

(494)

I got into <sup>a</sup> the side lanes  
and watched. There was a  
big chaos building - up in  
the <sup>huge</sup> shouting (otherwise orderly)  
crowd. I moved out of  
my watching place and a  
few others also running  
away. I later learnt that  
there was a lathi charge  
by <sup>the</sup> police; not only many  
people <sup>were injured,</sup> but also the socialist  
leader Sharad Joshi was  
hurt on his head. Whether  
the commotion later led  
to police firing, I don't recall.

(495)

I had read often in the  
news <sup>papers</sup> that on such occasions.

police ~~to~~ did not fire  
into the ~~to~~ crowd but in  
its periphery. So "innocent"  
bystanders who watches fun  
were injured / sometimes killed.

// That ~~to~~ <sup>was</sup> the reason why

I was always cautious of large  
crowds. Well that was (is) the  
process of "democracy", electoral  
politics or otherwise. Many people  
and smaller leaders get killed  
and also seriously injured. §

// I could understand about these

(496)

processes conceptually and in  
abstraction, but actual practice  
with my involvement ~~on~~ did  
not appeal to me; perhaps  
scared me (sort of an inner  
fear.) Also a crude empirical

fact was coming up before me  
often when I see such crowds.  
If one ~~is~~ was a leader  
she/he ~~is~~ was protected from  
any serious injury / death. If  
one was not a (big enough) leader  
then there was a grave risk.

Such a caution along  
with the fact of my <sup>recurring</sup> asthma

(497)

were ~~was~~ ~~the~~ great inhibiting factors  
for me from ~~of~~ even contemplating  
on getting into active politics. There  
was a short exception to it. I  
will cover it in the later part  
of the 1960's.

\* \*

~~A~~ 1962 was the year Papa  
also passed B. Sc. and she  
got married to V. Balakrishnan  
He was the younger brother  
of Sh Appuswamy who was a  
office colleague of my father.  
~~It is~~ I knew that family  
(though not Balakrishnan)  
during my stay at Kottaram

(498)

and later at Palayamkottai.

The family was that a rich landlord Sh Venkatachalam Iya, who had children through his first wife and later through the second wife whom he married after the demise of the first wife.

The first son of ~~it~~ through his first wife controlled the entire property but stayed at Palayamkottai. The first son through the second wife stayed in B Kottaram, technically supervising the work, yield etc. He lived like a "minor" enjoying

(499)

life of a typical princeling -  
landlord. The ~~&~~ overall -  
in-charge brother also would  
have quietly supported ~~it~~ such  
a life style as it helped  
in keeping all the property  
together - no rebellion from the  
frontline field!

In all these complex  
relationships, ~~and~~ Balakrishna's (VB)  
studies suffered. Appuswamy  
who was in railways like my  
father (I think they were  
same age) was in Bombay  
and brought his <sup>younger</sup> brother VB to

(500)

get him employed. VB had told me many times about his loss of opportunities for higher studies. & He joined evening

classes and completed his B.A. in economics from Bombay Univ.

\* He was admirer of my studies. I think it was he

who proposed to marry Papa to my father. She has He had seen her many times at

Coregon as he and his bachelors friends stayed for

some time in Coregon. He was

also expecting some additional

(501)

from the property settlement  
for which Appuswami was  
fighting on behalf of all  
his brothers with the oldest  
son of Venkatchalam Iya.

They ~~find~~ all finally arrived  
at a solution after a long fight  
perhaps even through court case.

I think Papa was also  
happy with the marriage. It is  
a person whom she had seen  
many times before but not talked.  
Also it would give her a relief  
relief from the suffocation of  
the Coorgam household.

(502)

She had completed 21 years.

The marriage was conducted in a good way. ~~the old~~ I don't

recall the ritualistic parts. But

I took active part in serving food — breakfast and ~~lunch~~ lunch to the guests. Cook and assistants were limited in number and we had to ~~do so~~ be the volunteer force. Fortunately during that period, I had no asthmatic attack. (Whether I

had taken a short dose of cortisone, as I was doing for the examinations, I don't remember)

The serving was in the

(503)

~~the~~ traditional mode, with persons sitting on the terrace ~~floor~~ floor (of the chawl) and being served in ~~flat~~ plantain leaves. I

don't think I even ate anything at all - may be a breakfast of idli & dosa <sup>with</sup> chutney.

~~I think after everybody's serving~~ The added problem was the cooking was done in the ground floor and we had to take the food vessels (normally a smaller bucket filled with rice, sambar etc) ~~upside~~ upstairs ~~to~~ two floors and then the terrace through the

(504)

stair case.

When all were served including the women, ~~I~~ I think I was exhausted. I went to our horse and to the partitioned hall. I pushed my head under a cupboard to cut out life and slept with some bed sheet covering me. Women after eating ~~had~~ ~~come~~ had come there to use it as a change room, casting away their ~~silk~~ <sup>traditional</sup> ~~pa~~ silk sari (patta pudavai) which was heavy to change over

(505)

to higher sarrees. Each of them <sup>very</sup> tired themselves, & just piled up ~~saree~~ one sarree over another (they would port out later after their rest) haphazardly and thus I was cornered under a huge pile of sarree. Unseen and undisturbed, I had slept for long. Well into the evening after sunset, people started searching for "Ambi" (that is me) all over. Then I heard the sounds and ~~was~~ woke up. I was just 18 years old; but a small body, but ~~but~~ had reached the current bus height.

(506)

Cut out of the huge pile and came out to hog some food. I don't remember any other thing of the marriage. Later when Papa & VB came to celebrate the first Deepavali (Thalai Deepavali), there was again a feeling of ceremony in the otherwise drab / tense house. Papa actively participated in Deepavali light lamp lighting, cracker bursting etc.

~~The~~ In all her excitement her <sup>silk</sup> sari came into one of the lamp; I fortunately noticed it. My general vigil

P.F.O (507)

(507)

|     |     |                         |                       |                   |                                    |
|-----|-----|-------------------------|-----------------------|-------------------|------------------------------------|
| 198 | 341 | Design Director Pvt Ltd | ENEA Two seater bench | Industrial Design | Architectural & Interior Products: |
| 238 | 340 | Design Dimensions       | FACES OF INDIA        | Industrial Design | Home Products                      |

against safety problems ~~can~~ was due to the training of Periappa.

Fortunately the fire was put out; only ~~with~~ a small hole in the Doree was the damage. Then the celebration went on smoothly. I was doing my M Sc during her marriage and 'thalai' Deepavali.

\* \* \*

One major career turning event took place, when I joined M.Sc. On that year (1962 academic) the Bombay University had introduced a course M.Sc. (Biophysics) This was not the usual stream. Probably it was taught at the

(508)

Cancer Research Institute. May be  
it was all of general physics  
plus a special ~~course~~ subject of  
Biophysics. I did not know  
the details. When I heard of  
it I was happy. A couple  
of years before 1962, I had  
read an article or editorial  
in a newspaper. It ~~said~~  
quoted Robert Oppenheimer,  
a great physicist of the Manhattan  
Project, ~~who was later witch-~~  
~~hunted~~ ~~to~~ saying that the  
~~an~~ era of physics was over and

~~30~~ (509)

future was with biology.  
The pangs of pain which  
I felt when I had to  
sacrifice the study of biology  
at inter-science stage, due to  
the (stupid) rule of the University  
then (now ~~the~~ I am glad  
that they allow PCMB - physics,  
~~maths~~, chemistry, maths,  
biology <sup>upto</sup> ~~at~~ 10+2 stages, though  
they still do not allow free  
intermingling of them), but  
one hard when I read it.

▲ Within two years

(5/10)

I had now an opportunity to have a course where Biology & Physics are combined. Those were the days when DNA has not been discovered. Only idea was that physics can explore the molecular aspects of living beings with x-ray and neutron spectroscopy and a little bit more. Physics was encroaching into (or invading?) into areas of biology!

(511)

It ~~sh~~ should have  
been a great opportunity  
for me: because I would  
have been in the "ground floor"  
of a newly emerging science.

(a metaphor ~~used~~ used by the Americans  
as I learnt much later!)

Maybe I was not adventurous  
enough. I think it was  
not the fear of not getting  
a job immediately, from  
my view point of early economic  
independence from my father

(512)

"Most likely it was my  
"performance arrogance" of being  
consistently first class all  
throughout, and also getting

B. Sc. (Hons) first class

without depending on <sup>an</sup>  
~~any~~ subsidiary subject.

In those days for getting  
admission into M. Sc., the  
candidate should have a  
minimum of 55% in B. Sc.  
either general or honours.

(513)

It was a strong filtration.  
So the "best" only can  
~~pursue~~ pursue M.Sc.  
then go on to Ph.D. later.  
~~It was the~~ This barrier  
was thus a guillotine!

But for M.Sc. (Biophysics)  
since none of the 55%+ were  
opting for it, the University  
had relaxed the limit to 45% ~~±~~  
So a simulation had been  
going ~~on~~ on in my ~~low~~ brain

(514)

(arrogant with high level achievement) that I ~~was~~ would be the only one in class with first class and all others near 45%.

(bottom of the second class;) 55% was to be informally referred to as higher second class). So my mind was working in a funny way: the class would be full of those with 45%, 50% marks. I probably would be the

(515)

only one ~~about~~ above 60%. Others  
would be thinking that I was  
also one of those under-scorers.  
Was it arrogance? or pride?  
I did not consult any body;  
none at home who ~~was~~ were  
knowledgeable. The ~~college~~ college  
faculty did not address such  
issues for the students. Nor did  
I have any friends who had  
~~the know~~ could have advised.

Strangely I do not remember  
any one attached to D.G. Raparel  
College for experiments (I think  
there were a couple of us) nor  
do I recall any friends from the

(516)

10 to 20 students of the M. Sc. class for the whole of University who ~~would~~ would all come for attending the common lectures given at various colleges. May be I had become very reclusive from my student-colleagues because of my fear of spending in restaurants, for which I did not have the pocket-money.

I felt looking back, these were the initial years of bio technology, ~~when~~ with physics aiding the process of penetrating into "life systems" made up of <sup>complex</sup> molecules.

~~518~~(517)

Had I taken the course of Biophysics, I would have ended up as a researcher, may be abroad or in India, mostly in basic research.

May be I was destined to work in another (then) emerging area of Space Technology: technology development and applications (not basic research). May be it was to suit my inner ~~social, pol~~ societal and political ~~the~~ ideas to be relevant to people at large, especially the bulk of Indians who were poor. These ideas had entered into

(518)

my mind ~~primarily~~ due to my  
exposure to Subramaniya Bharati,  
Swami Vivekananda, etc.

strengthened by ~~reading of~~ Marxism  
Criticisms and <sup>later</sup> Jawaharlal Nehru.

~~For~~ Exposure to Marxism was  
low during my college days.

So ~~of~~ ~~time~~ doing practical  
things was my desire.

But this decision not  
to pursue Bio physics, was not  
due to any ~~of~~ those weighty  
considerations!! Even so, it was  
a great ~~But~~ turning point in  
my life, just as moving into  
Bombay (as I have described ~~earlier~~)  
of one analyses, with hind sight

(519)

Nahmale, both were ~~stupid~~  
~~deliberate~~ ~~of~~ stupid's decisions  
to come to change medium of  
instruction etc at the final  
year matriculation and another  
one leaving out an opportunity  
for ~~me~~ fulfilling my desire  
to do Biology, Physics, Maths etc  
together.)

\* During this period  
after I ~~also~~ had a few  
informal meetings with <sup>the</sup> ~~my~~ brother in law)  
friends of V. Bal Krishna / at  
Chembur, who were young  
scientists ~~in~~ in Bhabha Atomic  
Energy (now called Bhabha

(520)

Atomic Research Centre - BARC).

I had appeared for an interview at Atomic Energy Training School. B.Sc persons can also apply.

I am not clear what exactly happened, whether I was rejected or in waiting list. But these

young scientists told me not to join Atomic Energy as I ~~would~~ would end up Junior

Sleeping Officer (SSO) or Senior Sleeping Officer (SSO) — no work ~~to~~ because of too much recruitment.

Also as a B.Sc entrant

I would be discriminated against. ~~Later~~ This led to me

(521)

to totally eliminate the  
idea of joining Atomic Energy  
even after completing M. Sc.  
based on my knowledge of BARC & IISRO.  
In the hindsight, it was  
a great advice those young  
scientists gave me. I should  
thank them!

The same later when I  
had just completed M. Sc., and  
waiting for results and opening  
for Ph.D or jobs, ~~at~~ advised me  
to apply for PRL (~~the~~ Physical Research  
Laboratory) which was a small  
advertisement (1964). They said  
"Young man, we don't know  
what laboratory it is and what it

(522)  
works on. But ~~we~~ we see one  
very refreshingly new thing. When  
Govt of India scholarship is just  
Rs. 250 p.m. for Ph.D. flat for  
3 years, this lab has offered  
Rs. 300/-<sup>p.m.</sup> for first year; Rs. 325/<sup>p.m.</sup> for  
second year and Rs. 350 p.m. for the  
third year. There is some body  
who is able to think pragmatically  
to ~~enthruse~~ <sup>care for</sup> young persons. Apply  
if you get, go! Later, I

got selected, joined and saw  
Dr. Vikram Sarabhai. He was  
unique, and magnet for people  
who want to work!

The turning points  
come in such funny and  
murky ways! Nothing is known

(523)

at that ~~that~~ time that it is  
a turning point!! It ~~is~~  
can be looked at a distant  
time, as an abstraction.

There was nothing spectacular  
about the M. Sc. ~~ex~~ classes. The  
experiments were tougher and  
interesting. The experiments and  
the results were bound as a  
report and ~~was~~ were an  
important part of the evaluation.  
\* \*

By this time Jayashree  
had entered the college, for  
F.Y. Sc ~~into~~ in D.G. Ruparel  
college. Not much of interaction

(524)

for studies etc. She was busy  
and I was busy and the  
family situation was no better.

Even Ambulu had moved  
over to Bhoj Mahal as Atimber  
desires some help. She also  
thought of being some help  
to her father, having completed  
all her studies and had become  
a full fledged teacher in Hindi.  
Some times Marii mama  
would come as he had been  
employed.

One great event was the  
~~child's~~ birth of a child (Raju) to  
Papa. She had come to Goregaon  
towards the end. I used to go to

(525)

Chembur, often by ~~the~~ train  
see her & Balkrishna and  
come. Sometimes I was asked  
to stay back. After <sup>(pregnant)</sup> Papa  
came to Goregaon, I was  
avoiding going out anywhere  
(1963) as I wanted to be  
of help during the time of  
delivery. ~~Balt~~ Dr was  
quite some time, I did not  
go to Chembur; Balakrishna  
persuaded Papa to send me over  
for a night. I was reluctant.  
I went to Chembur; stayed  
there and rushed in the  
morning. I was walking

(526)

through the ~~road~~ road adjacent  
to the slum in which Thairayal nayagi's  
~~our~~ (our house hold helper) family  
(as it was a short cut to our house in Gungass)  
lives. Her mother-in-law came  
rushing to me ~~to~~ and held me.  
She congratulated in Tamil: "Raja  
you have ~~now~~ become a Mama"  
I thanked. She also told that  
Papa was in the hospital  
with the baby. I rushed and  
saw. But I was deeply  
disappointed that I was  
not there at the time of the  
child's (Raju named later) birth.  
It was a natural delivery  
and all was well.

(527)

As if a repeat of this history, I had to go out to Boston, USA for ISRO MIT studies on INSAT when our son Vijay was to be born. Only a few weeks left but I had to leave. That is addressed <sup>in a</sup> later chapter. I could be there with Anna (my wife) only for the delivery of our second son Vikram.

But ~~not~~ notwithstanding this disappointment, I was very adept in handling that infant to help Papa. Though

(528)

Other veteran like Periamma was there. I could help in changing clothes for the ~~the~~ infant, cleaning etc. I was very proud about it, as ~~mostly~~ most of the males in those days ~~were~~ were not at all reliat good in handling such infants and I could be trusted upon, as being perfect. I had handled <sup>a</sup> few other infants when I ~~to~~ visited their houses.

One other major event which disturbed ~~the~~ me at that time, was the

(529)

decision by one father to  
marry of Jayashree even  
before she completed her  
degree course. He had  
fixed it with Anpalan  
who was the brother of ~~in~~ of  
a ~~family~~ ~~the~~ the lady  
~~in the~~ ~~fan~~ in the

same Goregaon housing  
compound. (Called Ragh Bahug)  
They were ~~to the~~

in one of the apartments  
in the chawl.

Some how I did not  
approach the problem cynically

(530)

or rationally from <sup>1 personal</sup> my point  
of view: "Well, if her marriage  
is completed, then it is no  
longer my responsibility as  
her elder brother!"

I had nothing against  
Cuspalan (we used to call as  
Cuspalan Mama — much later  
I started calling him Cuspal)  
He was a very fine person; very  
hard working. Though my  
relations with other members  
of his family was not good  
(because of my father's  
behaviour and his using them,  
especially the children of my age

(531)

by taking them to ~~cinema~~ <sup>Cinema</sup> and giving them special gifts  
etc.) with Gopal ~~there~~ my  
relations were good. I also  
learnt from him about the  
workings of the Siemens factory  
(also an avenue for me  
to get employed and pursue  
AMIE - ~~is~~ equivalent to  
an engineering degree - in  
case my college studies get  
aborted!) We also used to  
admire Gopal's multifaceted  
personality: simple man,  
~~is~~ mostly ~~is~~ smiling, did  
hard physical exercises  
and had a good body,  
~~and~~ strong; also good

(532)

most of the repairs of household electric items, ~~fan~~ ~~the~~ table fans, ceiling fans, tube lights etc. He ~~not~~ would easily climb <sup>on a stool,</sup> up ~~and~~ finish the job without ~~the~~ practically with no help from others.

The sons of Mali, including Pandu had a good ~~not~~ respect for him.

My first problem was <sup>about</sup> Jayashree's studies. She was <sup>probably</sup> the brightest of all three of us in studies. I had the desire that unlike Papa who lost ~~interest~~ interest in her studies

(533)

Jayashree should do her best going for the highest degree. I was sad that she could not pursue her <sup>carnatic</sup> music ~~beca~~ because of the constraints of Goregaon (a good teacher who was engaged also left far abroad). Had she been in Matunga Bhoj Mahal she could have pursued it very well. Also the SIES school, D. G. Ruparel college or any other college were near. This was not possible due to my father's antipathy towards Atimber. Atimber and Ambur

(B 34)

could have taken care of her.  
My father's desires (or designs)  
were different. ~~He wanted~~ Having  
blunked Periappa & Peramma,  
and Attai (very much earlier)  
he wanted the three of  
us to be away from Ambulu  
and Attimber.

Well music gone,  
should she not at  
least complete her degree  
and may be post graduation.

~~And~~ Another concern  
was that though Gopal was  
an excellent person, ~~and~~ he had  
to be tied up with his sister's

(535) with young children,  
family, which was large/ ~~and~~  
~~was in need of~~ and an old  
mother of Gopalan, ~~de~~ (step-mother  
of his ~~elder~~ sister). I Raghavan,  
the brother-in-law of Gopalan  
worked hard but had limited  
capability and his earnings  
were ~~not~~ inadequate for the  
growing family. So I was  
worried about the troubles which  
Jayashree had to face; she  
was just nineteen.

Thus as an elder  
~~brother~~ brother (with no capacity!)  
felt bad for Jayashree.  
Jayashree apparently was  
happy or might have perhaps

(536)

rationality assesses her situation. Who ~~would~~ would help her, if she said, "let me marry a little later!"

My father was unapproachable to her. He was equally

rough with her. (Recently 2011 or so she had told me how ~~difficult~~ humiliating she felt in college just wearing only two saris to attend!) So the marriage took

place when I had to be preparing for my M.Sc. examination. I was not

participating in the preparations nor my services were specially required. I used to sit in one corner and kept on reading my books for exams. By that time of my life Ambi-with-books

(537)

had already become a pattern even at normal times. Even when I went to Chamber etc I was with a book!

Though Jayashree might have gone through difficult times, my apprehensions ~~was~~ proved to be incorrect.

Later she had a commanding position in Gopal's household and got two good children (Vidya and Sreedhar).

She had much more of balanced life than what Papa had! Well,

(538)

vicissitudes of life ~~are~~  
are difficult to be forecast.

All the rational arguments  
I had, looked real then

but turned out to be

terribly wrong over ~~the~~

time! But can I preach

it as a guide for young  
people? Can I say, "don't

worry about anything; don't

~~not~~ get worked up; let things

happen; watch ... " ?

Will Life sort out differently  
in every case? Will we always

be proven wrong? Therefore

we should not care to do

(539)

anything at all? Be a dumb  
and deaf creature? I think,  
I argued for some time with  
Periappa and Peramma ( Abtai  
was no more! ) and later  
kept quiet!

Studies went well. Fast  
forward, I had to come to my  
final exams. Four general papers  
and two in special subject (electronics)  
Then two practical tests, after papers  
were over. Practical tests were staggered  
over a period. ~~They were done~~

Experiments were set up so  
meticulously so that the students  
~~cannot~~ could not tell anything

(540)

useful to others who come in  
later batch. Experiments were  
changed. The fluids whose  
measurements were to be  
done were changed. ~~§~~ Frequencies  
of oscillators were changed!

My turn came almost  
towards the end may be the  
4 (Yagnaswami!). On that  
<sup>(first experiment)</sup>  
day <sup>h</sup> morning, we had started  
the set up (total ~~to~~ <sup>was</sup> about  
three hours given to us) and  
started working. After some time  
unusual things were happening.  
The examiners (in vigilators)  
were ~~in~~ talking to each other

(541)

Very often in hushed tone,  
looked disturbed. But they  
did not disturb us.

When we all finished  
they asked ~~us~~ us not to  
go away and wait for  
some time. We were told  
that the first Prime Minister  
of India was no more  
(27 May 1964) and therefore  
the practicals experiments  
schedules for the next day  
~~was~~ ~~to~~ was off and  
they would announce dates  
later! Jawaharlal  
Nehru was very much a

(542)

favourite for me. I felt  
bad; but there was a  
rumour for several weeks  
(even months) that he  
was paralysed after ~~a stroke~~  
a stroke and they were  
just continuing with him.  
Hence it was not a shock.

Later we got a  
date and I finished my  
experiment.

~~Results~~ Results

were to come only in June 1964.  
We were to apply ~~to~~ for  
jobs, higher degree courses  
etc.

(543)

I got a good first class  
in M.Sc. Almost my very first  
application was ~~to the~~ to the  
Physical Research Laboratory (PRL),  
Ahmedabad. It was a very small  
advertisement; PRL could not afford  
to do more. I did not ~~see~~  
anything about it. It ~~is~~  
mentioned about the opportunities to  
do Ph.D in space research and the  
3 year ~~and~~ ~~scholarships~~ ~~scholarships~~ Rs. 300 p.m.  
in the first, Rs. 325 p.m. in the second  
and Rs. 350 p.m. in the third year. That  
is what attracted the young officer  
Scientific officers of the Atomic  
Energy and advised me to join. They  
also did not know what it was!  
So I applied, Rs. 300 p.m.

(544)

was good enough. I ~~can~~ <sup>could</sup> take  
Periappa & Periamma out of  
Bombay for them to stay with  
me, away from the troublesome  
Goregam stay. Some how  
I always felt confident that  
I ~~would~~ <sup>would</sup> do well in Ph.D or  
such academic ventures. I  
knew that if I did Ph.D.  
my job prospects ~~is~~ would  
be better. Any way even  
with an M.Sc. I could be a  
lecturer in some university and  
take care of P & P.  
I got a call almost  
immediately. I had to spend

(545)

for my ~~I~~ second class tickets (those ~~where~~ were days when third class was also there. Therefore second class ticket had some better status!) I used my fellowship money to buy a ticket from ~~at~~ Bombay - Ahmedabad - Bombay. The PRL was supposed to reimburse. I think my travel was by Gujarat Mail - starting night at Bombay & reaching Ahmedabad in the morning.

I had eaten <sup>dinner</sup> ~~lunch~~ come and therefore, it was only sleep and get to Ahmedabad. I had to be careful with my

(546)

expenditure! ~~There~~ There  
was ~~a~~ one Sikh gentleman  
in my compartment. We had  
some conversation. He said he  
was a businessman. ~~He then~~  
I told him what for I ~~was~~  
coming to Ahmedabad & I  
did not know how far away  
was PRL from the station. No  
guidance details were given  
in PRL letter of calling for  
interview.

The Sikh gentleman would  
have sized me up. Very ordinary  
clothes; almost innocent of the real  
world, though have been with the  
world of books, and external observations;

(547)

travelling first time outside ~~Rom~~  
alone; new to Ahmedabad.

When ~~we~~ ~~we~~ we were  
to get down he asked me when  
the interview was scheduled and  
also whether ~~to~~ I was staying  
in some place. ~~At~~ Answer to  
both was ~~no~~ "No!". ~~At~~ Then come  
with me and take a breakfast  
and then go to PRL; I will  
tell you the directions; you  
have plenty of time." I did  
not have any ~~set~~ feeling of  
a stranger; whether to go not. Moreover  
crime reporting as it is now, in  
every newspaper was very low.  
(I say this ~~to~~ now because  
those days were not without crimes

(548)

I myself got into trouble by  
trusting a stranger amount 1966 & and  
that is later!

~~He took me~~

He ~~is~~ went by a  
taxi or auto to Relief Road  
and a hotel there. To me it  
look very posh. Even by ~~those~~  
the standard of those days  
it would be middle only. For me  
all these ~~are~~ were new. ~~There~~

We went to the restaurant  
part. He told me to order  
my ~~food~~ breakfast. He ordered  
his. For me seeing such menu  
cards and to order was new.  
Also there was a fear about the

(549)

cost. Prices looked very high! Beyond my pocket; what if that gentleman ~~told~~ told that I should pay my part! So I ordered a very meagre food though I was hungry; I remember a boiled tomato.

He finished his food and I finished mine. He asked me whether that was enough.

I lies and ~~said~~ also did not take any coffee or tea. I had ~~developed~~ learnt certain storic methods of eating especially since I read Swami Sivananda's books on self-control. I don't know whether they helped. But

(550)

I could survive some difficult times. When the server came for billing, he told to bill both of us together and he paid.

My ~~hunger~~ partial-hunger pang came, "What the hell you did! You could have eaten some good food here!" ~~where~~

Well there ~~is~~ was a prestige issue and I could not ask him again!

Then he guided me as to how to go to PRL, Navrangpura by bus. Bus stand was not ~~far~~ far away.

So I land there in PRL. Many other students had

(551)

also come. I think it was  
some hundred or more.

That did not give me any  
fear complex. ~~But~~ Certain

administrative formalities

were completed. And we were  
all given a question paper and  
were to write the answers. I

don't remember ~~any~~ any thing  
about ~~the~~ <sup>the</sup> contents. But it

was a fairly long test lasting  
about ~~1~~ 1½ to 2 hours. We

were then asked to go for lunch.

There was specific  
declaration of results. I noticed  
that persons were called one

(552)

by one, some ~~then~~ papers  
were exchanged, they were paid  
and they went away. In  
the end some twenty were  
left. We were wondering why  
we are not called! We were  
~~then~~ told that we ~~will~~ would  
have to face an interview. I

My turn also came and  
I was confident. I don't remember  
the questions nor the persons  
who interviewed. Not sure whether  
Dr. Vikram Sarabhai was there.

It would not made any difference  
to me, as I did not know  
who he was and his initiatives.

I don't think many persons

(553)

in India knew him ~~dep~~  
~~at~~ despite the fact that  
(not Indian made)  
India's first rocket was  
launched during November 1963.

⊕ As we were ~~coming~~ returning  
from the interview room one -  
by-one, again I found  
some persons were paid money  
~~to~~ (ticket reimbursement)  
and they went away. I had  
finished my interview but nothing  
was known. I had to catch  
the night train back to Bombay.

About seven of us were  
left. Then one stern looking  
but handsome and lean old person

(554)

with Kurban came. He made us all sit together and ~~asked~~ read our names and asked some <sup>casual</sup> questions. To me he said

"Yagnaswami Sundarasajan, you should be a South Indian Brahmin; how come, you keep a moustache!"

I sported a thin moustache and hair cropped closely. Though

I did not like persons differentiating me in terms of caste, some how I gave a quick answer, "Sir, I

come from Bombay." It can mean several things. He responded,

"Oh! Desa - Sampradaya!"

That is Maharashtrian Brahmins always had a flourishing moustache!

(555)

After these formalities were over, he said: "You have all been selected. We will reimburse only one-way ticket for you. You come and join, then the other part will be reimbursed!"

No body said any thing, being happy that they ~~of~~ got the

scholarship and admission to  
<sup>I learnt the reason later:</sup>

PhD. ~~#~~ L PRL in those days was very short of money. The recruitment of PhD scholars till our batch were taken by word of mouth. For the first time our batch was

(556)

Through an open advertisement  
and a selection process. They had  
~~spent~~ incurred considerable  
expenditure in that. They did  
not want the selected ones  
to take the ~~the~~ train fare  
~~and~~ and disappear. I think

all of ~~them~~ the selected ones  
(That was the first interview after M.Sc and the first job)  
joined including me. Thus  
my career path was decided  
in July 1964 when I joined.

I learnt that the  
urban gentleman was  
Sreenivasiah Administrative  
Officer of PRL, all-in-all  
for PRL administration. He joined

(557)

PRL, after retiring from India  
Meteorological Department (IMD)

joining ~~the~~ <sup>his</sup> leader Prof K.R.

Ramanathan who was

an eminent scientist from IMD

and was ~~the~~ <sup>the</sup> de-facto

Director PRL, whenever Dr. Sarabhai

was away.

\* \* and other living aspects.

First about the hostel ~~at~~ PRL  
~~that~~ did not have its own

hostel. The administration had

worked out some arrangements

with the Gujarat University. Some

portion was allotted permanently

for PRL students. They were almost

(538)

to have their own ~~colleges~~ Cooking facilities. I don't know whether the expenses for the Maharaj (Cook) and the serving boys and other food materials were subsidised or not. But the ~~senior~~ students (who were senior to our batch) ~~are~~ — all of them stayed there. For faculty there were separate quarters built by PRL. We ~~are~~ used to go there only rarely.

The ~~PRL~~ hostel rooms allotted by Gujarat University for the students (in student's hostel complex) were full when we were admitted. So it was

(539)

a big problem for PRL-admini-  
stration to accommodate us. Guj GU

could allot only a remote  
newly built but not yet  
fully fitted hostel rooms  
for us. ~~So~~ Two students

~~we~~ were to occupy one room.

Minimal furniture of one  
cot each and a minimal  
~~bed~~ bed each and a fan.

Indian type toilets ~~we~~ but  
~~that~~ and closed bath rooms

but water was plenty. We

were ~~six~~ six and we were  
given room in pairs. My room

(560)

partner was one Kumbhar  
(from Karnataka). He used to  
be tense most of the time.  
Was not talking to any one.  
He had a sacred thread  
in which a fairly big size  
metal box was tied. ~~Later I~~  
~~learned~~ He used to sleep with that  
big piece on. I tried to be  
friendly with him; no avail.  
Some others used to tease him.

Our hostels were having  
only six of us as it was  
not fully finished with all  
corridor lights etc. Access  
roads (walking paths) were

(561)

absent. The PRL-GU hostels had the ~~east~~ eating place as a part of their staying place - as if going to the dining area in a big house. But for us, we had to walk through the some rubble and rough soil for a few hundred feet to reach ~~that~~ a huge canteen which served large number of students of GU. Mostly they talked only Gujarati. It accommodated about 200-300 students, very noisy. Had lots of space ~~we used to go~~ We had to

(562)

go there to eat. We did not  
all go together in a batch. Often  
I had to go alone, Kumbhar  
being what he was. The food  
served was totally Gujarati  
food; often we were ~~the~~ served  
bajra roti which I had ~~never~~  
not eaten before. Rice was  
~~little~~ available little; not  
all day. Food was hot  
and fresh served by very  
young boys, who did not  
even talk Hindi. Some options  
like fries or wasters papad were  
there "Thadelo? Sakelo?" ~~At~~ <sup>1</sup> ~~want~~

(63)

I did not know <sup>what they meant!</sup> I would  
say one of it and in the process  
I learnt. Same with the options  
of 'mirchi' (chilli). I started  
licking the food, even the same  
subjis with sugar or jaggery.

The amount of oil in the subji  
was amazing. The other boys  
~~was~~ used to drink them! I avoided

it, eating only limited amount  
of oil. ~~food~~ They serve

unlimited amount of food. I  
could not ~~eat~~ eat even 30%

of what the students ate. Also  
I had to learn many Gujarati  
words for the vegetables: like

(560)  
'doongli' for onion; I knew  
mostly Marathi words like "kaandha"  
'khaand' for sugar; Marathi  
word was "saakkai" etc.

Another most interesting  
(and surprising for me) thing was  
constant presence of ~~big~~ long  
legged, long-beaked (orange  
colour) ~~the~~ birds (grey in colour)  
much bigger than human beings  
which ~~would~~ would come  
when the ~~hostel~~ <sup>serving of</sup> food  
started in the canteen. They  
were not seen in other

(56g)

well occupied ~~ca~~ hostels.

Our canteen also was equally isolated. All around these birds ~~would~~ would come looking for left over. Some daring ones ~~would~~ would even enter our eating ~~of~~ place. The way they handle roti's in their ~~best~~ beaks was remarkable.

Another terrible thing was the presence of so many insects. Since the time of our admission was in July — the so called monsoon period, I say so called, because I

(566)

was used to the torrid  
rains of monsoon in Bombay  
in July. Here it was sparse.

But it was enough to trigger  
of many insects. One <sup>species</sup> of them  
used to swarm the canteen

especially the lights and  
fall on our table. I recall

~~a~~ ~~to~~ ~~a~~ some <sup>black</sup> insects which  
looks like bugs, <sub>used</sub> to smell badly. If  
they ~~fall~~ fell on food

that food ~~with~~ would smell.

Worst still was one which  
which ~~is~~ used to cause  
burn like boils. Survived  
all of them!

(567)

These were not the problem for the other old PRL-GU hostel. But it was not to be available for us for ~~two more~~ many more months.

In the meanwhile, ~~it~~ my top most priority was to get Periapappa & Periamma with me, freed from the Bombay living. I had found a local Gujarati scholar (attached to Dr. Sarabhai — probably his last students) Kargathra. A simple person. He had some problems in speaking fluent English and would stutter a bit.

(568)

But we became friends. I wanted his help to find a place within Rs. 100/- p.m rent, some shared house (one-third of my scholarship amount!) I was looking for low-cost houses. They were shabby homes, more or less slums. For about three months nothing happened. Kangathra ~~was~~ used to tell "I am trying". Then ~~one~~ one day he opened up "Sundararajan, don't feel bad when I say this. No body wants to give to South Indians, Madraasis, because they think they eat ~~meat~~ meat. I explained

(569)

to them that they were Brahmmins,  
and will not even eat eggs or onions!  
But they don't believe me! But  
I will keep trying!" Well that  
was the reality of India @ 1964.

In about 4 or 5 months  
he found out a place  
in Paldi, Tagore Society,  
which had the experience of  
having one Mr. Setty as  
one of the members of the  
Cooperative Society. ~~Somebody~~

They can see a South Indian  
family who ~~can~~ <sup>could</sup> be a vegetarian  
like them! It so happened  
that my marriage took place

(570)

through the medium of that  
Setty family. Strange are  
the ways of Destiny!

But before moving out  
of <sup>the</sup> hostel, I had ~~a~~ to face  
a wild experience. It was

~~that~~ because of Kumbhar.

# As I had pointed out before  
he had serious problems  
of adjusting to the new  
social space. I think he was

from Dhanwan ~~and~~ had not  
been exposed to any thing else.

His performance during the  
course work we had (I will  
explain it later) might have

(571)

added to his tensions.

One day before ~~the~~ food  
we had to leave for the  
canteen (it was getting dark),

when I was to go out  
opening the door, Kumbhar

jumped out of his bed  
and caught hold of me.

and latched the door closed.

He was shouting some thing  
and started attacking ~~for~~ me.

I was resisting but he  
was much stronger. I shouted  
and try to pull toward the  
door. He would not leave.

Fortunately other ~~for~~ students  
from my own batch came

(572)

out and saw what was happening through the glass window doors. They were beating against the door ~~to~~ shouting "Kumbar open". He would not. Fortunately they broke in and released me.

I am not ~~not~~ clear how Kumbar case was settled with PRL - Administration. But my friend immediately took me away, ~~vacated~~ all took away all my belongings and kept in another room

(573)

belonging to one of them.  
and left the room for  
Kumbar to be alone! He  
had enough strength to have  
crushed my neck or broken  
my arm or ribs! God's  
Grace, I escaped without  
~~for~~ any injury. If it was  
at ~~night~~ mid-night, my  
other friends might have  
been in deep sleep. I did  
not inform any of these to  
P & P. ~~or others.~~ <sup>(Periappa/Penanda)</sup> ~~the~~

Another hilarious  
episodes were around a good  
~~that~~ colleague O. P. Gupta.

(574)

He was from U.P. Totally innocent of the ways of cities. He was also finding it difficult to adjust to PRL, hostels etc.

Other boys were teasing him. One day his grand father landed up with a buffalo

to get good milk to feed his grand son.... ~~One~~ One one

side Gupta would be ashamed, but he did not know what to do.

I was able to communicate with him a little bit, as I was sympathetic to his plight.

One of his biggest problem was the poor knowledge of English

(575)

language. Even now <sup>[@2016]</sup> the  
damage done by the leaders  
in Hindi speaking States to  
their own students by not  
teaching them reasonable  
levels of English ~~is~~ is  
great. The students from  
these States find it difficult  
to adjust to other parts  
of India. That is the reason  
~~why~~ why there is a clamour  
now in those States for  
English medium ~~schools~~ schools.

O.P. Gupta might have  
found it difficult to follow  
the course work; he performed

(576)

poorly and finally left.

Kumbar also, I think, left. ~~was~~

~~at~~ With all the initial problems over, we had learnt to adjust to our new hostel environment. But before the ~~second bat~~ ~~batch~~ next batch of students came, I had left the hostels altogether.

Even ~~in~~ though we were in the isolated hostels, we used to go on Sunday evenings to the city with the students of the earlier batch, eat outside and also some times see ~~movies~~ ~~for~~ some movies. (films).

(577)

\* \* \*

~~One~~ Coming now to the academic part of the PRL life.

Right from the days of admission all the new ~~st~~ PH.D. students were given classes, by various faculty members of PRL. All subjects relating to Space Research were covered: Atmospheric physics, meteorology, ionosphere, geomagnetism, cosmic rays, astronomy, astrophysics etc. Each faculty had their styles. No prior notes were given; nor was it structured to have certain number of credit points. In addition we also had some workshop practice with lathes, drilling machines etc.

The classes were exciting for me. I used to read more

(578)

by using the library, which was excellent. One Mrs. Bharucha was in charge; Practically there were no ~~etc~~ controls of on issue of books etc. When it ~~was~~ came to annual check up, the missing books used to worry Mrs. Bharucha. I was the person she ~~would~~ would refer to: "Mr Sambharajin who you think would have ~~be~~ taken this book?" ~~I had~~ Since I was a regular user of the library, and was in touch with almost all students (including seniors), I would usually name 2 or 3 persons. She would get the books from them. So I was her "intelligence unit"! The entire library was

(579)

cleaned and dusted by an  
old person Kikaji — with  
khakhi ~~for~~ full pant,  
a khaki shirt & khaki cap,  
Most of his teeth had gone.

~~The~~ ~~too~~ Many classics, I  
read from that library. I

used to take pleasure in

deriving many of the  
equations. Interplanetary

Dynamic Processes by E. N. Parker  
was a great contemporary book.

To understand some of the  
fundamentals for it, one has  
to go to ~~books~~ massive

book on Magneto-hydrodynamics  
by S. Chandrasekhar.

(580)

In addition, I used to read  
~~to~~ many books on instrumentation  
as I was interested in "applying  
science" to society! In  
one of the <sup>yearly</sup> series on Advances  
in Electronics, I had read  
about TIFRAC, India's  
~~first~~ first computer built  
at TIFR. I was happy about  
it. At that time I did not  
realise that it would die  
without going towards other  
advances that were taking  
place in the world.

I was too innocent  
about ~~the~~ the processes of  
making the links between Science -

(581)

Engineering - Industry & Markets.

Like the leaders of India (political, academic, ~~and~~ scientific, administrative & industrial) our pursuit of science in adequate numbers was ~~ade~~ enough to apply the benefits of 'science' to the Indian people. In fact, that ~~is~~ <sup>was</sup> how the Nehruvian vision was being propagated to the general public and in the scientific / academic ~~at~~ circles.

So there I was learning more of and more of science and the applications that were taking place in the world.

What all I learnt, was not necessary for our course work.

(582)

I met those demands very well, ~~but~~ and was being taken as one of the better students. One professor, who had been giving great intellectual stimulation was Prof Satya Prakash, who was also building a payload for Indian rockets, for measuring micro-currents in the equatorial electrojet. One Subbanaya, a person almost 10 years ~~yet~~ elder to all of us, around mid-30's was his first student. He was a lecturer somewhere and had left it to get Ph.D. degree. All of us held him in high respects. (He passed away recently @ 2014 I think) I had seen a few times ~~after~~ when

(583)

I ~~was in~~ returned to Bangalore permanently in 2009 and was coming to ISRO HQ as Dr. Vikram Sarabhai Distinguished Professor);

another student was S. P. Gupta, who used to be frustrated with the demands of Dr. SP.

Short & soft-spoken Dr. SP was always concerned about the fundamentals of physics. For example: "If current is by the motion of electrons, how come the capacitor, assuming a totally empty space ~~to~~ between the two plates of the ~~condenser~~ capacitor, get electricity?"

(584)

He ~~was~~ <sup>take</sup> would / one full class on such questions. Other students were making a joke of him; he did ~~not~~ not mind.

Such questions used to challenge me. The answer to the question posed lies in electric field of the Maxwell's equation.

I could also ~~get to~~ buy three volumes of the famous Feynman's books on Physics, in the cheap editions which had started coming. They were of great help to me in grasping fundamentals of science, and also to think (scientifically?).

(585)

A remarkable thing I noticed ~~was~~ in the library was the notes by Prof. K. R. Ramamurthi on the front page of ~~the~~ various journals.

He would write the name of the faculty and the <sup>relevant</sup> articles ~~they may~~ ~~that~~ against their names! I don't think he ever asked them whether they read or not but it put a moral pressure on them.

Dr. Sarabhai was not a daily visitor. But he managed to come at least once a week. Then the whole of PRL would be abuzz.

During these course works,

(586)

I came across ~~a facet~~ a person in faculty by name Dr. Upendra D. Desai (U. D. Desai). He ~~had~~ <sup>wore</sup> thick glasses. Always with ~~some~~ one or another electronic circuits in his room and working on them. He was one of the ~~the~~ very early student of Dr. Sarabhai (perhaps second one after Dr. R. P. Kane). He had ~~done~~ gone to USA, and had contributed ~~to~~ instrumentation and electronics for many scientific payloads of NASA science satellites. That was a great attraction for me. I wanted practical work; building up new <sup>electronics</sup> circuits and

(587)

that was my vague idea about engineering/technology at that time.

I somehow felt that ~~it to~~ it was only through instrumentation/electronics, benefits of science ~~can~~ could go to society. One of my major motivations for ~~scie~~ going to science was to provide such benefits to society.

U. D. Desai also liked me. I had more or less made up my mind to work with him.

\* \* \*  
~~At~~ A break from PRL course work to go to my personal life. Kargathra

(588)

finally found a place  
in Paldi, ~~the~~ Tagore Society.

I brought Periapappa &

Periamma to stay with me.

I don't remember the details  
of train travel, travel from  
railway station. I remember  
how we lived ~~as~~ in the

small house of Pakel's. ~~A~~ One

portion was ours. A living room,  
bed room — all-in-all one, with  
pink, mosaic flooring. Then a

kitchen, again ~~was~~ <sup>with</sup> mosaic,

reasonable size. Beyond that a  
common area which housed a

(589)

a bathroom and Indian style latrine separately. Then a common door, ~~outside~~ which was for the back side, of the house. It had the space for the housemaid to wash ~~with~~ clothes. ~~For all~~ The ~~these the space,~~ house owner had almost equivalent space. The front side had a 'ghoola' in the common place, which was typical of a Gujarati house those days. We can also use it. I had seen Periappa & Periamma using ~~it~~ the 'ghoola' sometimes. The couple were ~~at~~ middle aged (around 40); had two ~~of~~ young children

(590)

one boy, one girl. It was interesting to see how Periamma manages to communicate with the land-lady (simple woman) who knew nothing other than Gujarati and my Periamma who knew nothing other than Tamil.

Periamma was happy, as she had regained her usual role of the Lady (Mastu) of the Home after a lapse of about  $7\frac{1}{2}$  years in Bombay. I ~~would~~ would used to give her all my scholarship of Rs. 300/- to her. Rs. 100/- ~~would~~ would go for rent. Rest was for household. My travel daily

(391)

to PRL and back was 50 Paise.  
I used to take packed lunch  
in the morning to catch the  
~~the~~ circular bus (46 & 47 - I  
understand it is still there). I  
had to walk about 10 minutes  
from home to the bus stand  
which was near the National Institute  
of Design (NID) which had also  
been initiated by Dr. Vikram  
Sarabhai. In front of the bus stop  
was Tagore Stadium. I rarely  
took coffee or tea from the  
canteen. Frugal habits out of  
the need to conserve money!

(592)

Periappa had stopped moving out. In our ~~side~~ neighboring house ~~was a man~~ lived a

mother and her son (growing up)

from Kerala. But they would not ~~to try to~~ talk in Malayalam

They wanted (especially the son, who was around mid-20's) ~~wanted~~ to behave as full Gujaratis.

The Selty family was of great moral support. The lady of the house, was a devout follower of Swami Sivamanda and the Divine Life Society. Most of the time she would be out of ~~the~~ her home. ~~Morning~~ She would cook bulk food

(593)

the large family: husband, three daughters and two sons, early in the morning <sup>would</sup> and go away for her social / religious services. Sometimes she ~~would~~ would make a quick visit to Periamma & Periappa. When I ~~go to~~ had the routine of going early (about 8:30 AM) to catch the bus for PRL, P & P were at home alone. Patel family, occasional visits of Sasirekha ben (Mrs. Selty) and going to shops (for Periamma only) were the sole social interactions for them.

(94)

There was no medical facility at PRL. Fortunately there was one Dr. Shah who had a dispensary very close to our society. He was more or less our "family" doctor. Because of my very limited earning, we could not avail of his expertise fully, except for some ~~se~~ urgent cases, which is so for most of Indians even today! (@2016)

My standard dress was a half bush-shirt, a full pant and a chappal. Thin moustache and ~~a~~ very close

(595)

~~to~~ cropped hair-cut (hair  
cut with a frequency of 3 to  
4 weeks!). Daily shave  
with the Bhenat Blades & dipper  
in hot water, as otherwise it  
~~can~~ could not shave! (This  
was done because of my  
obsession with India made  
products, though smuggled  
~~the~~ good blades were available  
at competitive prices!).

For the rainy seasons, I used  
to ~~tuck~~ ~~hang~~ my umbrella hang  
with its handle in my <sup>shirt</sup> bush + collar.  
~~people~~ I ~~can~~ could walk too

(596)

walk comfortably. People used to watch it with some wonder.

Periamma was ~~not~~ taking care of household supplies. As for getting kerosene, which was rationed and was available in only select shops, I used to walk up to Paldi bus station (about 20 minute walk) and lift ~~it~~ the full ~~time~~ bin of kerosene with the loop on ~~the~~ top of the bin. It was a little tough exercise. Almost every 20-30 ft walk, I had to -

(597)

Change hands to avoid the pressure on the fingers. I was doing this lifting to avoid the fees to be paid for a boy to lift. It would be ~~Rs. 5~~ five rupees or more. Auto rickshaw would be very costly. I did not know cycling; but even a cycle was a capital investment, which would have been too much, with scholarship being the only source of income.

There was no other social life in the colony or neighbourhood for us. For me it was much less than that of Periamma who

(598)

lives there most of the time. Periappa had developed a routine of being at home, walk a little outside and ~~he ~~not~~ won~~ converse with Perianma. He had his Vishnu-Sahasranamam, Subrahmanya Bhujangana ek to recite. We did not have a radio also at home.

I would occasionally talk to my house owner and sometimes with Setty, Sasirekha-ben. My days ~~not~~ were mostly spent in PRL, would come home

(599)

by 7 pm or so when I was a student. After moving to Paldi my going to the hotels was cut off; along with that my

Sunday evening with them also was cut off (like ~~eat~~ seeing cinema or going to the Neelam restaurant etc) ~~to~~ were all gone).

\* \* \*

About six months of the Ph.D. programme ~~was~~ <sup>were</sup> spent in learning about space sciences, as I had described earlier. Then came the question of selecting Ph.D.

(600)

research problem and the ~~guide~~ guide.  
In the overall Cosmic Rays were  
under Vikram Sarabhai with  
his <sup>now professors,</sup> students / R. P. Kane, U. D. Desai,  
P. D. Bhavsar etc ~~was~~ taking up  
the students. Similarly, ~~the~~ Atmospheric  
Physics and Ionosphere were under  
the overall guidance of Prof. K. R.  
Ramanathan with R. G. Rastogi,  
Shirke, etc taking the students.

I was good at both areas and  
likes problems in both the areas.  
But when it came to details  
of Ph.D. problems, ~~it is~~ ~~the~~ the  
ionospheric field was dominated  
by R. G. Rastogi. He had

(601)

mastered research - paper - production  
of papers on a massive scale; hence  
he had more students. All the papers  
were based on ionospheric winds,  
& global ~~comparisons~~ comparisons. Very  
little of real ~~science~~ new science  
was being attempted. Another item  
was airglow studies, which were  
then emerging; they were to address  
the chemical processes of the  
# various layers of the ionosphere,  
from sunrise to sunset to later.  
They could be linked to magnetospheric  
activities and solar flares etc. J.S. Shirke  
was to have started it, mainly with  
instrumentation at Mt. Abu.

(602)

Some D-layer studies with VLF propagation.

Bulk of the ionospheric work was around the Rastogi type studies. That did not attract me either ~~for science~~ as science-challenge or as instrumentation.

On the contrary Cosmic Ray group had plans for Balloon experiments. Even ground instrumentation was challenging, with correlation and anti-correlation detectors, logic circuits therein etc. Physics also was more challenging with studies of interplanetary dynamic processes. // So I was not inclined to join the ionospheric group. On the whole

(603)

for that batch, ionospheric group got one or two out of six persons. Others were allotted what they wanted. Probably because I was assessed to be good for both, I was held back and was told that Dr. Ramanathan wanted me to join ionospheric group. Normally, it ~~is~~ was an order. It was a great test for me to get out of that group. Though U. D. Desai (of Cosmic Ray group) had told that he was going to return to USA and therefore was not going to take me, I still felt that I have

(604)

Some better scope for Science and  
instrumentation. ~~an~~ Immediate task  
was to tackle this problem. Fortunately  
Prof K. R. Ramanathan did not  
call me directly. I had great  
respect for his keen interest in  
science and energy to pursue it  
even at that ripe old age. He invariably  
glanced through all the new journals  
and used to write on the ~~the~~ cover page  
of the journal itself, the name of  
the faculty person and the article  
he should read! He was very  
regular to ~~the~~ office; ~~he~~ came  
driving his own car? sharp 9 am.  
But his student  
Dr. Angraji was already very old

(605)

35 plus and was struggling  
with ozone observations for close  
to a decade. The reputation of  
Dr. K. R. Ramanathan as Ph.D  
guide was that it might take  
a decade or more! On  
the contrary R. G. Rasogi was  
the fastest within 4 years. But  
it ~~is~~ was the same repetition  
student - after - student with  
data for the newer years,  
obtained world wide. If the  
idea was to get a Ph.D  
degree in a couple of years  
(two years was minimum in  
those days), I could have

(606)

done it at Bombay with  
Prof Chiplonkar or ~~Prof Ar~~  
Prof Patel at Anand (Gujarat).

Both of them used the neutron  
or X-ray spectroscopy of selected  
eg crystals. One new type  
eg crystal: one Ph.D. Dr  
used to be called ~~Fal~~ Tolansky

Ph.D. Both were students of  
the great Atomic Scientist  
Tolansky and continued to  
their work after return to  
India. It was to be told that

(607)

that they used to keep the  
Crystal ready for the student.

Entire observation and thesis  
writing would be over in 18 months.

The students have to wait for  
six months to submit due

the minimum time of 2 years.

With PHD. the students had  
assured academic careers but

in those days not paid

well compared to the national

S & T laboratories like Atomic Energy.

or CSIR.

(608)

Prof. Ramanathan might have gauged me vis a vis Rastogi group. So the task of attracting me to ionosphere/atmospheric group was given to J. S. Shirke. He was short almost 5 feet only; stocky but built well. Having ~~it~~ always a nice smile. He had just returned from USA after his post doctoral work which was a must, in those days, for all those who got Ph.D from PRL. Laborat PRL helped them to get it. They stayed about

(609)

about 5 years. Dr. Shirke used to be referred as Maharaj Kumar Shirke - he was from a royal family belonging to Maratha kings. Later some time he had shared with me his experience of dealing with specialises cooks and assistants ~~and~~ of the ~~the~~ ~~the~~ palace of Kings of Baroda. How about 300 of them were to interviewed by him to know their specialities and where they could be deployed as the King could not afford such a large staff. There used to be 4 or 5 persons

(610)

for each subtask: a few ~~tasks~~  
writing the day-to-day menu  
options for breakfast, lunch  
etc and present to ~~kings~~ the

palace officers to decide on that  
day menu. A few for certain  
types of chutneys ~~et~~ etc. They  
were so super-specialised  
that they did not know any thing  
else. Many of them ~~are~~ were  
post mid-forties to learn new  
stems! . . . .

Coming now closer to  
the ~~task~~ options of Ph.D., Dr. Shirke

(611)

took me to his room and patiently explained to me the new areas of ionosphere opening up; the plans of air glow, at Mt Abu and possibly by balloons

later, D-layer experiments, ~~magneto~~ ground magnetometers,

telluric currents etc. I

knew them due to my extensive.

He was frank to reply to my sharp questions about the

readiness of ~~the~~ PRL to start work. Most of them would

start only in the medium term say 4 to 5 years. I may

(612)

have to start working on them.  
He himself was thinking of  
airglow experiments. ~~The~~ The  
ready items was ionospheric  
winds under Rastogi, etc.

I told him my hesitation.  
He did not press because  
he understood that I was  
knowledgeable as to what  
was happening in the world  
and what were the capabilities  
in PRL. He told me that his  
job was to explain everything  
so that I could take a  
conscious decision. I wanted  
to be excused. He was kind to

(613)

me. "You go ahead with your choice; I will explain to Proj KRR". So I escapes.

The choice now came to Cosmic Ray group. Proj P.D.

Bhavsar, Dr. N. W. Nerunkar (he had no plans at all, as he wanted to get into defence related projects) & Dr. R. P. Kane. So I was assigned to Dr. P. D. Bhavsar who had the Balloon programme. He had also entered into rocket based aeronomy with sodium vapor experiments with rockets with an elderly (35+)

( 614 )

person, ~~Rama~~ Ramamija Rao. He  
Prof PDB was also then responsible  
as Scientific Coordinator for  
~~Rock~~ sounding Rocket Experiments  
from Thumba (Indian National  
Committee for Space Research  
— INCOSPAR, which was  
the precursor to ISRO). INCOSPAR  
was a budget head in PRL,  
one "division", it had its  
affiliation to the world body  
COSPAR. Prof Chitrnis who  
was also a student of Dr. Sarabhai  
did not finish his Ph.D. but

(615)

went to M.I.T. USA and has  
returned. He did not plan  
to take any student. He had  
the responsibility of day - to -  
day administration of INCOSPAR.  
He was named Secretary, INCOSPAR.

He took care of international  
cooperation of INCOSPAR as well  
as the day - to - day administration  
of INCOSPAR. There were ~~some~~ a few

persons in the "rolls" of INCOSPAR  
(of PRL)  
and were independently administered,  
though overall legally it

came under PRL and the DAE's  
grants ~~to~~ for INCOSPAR PRL was given

(618)

to PRL // So my choices were  
were limited: R.P. Kane who  
was working on <sup>(the data from)</sup> the ground cosmic  
ray stations in Gulmarg (J&K),  
Kodaikanal (super neutron monitor)  
and mostly from the foreign  
stations, whose data were openly  
published. He confined himself  
to the early work started by  
Dr. Vikram Sarabhai, which  
was to find ~~various~~ different  
variations (or rather correlations  
of variations with lunar, solar,  
etc parameters) in the ground  
cosmic rays and derive some  
conjectures of their sources. About

(617)

a dozen of Dr. Sarabhai's ~~student~~ students ~~were~~ got their Ph.D's with such studies and went abroad and changed their subjects of research.

Another person in the Cosmic Ray group was Prof P.D. Bhavsar. Sarabhai wanted to build a balloon group under him with himself closely associated. The idea of the balloon group was to fly cosmic ray detectors high in the atmosphere and thus the nature of the received cosmic rays were less affected by the atmospheric <sup>generated</sup> secondary particles, they were much closer to those

(618)

which come from the interplanetary space and galaxy.

to USA; ~~Dr.~~ U.D. Desai — going away ~~of~~ Nerurkar concentrating on electronics products for defence; Chitmi's in-charge of INCOSPAR; Satya Prakash ~~Concentr~~ concentrating on ~~an~~ a rocket payload ~~some~~ for measuring equatorial electrojet currents; most of the other students of Sarabhai like U.R. Rao were abroad.

So R.P. Kane and P.D. Bhavsar, ~~the~~ the latter having the back up of Sarabhai to start a new <sup>balloon</sup> program. So the choice was "made"! ~~The~~ PDB

(619)

had already one student K. Kasturirangan from the batch before us, which did not go through the selection or induction process like what we had undergone: we were the first batch.

In addition, he had an relatively elderly person Ramamija Rao for PDB's rocket experiment — sodium vapour ~~experiments~~ <sup>experiment</sup> to ~~the~~ study atmospheric wind (not Cosmic Ray work). From our batch V. S. Iyengar <sup>(VSI)</sup> wanted to join ~~the~~ PDB probably because his earlier class mate Kasturirangan (KKR) was ~~there~~ with him. VSI missed one year in M. Sc. in Bombay Univ. KKR ~~was~~ came out in 1963. ~~He~~

(620)

VSI who was his ~~batch~~ Class mate in Ruia College of Bombay Univ., missed the 1963 final exam. One version was that he got fever ~~when~~ during exams.

Another one was that he was not sure of ~~his~~ his performance in a ~~paper~~ paper. He wanted to get a first class and therefore skipped practicals to declare his <sup>that year</sup> have ~~the~~ exams failed and appear next year. He was a

bright person, only son for his parents. Therefore he was in our batch 1964 batch of PRL.

~~at~~ I had not ~~seen~~ therefore seen KKR or VSI during my MSc. period course <sup>days</sup> as they

(621) senior  
were in the earlier batch.

Any way finally, we  
three were attached to the Cosmic  
Ray & group, with a focus on  
balloon based cosmic ray studies  
and ~~not~~ the usual ground based  
data from different countries being  
analysed for <sup>different</sup> variations; in any case  
by 1964 ~~that~~ those set of studies  
have been "beaten to death". Only  
other person working in Cosmic  
Ray group was Kargathra, a  
year senior to me. ~~He~~ He was  
the last student of Vokram Sarabhai  
and Kargathra's task was to  
build a large ~~scientific~~ scintillation  
counter, which can also ~~to~~ infer

(623)

directions.

So I had to get into Cosmic Ray Balloon group. Not much had been done there except for an idea of having Geiger array and transmitting <sup>the signals</sup> down. Roy PDB had some <sup>drawings of</sup> circuits with him which were obtained from Minnesota. They contained the logic circuit for the counters made of transistors (it was a great leap forward for India then!), and FM/FM circuits including transmitters at 108 MHz to send ~~the~~ <sup>digital</sup> signals down. These were again of ~~the~~ transistors. The components were somehow obtained by PRL for us. It is

(624)

the guide's job! So KKR, VS I & I started the work of making circuits and testing them. There was a question of ground systems to receive. The balloon was the usual Met Balloons made of rubber; it will go up fast & burst. It was to be launched at Ahmedabad as ~~the~~ ~~the~~ Hyderabad ~~for~~ balloon facility which was under TIFR was not easy to access and not equipped for radio reception. TIFR sent massive stacks of emulsions and oscilloscopes in big balloons and recovered them. We were