

1. Annual Meeting
2011 Jan 18th

2. Ralph Greenspan Course (important)

2011

2012



national centre for biological sciences
tata institute of fundamental research
GKVK, Bellary Road, Bangalore 560 065 India

Speed

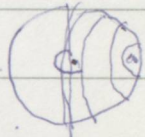
Velocity



Displacement in 1 min

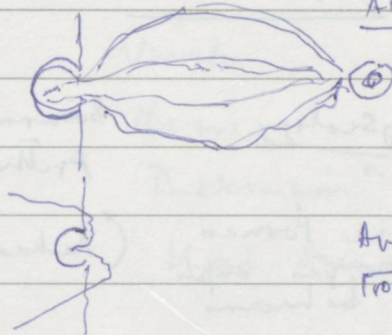


5 min



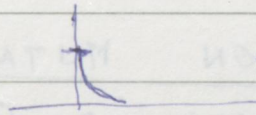
Measure Turning

Away

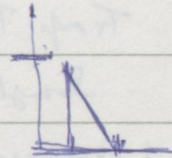


Attraction

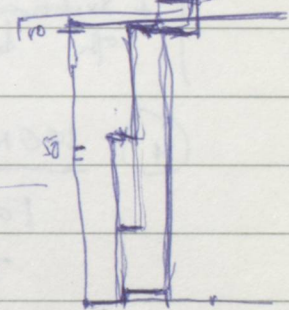
Threshold for
one shock



Threshold for two shocks



Aversion



Consolidation:

1. Projects for Students :-

a. Improve larval test :-

Minimize - Volage
Duration

| Make errors

| Exposure
Duration

with - | Shulpa
| Bhuvanendra

② Study fear response

- Get report from Sawathi
- Do experiment on Plalās

MYSELF

③ Physiology

Sawathi
Prithvi

Mixture
Response

Continue Poornan + Srkanyas expts of behaviour (Aakanksha) My self

④ ICON MUTANTS

Fatima Conditioning
Trap Test, Glass Tube
Single flies
Preference Test
Mixture Response

Applicants

1. Mahati
- 2.
- 3.

Ann Meeting

Vejay

Welcome :

Angana -

Bakerley

Brand

Banneya

Vivek

Hansi

Dikinson

Kai Simons

Karen

Sprich

What are the advisors
doing?

$$\frac{19170}{18500} \approx 130 = 120.0$$

$$\frac{14.7 \times 14}{12} = 17.15$$
$$- 3.50$$
$$\hline 13.6 \quad (11.3\%)$$

NEW RECRUITS TO N C B S

① Makeesh : Sankaran

Climate Change; Vegetation Dynamics

The big picture :

Distribution of
Ecosystems
Biomes

Savanna Structure

Savanna to Forest (Transition)

Global view of Evolution of { Climate
Vegetation

Vegetation + Climate → Global
Pontes Interest

Interesting

Subhel (Kims)

Present.

Hosts & Parasite

Prey & Predators

Future

How the world is going to change

State of Biodiversity

Red List

Conservation Efforts

[Conservation works]

Peoples efforts (Public participation)

(Phenology network)

INTERESTING

Bio mechanics

(Interesting)

Madhusudhan

(New member)

Design + Control

(in Humans)

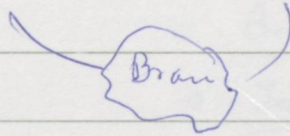
Hand Movement
Mechanics

Fingers

Control

Feed Back

Legs



Are there Gaps

in our understanding

Mechanics

Biomimetic

Bioinspired

Quantitative Issues

Mathematical
Modeling

Robotics

Ask
Lipschitz

Shoring a new
Area

Design + Control

Does it
to have relevance
disrupts -
clinical applications

Course on Drosophila Genetics

Ralph Greenman (1) Short History

Francis Galton: Contemporaneous with Mendel

Founder of quantitative genetics: Human intelligence
(1865)

W.E. Castle (1901) Harvard - Rodent coat colour

genetics. Trained most other geneticists -

Drosophila behavior - Carpenter. (1905) Photobaxis

o Berrows (Olfaction)

o Jacque Loeb German Physiologist
(Theory of Trophism) J. Exp
Zool, 1910)

< o Watson and Stenness View >

Dominated early 20th
century. (Parlovian)

o Franks Lutz (1911)

Courtship behaviour

Carried first to

Columbia - Morgan's lab

(T.H. Morgan: 1910)

Single genes &
Cytology.

Colbeck (Morgan's School)

Sturtevant, (1915-) - Mapping - Sexual
selection

Stanley He Eamen, Reactions to Light and
gravity - Phototaxis mutants.

George Wald :- Visual function of Drosophila
(1933) - went on to
work on Visual pigments

Brown & Hall. - Y. maze
Response to light

Jerry Hirsch (1956). Survival of Calypso -
Evolutionary approach.

Selection experiments

Maze born & Maze dull rats.

Invented the multiple Y maze

(Hirsch and Torgin)

Akharisbas worked well for
gestalt - (when vertical)

Dobzhansky & Shaskey at Columbia became interested in behavioral selection.

Werner Reichardt -

Ferri and Reichardt (1963)

Quantum mechanics as a motivating factor — Quantitative measurements of optomotor response
Dalbrück's - work -

Banger . (Drosophila)

Stent . (Leech)

Eg Levinthal

Karl Gibby (use of fly mutants)

Deckenson Wing beat monitor

Seymour Benzer (1965)

Contribution to gene theory (1953-55)

Mechanism of protein synthesis -

When at Purdue began to look at brass
with Max Lu Perrine (a lab technician)

Work in Sperry Lab.

Turn to Drosophila

(counter current apparatus)

○ Isolated the first induced mutants:
Visual mutant

Bill Pak at Purdue
on Visual mutants

Martin Hershenov (at Caltech)
with Delbruck.

Back in Turku - isolated
optomotor mutants.

Suzuki

T. S. Murakami

para 15
Shibata

Kaplan & Dagan

Shaker (1974)

Lead to the identification of R-channels.

Forward genetics

Null

Loss of function

Gain of function

Muller's ideas

Ron Konopka

→

clock mutants

Bewzers Group

Eccentrics

Ron

Chip

Doug

Jeff

Bill Harris

Don Reddy

Bill Hanson

Hatta

O.S.

Ann-Shyn Chrag

learned Drosophila at Cold Spring Harbor
Trained as an entomologist -

in order to control behavior - genes have
to express very specifically - Hence "connectome"
of an organism

3-D connection reconstruction - Two neurons
are "connected" - use EM in 3D to
label and reconstruct, Will take too
long.

What we need to know is connection
between cells - for understanding information
processing. (Cell is the elementary unit)

Techniques

- Dye impregnation - Golgi
- Diffusion labelling
- Genetically labelled tracers (GFP)
(HACHT)
- EM
- Random section (Malkinson)

Predicting synaptic contacts of 7 neurons -
Can be enlarged to include more

Compositional Principle.

How can it be "extended" and also
minimised?

Photoactivatable GFP

For mapping afferent events

DIGITAL NEUROANATOMY

FLY CIRCUIT.

⑤ Neurosciences Institute
San Diego

Greenspan (3) Sleep and Arousal

EEG (Brain Waves)

What is sleep?	Awake	REM	Deep sleep
Do they sleep? (V fish)			

Deep and REM

Kleitman's Work on Sleep (Find out)

Sleep Deprivation (Effects on rats)

→ They die on sleep deprivation -

(Apparatus for monitoring sleep)
Shaw et al. (2000) Science 287: 103.

○ This are similar to humans

Very Important

Cirelli et al (2005) J. Neurochem
Sleep regulated gene. Same as
in mice.

Brain recording
→ Physiology of sleep.

Nitz et al Current Biology (2002)
Local field potentials. lowered in
sleep.

Van Swinderen + Greenham
Current Biol. (2004) Current
Biology. 14: 81.

(Shaw et al (2000) Science 287: 183.
Sleep rebound.)

- Sleep regulation - "Neuromodulators"

Andrzejewski et al Current Biol (2005)

SLEEP RESEARCH
IN FLIES
(important)

READ

Greenshan

Ron Davis

"Dally" heptade monitored in sleep.

Leav et al (2005) *Neuron*, 48:221

Pitman et al (2006)

Mushroom body
and sleep.

② "Sleep enhances memory consolidation"

Greenham

Sleep is a primitive repair process.

July 1st

Paramaccium

Salmice assays -

Appetitive salience

Adm enhances
stripe response

Is Ralph willing to come
for a lab workshop?

Greenham

Is the pink fly conscious?

1) Consciousness is a first person - ^{phenomenon} (problem)

② William James (Harvard)

(Anti-Cartesian)

'Definition of consciousness -

comprising view of
the world
Imp-
/

- Are insects automatic?

Aristotle

Descartes

Rachlowski

< Husserl >

③ Read Edelman - Imp- →

Buy Edelman Book

Size of brain & Consciousness

Self awareness - (May require language)

(Local field potentials from this brain)
Image dependent response. } Get information

"uncoupling of the brain."

Field potential

Somesthetic Response

} Appetitive response
Somesthetic of smell

1. Attention

Coherence - (Phase locking)

2. Integration - is a "distributed" function
in the brain.

- "Multi-site electrodes" in fly brain

"for coherence increase"

"Synergistic activity"

{ Degree of integration in
a network }

"Biological network has the most
information carrying capacity."

- Coherence can be achieved in
multiple ways. (Variable way)

Resilience.

0 - Properties
 of olfactory
learning + memory
 tend to be species
specific
 (Evolutionary)
 history
 = niche (Life style)

Tend to be species
specific
 • Receptors
 • Signaling
 • System
 • Neurotransmitter
 • Synapses etc.
 (mechanisms)
 • Anatomical
 organization

0 Discernable properties
 are "paradigm", dependent on
 on how you observe +
 describe ~~the~~ behavior.

Behavioral
 Experiment →

structure

{
 Mid
 Cerebrum
 Anatomical
 Brain

Genetic

Determined

= "Innate"

Inborn

Acquired
 or
 Learned

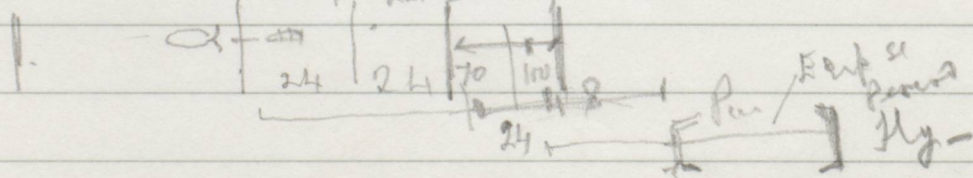
Not Acquired

- Phylogenetic

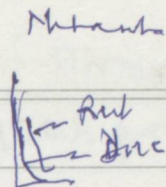
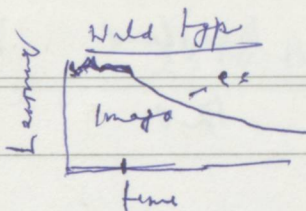
- memory

1-2 yr / 11 2yr 3

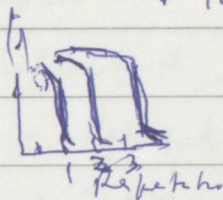
vs Genetic
 memory



1) Olfactory Learning



Quinn + Tully

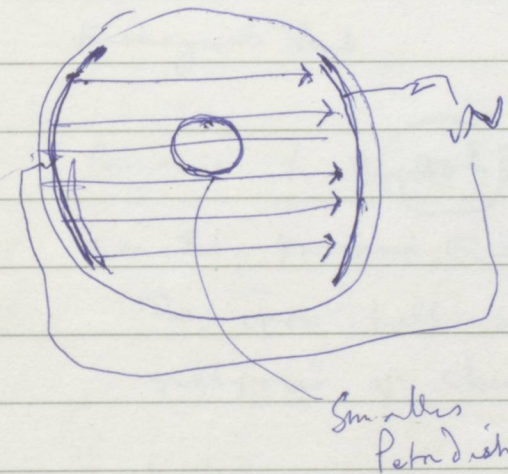
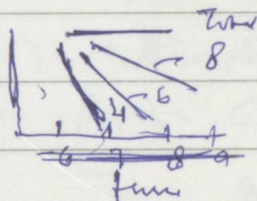


Amos?
Shibata?

Make Kinoshita Preuss

Minimiss V

Duration of Shock
Concentration of food



Smaller
Petri dish

(1/2 month)	Invested	Value	% gain
Aug 2011	120	130	8.3 / 14 months
			7.0 / annual
		Fee Paid	(4.1) / 2 yrs
			= 2% year

EQ Shar	130
HF - Debt Shar	101
HF EQ Shar	47
HF Debt Shar	5
Bank	15

298 N 300

150	N	10%	15
150	N	22%	33
			<u>48</u>

Traces of Indus
Valley @ Rupp on Sutlej

2500 BC

Indraprastha with the capital
of Pandavas - (The Mahabharat
was fought on/about - Paupat,
Bashpal, Lonchal and Tulpal (the
fourth being Indraprastha) - Indraprastha
was somewhere between Prave Qila and
Humayun's Tomb

Remains of Gupta period have been found
in the Prave Qila sites ✓ 4th Century AD -
The iron pillar at Qutub - records the
reign of Chandera Chandragupta II

In the medieval Rajput period there is
no definite trace of Delhi,
Suraj Kund - Some three miles from
Tughluqabad - contains one of the few
temples in India to Surya, Anang Pal

Slitem.	1000 x 7	70,000
Bank	5000 x 20	1,00,000
Yas	500 x 30	1.5 Lakhs

a Tomar Rajput was the founder of this city (AD 1020)

A few years later the city was moved to the Qutub site - It was known as Lal Kot.

About 1150 the Tomars were displaced by Chauhan Rajputs of Ajmer. The conqueror was Viharaja whose nephew was the famous Prithviraj. Delhi was now an outlying city of the Chauhan Kingdom.

Prithviraj died at Thanewas in 1191 fighting Mohammas of Ghor. This led to capture of Delhi and the beginning of the Delhi Sultanat. (Beginning of Muslim rule)

6,125 sq ft

Delhi Subhanali

- 1191 - 1398

Behavours

Larval Group

Amago

Physiology

Abn

Shelka

Bhunenah

Fakema

?

?

,

Saurav

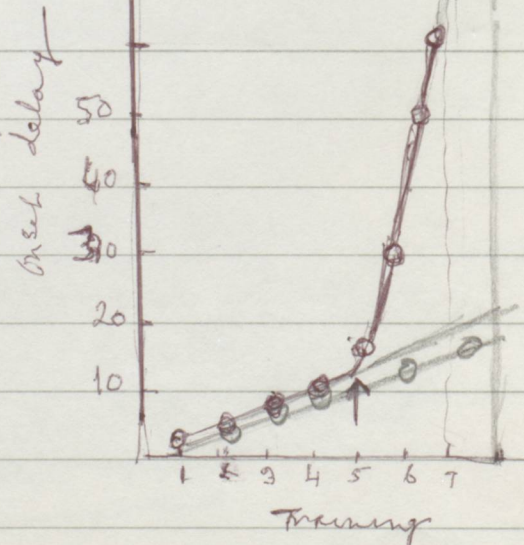
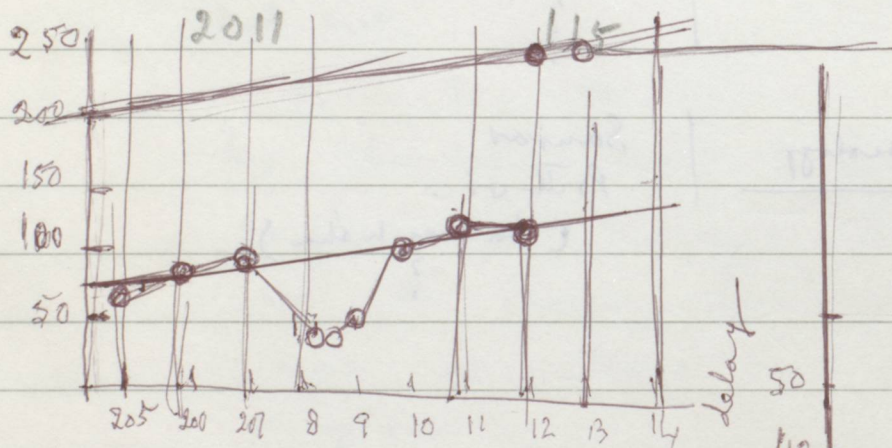
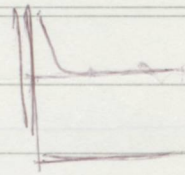
Prithvi

(Aakanksha)

?

,

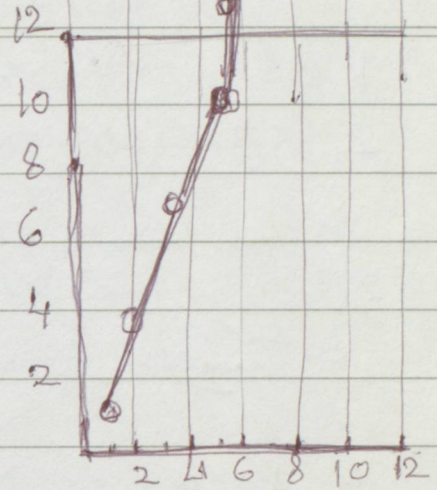
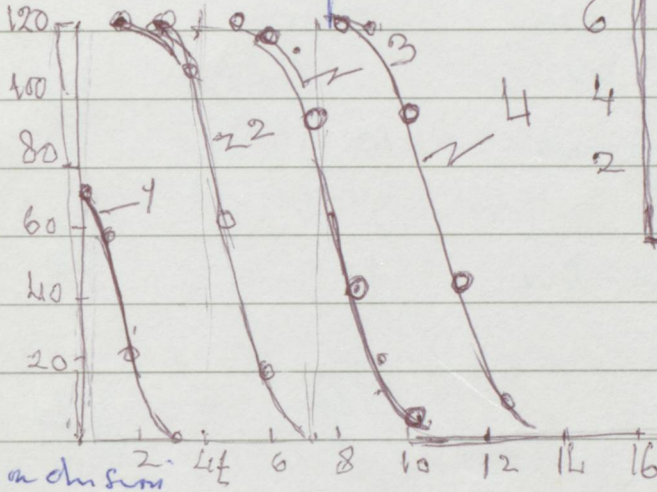
Year	STH	MITM	Value
	(25M)	20	4
		50	6
2005		110	68
2006			74
2007			87 - 105
2009	Feed No	(39)	Lakt - (102 Jakt to 48)
2009			48
2010			97



For my Talk

The Small Packet
+
The Big Packet

Adapt
Prepar

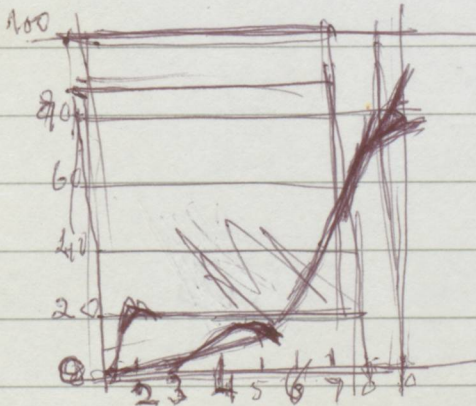


In the conclusion

Conclusion

Return to the big packet
for offaction

Single element
+
Mixtures



ARM.
ASM

1 BBI Frontline - F& 10 10

2 SBI (PSL Fund) 10 10

3 { Tem. India Growth Fund. Div 7 }
Templeton Growth 10 } 17

4 Kotak Gold. Div 10 10

5 Rel. Reg 4 ~~4~~

6 { WTI - Div Fund 10 }
WTI Div Fund 26 } 41 L.
WTI Opportunity 5 }

7 ICICI Dynamic 26 31

8 ICICI Discovery 5

128