Ocean *doings*

are fast building that electron pathway.

Intelligent handling of this development by the U.S.A, not just to avoid war, but for constructive world development, could obviate total world conflict.

If this inevitable trend is not consciously heeded and voluntarily attended by our own leaders, it might well be that the totalitarians in their efficiency drive will arrange matters so that we must furnish these services to the Orient whether we like it or not.

Dictators never invent their own opportunities.

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