

Ether and The Atom

Astronomy Notes

①

<u>Atom</u>	<u>Electricity</u>	<u>Ether</u>
Matter or Form	Energy or Force	All Comprising Unity

The term Unity as here used is a unity not merely in the sense that all or everything is united as by some connecting link or common aim or purpose, as two or many people may be united in a single effort or in single-mindedness, or two horses may be united in pulling a single wagon, or even in the sense of inseparable proximity such as the contact between the flesh and the bone, or that between the land dweller and the air. These all signify closeness, even eternal closeness, but not unity.

Unity as it is here used means being one and the same thing

The Hand of God^① Rodins Statue

The obvious meaning

The obvious not always
the true.

Copernicus - Galileo

We get out, as we bring to

View Statue in that light

Rodins work in two groups
Portraiture - Symbolism

This work, as name implies,
is Symbolism

Explain Symbol

General & Biblical belief

Apply Reason & Analysis
Inductive - Deductive

Our Inquiry Inductive

Discussing Marble Statue

Marble is a Compound

1 - Calcium
1 - Carbon
3 - Oxygen } Elements ⁹²
~~now about 100~~

Explain { Elements, Compound
 |
 atoms, molecules

Marble will melt in water

Elements can be transmuted
from Solids to Gases
and from Gases to Solids

Explain Atom & Electron

Reduce all to Force

Basis of All Matter is Force

Matter but Form

From where or from what
does Force emanate?

Other, power of all things - I am an
creation of all things - I am all things

Other, the Mother, the only one who has
the power to give life

Other, the Father, the only one who has
the power to give life

Other, the Son, the only one who has
the power to give life

Other, the Spirit, the only one who has
the power to give life

To know - this is to understand the meaning of Paul, that we
are all different members of the same body made
by the Spirit of God.

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are all different members of the same body made
by the Spirit of God.

To know - this is to understand the basic truth of
justice and equality, and only through the truth
and the love of God can the world be
saved.

Ether, for that would be a play on words and confusing the underlying thought, but that everything has come out of and remains part of the One and All pervading, the Only Fundamental Substance, The All Comprising Unity, which for the want of a better term we have named Ether.

The question now before us is:— Have the Electrons, in which we recognize the first evidence of the existence of a fundamental force, have the electrons separated themselves from this fundamental force of their own volition and by their own action, ~~did~~ ^{did} the separation ~~and~~ take place, and is their continued separate existence due ^{to} their own initiative; or have they been separated (if they are separated) and had they been sent or impelled ~~on their way~~ ~~and~~ are being sustained on their respective orbits and in their

dependent upon any other thing (6)
or substance or force more fundamental
for its existence.

It cannot be divisible, for
being the basis of an element, it
is the minutest part that is
conceivable of that element.

This presents at least two fallacies:
First, nothing that has substance
and permanency, as must the atom
under this conception, can be imagined
that is indivisible.

Second, there being 93 different elements
we are confronted with the existence
of 93 different fundamental principles;
for each atom being self-sufficient
and not dependent upon any primary
cause or force more fundamental
than itself, must be a law unto
itself; and a babel of conflicting
fundamental law is unthinkable.

If the mere statement of these
fallacies is not sufficient let us
examine them very briefly.

Is it possible to conceive of a
substance that has no substance and law.

without conceiving that it may ⑦
be halved and quartered, and if
halved and quartered then why not
divided into a million parts, and why
not one of the million parts into
another million and so on infinitely.
Are we not immediately driven
to the consideration of a fourth
dimension that will contain our
results, as Einstein was to
reconcile his molecular theory of
light with the known laws of
physics? and if a fourth
dimension then by these same
known laws of physics, what
has become of the matter?

As to the second fallacy stated,
if we attempt to reconcile the
existence of at least 93 permanently
different fundamental elements, and
therefore of 93 different fundamental
laws of matter, how are we to
explain the transmutation of elements,
the subservience and obedience of
all elements to the laws of attraction
and repulsion contraction and expansion

as we come in contact with Creation only through its material Manifestations, there must be a many fundamental laws that govern this manifestation as there are ^{permanently} dissimilar material elements that are irreducible beyond the Atom (and these, Mr Geiger assures us, are now 93).

All reasoning from Facts to Causes must then cease at this point and we become limited in our conclusions to those that are deducible after the facts, in other words to pure materialism, and to which manner of reasoning most of the illogical conclusions that govern this Civilization are chargeable.

If we accept the term Unity as an attribute or quality or description or characterization of Existence, then ~~then~~ it follows as axiomatic that everything is of this Unity. All Matter and every function of

To leave this unanswered, or to ③
say that neither of these eventualities
have occurred and to assert that
these things "just happened" is merely
to evidence ones ~~own~~ unwillingness
to follow philosophic reasoning to
its rational and unavoidable conclusion.

~~In the last paragraph~~
Just as the Atom is the attribute
of the Electron and has its form
by reason of the impulses and
actions of the Electrons composing it,
so are the Electrons the attributes
of the Ether and get their Force
or Energy from the Nature and
Intent of the All Comprising Unity.

The Electrons do not take their
impulses from the Ether any more
than the Atom takes its form from
the Electrons. The forms and
impulses of both the Atoms and the
Electrons are imparted to them by
the force ~~or force~~ that expresses
itself through them.

If then, all original impulses ^④
come out of the Ether and receive
their inspirations and sustaining
elements from the Ether, is there
any escape from the conclusion
that all Material Existence in its
Substance and its Compelling Energy
is an Expression of The One Simple
All Comprising Unity ?

We have already considered the
admission of Science that it finds
itself at the "jumping off place"
of Matter, at the brink of an abyss
where there is no more solid ground
on which to stand and no place
where to jump but into a void
of pure force or energy, the source
of which is unknown but yet
which manifests itself so compellingly
and so unmistakably that Science
admits it to be the basis of all
form and impulse there is in
nature

This, then, being the recognition by Science of the essential non-existence of matter excepting as it is the form that force takes on in its manifestations, let us for a moment indulge in a philosophic speculation as to the improbability of the permanent existence of what we commonly know as matter.

The illustration I am about to make, no doubt, can be improved upon and very likely has been by modern philosophic thinkers, but it served my purposes 30 years ago and as it was entirely original with me then and I have found no valid reason to discard it since, (true, I haven't looked for one) it may be of some service still and I commend it to your tender mercies.

The Atom is the most minute particle of matter. Assuming that matter is real and permanent, then the Atom, its minutest part must be complete and indestructible and not

molecular motion and the inevitable⁸ ultimate disintegration?

And how could we escape this in that case unavoidable conclusion that we are coming in contact with Creation only through its material manifestations, there must be at

that Creation had its ~~inception~~ in a heterogeneous beginning and was maintained on a basis of unharmonious dissimilarities. Beginning nowhere in particular ending everywhere in general and fully justifying the early Greek conception of a separate and distinct God for every phenomenon of life. Indeed ~~we should~~ to be logical we should have to improve on their conception of a God of the North Wind and ~~of each~~ a God of each of the other three ~~of~~ main divisions of the Compass. We should invent a God of the North West Wind and one of the North North West etc. and of course a separate one for Whirlwinds, Cyclones, Simoons, Typhoons etc etc

The Minimum of course being 93. For

Game Laws are not laws of a game but laws of men, made men to govern the actions of. They govern ~~the~~ relationships of men to game, but it is man not that they govern.

~~Laws of Nature are laws of the expression of Unity into Nature. They are laws of Nature.~~

Assuming Nature to be the things we visualize, Natural Laws are not laws of Nature but Laws of Unity, made by Unity to govern the expression of Unity into Nature.

They govern ~~the~~ a relationship of Unity to Nature, but it is Unity not Nature that they govern.

Unity, and as the form and function (10)
of the Atom (the first basis of matter)
are but the composite result of
the Electrons composing it and as
the Force or Energy of the Electron
is but an expression of the Ether out
of which it arises, it follows that
every Law that governs the existence
and functioning of Matter is a Law
of this Fundamental Unity and not
merely a law of matter.

The Law of Gravitation (or any new
conception that may supersede it) is
but a Manifestation of the combined
working of the Atoms and Electrons
and is thus a Law of this Unity and
not merely a law of matter.

All the laws in all the Sciences
are Laws governing the expression
of the Ether, or the intangibles, into
Matter and Force and are thus the
Laws of Unity, appertaining to ~~this~~
~~expression~~ the process of
such expression into Matter and are
therefore not laws of Matter or Matter Laws.

Unity of All established, also the
fact that All is an expression
of the Fundamental Substance.

Let us inquire what is the
Nature of some of these expressions.

We have seen that the Electron
is an arrangement of points always
in motion, intangible and invisible
in themselves, yet sufficiently
definite in their actions to collectively
assume an outward form known
as the Atom and thus functioning
as the basis of all matter, acting
always the same under similar
conditions and always displaying
at least the quality of consistency.

We have already accepted the
Electron as the most direct and
immediate expression of the Fundamental
Substance into matter and must

therefore concede this fundamental²
substance to be at least consistent.

The moment we leave the merely
atomic or the so called inorganic
form of matter and approach the
organic, we are confronted by a
complexity of motion and structure
inscrutable in their causes or
their beginnings, yet bearing
every evidence of persistence and
intent and forming the bases
of what we call Life.

Persistence and Reproduction
of Species, Growth from Seed to
Maturity, and development from
lower ~~or~~ more simple, to higher
or more complex forms; Sensation,
the power of discrimination, Movement
and Control of Movements. Sight
Hearing, The Sense of Taste and
all the various and many other
Subconscious acts, bear evidence

of intent, of persistent intent
of determination and of achievement
and these are qualities and
characteristics of an expression
of the substance of unity, and
therefore (making allowance
for the ~~the~~ limitations of language)
~~it~~ are qualities and characteristics
of the substance itself.

And what shall we
say of Consciousness!
~~The~~ Thought! and Reason!

If all that we have said
is true, can we escape the
conclusion that Consciousness
Thought and Reason, also being
qualities and attributes of an
expression of the all inclusive
Fundamental Substance of unity,
are in reality ~~the~~ qualities and

attributes of that substance?
Itself?

Whether these qualities are the developed qualities latent in the electron, or whether they are a separate and distinct expression, as may appear from a differentiation between organic and inorganic matter, does not matter for the purpose of this inquiry. What does matter and what is of vital importance now is that we recognize that whatever qualities or attributes or characteristics may be ^{currently} ascribed to any and every expression of the Universal Substance must be conceded as qualities, attributes, and characteristics of that substance.

4th March

11

Distance from Sun to Earth (approx)
Distance from Earth to Sun about 25000 Miles

{ Rotate about axis 1000 Miles an hour
in this latitude about 500 miles an hour and vary slightly at poles.
Revolve around Sun about 2 Million Miles a day

Distance from Sun ⁱⁿ Milky Way 12000 Miles a Minute

Distance from Sun and Neptune 278,000 Miles a Minute
in direction of the sun at about 26 Miles a second
The distance from Earth to the sun is 93 million miles

Age of Earth 2 Billion to 30 Billion Years

Height 13 Quadrillion feet

Whole mass of atmosphere weigh 5 Quadrillion Tons

go to
center
11.2

The Sun

(3)

1 Million times the size of the Earth
600 000 times brighter than the Full Moon

Mass about 2000 Quintillion Tons

" 330 000 times that of Earth

Age not less than 10 Billion years

Estimated to last another 10 Billion years
Will eventually be cooled

Rotates once in 25 days at its equator

" 34 " " " poles

and proportional to in between

No one has ever seen the sun, no one will
ever see it - It is covered by
9999 thousands of miles in thickness

Heat is estimated at 100 Million degrees F.

A mere speck of iron in Chicago heated
to 100 Million degrees F would be as hot as
living things in N.Y. to a glowing substance

Heat at the surface is about 11000 F.

Without the Sun { NO Wind, waves, clouds
NO Rain, snow, fog
NO Sun, no light, no heat
NO Tree, No vegetation would be

Q. 4. (4)
On a cloudy day, in mid summer - in India
33000000 horse power-hours of solar energy are
available on each square mile - The population
of about 800 million.

Can live another 15 Million Million years.

The heat emitted each year is about 12 Million

Million Tons

Loss is losing mass at rate of 4 Million Tons per year.

SOLAR ECLIPSES

9. 10. 1977
 2. 11. 1977

Solar Eclipse (when the sun is obscured by the
New Moon

Lunar Eclipse occurs when the full Moon

is in the Earth's shadow

Jan'y 30 Ecl'pse of Sun - Feb'y 10th Ecl'pse of Moon

Printed. I have requested Eclipse, with great accuracy.

There are allowed of impudencies, and a viz -
that the gods will be angry.

I should, an excellent means of improving fear
and abstinence in the multitude, when the
priests (the astronomers & astrologers - in that day)
learned to forecast the happening. (C)

~~Camp at~~ Camp
Feb'y 7th / ~~Sep't~~ June 8th

~~I am confident you will find~~

12. *Chrysomelidae* (see also 10, 11, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843,

~~Alfred as a weakly subject, a person who
was always subject to illness, and
Pierce (the mother) was a very
affectionate person for her son.~~

[Faint, illegible handwritten text]

[illegible]

OVER

Solar System



(8)

Sun 865,000 Miles in diameter
 Surface 12,000 times that of earth
 Volume 1,300,000 " " "
 Mass only 332,000 " " "
 Its density therefore only about $\frac{1}{4}$ that of earth
 Its rotation 25 $\frac{1}{2}$ days

Major planets	Miles from Sun	Number of moons	Diam	Per cent of Earth's diam	Year Day	Year	Satellites
Mercury	36 m	1	3000	1	88 d	88 d	0
Venus	67 m	2	7800	3?	225 d	225 d	0
Earth	93 m	3	7900	3	24 h	365 $\frac{1}{2}$ d	1
Mars	141 m	4	4200	1 $\frac{1}{2}$	24 $\frac{1}{2}$ h	687 d 1.9 m 11 d	2
Jupiter	483 m	14	86500	29	9 h 50 m	4332 d 11 3/4 y	59
Saturn	886 m	25	73000	24	10 h 18 m	10754 d 29 1/2 y	10
Uranus	1800 m	50	31000	10	10 h 45 m	30686 d 84 y	4
Neptune	2800 m	80	33000	12	16 h	60181 d 164 y	1
Pluto	3813 m	100				3200 y	

Mercury too near to Sun to know
much about it

Venus most brilliant of all the
planets and the nearest
to Earth

Mars - Canals - Atmosphere
~~Ground seems reddish~~

Dark pale white - probably snow
thin green in spring & summer - brown in fall & winter

Jupiter - Greatest of all Planets
Supposed to be still part molten

Saturn - Rings - ~~How many there~~

Uranus - Not much known about him

Neptune - farthest planet
a little to the naked eye

Minor Planets { Asteroids } (1)
or
Planetoids }

About ²⁰⁰⁻⁹⁰⁰ ~~400~~ Known and Named
Believed to be a broken up Planet
^{5 to 500 miles in diameter}
~~None much larger than 100 miles in diam.~~

Orbits all between Mars & Jupiter
Not visible to the naked eye

Period 3 to 5 years - a few, 6 years - 1 or 2, 9 or 10 yrs

Ceres, first one discovered in 1801.

Some of the others are:

Vesta	Hebe
Pallas	Iris
Juno	Flora
Vesta	Metas
Aetnae	Hygeia

across page
type ~~with~~

History

Babylonian priests discovered Saturn, Jupiter, Mars, Venus and Mercury.

In the 19 century we discovered Neptune and Uranus.
Galileo 3 centuries ago first to use telescopes.
Copernicus 16 century.

Aristarchus of Samos about 250 BC maintained the central position of the Sun and, like Galileo, was therefore a source of impiety.

Hipparchus about 150 BC.

Ptolemy 140 AD.

Earth History

(11)

Babylonian priests discovered
Mercury - Venus - Mars - Jupiter - Saturn

In Greece, Aristarchus of Samos (250 BC) maintained
the central position of the Sun, and
Arabic like Galileo, was the first to name
the impact of Hipparchus 150 BC
140 A.D. → these names
get lost like
the following

Copernicus 1473 - 1543

Modern System of Astronomy

Galileo 1564 - 1642 Telescope

Herschel 1798 discovered planetary
nature of Uranus

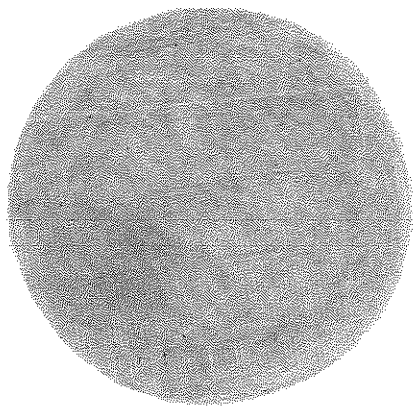
It was found that Uranus did not
behave as it should

Leverrier & Adams discovered Neptune
Middle of 19th Century

Pluto last year - Lowell

Satellites

		Diam. Miles	Miles From Planet	Period
Earth	- Moon	2,162	238,840	27 d 7 h
Mars	- { Phobos	7	5,850	7 "
	- { Deimos	5	14,650	1 " 6 "
Jupiter	- { Io	2,500	261,000	1 " 18 "
	- { Europa	2,100	415,000	3 " 13 "
	- { Ganymede	3,550	664,000	7 " 3 "
	- { Callisto	2,960	1,167,000	16 " 16 "
	- { Unnamed	100		12 "
Saturn	- { Thomas	600	117,000	22 "
	- { Enceladus	800	157,000	1 " 8 "
	- { Iethys	1,100	186,000	1 " 21 "
	- { Mione	1,200	238,000	2 " 17 "
	- { Rhea	1,500	332,000	4 " 12 "
	- { Titan	3,500	771,000	13 " 12 "
	- { Hyperion	500	934,000	21 " 6 "
	- { Iapetus	2,000	2,225,000	79 " 7 "
Uranus	- { Ariel	500	120,000	2 " 12 "
	- { Umbriel	400	167,000	4 " 3 "
	- { Titania	1,000	273,000	8 " 16 "
	- { Oberon	800	365,000	13 " 11 "
Neptune	- Unnamed	2,000	225,000	5 " 21 "



MERCURY

MAJIS

COPIED

THE PLANET
VENUS

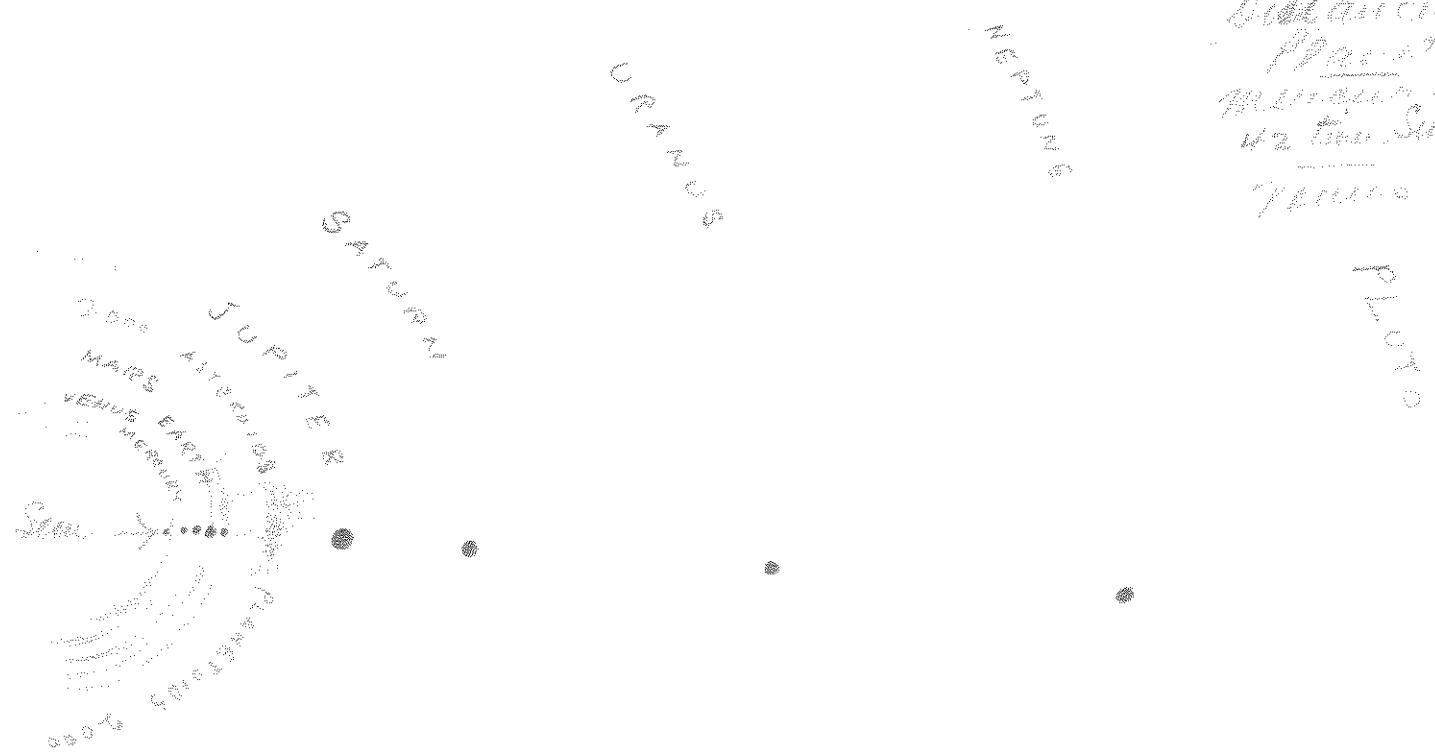
SATURN

NEPTUNE

URANUS

Handwritten text, possibly a signature or name, located in the lower left quadrant of the page.

Our Immediate Family



86,000,000 miles
 Distance from
 Earth to
 Mercury
 42,000,000 miles
 from

36,000,000 miles
 36,700 miles (unit used)
 being distance of Mercury from Sun

Solar System
 of

Our Universe

Stars travel at the rate of about 200 Miles a
 second - One is known to travel 287 Miles a second
 Our Sun travels $12\frac{1}{2}$ miles a second
 All stars travel
 A stationary "fixed" star is impossible
 One star travels 400 miles a second
 Our galaxy about ^{100,000} light years across
 Between ~~2000~~ 3000 Million Stars in our galaxy
 About 6000 stars in stars visible to the eye
 Most of our Universe 2000000000000000 Miles
 2 Million Trillion or 2 Quintillions

about 1000

• Seen — seen 100,000 miles
 • 1000 Miles — 21,000 miles
 • 1000 Miles — 21,000 miles
 • 1000 Miles — 21,000 miles

the sun, 1000
 1955 to
 1000 miles
 1000 miles
 1000 miles
 1000 miles

the sun, 1000
 1955 to
 1000 miles
 1000 miles
 1000 miles
 1000 miles

Reck of some Neturas has been
calculated at ~~15000~~ ¹⁵⁰⁰⁰ Muzap, Record
~~12000~~ ¹²⁰⁰⁰ ~~7000~~

Some 100 Million times as bright as
our Sun

Size of known Universe at present
one 1200 Million Lf.

Instruments

Telescope

Photographic plates

Spectroscope - Analyzes the light of incandescent masses and enables the physicist to deduce chemical compositions and physical states.

Interferometer - makes it possible to measure the diameter of a sun.

Thermocouples and Calorimeters, so delicate that they respond to the heat from a burning match a mile away - they record the warmth that we receive from any given star.

Photometers measure the light of the stars
Micrometers for closer measurements

New Telescope - 200 in. diameter
200 in. diam. lens
Mirror will weigh 3 tons.

Measurements

Parsec 19 Trillion Miles $3\frac{1}{2}$ ly
Kilo parsec - 6200 ly
Light Year = 5.8 Trillion Miles
~~Astr~~ (Nearly 6000 000 000 000 - 6 Trillion Miles)
One Astronomical Unit 93000 000 Miles (distance of
Earth from Sun)

Parsec is a parallax of one second of an arc

Light travels from Jupiter to Earth, 483 Million Miles
in $\frac{1}{2}$ hour

Light travels 4 hours from Neptune

Beyond 500 light years away we need the
spectroscopes

Age of Sun ~~estimated~~ by the color

Blue - White - Yellow - Red

Heat a mass of iron and it goes from Red to red to yellow
to white to blue

Parallax or Trigonometric Parallax, the
shift or displacement of a distant star against
the background of the more distant heavens.

Light comes past around the Earth in less
than $\frac{1}{8}$ of a second - It reaches us from the
Moon in 1.2 seconds - and in about 8 minutes
from the Sun

Our Universe

Alpha Variables - after the star Algol, whose light is cut down every 3rd night for about 14 minutes - more than 100 such stars

Light star

Dark star

Earth

Also called eclipsing double or Variable stars, Binaries. About 1/3 of all the stars are double or multiple.

Some complete circle in 4 1/2 hours, some in 3 days.

Alpha Centauri (the second nearest star to us) consists of 2 stars which are 2000 miles apart and take 80 years to complete a revolution. Some take hundreds of years to get around.

"Cepheid Variables" Like the Variable in Cepheus. Build up to great brilliancy. - These are single, not double ~~stars~~ - stars. The cause of their flare up is not known. It is perhaps due to some spots. - Our Sun is a variable (Nobis or New stars flare up suddenly, but do not last long)

The spectroscopic binary star Capella, each of whose components is about 100 times as bright as the sun is 54 ly distant.

Rigel about 13000 times as bright as the sun is about 500 ly from the Earth.

The star Antares is 100 times as bright as the sun is 1000 ly from the Earth.

Quinn

~~Capt. H. J. ...~~

There are at least ~~6~~ 16,000,000,000 - Ten Billion
galaxies (or billions) in the universe.

Season of the Aleutian Current range in distance from 2000 to 5000 ly.

Clouds of Cosmic dust - Dark Nebulae

Each the immense distance of 350 ly carries a star like
Antares, more than 400 times the sun in diameter & shrink
to a tiny point too small to be magnified by our telescope into
a true disc.

Retolquiere 150 Lt Grana, - Stam 2500.000 Mln
about 1000000 Reboluc in the 1900s

Calladonia Capillaris, from the summit to a
trunk of a tree.

A great many stars are double and travel around their common center of gravity.

Alph. a Centauri 2^d light blue away } nearest
Polaris Centauri 7th " " " " } star.

Only about 30 ft. water a hundred billion
miles of the sea.

of 30 str. occupy 200 T. ulm. This is 200, ~~the~~
what space is occupied by 2 Bellin. str.
Ant. etc. 400 T. ulm. This is 400.

Only 4 Stars are known to be closer than
10 ly from us.

Procyon is 11 ly

Altair " 15 ly

Vega and Arcturus each about 60 times
as bright as the sun at the same distance.

The Galaxy (The Milky Way)
makes one revolution in 250 Million Years
(The Galactic Day) or One Sun Year

Our Universe

Cluster of Hyades is about 130 ly

The Pleiades, a cluster of from 300 to 500 stars is over 30 ly in diameter as is about 325 ly away from us

The group of blue stars in Orion is nearly twice as remote (600 ly)

Thus we may begin to appreciate the meaning of Aristotle's expression that the universe penetrated into time as well as into space.

~~The great stars in Hercules contain fuel 3500 times as bright as the sun, but are 1000 times brighter, is 1000 ly away~~

The Galactic System

~~The Galaxy is Our Universe~~

300,000 ly in diameter by 37500 ly in thickness

Glaxo can Cluster Messier 79 - about 8500 ly

Glaxo can Cluster NGC 7006 - " 220,000 ly

61 Cygni, a Dwarf, Red (~~white~~ one of our nearest stars) is 200,000,000 miles from the Earth

Alpha Centauri (the nearest star?) is $4\frac{1}{3}$ ly distant
 Sirius - the time, as bright as the Sun is 8.7 ly "

③ Speed of Star in our Galaxy from 200 to 400 Miles a second

There are at least 10 Billion Stars in our Galaxy

Only about 10000 nearer stars visible to the naked eye

Size of Star Compared to Sun

Arcturus
to light
Chicago
1933
4074 away
light
Antares
last Chicago
1893

Arcturus
1 1/2 in

27 in

15 in

Antares

Belshazzar

- Not in center - Sun, 88500 Miles
- Inner Circle - Arcturus, 210000 Miles, 1 1/2 in (24)
- 2nd Circle - Belshazzar, 215000 Miles, 1 1/2 in (24)
- 3rd Circle - Antares, 407400 Miles, 27 in (45)

c) Only 4 stars are known to be less than 10 Ly from us.

Arcturus about ~~30~~⁴⁰ Ly.
Betelgeuse " 160 Ly.
Antares " 350 Ly.

Star Cloud, or Cluster
as called. Galaxy, Cloud.

Most stars are members of a Cluster.
Clusters vary in size from
30 to over a thousand Ly in diam.

New stars that pop up (NOVAE) 1 Revolution of Galaxy 250M years.

Light from stars in Galaxy seen.
Also called
Light from stars in Galaxy seen.

Almost all stars are found in Multiple

Light from stars seen. In low light, some stars
are seen.

Alpha Centauri (the sun is one of the stars in this system)
- stars 200,000 miles apart. Takes 80 years to complete a revolution.

On account of Matter in Space
 like a grain of sand compared to the Earth.

At 12.15 PM I saw Clouds in the
 Air. — ~~and~~ seen in our Milky Way.
 — though it is peculiar broken shape.

~~At 12.15 PM I saw Clouds in the Air.~~ — One in
 the Air. It is peculiar shape. It is a small
 cloud about 1/2 long and 1/4 by 1/4 in diameter.

At 12.15 PM I saw Clouds in the Air.
 10 to 100 Miles from Earth. Some
 1000 to 10000 Miles from Earth.

~~At 12.15 PM I saw Clouds in the Air.~~

At 12.15 PM I saw Clouds in the Air.
 10 to 100 Miles from Earth. Some
 1000 to 10000 Miles from Earth.

Type over top part of this page

The astronomer Jean Le Rond d'Alembert thought that life on a planet may be something like a disease with which matter is afflicted in its old age.

~~On the other hand~~
Astronomers declare that the stars are radiating themselves away - dissipating themselves out waves of light and heat.
Of this it is so out space is, ~~something~~
even finite and learned as Einstein seems to have mathematically proved that what becomes of starlight? Is it possible that it is converted into matter and then into black stars? (3)

② In 1789 Herschel discovered the ~~planetary~~ nature of Uranus - ~~It was discovered that Uranus was a planet~~
Astronomers soon ~~discovered~~ began to notice discrepancies in the motions of Uranus. The laws of planetary motion are so exact that knowing certain elements of a body's motion mathematicians can compute the unknown elements precisely - It was found that Uranus did not fit as it showed even after allowance had been made for the gravitational influence of Saturn and the minor planets. Its orbit was far off from what astronomers saw. Over