

A-15c

July 157

L. SZILARD
1155 E 57th St.
Chicago 37 Ill

THE SPIRAL

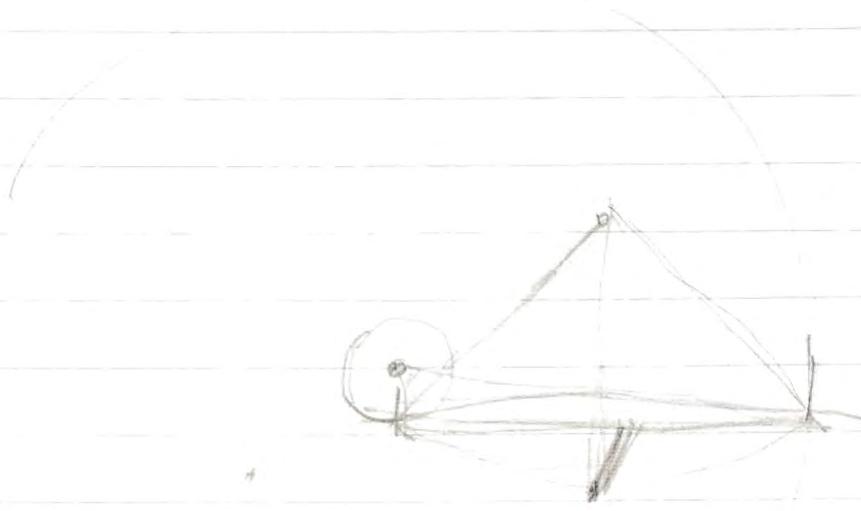


REG. U. S. PAT. OFF.

- 1.) After Warner Speech in Plymouth
- 2.) Letter to the Times Aug 6/57
- 3.) " control.
- 4.) { Letters by Huntington 0-5
Dictating machine 5-8
- 5.) Dictating machine
- 6.) Second letter to the Times
- 7.) Dictating machine

no 6

M



brass
brass radius 6 cm
arter 15 cm
if substituted to $33\frac{1}{2}$

area of poly radius 1.5
of $\frac{7.25}{5.25}$

1.4 or 40% larger poly

Brady

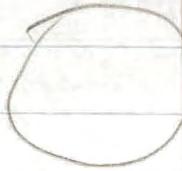
Assuming the 1st theory of inhibition

How do we explain suppression
of enzyme by Arginine?

We may say arginine-R
inhibits Polypeptide to Template and

an inducer competes with
arginine-R and does not inhibit or
kill.

image force



Quanta/cc

Quanta/cc

$$\sigma \sim \frac{r_e^2}{(h\nu)^2}$$

$$\sigma_T \sim \left(\frac{e^2}{mc^2}\right)^2$$

$$\frac{\sigma_T}{\sigma} = \left(\frac{h\nu}{mc^2}\right)^2$$

$$30,000 \text{ eV} = h\nu$$
$$= 100 \cdot 5 \cdot 10^{-10} = 5 \cdot 10^{-8}$$

$$25 \cdot 10^{-40} = 25 \cdot 10^{-16} = 25 \cdot 10^{-23}$$

$$\frac{1 \text{ quanta}}{\text{cc}} = 610^{23}$$

photon density:

$$2 \times 9.6 \pi \left(\frac{kT}{hc}\right)^3$$

frequency shift in Compton scattering:

$$h\nu = \frac{h\nu_0 mc^2}{mc^2 + h\nu_0(1 - \cos\theta)}$$

$$\frac{1}{\nu} = \frac{1}{\nu_0} + \frac{1 - \cos\theta}{c}$$

$$\frac{\nu}{\nu_0} = \frac{1}{1 + \frac{\nu_0}{c}(1 - \cos\theta)} \quad \theta = \text{scat. angle}$$

scattering cross section for high frequency quanta

$$\phi = \phi_0 \frac{3}{8} \frac{mc^2}{h\nu_0} \left(\log \frac{2h\nu_0}{mc^2} + \frac{1}{2} \right)$$

$$\phi_0 = \frac{8\pi}{3} \left(\frac{e^2}{mc^2}\right)^2$$

photon density:

$$2 \times 9.6 \pi \left(\frac{kT}{hc} \right)^3$$

frequency shift in Compton scattering

$$\lambda_\nu = \frac{\lambda_{\nu_0} mc^2}{mc^2 + h\nu_0 (1 - \cos\theta)}$$

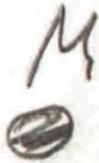
~~$$\frac{h\nu}{mc^2} = \frac{1}{1 + \frac{h\nu_0}{mc^2} (1 - \cos\theta)}$$~~

$$\frac{\nu}{\nu_0} = \frac{1}{1 + \frac{\nu_0}{\nu_c} (1 - \cos\theta)} \quad \theta: \text{sc. angle}$$

scattering cross section for high frequency quanta

$$\phi = \phi_0 \frac{3}{8} \frac{mc^2}{h\nu_0} \left(\log \frac{2h\nu_0}{mc^2} + \frac{1}{2} \right)$$

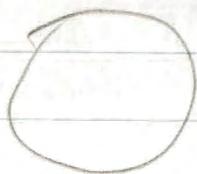
$$\phi_0 = \frac{8\pi}{3} \left(\frac{e^2}{mc^2} \right)^2$$



-2
0

image force

M



$$\text{Quanta/cc} \sim \left(\frac{kT}{hc}\right)^3$$

$$\text{Quanta/cc} \sim 2 \times 9.6 \times 11 \left(\frac{kT}{hc}\right)^3$$

$$\sigma \sim \frac{r^4}{(hv)^2}$$

$$\sigma \sim \left(\frac{e^2}{mc^2}\right)^2$$

$$\frac{\sigma_1}{\sigma_2} = \left(\frac{Amc^2}{h\nu}\right)^2$$

$$30,000 \text{ el. volts} = h\nu$$

$$= 1005 \cdot 10^{-10} = 5 \cdot 10^{-8}$$

$$25 \cdot 10^{-40}$$

$$= 25 \cdot 10^{-24} = 2.5 \cdot 10^{-23}$$

$$25 \cdot 10^{-16}$$

$$\boxed{1 \mu\text{m}^3} \sim 6 \cdot 10^{23}$$



$$\frac{1}{a} \frac{x}{2} = \sin \frac{\alpha}{2}$$

$$x = 2a \sin \frac{\alpha}{2}$$

$$\frac{b}{2} = R \sin \frac{\alpha}{2}$$

$$b = R \cdot 2 \sin \frac{\alpha}{2}$$

$$\frac{x}{b} = \frac{a}{R} = m$$

$$\frac{\Delta R}{R} = m$$

$$\Delta R = m R$$

$$= m b$$

$$\frac{e^2}{r} = m \frac{v^4}{h^2}$$

$$\frac{h^2}{r} = m e^2$$

$$r =$$

$$\frac{Z e^2}{2r} = \frac{m v^2}{2} \quad \left| \quad \begin{array}{l} Z e^2 = v m v r \\ \frac{Z e^2}{h} = v \frac{h}{r} \end{array} \right.$$

$$\frac{Z e^2}{4r} = m \left(\frac{Z e^2}{h} \right)^2$$

$$\frac{1}{r} = \frac{m}{h^2} Z e^2$$

memo
thick body (if equilibrium appreciable) ~~is~~ hot, should charge up (-) because (hot+) escapes; (hot-) is kept in.

~~Pos rays at low energy~~
Radiation from thick body passed between 2 plates forming a condenser, if

charged with w γ rays
now also an ~~of~~ of capillary
with same frequency

positron rays enter through
wall into vacuum chamber
and can be accelerated
to hit ~~fluorescent~~ 20000
volt to be detected in
ions. chamber or with
fluorescent screen.

$$\frac{1}{2} m v^2 = \frac{zeE}{m} \\ (1) \quad \frac{m v}{m c} = \sqrt{\frac{2zeE}{m c^2}} = \sqrt{2} \sqrt{\frac{E \times m c^2}{c e}} \\ (2) \quad v = \frac{E}{c}$$

Field emission should start
at lower voltage for $(hv-)$ because
tunnel effect more pronounced but
even lower fields for $(hv+)$



A current of $(hv+)$ should pass in
vacuo between two thick electrodes.

$$300 E (\text{eV}) H \cdot l = \varphi = \frac{e}{R}$$

$$R = \frac{l}{300 E}$$

$$\frac{He \cdot l}{e} = \varphi \quad + \otimes \quad \bigcirc$$

$E = 300 E^* (\text{eV}) e$
H

$$\frac{Hl}{300 E^* (\text{eV})} = \varphi = \frac{e}{R}$$

$$R = \frac{\text{Energy (in eV)}}{300 H}$$

$$H = \frac{e}{R}$$

$$\left| \text{Watt} (\text{cm}^{-2} \text{sec}^{-1}) = 10^7 \text{ erg} / (\text{cm}^2 \text{sec}) \right| =$$

$$\frac{1}{300} 5 \cdot 10^{-10} \approx 2 \cdot 10^{-12} \text{ erg}$$

$$\text{1 eV} = 10^{-11} \text{ erg}$$

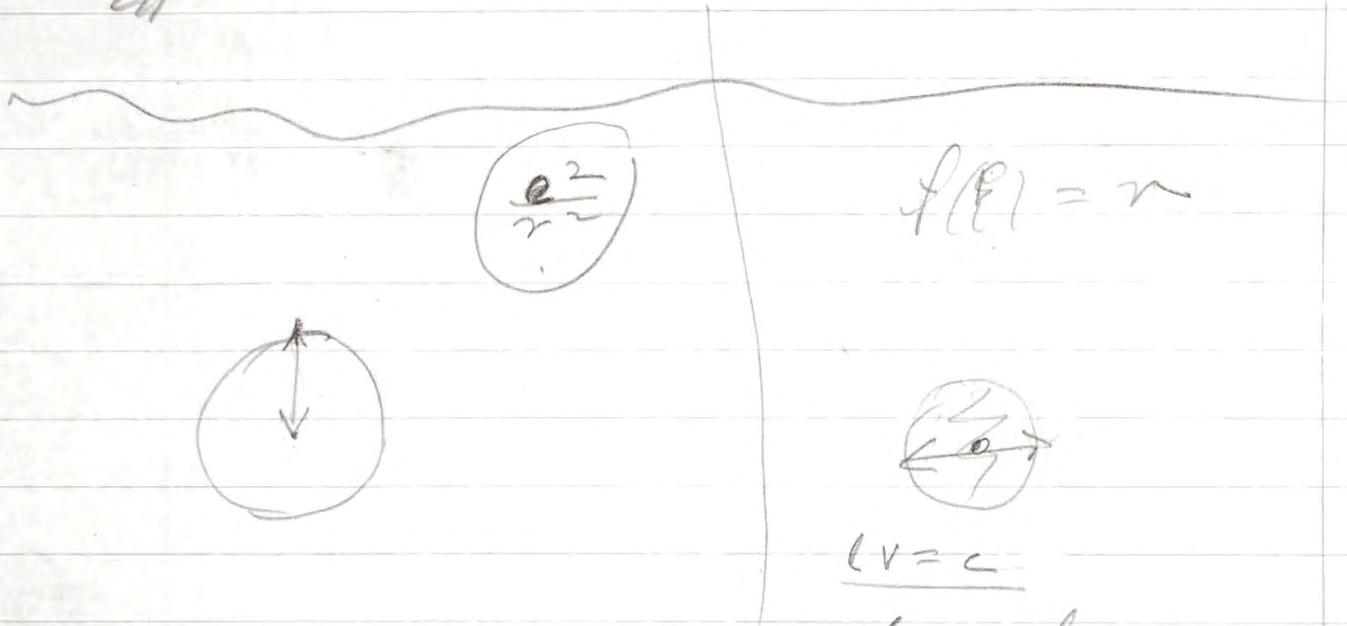
$$L = 3 \cdot 10^8$$

$$\text{space charge} = \frac{10^{+12}}{c} \text{ electrons/cm} = \frac{1}{3} 10^8 \text{ electrons/cm}$$

$$W_m = \frac{z^2 e^2}{2m^2 a_0} = \text{scribbles}$$

$$\frac{h}{2\pi} = \hbar$$

$$\frac{e^2}{r}$$



$$\frac{e^2}{r}$$

$$f(r) = r$$

$$lv = c$$

$$hv = \frac{ch}{e}$$

$$\frac{e^2}{r}$$



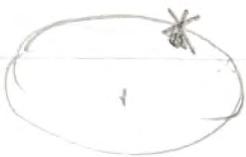
$$\frac{ze^2}{2r} = \frac{mv^2}{2}$$

$$\frac{e^2}{r} = m \frac{v^2}{\hbar^2}$$

$$\frac{e^2}{r} = mv^2$$

$$e^2 = mv^2 r$$

$$ze^2 = v \dots$$



$$-\frac{e^2}{r} + \frac{e^2}{2r} = -\frac{e^2}{2r}$$

$$\left(1 - \frac{1}{N}\right)^m \quad \frac{m}{N} = p$$

$$\left(1 - \frac{1}{N}\right)^{m-1} \cdot \frac{m}{N}$$

$$\left(1 - \frac{1}{N}\right)^{m-2} \left(\frac{1}{N}\right)^2 = \frac{m(m-1)}{2}$$

$m = \text{balls}$

$N = \text{boxes}$

$$\frac{1}{N} = q$$

~~(1-q)~~

~~q~~

□

□

□

tries

1
1

2

3

$$q^2 (1-q)^{m-2} \boxed{\frac{m(m-1)}{2}}$$

$$\left(1 - \frac{1}{N}\right)^{pN-1} p = \text{Prob}\{1\} = e^{-p} p$$

$$\left(1 - \frac{1}{N}\right)^{pN-2} \left(\frac{1}{N}\right)^2 (pN)(pN-1) = \text{Prob}\{2\} = e^{-p} \frac{p^2}{2}$$

$$(1-p)p$$

$$e^{-2p} p^2$$

$$(1-2p)p^2$$

$$(1-p) \frac{p^2}{2}$$

p. 42 Pauling, Wilson

$$W = \frac{z^2 e^2}{2 a_0}$$

$$137 \left(\frac{z}{Z}\right)^2$$

$$V = \frac{W}{h} = \frac{z^2 e^2}{2 a_0 h}$$

$$1V = \frac{z^2 e^2}{h^2} \frac{1}{a_0} = C$$

$$\frac{z^2}{2} \frac{e^2}{hc} = \frac{a}{a_0}$$

$$z^2 \frac{25 \cdot 10^{-20}}{2.6 \times 10^{27} \cdot 3 \cdot 10^{10}} \approx z^2 \frac{25}{36} 10^{-3} = z^2 \frac{1}{144}$$



$$2 \cdot 10^{-16}$$

$$\frac{h^2}{h^2}$$

$$\frac{e^2}{hc}$$



$$6 \cdot 10^{27} \cdot 3 \cdot 10^{10}$$

$$\frac{hc}{e^2} = 137$$



$$5 \cdot 10^{-10}$$



$$a = \frac{h^2}{4\pi^2 m e^2}$$

$$E_m = \frac{k^2}{2a_m}$$

$$a_m = m a_0$$

$$E_n = \frac{a_0}{Z}$$

$$\frac{E_{n+1} - E_n}{h} = \frac{1}{h} \frac{e^2}{2a_{n+1}} - \frac{e^2}{2a_n} = \nu$$

$$= \frac{e^2}{2a_0 h} \left[\frac{1}{n+1} - \frac{1}{n} \right] = \nu$$

$$\lambda = \frac{c}{\nu} = \frac{2c}{\frac{e^2}{2a_0 h} \left[\frac{1}{n+1} - \frac{1}{n} \right]}$$

$$= \frac{2ch a_0}{e^2} \left[\frac{1}{\dots} \right]^2$$

$$\frac{\lambda}{a_0} = \frac{2ch}{e^2} \left[\frac{1}{\dots} \right]^2$$

$$W = \frac{m e^4}{h^2}$$

$$\frac{2e^2}{2n^2 a_0}$$

$$\frac{h^2 e^2}{h^2 n^2 a_0} = \nu \lambda = c$$

$$\frac{h}{a_0} = \frac{ch}{e^2} = \frac{18 \cdot 10^3}{25} \cdot \frac{10^3}{(5)^2 \cdot 10^{-20}}$$

Brown to Canada by 0.6130.

Lehigh Hillside 5-4911

Wiesner

WA 4.6782

Ci 73700

UN 4-6900

of Enon

The Chesapeake and Ohio
Terminal Tower
Cleveland 1

Lehigh
Room 5600
↓

→ Rabblatt Kingsbridge 9-9289

2nd July

Cl. of Br. Blair AEC.

Hotel Wellington Greenfield 34400
2472

MI 3 3056

Room
at
end Wdn

Ci 73900

Pleasantville N.Y.

Aug 9-1300

10

Wed night

Op 302

Shirley Shivers
Tower 1-2200
Cleveland

9³⁰ - 12³⁰ from [unclear]

↓ Bonnis Bay [327]

[Pugwash]

9 miles

Wiesner

The pan

Ch. p. lwa plume

418

Rich and Bollick

Mrs. Madden

days with

$$\frac{234}{234} = \frac{30}{1000} = \frac{3}{100} \quad \left| \frac{920}{10^4} = \frac{2000}{10^4} = \frac{2}{10} \right.$$

$$\frac{240}{8000} = \frac{30}{1000} \quad \left| \frac{9}{10^4} \cdot 8000 = \frac{9 \cdot 8}{10} = \frac{72}{10} = 7.2 \right.$$

$$\sqrt[7]{240} = \sqrt[7]{15 \times 3 \times 2} = \sqrt[7]{15 \times 6} = \sqrt[7]{90} = \frac{1}{2}$$

$$\frac{240}{8000} = \frac{3}{100}$$

$$\frac{9}{10^4} \cdot 8000 = \frac{72}{10}$$

$$\sqrt{7} = \frac{2.645}{2.645}$$

234μ = amino acid residues in sequence.

20

80

40

7

300,000 mol weight / $6 \cdot 10^{+23}$

$$\frac{3 \cdot 10^5}{6 \cdot 10^{23}} = \frac{1}{2} \cdot \frac{1}{10^{18}} = 10^{-6} \text{ cm}$$

$$R = 10^{-6} \text{ cm}$$

$$\rho = 10^{-6} \text{ mol/l} = 10^{-9} \text{ mol/cc} = 6 \cdot 10^{14} \text{ molecules/cc}$$

$$\rho D 4\pi R =$$

$$6 \cdot 10^{14} \cdot 10^{-5} \cdot 10^{-5} = 6 \cdot 10^4 \text{ molecules/sec}$$

5/2/22

10/10/22