



can't determine their
sign.

Microscop. Exam. for the

staining for a diplococcus
ppa. means are made
in ordinary way then
stained for 5 min. with
this sol.

Rx. Dahlin gum 55.

Methyl green gum 1.5

Sat. alcoholic solution 20.
20.

Oxyc. dent.

2000

The stain is added to a smear
spread on a slide then
and then is allowed
to remain on for 5 min.
to spec. is washed and
examined.

The gum loc. are stained by diluting
Carbol fuchsin 15-20
times with distilled water
and staining.

March 8th 1888
Florence, Jan. 8th 88

reddish yellow.
Enchyma spines,
there are found usually
in spurs. in Branch-
ial arches & occasion-
ally in pa. they consist
of thick yellow & white
masses. Each shows a spir-
ally twisted appearance
microscop. they are seen
to be composed of a spir-
ally twisted network
of delicate fibrils, con-
taining epith. & muscle
& Charac. Leyden. Cyst. ac-
to. seen. Echinococcus
membr. we found in
spurs when a cyst
has perforated into bly.
poin & div. they appear as
thick white tough masses.
concretions are rarely
seen in spurs. there
are not expected in
the. they represent re-
nants of calcified tro-
chae gls

these are from the
urine in the
urine of the
urine of the

Lecture Jan. 8th 08

Urine

For the purpose of
qualitative exam.
of urinary constituents
it is necessary
to have a sample
of 24 hr. urine.
It is also necessary
to know the total quan-
tity passed in 24 hrs.
this is necessary
because the quantity
of solids vary.
As all urines under-
go decomposition or
standing some
causes must be
observed in collect-
ing 24 hr.

It should be collected
in a bottle.

It is usually of a greenish
color, seen in fact
its character. In most
cases it is put, has no odor
but in pul. gang. putrid
bronchitis it has a char-
acteristic putrid odor.

Gross constit. of
pus! You might
find it is.

Fibrinous casts are
seen especially
in fibrinous bron.
It is in craggy pa.
& light. When
membr. has extended
to finer tubes, they
are white in color
but are usually
reddish brown or

It should be collected
in a perfectly
clean bottle, and
allowed to stand in
a cool dry place,
and carefully
corked. After the
addition of each
specimen of U.
for qualitative exam.
a freshly voided
specimen, is best,
as a rule & spec.
should be passed
a few hrs. after a
meal. We usually
exam. & morning
U. but it is not
always best,
For microsp. exam.

✓ Spout has a robust,
tomato eating appear-
-ance.

Dissolution of particles
of carbon gives a greyish
or even black color,
a red color usually
indicates presence
of bld. The intensity
of color depends
- ing upon amount of
bld present, the color
will depend upon how long
bld has remained.

In pulmonary gang.
a dirty brownish red
color to red, a chocolate
color is seen occasion-
ally when pa. termin-
ates in necrosis & gang.

color is seen occasionally
only when path terminates
in necrosis & gangrene

with liver exposed
exposed on side 1

V & U should be as
fresh and concen-
trated as possible
When V & U, stands
for a time, and be-
comes alk. in
react, some of V
morphological ele-
ments such as
casts and epith.
are disorganized
as they are slightly
soluble, in alk.
sol. If it is desired
to ship a spec.
of U or keep it for
any length of time
some preservative
such as a few drops

supposed to be
ingone 20 & 20 20 20

jaundiced bronchitis.

& color of & spots mucus
& transparent. to me.

grey, yellow, green, red
brown or even black.

& larger & no. of pus
cells present & more

opaque does & sometimes
become, assuming

at 1st a white then

yellow and finally
a greenish color. yellow

and green usually
indicates pus tho at
times a green color

me. due to presence
of bile. this it occurs
in jaundice

In anæsthetic gives obs.

that perforates into & eg.

justified immediately.
I can't find a reason
for the color of the urine.

Of C & Cl 3 or formulae
should be added.

Always state & preser-
vative.

The color of normal U.
is a straw or amber
yellow color, but varies
considerably in
health, without
meaning anything
for ex. It may
vary from a color-
less watery appear-
ance to yellow
or reddish brown.

Pale urines in
health usually con-
tain relatively small
quantities of coloring

4 in 1st & 2nd stages
of pa. The amount of
muc. & consistency
corresponds in a gen-
eral way to amount,
& may vary from aligned
to highly tenacious, ^{character}
an ac. bronchopne. pa.
up to time of crisis
& sput. is usually
very tenacious, & at
also tenacious in pro-
clude asthma &
in 1st initial stages of
ac. Bronchitis,
& sput. muc. fluid
in character. In
sediment of ag &
gang & abscess & in

4 - 1 / 5 + 2 = 3
Opa. the end

matter is due to
the ingrowth of lgc,
and of fluid.
High colored U. are
usually concent,
& contain relatively
lge. quantities of
coloring matter &
solids.

Sp. Gr. is usually high, & occurs after heavy meals vigorous exercise, profuse sweating & when but little fluid is ingested. Under pathological conditions, & color varies from a pale watery

very low mobility

Lecture, Feb. 27th 1908.

Sputum.

Amount of sput. depends upon nature of & dis. It may vary from a few c.c. up to 500 or 1000 c.c.

Lge. bc. of sput are expectorated in cases of pulmonary gang. bc. pul. degeneration and perforation ~~and~~ communications of pus into & air passages

Lge. cavities in v. lq. In abs. of v. lq. and pul. cavities & bronchiectasis. In early stages of t.b.c. & early stages of ac. Bronchitis

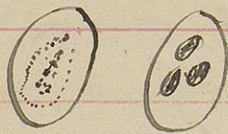
1 Jan 1908
St. Louis
Dec. 27th - 1908

appear, up to brown
or brownish black.
The color may be due
to an L. or D. of V
normal coloring
matter, or it may be
due to V addition
of abnormal color-
ing matter

Pale U. may be met
with in Diabetes
Mellitus, Diabetes
Insipidus, Hysteria
Ch. Intestinal, Nephro-
ritis. Amyloid deg.
of H. & S. in con-
valescence from
ac. febrile dis.

High colored U. 1/2

has been given, but
eggs are found
the eggs are ^{very} ~~very~~ ^{shaped} ~~shaped~~
rounded by a
thin wall, the ~~the~~
contents are gran,
a segmented or
unsegmented by a
clear space. The
contents are,
found in all
stages of development.
The eggs are about
70 μ long and
about 40 μ wide.



199922 100000
100000 100000
100000 100000

High colored U. of a
reddish tint are
~~usually~~ caused by
fevers and inflamma-
tions, but the
heightened color is
usually due to con-
centration & not
abnormal pigment.
Is partly due to this
fig. and more than
much U. is spoken
of as ferric U. Is
usually highly acid
in react. & high-
ly Gr. and often
contains traces of
alb. & presence of
fcd. in U. usually

Uncinaria stenocephala,
Ankylostoma or Hook Worm.
Is one of the most important
intestinal parasites found
— ~~in human beings~~ being
they are present at
birth and causing
any symptoms, or
they may cause
no degree of anemia
if full grown worms
is about $\frac{1}{2}$ in in
length. The female
being about 10%
than the male &
adult parasites
not put in &
feces unless they are

Antihypertensive or Heart Worn.
Nervous and Anxious.

causes a reddish
color. A green or a
greenish yellow in
color may be due to
the presence of some
bile. A greenish
color may also ap-
pear in ~~the~~ V.H. in
diabetes mellitus.
Administration of
various drugs,
such as
Rhubarb and Jamaica
cause a brown
or reddish color.
Carbolic acid causes
a black color. In this
case V.H. is often
normal when 1st

Tricocephalus dipus
Hominis

Tricocephalus dipus
Hominis
parasitic worm.

When full grown
these parasites are
from $3/4$ of 1 in to
1 or 2 in. in length.
The eggs are oval
shaped & double ball-
ed with a lid at each
end. They are
reddish brown in
color contents orange
gray. They are about
50 μ long and about
20 μ wide.



~~transparency~~
passed but after
exposure to air turns
black. Iodoine,
gives a yellow color
Methylene blue
produces a blue color
& odor of N. U. is
not of much import.
but it may have
a putrid odor if ulce-
ration occurs
some where in V
urinary tract.
Transparency of V
U. freshly voided U.
when 1, 20 passed
should be clear or
possibly show but a faint
cloudiness. After

very light colored
It is for the
very light colored

Is also a very common
parasite and in
stools. They appear as
pieces of fine white
thread when full grown
at 5 from $\frac{1}{4}$ to $\frac{1}{2}$ in.

— Length. The eggs
be about 50 μ long
and about 18 μ wide.
Contents of eggs are
coarsely granular & not
regularly distributed, & occa-
sionally the embryo
can be seen
in the interior of
eggs



standing for a time a
very light cloud
developed, which grad-
ually settled to bottom
of container. This
is composed of mucus
a few epithelial cells &
so called mucus
conspicuous. Patho-
logically & U. are
turbid from a no.
of causes, such as
ppt. of urates, car-
bonates, phosphates,
or turbidity of
U. are due to
presence of organic
products, such as
blood, pus, chyle,

of several inches, quite
thick, and dense

50 μ wide they are
yellowish brown in
color & are surrounded
by an ^{albumen} ring. ~~shell~~
cover, within this
is surrounded by
a very tough shell
contents coarsely
gran. The outer
shell is color
from this case the
eggs are mistaken
for those of suby
lotion!



O. pumila benicensis
a reaf von a
thead von

excess of Union, epistolary
 & back, all these
 might cause & H.
 to be troubled when
 I 20 passed,

Early in morning
when cold & acid
urates are pptd,
and disappear on
heating. Of the tur-
bidity of M. H. dis-
appears on heating
it is due to the pres-
ence of urates.

If it is an application of heat, it is due to presence of phosphates or other of alk. elements.

of the living N. H. ...
to the ...

eggs the lid can't
be removed.

V eggs are about
20 μ long and
about 4 μ wide.



Round Worms,

1. Ascaris lumbricoides: this is a very
common parasite the
full grown worm is
6 or 8 inches in length
-th and about as
thick as a com.

lead pencil. The
~~worm~~ is of a grey or
dirty reddish brown
color. V eggs are about
20 μ long and about

1000 cc of 1

1000 cc of 1

1000 cc of 1

of turbidity of H.
Is due to PO₄.
This clears upon
addition of an
acid, but if it
becomes more
turbid on addition
of an acid it is
usually due to
alb. elements.
If H. remains
changed on add. of an
acid it is due to
the unknown soft body
changes on standing.
When H. H. is
1st fused & reacid
is acid & H. is
perfectly clear. The

Boogers on the wall
over mossy rocks

a little smaller.
Bothrioccephalus looks
a little more,
this is not a can,
juvenile then full
grown it varies in
length from 30 to 50
ft. in length. It
has a bean shaped
head with suckers
& no hooks.

the eggs are oval in
shape. have a thin
shell, with present
little lid arrange-
ment at one end
& the ~~center~~ ^{center} ~~to~~ ^{are}
conceal gran.
In very young

After menses,
Bleeding from
the uterus
is known

changes occur soon
after it is voided,
& acidity soon
diminishes & the
react. finally becomes
alk. These changes
are rapid or slow
depending upon the
react of the U. when
1st passed. Its con-
centration, the temp.
at which U. is kept,
and also on the presence
or absence of virus,
at normal acid U.,
1st pptes, the amor-
phous mass, then
uric acid and often
calcium oxalates.

These changes in
the worm from 2-4

when a careful
exam. will be found
to be radically changed
& contents are coarsely
gran. & a few
hooks are seen.



For globules
that may be seen but not necessarily

present

Tænia solium

hog tape worm.

This is not so com.,

when full grown

is about 6 or 10 ft.

length. the head
has 4 ^{mentes} suckers and

a double row of hooks

the eggs are also

similar to the beef

worm eggs but are

1 1 1

the medium
will be kept
in an opaque

these changes in,
occur in from 2-4
days depending upon
temp. at which
it is kept. At a
temp of 90°F , if
it is exposed to
air it becomes
dull and opaque
in ^a very short time
owing to the presence
of micrococci.
When these organ-
isms grad. trans-
form urea into
(NH_4)₂CO₃ the acidi-
ty grad. diminishes
until finally it
is alk. in reaction.

our specimens in
various envelopes &

Take worm - cestodes.
the most important
is *Taenia saginata*
a ~~thin~~ ^{*Taenia*} medis-
cinalla Canellina.
a deep tape worm,
this is a can. tape
worm for this country
1 worm is from 12
- 24 ft in length.
1 head has 4 pig-
mented suckers
but no hooks, the
eggs are round or
oval in shape and
are about 50 μ in
diam.

they are surrounded
by a double wall

& ammoniacal matters
 are transformed into
 $(NH_4)_2$ matters. The
 lactic acid cryst.
 disappears and gives
 a sediment composed
 of triple phosph.
 Calcium phosph.,
 & Calcium carbon-
 ates & thrown down.
 At times especially
 in diabetes the acid-
 ity of the U. S. upon
 standing, this is
 probably due to the
 formation of organ-
 ic acids.

Sp Gr of U. S.
 1.021 of U. U.

1025 1015
Notes between 1015

Trochomonis is Intest-
inals.

this is a flagellated
pear shaped organism
20-50 times longer
than 1 w.b.c. it possess
-es very active movements
It is similar to Trochomonis
virginensis
which is found in urine
there again
meroprent in
feces in eye nos.
their significance
is unknown. & you
will find them
very near every case
of dysentery, fluid
stool.

might be a
thing is a possibility
in some
group of symptoms

values between 1015
+ 1025 but we,
as low as 1010 or
as high as 1030
with out meaning
any thing.

Profuse sweating
and severe vomiting
+ diarrhoea can cause
a high Sp. Gr. the
injection of large
quantities of fluid
can cause a lowered
Sp. Gr.

Pathologically they
vary between 1005 &
1060.

As a rule all those
conditions which cause

of sugar of the blood
left to increase
level of glucose in
the blood.

An I. quantity of
U. will cause a
lowered Sp. Gr.
and all those con-
ditions, which cause
a decreased quantity
of U. will cause a
high Sp. Gr. This
is a rule but ^{there} are
some exceptions.
In diabetic mellitus
a cge. amt. of U.
with high Sp. Gr.
are passed. owing
to presence of glc.
amt. of sugar.
On the other hand
a lowered amt. of
U. with a low Sp. Gr.

very much like
begin. spin cell,
Paramecia can be
differentiated into
an outer clear
zone and a gran-
ular zone con-
taining a nucleus
and vacuole. The
movement of Parame-
cia is character-
istic in that it is from some
point on its per-
iphery a little
knob will project
& internal flows
towards it.

With a Paramecium

Very much like
Rochester. - with coals
of limestone on the

me. met with
when a deficient
amt. of solids is
eliminated in the
U.

Multiplying last 2
figures of $\frac{1}{2}$ sp. 41,
by 2 will indicate
— grammes the
total amt. of solids
eliminated

React. of $\frac{1}{2}$ U.
 $\frac{1}{2}$ react. of U. U. is
acid. but spec. we
passed during $\frac{1}{2}$
24 hrs having a
neutral or alk.
react. $\frac{1}{2}$ U is especi-
ally liable to react.

from the above info
no more

In such cases
as there is feces
must be examined
for the. Is made
as an exam. of
specimen,
staining for the bac

Amoeba prolifica in
feces.

Amoeba Coli.

Is about 35μ in
diam. when at
rest. its outline
is as a rule circ.
It is ovoid & looks

in reaction soon
after a heavy meal of
vegetables, that is con-
-posed largely of vegetables
& react in change
in dis. but is not of
much significance
an alk react. due to
presence of NH_3
it occurs in cystitis
and in this case
reaction should be
tested as soon as
~~possible~~ ^{possible} after the
N. is voided. Test
react with litmus,
and state whether
faint or marked.

~~James Westcott~~
~~1891~~

Many advanced cases
of pulmonary tuberculosis
associated with a
tuberculous enter-
itis but in addi-
tion to this we often
have a few cases
- any tuberculous
enteritis. In either
case the one found
in a few. In young
children and oc-
casionally for
adults who suffer
from p.e. t.b. &
spontaneous intestinal
bleeding experienced
is coughed up &
then swallowed.

Many known cases
of hemiparesis the one
associated with a

Quantity of H.
Varies between
1200 & 1500 C.C.
being slightly less
in females than in
men. Polyuria
a 2. amt. of H. is
noted in following
conditions, Diabetes
Mellitus the amt.
passed varies a great
deal from almost
normal, up to 15,000
or 20,000 C.C. in 24
hrs.

It, me, noted
after a large ^{serous} ~~serous~~
effusions, he absorbed
much as is or

many varieties
are found. Many
all of them are
poisonous, tho
some of them
may become path-
-ogenic under
certain conditions
such as colic bac,
In the various
pathl. organisms
are found such
as typh. bac, Shiga
bac & the bac,
and very many
others.

Exam. It fees
for the bac. is of
great importance.

pleural effusions.
It was observed during

my convalescence from
the febrile dis. Ch.
interstitis, neph.

Diabetes, Insipidus,
Amyloid Degeneration of
K. & in hysterical
conditions.

Oliguria, or decreased
amount of U.,
is much more common

than polyuria,
and is met with in
ac. Bright's Dis.

Ch. parenchymatous
nephritis, Cardiac
Dis with failure
of compensation

smooth lining of
mucous covered of
green with iron
oxide.

constant derived
from digestive
tract.

A few epithelial cells
are found beneath
the Gorgonia, usually
- by indicate some
inflammation. Condition
a few pus cells or
leucocytes, seen
in ^{mucous} large stores. Large
no. indicate ul-
-ceration.

Bacteria.

In every normal store
contains, bact. in
numerosity.

just kept.

Controlled
Experiment

In various nervous
dis. during course
of ac. febrile dis. &
it. from much
causes such as
free from a stone
etc.

Normal count
of H.

Normal amt.
of Urea eliminated
in 24 hrs varies
between 20 & 30 grs.
& Urea is ~~not~~ during
course of most
of ac. febrile
dis. It is ~~not~~ in
dis of L. and in
Bright's dis.

May 24

Notes

poor food, indicate
defective digestion.

V.S. or rule is

In ch. const. derived

from V food me. mass
fibers, which usually

recognized by its
transverse striation

It me. elastic to,

For me, present

in V. pres. as far
globules or in V

form of needle like
crist. of fatty acid.

Various forms of reger-
table cells are seen

often containing gran-
ules. Starch

granules stained

Drop contents of
1.5 or 2 ml. in
test tube
physical test, mixture

Tests.

For urea,

Place a small amt.
of suspected fluid
on a glass slide &
add a drop or 2 of H₂SO₄,
warm the slide over
the flame of a Bunsen
burner & if urea is
present, characteristic
white cryst. of urea
H₂SO₄ will settle out.
The following test
is applied,

add a few drops
of suspected fluid
to an equal quant. of
a solution of hypophosphite
bromide. If urea

of brownish or green
in brown bottles
many stones appear
grey or clay colored.
Pus. me. present
in much lye. or. and
be recognized with a
naked eye.
Microscopic Exam.

1. The contents derived
from a food. There are
portions of undigested
food or particles of
undigestible food.
As a rule a presen-
-ce of lye. pieces of
unchanged food
or many small port-
-ions of undigested
food or only partly

gas will be given
off mostly CO_2 gas.
If normal n.

Quantitative est.
of urea.

For all chemical
purposes the
Froehde's method
is best. The in-
strument is filled
with a sol. of Na-
hypobromide then
exactly 1 C.C. of H.
is introduced into
the tube by means of
a hypodermic syringe.
The urea is decom-
posed into CO_2 .

Mr. [unclear] & Mr. [unclear]
we found in 2 pieces
- health. but when
marked off. are present
it indicates catarrhal
inflam. of 1 m.m.
It is. then hard
ribbons, masses
are covered with [unclear]
or r [unclear] seen
in sheets, or prob-
ably indicates a catar-
-rhal inflam. in
v lge int. When r
[unclear] is finely
divided & mixed
with v pieces. & [unclear]
-ly comes from v
[unclear] int.

~~method of estimation~~
~~the amount of urea~~
~~is found in 1/2 hr~~
+ Nitrogen, the
N₂ collects in
cup of instrument
+ CO₂ is absorbed
by KOH or KOH
After standing for
15 min. the decom-
position is complete
+ amt. of urea
can be read off
scale,

Uric acid.

Normal amount elim-
inated in 24 hrs
varies between 1/2 and
1 1/2 gms, + Uric acid
is I or II in pract-
ically all conditions
in which urea is I or

Town for the road

1/2 mile into the river
The river is probably
more of the same
a mile into
then it comes from
2 1/2 x mile into it
is nearly always more
or less attended by
pearlance. It is
brownish red & black
if black = tany stone
same & bright
color of 2 bed & 1
- on the river for
the 2 to 1 mile
If you may get per bed
from presence of 1 per

your work on
the same
group of the
which is
\$

Tests for Uric acid.
Uric acid cryst are
easily recognized
by the microscope.
The Murexid test.
is the best. Chemically
this detects the presence
of uric acid, ^{and its compounds,} the sediment
it remains after evap.
oration is treated
with a few drops of
HNO₃ in a porcelain
evap. dish, after
the addition of
acid it is evap. to
dryness, then a drop
or two of strong
H₂O is added

of the
irregular
pieces or
irregular

pieces in varying
proportion, & conditions
then found unaltered
or in various ways
it is probably from
rectum or large int.
& usually due
to transmigration &
is coated with f. bed
then & pieces are hard.
Severe here may
come from rectum
of rectum or colon
as the result of
malignant dts, or
severe inflammation
& bed sore, intimately
united with & pieces

if uric acid is present
a purple red color
is produced.

Uric acid and
its compounds will
reduce Cu^{2+} in
Fehling's sol.
If you get a marked
reduction of Cu^{2+} .

Chlorides.

From 11-15 gms of
Cl are eliminated
in H_2O in 24 hrs.

The Cl. accum
combination with
 Na , K , Ca & NH_4 ,
mostly NaCl
they are I. or D. in

see 1 the volume
of gold stones
and considerable
cliff volume,
When examined,
stone of a suspected
case of gold stone
collected in place should
be carefully worked
thru a small mesh-
ed sieve the gold
stones are found
occurring masses
as hard as iron, more
green stones, very
considerably in
size, these gold stones
ply have been found
on them.

all the time
and cannot
be seen in it

1 course of
all the, febrile
dis, and many
of the dis,

During convales-
cence from ac. fe-
brile dis. the quan-
tity is nearly always
increased. Use

AgNO₃ for the test.
Phosphates.

are found in L.U.
as Na, K, Ca + Mg.
PO₄. Between 2 1/2 &
3 gms are given off
in 24 hrs. the PO₄
occurs in L.U. in
2 forms. 1st The
earthy PO₄, Ca + Mg

of the stomach. The contents of the
stomach consist of various fruits & vegeta-
bles & skins of the
same & the fibres
of vegetable matters.
The foreign bodies of
various kinds have
been seen as in the case of
children & weak undig-
-ed individuals when
such bodies have been
swallowed, pins, buttons
etc. In certain cases,
Dr. S. & I saw those
who eat too much &
too fast undigested
& unchanged particles
of food were found.
There should have been

Mon. 10/10/1919
seen a v. young of the
same & the skin
phos. L. & V. air.
phos. that is Na &
K phos.

(Reaction of the
urine) acidity is
due to dissolved sodium
phosphate.

The phosphates are
D. during most
of t. ac. febrile
dis. & most of
t. ch. dis. They
are D. during
convalescence ~~to~~
from ac. febrile
dis. & phosphate
diabetes.

Test.

1.25 test for earthy

changes the so called
tarry stools and this
character, When
ant. of bile wch. is
passed into v. is
is diminished &
stools become less
highly colored. & if no
bile is passed into
v. int. they are almost
colorless and are the so
called clay colored stool.
the clay colored stool is
due to presence of
undigested fat.
gross constituents
& feces.
there are very numerous

and the test for Pb^{2+}
is done. However, when
these tests are made
changes in the color
of the solution are
noted.

ptd. as a white
cloud upon the
addition of NH_4OH
you test for the
alkaline PO_4 ,
the mine is made
alk. by the add.

of NH_4OH , and
then filtered, the
filtrate is acidified
with acetic acid
and a few drops
of ferric chlor
ironium nitra
te is added,

a yellow ppt. indi
cates PO_4 (alk)
In order to remove

of the & Bi. causes
 stools to become
 black. If Cl may
 cause a green color
 green stools may
 also receive their
 color from the presence
 of a bacillus which produces
 a green pigment.
 Administration of
 sodium rhubarb
 & senna causes a
 yellow color, Haematox-
 ylin a red color.
 The feces may be red or
 reddish brown from
 presence of unaltered
 red, a black when &

must be made
alk by the add,
of Na or KOH. The PO_4
& PO_4 are morph.
by a solution of Ca or
Ba chloride and
then filtered.

PO_4
are of 2 kinds,
1st neutral PO_4
of Na & K. & 2nd
H conjugate or acidic
sulphates. From a
mixture of PO_4 solution
- in water in 1 H. in
24 hrs is between
2 and 3 gms.

Set: Morrison
Set: Morrison

* React. of feces is
not constant. Blue,
acid or alk.

the color of feces varies
too much to be of any
diag. value. the color
is very dark from
haematin and me-
plide of Fe. when
much meat is
taken. With a vegetable
diet the color is usually
much lighter.
With an absolute
milk diet the color
almost disappears from
the feces.

with a look
not confined to
the renal system

Alb. of the various
alb. found in U.
serum alb. is v
most inapt. while
albuminuria does
not always mean
Bright's dis. it
should be regarded as
a pathological con-
dition in all cases.
The causes of albumin-
uria are grouped
under 3 heads.

but in some
cases it is
due to several
causes acting
together

is the. The water is extracted if
becomes hard and
dry and may form
dry ball like masses
= tubercles, masses.

on the other hand
they are, with a
few they are liquid
& watery or mucous
and bloody.

of no food
Let us by can-

If most of food
which is ingested is digested
and absorbed but
little will be left
behind for $\vee$ formation
of feces. In any dis.
that prevents absorption
of digested food
or causes an in-
creased content of
it, $\vee$ amount of feces
will be $\downarrow$.

The form and con-
sistency of stools
varies considerably even
in health. They are
usually cylindrical
& firm or runny.

these with the blood
- the and removed
work in urine & blood
the most of the
- in the eye and
all are found
as a rule, but
must be remem-
bered that the
Bright's dis. may
occur with album-
inuria or only
traces may be found
In ch. for chronic
nephritis and
Albuminuria
low. In ch. Inter-
mit. nephritis
may not be
at all found
at all. In cases
of ch. intermit.

of passage in
bowels: if yellow

absolute non passage
for days as in stricture
or an almost con-
tinuous passage as
in some forms of int.
inflamm. It may
occur with con-
stipation, the fecal
masses are accompa-
-nied with & passage of
loose stools due to inflam-
mation by & inflam-
-mation of the feces in
health varies between
140 and 200 gms
in 24 hrs.

But this varies with
vol and character.

the group was sharp ref
sharper than the group

nept. p. 1/2 of
it should be made
and more delicate
tests applied.

2nd group, album
minima due to
haemic disorders
classification.

Fibrile albuminuria
that is the album.

W.C. occurs during
a course of fever
In some cases
albumin is partly
due to haemic
disturbances and
partly due to weak
circulation, Fibrile albumin
may occur during

the course of labor
24 hrs is 1 meal.
25-² or 3 meals
A perfectly normal
individual may
pass but one stool
in 3 or 4 days, 1 meal
and character. Of food
+ of fluid ingested
+ exercise are important
factors in determin-
ing the frequency of bowel
movement. Or or
peristalsis. For what
ever cause will induce
or constipation
respectively. In pathol.
conditions both extremes
are observed.

temperature is
normal in the
normal body
the course of all
acut fevers & varies
somewhat with the
intensity of the Dis,
It is observed in
various dis of the
bld. such as anemia
leukemia, Diabetes
and many other
conditions some
poisons such as
carbolic acid and
turpentine probably
prod. alb. thru its
disorganizing
~~disorganizing~~ effect
on the composition
of the bld.

lactic acid.

Feces.

are composed of a mixture of indigestible and undigested particles of food, unabsorbed residues from various intestinal mucous, lact, and epith. & no. of stools in health varies with individual & the character of food taken during infancy three or four stools per day are normal, but

Jan 10th 08.

Albuminuria
due to circ. disturb.
occurs in Card,
dis or weak H. from
any cause,
Febrile album. in
some cases. me.
due to & weakened
condition of V H.
Nervous dis. prob.
cause album.
then its influence
upon V H. The chronic
obstructive path. causes
album. then local.
circ. disturbances,
The renal function
is impaired, album

I have found
a perfectly new

I found a number
undigested food
mus cells, etc.
epith. cells and
various mis.

Among 1 last found
in the. The
Oppler Bone bone
1 short finger.
It is very found in
association with
gastro cancer and
is a long non mobile
rod shaped bone. some-
-ing ~~single~~ in
pairs and it joined
near 1 ends. I have
thought to be respon-

... and
...
...
...
are probably due to
a combination of
causes, at times
is called albumin,
met with, that
to the alb. may not
come from K or
all, but more due
to a he. in some
form of primary
trout, or in case
of K ferall it may
be due to an ad-
mixture of men-
al bld. It is very
difficult to determine
source of albumin,
It does not signify
Bright's is always.

unmuzzed charge gun
no end ~~happens~~. If

and allowed to evaporate,
the residue is taken
up with distilled water
and tested as follows,
3 drops of a ^{saturated} ~~hydrogen~~
sol. of ferric chloride
is ^{with a carbolic acid sol.} mixed. It is then
diluted with distilled
water until an am-
ber light blue color is
obtained. To this sol-
ution the ethereal extract is added
of lactic acid & present
a lemon yellow color.
is prod.

Microscopic exam.
It is not containing.

and with much water
the residue is often
and almost over.

U. containing pus are
not always albumin-
ous. St. pus is very
much present & is
alb.

Tests for Alb.
In every case V
U. should be filtered
before any test is appli-
ed. If filtering thru
ordinary filter paper
does not clear up
V urine V removal

of phosphates &
Sulphate will
clear it up. After
removal of P & S
you must make
it acid by HCl 2/4302

1. Test for iron & cobalt
Waller's test

1. Test for the Keilings
a small amount of a filtered
juice is placed in a
test tube and to this
is added 10 times as
much distilled H₂O
to this is added about
3 drops of a 5% aqueous
sol. of ferric ch-
loride. If lactic acid
is present a distinct
greenish yellow color
is prod.

Uffelmann's test
5 to 10 c.c. of a filtered
juice juice & an extract
is added by shaking with 20
or 30 c.c. of ether.

1 test & the Kelling
a new one of 1000
part of 1000000

Hellers Ring test,
HNO₃ test,
Place a small amt.
of filtered U. in a
pedimentation
glass then with a
pipette carry a
small amt. of
pure HNO₃ to V
bottom of glass
and allow it to
flow out under
U. try to avoid
mixing acid & U.
together, if alb. is
present a white
ring forms at V
junction of acid
& U. The Ring is

1
Step 2. 200 cc. milk
not from by-pass 1

of chymosin carries
with it the same sig-
nificance as the pre-
sence or absence of
pepsin.

to Test.

5 or 10 cc. of milk
are treated with ⁽⁴⁾ 10
or 5 drops of filtered
gastric juice. — ~~to~~ a
test tube. This
is then set aside
and kept at body
temp. for 4 or 5 min.
& kept at body temp.
+ 12 milk & coag.
a trace of lactic acid
is found —

importance with the
with the same re-
coming immediately
cloudy mass from
uric acid to dis-
appear.

If V.U. contains
an excess of urea,
a ring of urea NO_3
crystals will form
at V junction of
V.U. & acid.
Bile pig. when present
in V.U., causes V
various rings to appear
green usually pre-
dominate, an
excess of indurium
causes a violet
colored ring,
a mahogany colored

(hydrogen).

When HCl leaves
from a gas, if the
test is made in
the same way as for
pepsin, after addition
of a few drops of ^{very} dilute HCl.

Milk Curdling Ferment,
Chymosinogen is only
secreted by cells of
the stomach, mucosa, and
it is transformed into chym-
osin then the active
enzyme of HCl. But this
may occur when HCl
is absent if CaCl₂ is
present.

Test & make a
few - 1 part. the
glucose the colour
ring in the
protein.

U. primary,
may cause a col-
ored ring varying
from pink to a
brick red. color
H&H: ppts not
only remain alb.
but remain glob.
ulin, albumoses
, nucleos. alb. &
certain resinous
bodies ^{with} are usually
due to campylobacter

Albumoses dis-
appear on boiling
but reappear on

presence of pepsin,
so that when pepsin
is diminished or absent
there is probably some
organic acid present.
Test for Pepsin.
If HCl is present
mix gastric juice
about 10 c.c. one
placed in a test tube
and a small piece of
coag. egg alb. is added
to the tube & set aside
and kept at body
temp. for about 1 1/2
hr. if pepsin is pre-
sent the egg alb. is partly
dissolved.

the test tube is placed in a
boiling water bath
and the test tube is
cooled.

Removal of globulin
is removed by
sat. with $(NH_4)_2SO_4$.
Resinous bodies by
alcohol.

The Boiling Test.
A small amt. of
U. placed in a
test tube and
then boiled, after
boiling a few drops
(not more than

3 or 4 are added)
If alb. is present
a yellowish white
ppt is thrown down
heat alone coag. alb.
But boiling & U.

color of food.

Elements of gastric
& pepsinogen of pepsin
(pepsinogen) and not
pepsin is secreted by
cells of S. This is
then transformed into
pepsin thru action
of HCl. The determina-
tion of presence
or absence of pepsin
in gastric juice is
probably more value
than recognition
of presence or presence
of HCl. Disturbances
of circ. and nerve
supply of S. probably

may also precipitate
of LiPO_4 , & add,
of Li acid causes Li
 PO_4 to go into sol.
again, the Li should
not be boiled after
& add. of Li acid.

Purdy's Test,
Fill a test tube
about $\frac{1}{2}$ full with
filtered Li . after
this about $\frac{1}{4}$ of its
volume of a sat. sol.
(aqueous) of Li chem.
pure NaOH . Now
add about 10 drops
of 50% $\text{H}_2\text{C}_2\text{H}_3\text{O}_2$
then boil & upon
pour of Li in Li

For assay of iron in
iron ore is
added to a few drops of
gastric juice in a por-
celain evap. dish. This
is then slowly evap.

If Fe is present
a rose color is prod,
that excludes organic
acids. In qualitative
estimation of free
Fe.

5 or 10 cc of gastr. j.
are placed in a beaker
& 1 or 2 drops of directly
-l sol are added if it is
then titrated with a
dichromate sol. The
sol. turns the
sol. red color

When a small amount of alk. is present even in minute traces it will appear as a white cloud in the upper part of the tube, this test is distinguished from all other forms of alk. wh. we found in the U.

Trichloro acetic acid test

This is said to be the most delicate of all tests for alk. and is applied in some way or the other.

rather 1 rule in
gastric juice. If S:
Tests for Free HCl,
a rule. of 2 or 3 drops
of a 1/2 of 1% alcoholic
sol. of dimethyl-amido
azo-benzol is added to
r gastric juice. If free
HCl is present a bright
red color is prod. This
test is not absolute.

Borax Test

consists of

2 gms. phenolphthalein,
1 gm of vanillin.
Dissolved in 30 cc
of absolute alcohol.

giving rise to the
Turbidity for the
this causes a white
ring to appear at
the junction of U₁ and
acid if U₁ con-
tains alb, will
not detect alb.
— normal U,
Quantitative test
for alb. Erba's is
the best test, alb.
is thrown down as a yellow
-ish white ppt,
Serum Globulin
is H₂ found in
U₁ in lge. amt,
— amyloid Degener,
of U₁. It is usually
associated with
renal alb,

to be excluded when a
normal and S. of per
the to present. Hypo
hypochlorhydria is observed
when a secretory element
is deranged. as for
ex. in sub ac, & ch,
gastritis & some cases
of ex. of S. sec. of
duodenum, carcinoma
of stomach & it is in
dilatation of S.
Hypochlorhydria is obser-
ved in carcinoma
of S. advanced cases
of advanced gastritis
and it is in some
cases hyperchlorhydria

the extracted when
removed and I put
the 2 portions of the
by the addition of the

to test for serum,
glob. & H. is made
alk. by addition
of NH_4OH . Any
pptd. are
filtered off, the H.
is then treated with
an equal volume
of a sat. sol. of NH_4
 HCO_3 a pptn. in-
dicates globulin
Carbohydrates

The carbohydrates
wh. are found in
H. are glucose
lactose, maltose
and others, when
you speak of sugar in
H. you mean

fractee. in 8. 0.2 of 1%.
to 0.3 of 1%.

Obviously. It is
necessary to distinguish
between Euclohydria
or secretion of a
normal amt. of HCl,
or Hypoclohydria when
it is deficient.

Hyperchlohydria too much,
and Anachlohydria
when there is none,
the euchlohydria when
associated with young.

Indigestion usually occurs in the morning.

It is said that religious
institutions can always

Glucose.
Fehling's Test.
Fehling's Test.
Fehling's Test.

Glucose,
Traces of sugar are
said to be found
in U. U. but in
such small amount,
that its presence
cannot be detected
by the ordinary tests.
As a rule sugar in
U. always means
diabetes. If in time
diabetes & sugar will dis-
appear from U. U. for now
this.

Tests for sugar
Fehling's Test,
2 vol are used,
1st vol. of CuSO₄
2nd vol. of NaOH.

and =
the ~~the~~ ~~one~~ ~~way~~
to neutralize 100 cc of
gastric juice.

Under normal conditions
figures varying between
40 and 60 are usually
obtained 1 hr. after
Ewald's test meal.

While in pathol. con-
ditions marked vari-
ation are observed.

In ac. & ch. inf.
conditions, as well as
in some of neuroses
& acidity is below normal.
High figures are met
with in cases of ulcer and
in some of neuroses
and 20% is dilatation.

Under normal conditions
ferment juice.
to remove the 100 cc of
the juice.

then they are mixed
in 2 parts.

An excess of lactic acid
will reduce the sugar.

Fermentation test.

yeast is added & if sugar
is present CO_2 is given
off.

Phenyl Hydrazine test.
not much good.

Quantitative est. of
sugar.

Barth's method.

2 vol. is composed
of following ingred.
Cu SO_4 pure, 4 gm. 752
m. gm.

23.5 gm of pure
KOH.

Henry P. D. C. E.

- are reacted & are
measured.

Method of determining
total acidity of
gast. juice.

5 or 10 C.C. of 1 filtered
gast. j. are titrated
with a decinormal Na
OH sol., 1 no. of
C.C. of soda or the
employed multiplied

by ^{0.100365}~~0.365~~ will indi-
cate acidity of 1 or
10 C.C. of 1 gastric
juice in terms of HCl.

For clinical purposes it
is more convenient to
indicate 1 degree of
acidity by 1 no. of C.C.

1 to the other 1
Methyl Methacrylate
monomer.
- some more and

350 cc. of strong
ammonia.

38 cc. of glyce.

Aqua dest. q.s. 1000 cc

1 vol should be
prepared in follow-
ing way. Dissolve
1 Cu & glyce. in
200 cc. of H₂O by
aid of gentle heat
if necessary.

In another 200 cc,
of H₂O dissolve 1
KOH mix 1 2 vol,
together and when
cool add 1 NH₃,
then make 1 vol
up to 1000 cc with
dist water.

the same in
stomach 15 Oct 1911
by J. J. J. J. J.

juice. Throat acid
solts + lactic acid
derived from the carbo-
hydrates ingested.

Pathol. the free HCl
is diminished or
absent or is greatly
diminished and lactic
acid is present in
large amounts. Since it
reacts for gastric juice
is always acid normally
we usually find it

some condition in
disease. For when HCl
is absent fatty acid
and lactic acid are
usually present.
consequently an alkali

removed from the ends
when the rest will
give. That will

the can in
exactly 35 cc of this
sol. is reduced by
1/200 gm. of sugar.
means exactly
35 cc of ~~the~~ sol
into an ~~Erlenmeyer~~
flask and then
add aqua, dest.,
to 200 or 250 cc,
boil & sol,

Boil & sol. and
when boiling add
1 cc. drop by drop from
a buret, 1 cc. should
be slowly added until
the blue color just
disappears from the
sol. Then you can
calculate & find

abnormally age or
~~me~~ obtained from
 non digesting organ
 - cores of ch. hyper-
 secretion. that some
 of forms of neuroses
 the same.

Chen Exon

V. gort. juice consists
of H₂O, free HCl. The
ferments and
their pyruogen and
mineral salts. The
acidity of gort. juice
is due to presence of
free HCl, but during
digestion other factors
enter into consideration
— exam. of V. gort.

now again I begin
measured from
Assessment of the

of gain in V.U.

Penetration method
you have to wait for
24 hrs. and so there
is convenient,
urinary pig.
& yellow color of
urine is due to
presence of uroch-
rome; the red color
is due to uroerthrin.

Other pig. are present
in V.U. as chromo-
gen. that is it is nec-
essary to add some
reagent to bring out

~~no. 1000~~
~~no. 1000~~

Hcl. clear over & Bismuth
bromide and then add
a few drops of 5% sol.
of K ferrocyanide.
A blue color will be
formed from the present
— & old.

Amount. Of Gastric Juice
The daily amount varies
between 2⁰⁰⁰ and 3000 cc
Amount of juice ingested.
From & non digesting
organ a small amount of gas-
tric juice can be obtained.
From 20-60 cc, of
filtered gas-j juice can
normally be obtained
1 hr. after Swallow test
meal.

After sleep of 5-8 hrs.
lunch and shower
H.C. Stearns & Thomson

1 color, 1 one
ingr. and some
are not.

Indican.

Indol formed
during isil. process
factor. absorbed
by H_2O , & there
oxidized, into Indox-

yl.
This enters into
combination with
 H_2SO_4 and is
eliminated in H_2O
as sodium
or K indoxyl SO_4 ,
then ~~out~~ add H
certain reagents
it forms Indican

ingest or most
of the same

partly digested forming
v so called coffee ground
vomitus

Bed. m. recognized
by v microscope or by
its gross appear. but
at times v brownish
gpt. m. seen in
v thin contents. Both,
microscop or grossly
does not appear to be
bed, a chem. test is
then necessary.
Place a ml. of
v material to be
exam. In a porcelain
evaporating dish. Add
a ml. of $KClO_3$
and a few drops of strong

partly digested forming
100 cc. of coffee ground

a small amount of
Indican is present
in urine in
normal con-
dition but rarely
enough to give a
test with ^{primary} reagent
It is I. in de-
cis. associated with
an I. degree of
putrefaction

Test for Indican
A small amount of U.
is heated with an
= amt. of strong
HCl. one or 2 drops
of a sol. of Na hypo-
chloride is added
then a small amount

of odoriferous the
the alcohol be

at times & odor may
indicate & nature of poison
on materials when there
have been swallowed.

A mass of ~~any~~ mucus
may be found in the
stomach. But in
catastrophic ring of &
mucous throat &
stomach. & of. me
greatly 2. Mucus can
be recognized by its
stringy tenacious
character. Bld me.
present in gastric
juice from a great
many causes.

& Bld. me unaltered
in appearance & be

of times 1 or more
indicate 1 or more
the mixture is

of chlorophyll. The
sol should be
mixed together
thoroughly and
then set aside for
a short time.
If indican is ^{present} ~~present~~
blue color will
be produced in V
 $\text{C} \& \text{Cl}_2$,

In making V test do
not add too much
of the hypochlorite
solution bleach
 V to,

Bill pig,
are not found
in V to usually

to work & rest, and
except where you expect con-
-en.

Pure gastric juice is an
almost clear faintly green-
ish yellow fcd. Has
a sour taste, and a
peculiar character. odor
& sp. gr. varies, between
1002 - 1003, & react.
to acid owing to
presence of free HCl.
& odor of gastric juice
is not normally
but at times more
aromatic from
presence of fatty acids.
& odor more feeble in
cases of int. obstruction.

majority of the subjects
found on 1 year 2

they are found in
& minute in all
cases of jaundice
usually & presence
of bile pig. m.c. rec-
ognized by & gross
appearance of U,
as U. much contain
bile in notable quan-
tity presents a color
varying from a gol-
den yellow, to a green
ish brown, you
do not often see a
greenish color in
& U. from bile.
When & bile is present
, when & U. is placed

20
mash & mash
total mash

✓ Boob's test meal
when it is necessary
to test for lactic acid
and it is desired to
exclude lactic acid from
✓ test meal.

this consists of
Oatmeal soup prepared
by boiling down to
500 C.C. 1 litre of water
to which has been added
about $\frac{1}{2}$ oz of oatmeal,
✓ S. is waited out
✓ night before and
the test meal given ✓
next morning on an
empty S. the gastric con-
tent is obtained / hr. later.
It is not always necessary

1 13000 test
when 10000
2 test for test and

on filter paper
you get a yellow
stain.

The tests for bile
have been given.

Diagno Reaction.

Dr. R. does not think
much of it. He thinks
it is more diagnostic
of tuberculosis in
any part of body.
Reaction is due to
presence of some
abnormal pig. in
R U.

Test. 2 vol.
1st vol. is a 1%
sol. of sulphuric
acid in 5% HCl.

2nd lot. 2 1/2 lbs.
American net. of the
H. H. H.

receives 30 gms. of lean
cold roast, cut into
very fine, pieces so as
not to obstruct retention

tube. 205 2 50 c.c.

of milk, 60 gms of
rice, & 1 soft boiled
egg, 4 hrs. later 2
2nd ter meal is

given. this is composed
of Bread 70 gms.
Water 400 c.c.

2 gastric contents
are obtained 1 hr
later. Normally 1
L. should contain
no remnants of 1st meal.

as a result, the
solution, just too
concentrated to be used

2nd sol. is a $1\frac{1}{2}\%$
aqueous sol. of Na-
nitrite. This Na-
nitrite sol. should
be fresh.

Tests.

the sol. are mixed
in following way.
40 parts of sulphuric
acid sol. and 1 part
of V Na nitrite,
to this is added an
= amt. of V H₂ to
be tested then a
small amt. of NH₄
OH. is allowed to flow
on top of V sol.

If V reaction is
positive a bright

test meal, is
Oleed Enwall's.

Is composed of
70 gm. Bread &
400 cc water.

Is usually given in
morning on an empty
stomach & the gastric
contents are obtained

1 hr later. 2 egg slices
of light bread and 1
glass of H₂O, are about
equivalent to the proper amt.

When it becomes neces-
sary to test & motor
power of stomach
the ~~the~~ double test meal
of Solger me. used.
For breakfast & for

Test used in
Oreochromis
pinnatus

red ring forms at
junction of KN#3
and v sol, to be
positive it must
be a bright red color
ring. Most all
h. give some color
if the sol. & W. is
shaken up the pan
will be a ~~to~~ bright
pink color

Microscopic
of v W.
The idea of v
nature of v primary
sediment must
be formed by v gross
appearance, this is
not reliable in all

Lecture Feb. 21st 08.

Gastric juice.

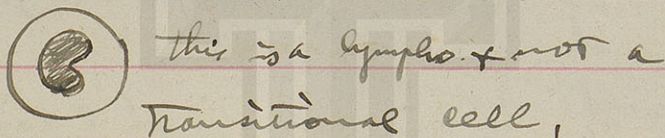
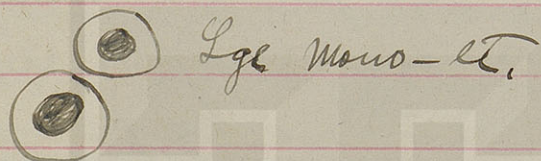
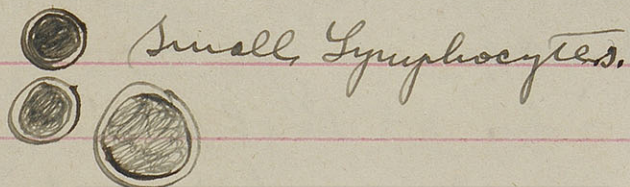
A meal and of gastric juice is constantly present in the stomach but in such small amount that it is not sufficient for analytical ~~purposes~~ purposes therefore when we wish to make a chemical exam. of gastric contents it is necessary to make use of some gastric stim. such as a teaspoonful of most commonly used test meal is the Ewald and Boss

Section 26, 21st 08.
Germine juice.
A me. and 1/2 grain

cases,
a crystalline sedi-
ment of a brick
red color & due to
presence of uric
acid. It looks like
ground up brick dust,
the react. of H₂O will
have some effect
on & unorganized
red.
1st uric acid cryst,
these cryst. vary
a great deal in
size and shape,
the most com. being
the so called whet-
stone form. & cryst,
are, singular or are

arranged in groups.
have acid content.
are made of cells.

2 T. male. They
vary considerably
in size,
cells.



^{fine gran.}
Polymuclear.
May have fine gran. and
are not as large as eosinophilic
gran.



large gran. Bright red in color.
Eosinophilic. gran. are
large.

They are
commonly found
in urine. They

-anged in groups,
uric acid crystals,
are usually colored
red yellowish or reddish
brown; but at times
they are colorless,
They may occur
in dumb-bell form
or envelope shape,
they are soluble in
sodium ~~uric~~ hyposul-
phite but reappear
when treated with HCl,
Amorphous urates,
are R. M. A. + K. urates
as they are called,
are always found
in acid urines and
are usually colored pink

a yellowish line
in white, thin red
I guess

It is more
delicate in outline
and has a typical
vignette like swelling
at some point on
its interior & forms
a real ring.

6/ or 2 grains of
big one made at
L & T. par. but
not. never in
L & A. A. small par.
L & A. A. of same
smaller smaller
than T. par.

In a given spec.
1 ^{ring} ~~ring~~ of L & A. par.
is all of exactly
1 same size.

521 17-11-1914

It is more
abundant in the fine
sand from a Thymus

or yellowish but
now, white, this sedi-
ment goes into sol,
on heating. Is the
only one that will
disappear entirely on
heating.

Calcium Oxalate
cryst. are usually
colorless. they are
highly refractive
cryst. and usually
occur in 1 envelope.

one form is
easy to recognize!



they also occur in
dumb-bell form.

Ca, oxalate cryst,
are mistaken for
triple PO₄ or ure,
mistaken for uric
acid cryst, PO₄ cryst,
are sol. in acetic
acid. Oxalate cryst,
are not sol, uric
acid cryst. are
sol in sodium
hydrate Ca oxalate
cryst are not,
the ammonio
triple PO₄ or triple
PO₄ as they are called
are usually found
in alk urines,
but may occur
in a feebly acid or

raised & in all
that is left.

1 ♀ Quaternary par,
When full grown
is smaller than
♂ T. male and
usually of more
shape and contains
a few coarse gran.
pig. & red fed all
smaller and
coarser than now.

2 body of ♀ par. usual-
ly stains like ♂
T. male,

♂ A.A. par. is
much smaller
than ♂ T. male,

Lower in A ^{thin} ~~thin~~

neutral H_2O , they
occur in a great
variety of sizes and
shapes. They are always
sol. in water, and
the most common
form found
in H_2O , is in the
so called amorphous
form. Under micro-
scope they appear
as transparent
granules and exam-
ple amorphous
beats. They are
sol. in water
~~acidic~~
 H_2O water cryst,
are seen only in

Differentiating parasites
in stained B&L,

Tertiary. for when
full grown fish & cell
almost completely,
& body of & for status
blue. & nucleus

2 nuclei present
stain a purple.

1 pig. gran. do not stain, & consequently appear as reddish brown gran and are finer & more numerous than in other varieties. 1 invaded r.b.c. is lger, and paler than normal. It will almost always

Phosphatic limestone
in North Bdk.

primary sediments
when Fe has under-
gone massive
decomposition they
occur
~~in~~ ~~as~~ in
form of round or
spherical bodies
usually colored brown-
ish yellow and
are sol. in acetic
acid.

Ca carbonate. Cryst
appear as minute
granules either
single or arranged
in masses, they
if occurring in
a bell form,
these cryst are sol.

1000 8/12 2000
1000 8/12 2000

2 per cent of 1/200,
there filaments are
about as long as
1 diam. of 6 or 8 ribs,
40-50 microns
in length, there
flagellae are very
active and are
seen to move
about in a whip
like manner,
after a time these
flagellae become de-
tached and are now
free from 2 adult
parasites.

Riz, extracellular
bodies are not seen
except in E. a. mol

the condition of the
sediment of cysts

in acetic acid and
give off gas,
the sediment of cysts,
may or may not
mean any thing,
it usually means
F conditions, one
favourable for the settling
out of these cysts,

Organized Constitu-
ents of Urinary
Sediment, &
Epithelium

A few epith. cells
are found in
the normal and
they may come
from any part
of urinary tract.

iron ceases.

There bodies under
- go one of two changes
1. they may die &
this ends it.

2. Some of them
become flocculent,
this change can often
be seen in fresh.

bed. & pig collects
in & center and
a slight tang move-
ment is noticed
at & periphery of &
parasitic then rather
suddenly from 1-6
slender filaments
will be seen to extend
from some part of

These cells are
seen - see
In lye mts. they
are pointed and
mean either infl.
or some circula-
-tory disturbance,
to the cells are,
classified 3 varieties
1st round cells,
the round cells
usually come from
v tubules of v k and
v deeper layers of v
pelvis of v k, they also
come from v male
urethra, these cells
are round have
a distinct single
nucleus and
are larger than

Apes cell, there
cells of muscle.



ovoid

5. Stage.

Pigmented Extra-
cellular bodies.

There are parasites which
failed to undergo reg,
when ^{they} reached
maturity but
leave a red cell with

out standing and
appear free in the blood.
After leaving the h.c.,
they d. in size.

They are large and
irreg. in outline and
are often vacuolated.

They at first possess
very active movement
but this movement

Chloroform T. 100

stage 15
micro (1) (2)

a few cells, these
cells at times look
same granular
and may be ~~an~~
mistaken for few
cells. but the
addition of acetic
acid dries &
granules and
shows & few cells
to be poly nuclear
and & ^{epith} cells
to be mono-nuclear.
2nd variety.

Conical & conical
cells.

these cells come
from & superficial
layers of & pelvis of &

K. and several
other men in
the morning

✓ typical crescents
are highly refractive
bodies and are
from 7-9 microns
in length and about
2 microns wide.

✓ extremities are
unevenly rounded
off and joined
by a delicate mem-
brane, bridges over a
concave border.

✓ Pig. is nearly always
collected near ✓
center, except as
to shape and size ✓
spherical & ovoid
bodies show ✓ same
general features.

Collected at 1. 10. 1935

1. These are common
and highly refractive

K. and are very
often seen in
pyelitis, similar
cells are found
in 2 neck of V
bladder. 4th cells
is 3rd variety,
3rd these cells
may come from
V ureters, V B,
prepuce of V male,
V vulva and
vagina of female
They have the
characteristics
of ordinary squa-
mous epithel.
Blood cells in V
u. When rbc. are

1
found in 1 h.
1 condition is needed
In T. mal, 1 year -
spores no. from
15-20, for each other
year. In Q. mal,
from 6-12
+ in A. A. mal
from 10-20.

1 porrogon occurs just
before they rupture.



reg.

4. Stage.

Crescents. ovoids
and spherical bodies.
these bodies are
seen in cases of
A. A. mal. and
after 1 fever has
lasted for 7-10 days.

Chlorid 1.47 1.00 1.00

of "on work"
to the "on work"

found in V U,
V condition is called
haematuria, red pig.
in V U. = hemoglobin-
uria.

the color of V fld. in
V U. will depend
upon how long V
rbc. have been present
The appearance of a
Rbc. will depend
upon V length of
time it has rem-
ained in V U.

When V bleeding
comes from V
vessels or B, they
are apt to be of nor-
mal appearance

been known to
in some persons

and are rarely
seen in circulating
bed.

After 1 pm. reach
full development.
Spore or seg-
mentation occurs
& it divides into
2 or 3 mil. bodies
called spores, each
one of which possesses
a nucleus, & R.B.C.
mythos and 2
bodies are set free
in circulation
These spores now
invade other R.B.C. and
in time form new
foci.

Clinical Lab. I 105

and are easily
seen but only

or become crenated,
& are easily recog-
nized.

When V & R.C. have
remained a long
time in V & R. as
for example when
they have come
from V & K. They
appear as bodies
V size of red cells
but are colorless
and appear as faint
transparent rings
these are called
pale shadows or
ghost cells.
It is important in
every case to recog.


 Full grown testis for.
 full grown  / stage.

Quartan, par. ^{full} grown

① a. a. par full grown

3. Stage of Develop- ment:

segmented bodies,
segmentation occurs
in all 3 varieties,

In Tertiary and
Quaternary mol. This
occurs in 1 circ.

bed. But in V
A. A. mal. reg-
imentation occurs
usually in 1 place

1771

three grown children
three grown children



size & source of
V H, But this is
not always possible.
Pus Cells.
Are seen in nor-
mal U. in a way in
very small. red,
lye. and H. of pus
nearly always means
tis in some part of
V urinary tract.
V appearance of V pus
cell will depend to
some extent upon
V reaction of V U.
If V U. is acid, neutro
a fairly ^{alk} ~~acid~~ in
reac. V form of V
cell is usually

47 1/2 ...
1 - 1/2 ...
- ...
darker than normal. In A.A. ...
usual. Only a few ...
pig. gran are to ...
be seen, seldom ...
more than 2 or 3

they are usually found ...
at the periphery of ...
or granules and are ...
pale with ^{out} no ...
when full grown & ...
far. However as ...
age, as a full grown ...
T. or Q. it also ...
tends to assume ...
a ^{round} O or ^{ovoid} shape, ...
& invade ...
smaller and darker ...
than normal,

Clinical Lab I 105

fairly well pre-
served, But on V
other hand if V4,
undergoes an un-
usual decomposition
as in cystitis, fus,
cells become dis-
integrated and
appear in V4.
as ~~a~~ a sticky mass,
should determine
V source of V pus if
possible

Antiseptic than non-
antiseptic. B. & A.

Feb. 15. 08.
Set. 15. 08.
Set. 15. 08.

In Quaternary, & big gran. are not as numerous as in & tertiary pos-
-ite & the gran. are larger and darker than in & tertiary pos. and show but little movement. When & organism reaches full develop-
ment, it is not as large as & tertiary pos. & is usually of a round or oval form and does not completely fill & p.b.c. & rounded r.b.c. is smaller and

CLINICAL I. 125

... but 1
... of

Jan. 15, th 08,
Get. Simon's Clin.

Diag.
Tube casts.

Tube casts or
urinary casts
represent a mold
composed of some
substance, which is
excr. in urinary
tubes. When casts
are present in U.
we call the condi-
tion cylinduria.

The term Tube cast
can only be applied
to those consisting
of a uniform,
transparent, gelat-

~~to wet - color skin~~
~~in many cases~~
~~in many~~

In $\sqrt$ tetracycline para-
-site $\sqrt$ pig. gran.
are small. reddish
brown in color, and
in fresh sed. pos-
sess a very active move-
ment. When $\sqrt$ para-
-site has reached
maturity $\sqrt$ pig.
gran. are greatly
diminished and $\sqrt$
organisms almost
entirely fill $\sqrt$ r.b.c.
 $\sqrt$ divided r.b.c. is
larger & paler than
normal. In many
cases $\sqrt$ remain
 $\sqrt$ r.b.c. cannot be made
out.

2 1 coriaria poma
-one 1 big. gran.

-inuous ^{matrix} ~~matrix~~
to wch. other elements
are attached
such as muscle cells,
epith cells. and
r.b.c. True casts
must be distinguished
from pseudo-
casts, wch. are not
of a uniform matrix.
Again we have cylin-
droids, these ^{cylinders are in cells here} cylin-
droids are band
like forms wch. clo-
sely resemble true
casts, they are com-
posed of mucus,
True casts are 1
most imp. of 2

its proct and
movement. V
ring bodies are
much ^{at} smaller than
V. certain and
present at some
point on their
interior a shadow
appearance.

① ② ③
T. A. 2

2nd stage, V pig-
mented intra cellu-
lar bodies,

there are later
stage of development
of V. formative and
reformed in all
3 varieties

1. *Grosserum*
on tooth

kinds. 1. Hyaline
& waxy.
✓ hyaline caries are
sol. in acetic acid.
waxy are not sol.
✓ waxy caries are
more highly refractive
and they are of a
slightly yellow or
yellowish grey color.
✓ matrix of hyaline
caries is not alto-
gether homogeneous,
as the granules
are almost always
seen imbedded in
or adhering to matrix
according to no.
& size of these gran.

work by only longer
gross at work or

at this stage is free
& undistinct & not
sharply outlined in
v.r.b.c. & unobscured
movement. is more
extensive & rapid
than in v. other

forms.
In v. Inaction type
& again is sharp-
ly outlined and
more repulsive and
& parasite at this
stage possesses very
little movement
& aestro-antennae
points usually
takes on a ring
shape and there

Clinical L. I. JCS

from a pump &
out the more to be
seen of these organs

we speak of 1 cast.
or being finely gran
or coarsely gran.

Should the morpholog-
ical elements be
attached to 1 cast.

they are called jux
casts when jux cells
are attached.

R.B.C. cast, or bld. cast.
when bld. cells are
attached or epith
casts when epith.
cells are attached.

this material con-
sists of K. tubules & forms a mass.

1 length of 1 cast
varies a great deal
It may scarcely

at least 1 brood 2
in winter. I have
1 field. have not

2 bld. ans. exam
either wet or dry.
Branches stained yes,
are more satisfac-
tory.

1st & hyaline
nonpigmented intra-
cellular bodies, these
are the earliest stages
of the development of
the parasite and are
found in all forms
of malaria. these
bodies look like
vacuoles, but are
differentiated from
vacuoles by their
amoeboid movement,
& Tertian parasite

Chloroform I, JCS

There is a
difference in
the amount of
blood in the
arteries and
veins.

Lecture Jan. 29th 1908.

Blood.

Sp. Gr. of n. bld varies
between 1058 - 1062

is slightly higher
in men than in women
& in adults than in
children.

& Sp. Gr. is decreased
in all anemias.

& Sp. Gr. inc. in febrile
conditions, some of dis.

of R. H., emphysema, and
in jaundice

Method of determining
Sp. Gr.

~~Hammer~~ Hammer slides

method is best

capillary vessel

of these bodies are often
collected in masses
by the M.G. & are found
in the M.G. & are found

colours ~~are~~ elements
and are often seen
collected in masses
in v stained fld.
~~In v~~ these bodies
can often be seen
in v rd. c. either
in v center of v corpus
- clear at v edge. and
are often mistaken
for malarial parasites
with Wright's stain
they present a blue
color. Their no. varies
between 200000 & 500000
per cu. m.

* Mullers Bld. Dust.
These particles are
seen in any field

Clinical Lab. I. JCS

occurs in solution
at the bottom

is filled with a mixture
of oil & benzol
so that v. sp. is
somewhere between
105.4 + 1062. A drop of
oil, allowed to fall
directly from v. finger
into v. vessel. If 1 drop
of oil sinks to v. bottom
v. sp. of mixture is
too low + oil must
be added. If 1 drop of
oil tends to float to
v. sp. v. sp. is too high
+ benzol must be
added. When v. drop of
oil remains suspended
in middle of v. fld,
v. fld. can be filtered

U 1128
+ to M. G. Tuberc.
At M. G. tuberc.
- plicated cases of T.B.C.
All forms except
T.B.C. meningitis.

It is observed in
measles, this case,
considered an impt.
point in & diag.
between measles &
scarlet fever as &
cancer is usually asso-
ciated with l.t.t.

Uncomplicated cases
Typhoid, & Influenza
Dengue is never
associated with l.t.t.
anything above 4000 should
be regarded as a l.t.t.

Bld. Plaques,
there are several round

Clinical Lab. JCS

the same as the
- the same as the

+ its N. G. taken,

+ N. G. will be that
of v bed.

Reaction of v Bed,

v reaction during life

is due to presence

of disodium phosphate

+ NaCO_3 . Under various

paths, conditions &

alkalinity conc. 2 or

3.

The Hb.

100 gms of bed

contains about 13.7

gms of Hb. this amt.

corresponds with 100%

on most Hb. scales

The Hb is 3. in all

v areas, whether

18. in the middle

will show a lit,
Hypo-lys. or leucopenia.
By this we mean
a $\downarrow$ in $\downarrow$ total no.
of w.b.c. It is observed
in uncomplicated
cases of typh. fever
but very impt. from
#^a diagnostic standpoint
Whenever an $\downarrow$ in $\downarrow$
no. of ltes. is observed
in a suspected
case of typh. fever
it is more than
probable that some
complication exists
or $\downarrow$ diag. is wrong.
Hypo-lys. is also
observed in uncon

MS. A. 9. 2. 7. 10. 11. 12.

Hydro-lysis. A. L. C. 10-10-10.
rice when a lot.

primary or secondary
Hb. in Hb. is usually
proportionate to
Hb. in no. of r.b.c.,
there are some
exceptions, as etc.
chlorosis when r.b.c.
are normal or nearly
normal in no., but
there is a marked
Hb. in Hb. In pernicious
anemia Hb. is
higher than no. of
red cells.

Color Index,

$\text{Color index} = \frac{\text{Hb.}}{\text{no. of r.b.c.}}$
normally color index is 1. In

is less than normal
admission is secondary

lts. does not mean
that r pat. is going to
get well.

r w.b.c. count in pa.
m. vary anywhere
between 20,000 - 60,000
- 80,000 per. cm.
you get a higher
lts. in pa. than in
any other dis.

In all accumulations
of pus a lts. is a rule
unless r abs. is well
walled off and there
is no absorption of
toxins. Nearly all
cases of pyoderma
vel. are associated
with purpura

Clinical Lat. JCS

in hemoglobin & color index
more than 100%

chlorosis & color index
is lower than normal,
but in pernicious
anemia & color index
is higher

Microscop. Exam. of R.B.C.
of R.B.C.

A microscop. exam. of
a per. spec. of blood
will show large no. of
faint greenish yellow
non-nucleated discs
like can can discs. there
are several erythrocytes.
Under h.c. condition
there is some variation
in size of R.B.C. the
average size being $7\frac{1}{2}$
to 8 microns in diameter

The name *Ac. neon*
was a misinterpretation
of some name

considerable value in
differentiating diag.
between carcinoma
of stomach and other
dis. of stomach.
a lts. is very com.
in both conditions
and is often a matter
of considerable import.
In *Ac. inf.* dis.
lts. is a rule,
In *lpa*, the presence
of absence of lts. is
an import. point in
diag. as nearly all
cases which do not show
a lts. end fatally
unless of a very mild
type. the presence of a

Clinical Lab. I. 305

Considerable value in
differentiating

the same we. seen
which are slightly larger
and some smaller.
Under some pathologic
conditions as in
anemia. Abnormal-
ly large & small cells
we. seen. & small cells
are spoken of as microcytes
and when they are present
in the blood condition
is called microcythemia
& large cells are called
macrocytes & when
they are present in the blood
- macrocythemia.
At times, cells we. seen
which are much larger
than the macrocytes, these

in cases of
these cases we must consider
the possibility of

or perhaps better hyper-
leukocytosis. A D.
is a hypoleukocytosis.
We may have a phyl.
leukocytosis with me-
net with under the
following circumstances.
In infancy, after
cold, teething, severe illness,
exercise & during
pregnancy. You may have
a leukocytosis after meals
& this is called digest-
ive leukocytosis.

Under some pathol.
conditions a digest
leukocytosis is absent.
And at one time
was thought to have

CHIEF L. I. JCS

ing of the most common -
voluntary contraction of the

One called megalocytes,
these cells are not nucleated
Variation in the form
of the R.B.C. or shape.
This is seen in some
of the anemias & usually
occurs in connection
with variation in size
this is called poikilocy-
tosis. It means variation
in size and shape of R.B.C.
The number of R.B.C.
to the no. of R.B.C.,
is from 5 - 5½ million
per cu. mm. for the
adult male. & 4,500,000
for adult female
8,500,000 if it is the highest
count that is not found but very rarely

2. Eosinophiles,
myelocytes. These
are similar to V
neutrophilic mye-
-locytes except that
V gran are eosin-
-ophilic and stain
a bright red with eosin
there are very seldom
seen except in mye-
-logenous leukemia.

Lecture Jan. 31st 08.
Nor. & no. of W.B.C.
varies between 6,000 &
2,000. & average no.
being about 7,000
Leukocytosis is a
dim & no. of W.B.C.

2. *Exanthematic*
2. *Exanthematic*
2. *Exanthematic*

In dried condition
there are ~~are~~ apparent
2. in 12 h.c. this con-
dition is called polyceph-
-min & is a rather
rare condition.

It is met with in
all conditions in which
a concentration of v.b.c.
is a whole occurs as
for ex. in prope O
severe vomiting and
sweating, and in
a rapid collection of
serous effusion in
body as in ascites
It is found in
some cases of sta-
vation especially

who started is
taken. It is the

they are found in
2. also in myeloid
leukemia

myelocytes.

1. Neutrophilic

they are not found
in bone marrow.

1 neutrophilic leucos
5 a lge. mononuclear
leucos. the prothrombin
of which contains lge.
neutrophilic gran.

they are present in
lge nos. in myelogen
leukemia. a
few of them are

found in blood.

in all cases plenko-
cytosis.

They are found in
the same manner

when elevated, is
taken. It is in & dis.
with failure of com-
-pensation or in fact
with any condition
that causes congestion
or ^{in the vessels}

of peripheral circ.
& It is in diabetes
there is a high r.b.c.
count.

V H. $\rightarrow$ V R.B.C.
When r r.b.c. are H.
= no. & condition
is oligocythemia. and
is more common than
poly-cythemia. a H.
occurs in all forms
of anemia. & lower
figures are usually

found in various
parts of the body

As carcinoma of
bone, & other places,
6. Myeloid leukemia
7.2 connection with
some nervous diseases
5. variety of cells
found in the blood
is 1. Erythrocytes
2. Leucocytes
3. of these in the blood
is $\frac{1}{2}$ - 1 %
these cells are round
or rounded and the
nucleus usually
stains a light blue.
The gran. are large and
coarse & stain
purple, blue, or almost
black.

CHIEF I 100

found in previous
inquiries & use, as
low as 200,000 per
C. M.

In & diag. of carcinoma
of stomach from
ac. & ch. gastritis
a more marked
manifestation of cancer
to prevalence.
or as a rule & r.h.s.
ac not to in ac,
gastritis and but
little in ch. gastritis,
unless long continued,
and even then it is
not as pronounced as in
cancer. In differe-
ntial diag: between
carcinoma of stomach.

2. Bronchiolitis
★ fibrous bronchitis
3. Various dis of
skin.
4. In post febrile
condition, ~~during~~
~~& course of~~
~~of acute dis.~~

During & course of
most infections
dis & eosinophils are
absent except
in scarlet fever, malaria,
and rheumatism

5. In connection with
prolonged fevers

any more
2. Perle's anemia

+ pernicious anemia
a count below 1,000,000,
is in favor of pernicious
anemia.

Color of R.B.C.

depends upon v. and

of th in v capsule
and in cases of anemia

v cells appear paler than

normal. If there is

a marked degree of

anemia many

r.b.c. will be seen

with. we almost color

less. many of them

appearing as rings.

1 malarial m.

seen r.b.c. with

perant a bronze

known appearance
of the following forms

highly refractive gran,
rich stain a bright
light
1. red with corin.

Eosinophilic.

An eosinophilic
and in eosinophiles
— red is always a
further condition the
at time, it is
impossible to find
cause. An eosinophilic
one, observed under the
following conditions.

1. In association
with other parasites,
all parasites will
cause it except
mucosa.

highly refractive gran
ules & large
nucleus

1) brassy appearance
2) Behavior towards
aniline dyes,
normally H^+ & H^+ will
only take up acid
dyes such as eosin
& others of this class
but in anemic
conditions this prop-
erty is partly lost
and they stain to
some extent with
basic stains as for
example in stain-
ing with eosin mostly
are blue w/ the blue
majority of cells
are stained red, but
some of them take a

There is a difference in the number of cells which make up the increase when the total no. of cells are 2 in reptile conditions.

There are the cells which make up the increase when the total no. of cells are 2 in reptile conditions.

4. Oxyphilic or eosinophilic leukocytes, there are present in blood in 2-4% of total no. of white cells. In size and general appearance they resemble the polymorphous neutrophilic leukocytes, but they differ from these in the absence of neutrophilic granules and presence instead of large oval or rounded

Chloride 1.46 I. 505

these cells
well marked up

the time this condition is due to some degenerative process in the capsule and is called, anemia or polychromatophilic degeneration. Polychromasia is the same. this is a degenerative change.

Brenner's Diabetic
bld. test:

Non-diabetic bld.
is readily stained
with Congo red. Eosin
etc. Diabetic bld.
does not stain well
with them.

The test
no. 5

twisted upon itself in
irreg. form. at other
times it presents
a broken appearance
conveying the appearance
that several nuclei
are present. The
nucleus stains readily
with a blue of Wright's
stain & appears dark
blue in well stained
spec. & gran. stain
^{very} slight pink or some
shade of blue.
Average 70 is about
72 for normal bld,
but 1 to me, as
low as 60 or as high
as 75 to

more or less. Some
times, however,

The test.

A no. of smears are
made on slides and
at the same time
smears are also made
with nondiabetic blood
as a control, the spec,
are fixed by heat
and then stained
about 2 min. with
some of the ^{acid} sol,
normal red reading
stains diabetic blood
does not stain.

Gram Stain of
r.b.c.

In various forms
of anemia r.b.c. may
be seen which contain

one of non-gran.
protoplasm. These
cells are st. called &
large hyaline cells,
which is probably a better
term than large lympho-
cytes, (are also called ^{etc} lymphocytes).

They are present in
normal blood in 1-2%.
They are 2 or 3 in
various pathol. conditions.
3. Neutrophilic poly-
nuclears.

These cells are much
smaller than large
lymphos and are
filled with fine neutro-
philic gran. & nucleus
is a long body with

strongly eosinophilic
not now found

basophilic granules
in variable no.,
these gran. are easily
stained with methylene
blue and in a spec.
of bld. stained with
Wright's stain they appear
~~blue~~ blue. They are
seen within r.b.c.
or they may free in
plasma.

Uncleated R.B.C.

Uncleated r.b.c are not
found in normal adult
bld. but are found in
many cases of anemia.
3 varieties have found
1st + normoblasts,
there are uncleated r.b.c

✓ nucleus is usually
round
~~trans~~ but at times
conc. invaginated.

Under normal conditions
they constitute from
20 - 25 % of total
no. of leukocytes.

but at birth & through
- out infancy and
childhood & to some
much higher.

2. Large mononuclear
- ear leukocytes. These
cells are from 2 - 3 times
as large as a r.b.c. and
have a large single
nucleus. Nucleus is oval
or elliptical in form,
& surrounded by a wide

going to try ~~more~~
smaller & younger

are about 1/2 size of
an ordinary r.b. corpuscle,
with Wright's stain
& nucleus stains blue,
protoplasm usually
stains red. These cells
are found in & out in
all forms of anemia.

2. Megablasts (nucleated)
are from 2 - 4 times
as large as r. b. c.

& nucleus as a
rule does not stain
as dark as those of the
normoblasts. Megablasts
are usually not found
in ordinary anemias
unless very severe. They
are found in pernicious

Leukocytes in marrow

1 following varieties of
W.B.C. maybe made out
on exam. of 1 bld,
1. Small mononuclear
leukocytes or small lymphos.
these cells are of 1
same size as a W.B.C. are
larger. 1 protoplasm is
usually
non-gran. but at times
1 basophilic or eosinophilic
gran. are seen.
1 nucleus stains a
dark blue with Wright's
stain, and 1 proto-
plasm a much lighter
blue. 1 nucleus is
comparatively large. 1
1 color of protoplasm
about 1 nucleus narrow.

one specimen shown. 5. 2. 1
1 blood & tissue

menia in varying
numbers.

3. Microblasts,

these are very small
unclotted r.b.c.

White Cells,

Leucocytes or white
corpuscles. as seen
in a fresh spec. of bld
are rounded or irreg-
-ular shaped cells and
usually larger than r.
b.c. They are unclotted
& some of them are
granular. Some of
these cells have amoeboid
movement. Some of them
have the power of taking up
foreign particles, = phagocytes.

