

(625)

Planning advanced technologies.  
For ground reception, we struck a  
good idea. ~~Dr~~ Vikram Sarabhai  
had obtained a large "junk" of  
World War II ~~so~~ equipment,  
~~mostly~~ made of ~~the~~ electronic valves.  
It had transceivers for communications,  
~~as~~ radio receiving sets, etc. It  
was ~~at~~ in a ~~duddy~~ ~~dusty~~ dusty  
store. VSI & I ransacked the store  
which had not been touched  
before by any body! We selected  
~~the~~ equipment (on a best  
guess basis). We made the  
radio receivers and transceivers work!

(626)

What a great feeling! Our balloon ground station was ready! We tuned the ground receiver to 108 MHz. We knew that it was not right frequency allotted for the balloon research. But our onboard circuits (drawings for which were from Minnesota) could not be changed. So we had to tune the ~~rec~~ ground receiver accordingly. It was some police band. Our only bet was that the flight was for a very short duration. It ~~was~~ would go up and burst!

(627)

The Erigeron array was done by Sharma, the glass blower at PRL.

To cut short, the flight took place successfully. ~~The~~

That was the first

FM/FM telemetry from a

balloon in India. It was

path breaking. India Meteorological ~~Dept~~ Department (IMD) which had been flying radio-sonde and the telemetered signals of pressure, temperature etc was doing it in AM (Amplitude Modulation).

(628)

Modulation). The data received was very good. All of us including PDB was happy.

VS who saw it later was happy.

~~We~~ We were excited and moved on to other works.

No newspaper coverage. I don't think that there is any record

of such a first FM/FM flight

in the annals of <sup>Indian</sup> Science & Technology.

There was a paper that was generated. ~~It~~ It went in the name of ~~Bha~~ PDB and KKR. VS I & I did not

(629)

bother about it. It would  
add to the Ph.D. program of  
KKR. That was the order  
of things! I did not think  
it was a great deal for me  
in my career, as ~~my~~ my  
mind was looking beyond —  
God knew what!

But one message came  
into me. That scientific paper  
of PDB / KKR was not  
an earth shaking one. I knew  
the limitations of the height ~~with~~  
array, because of the thick  
glass walls through which ~~jam~~

(630)

there ~~would~~ would be many  
escape particles. So the  
accuracy ~~would~~ of the number  
of counts would be limited.

My mind asks these  
questions: what if we keep  
on doing such scientifically limited  
experiments, mainly because  
we had severe constraints  
of instruments? The world  
scientists ~~from~~ <sup>were</sup> ~~are~~ moving  
forward with more sophisticated  
measurements through satellites,  
rockets and balloons. We <sup>in India</sup> were  
literally in backwaters.

\* \* \*

(631)

During this period lots of things were happening inside me. With Periappa & Periamma settled with me, home front and my greatest duty to them ~~was~~ <sup>were</sup> going on well. In between there was once a need for a cataract operation for Periappa. The Our local doctor was a fine person and he arranged for it. When he checked the BP of Periappa it was high; it was more due to hypochondriac reaction, which the doctor also knew; as otherwise he used to be fine in BP. So he was put through a mild BP reduction medicine for a week and doctor himself came to

(632)

the place where operation was to take place. He measured; it was high? again. Then he took me to the side and told me tho. But added that he would ask the ~~opt~~ surgeon to go ahead with operation. ~~at~~ He would tell Periyappa that all was well with him as the BP medicine had worked!

Operation went well. In those days (~1966), it was a serious operation. There was full anaesthesia. He should not move at all. I ~~am~~ was supposed to take care! After a few hours, when Periyappa

(633)

came out of anaesthesia, it was tough to hold him. He was trying to get him. He was in a semi-conscious state. It was difficult for me to hold. He was a strong man, even at that age (in his sixties). Finally when I was going to fail, I went on screaming "Penappa! Penappa! I can't hold you. Why are you troubling. Pl. help me by calmly laying down. I am helpless!" I think through his semi-conscious state the appeal went through. Then he stopped stirring. I was

(P.F.O)

Secured Sites

Verisign Secure

(634)

happy that his operation went through successfully; he was released. ~~Has da~~ Later he had a thick glass, as it was the only technology in those days. Periamma ~~was~~ suffered from arthritis of the knee. No great medicines were available then. Nor did I know much about it. Whatever the local doctor gave ~~to~~ did was the only medication. But Periamma was a person of great mental strength. She managed things even with

(635)

the problem of her knew and a bit of overweight she had. Her philosophy was simple: "As long as I live, I want to enjoy good food. No restrictions of salt, ~~etc~~ or reduction of food ~~etc~~. If because of that I ~~don't~~ die a few years earlier, it doesn't matter!"

Another side of my life was an increased intellectual involvement with left especially Marxism, Leninism and communism. Though I was fascinated by the writings of ~~the~~ Jawaharlal Nehru (like Discovery of India & Glimpses of World History) when I was in

(636)

in Bombay, the actual ground realities in India — severe scarcity of food items, water, ever rising prices of essential commodities etc ~~it had~~ were taking the sheen out of Nehruvian form of democratic socialism. The communal riots in India, though not reported widely & were high. I had noticed it ~~in~~ <sup>during</sup> Bombay life.

It was so in Ahmedabad as well. Almost constant skirmishes with Pakistan had serious effects on Ahmedabad: many night black outs. Also communal riots. Some of the workers in PRL were ~~Kera~~ Muslims from Kerala. They

(637)

would be protected in their neighbourhood  
by assuming names like Katty  
which was also a part of the name.  
Some ~~assumed~~ attached their  
abbreviated initials the word Nair  
as end. They would even go  
to local & Sahyaranarayana pujas  
and sit there.

Earlier, the humiliation  
in 1962 with China ~~to~~ (when  
I was in Bombay) caused a  
deep imprint <sup>(9 was 18 years)</sup> about the weakness  
of the Indian State. Babu Rao's  
Patell Patel's columns of questions  
& answers were attacking the Congress  
government, in States & Centre. ~~The~~  
He was anti-communist also.

(638)

The use of ~~the~~ President's rule to topple E.M.S. Namboodiri Padi elected ~~Communist~~ Communist Govt. in Kerala ~~did~~ ~~may~~ made a dent (in me) of Nehru's commitment to democracy. Thus it raised the question whether communism ~~can~~ could come to power through the electoral democracy. So there was a double whammy for "democratic socialism" in my mind. Democracy was in question; and there was little of socialism in terms of taking care of the poor. Of course, my understanding of economics was poor. except

(639)

My exposure was through  
Marxian writings which were  
at aggregate philosophical  
levels and a little bit  
of details of economics  
through "Economic & Political  
Weekly". I subscribed a copy  
as student member and got it  
at a concessional rate. Many  
of the articles were ununderstandable  
to me. I understood that  
it was a leftist critique.

The period in which  
I was in of Amretal, Nehru  
was no more. Lal Bahadur  
Sastri was the P.M. That period

(640)

was more about ~~Jai~~ "Jai Jawan  
and Jai Kisan" — one for  
fighting Pakistan and another  
for fighting acute food  
scarcity in the country. In  
general the press was  
anti-US especially for its  
continuous military and  
economic aid to Pakistan which  
was using it against India.  
I at I also was against  
such a "US imperialism" — so  
much so, I shunned the  
American symbols like Coca Cola.  
But most of the scientific  
~~litera~~ and engineering literature

(641)

we used ~~was~~ were from USA.  
Even for my research work  
~~the~~ we had to follow much  
of the Cosmic Ray work done  
in USA. We had to use  
the components available  
from USA (many of them  
as gifts!)

In those peak cold  
war days, India was flooded by  
cheap American & Soviet books  
— from novels to history to science.  
I used to buy them as they were  
affordable. In addition I used to  
visit a special <sup>govt</sup> library (unity building?)  
which had excellent books about  
the growth of Communism in India

(642)

There was a brilliant work by M.N. Roy (Reason, Romanticism & Revolution) published from Dehra Dun. He was trying to integrate the new findings of biology as well in his version of Marxism. I have read a few journals of the Radical Humanism, which he edited. In addition I was getting a copy of New Age (CPI) & People's Democracy (by CPM) from the Sastu Kitab lghar. It was ~~a~~ in an isolated place; may be police was ~~to~~ keeping track of people who go there. I had also got a few books of Mao Tse Tung and his "red book". I had full collected works of Stalin.

So along with ~~an~~ active scientific research related studies, I was also engaged in my "political development." I used to openly

(643)

air my view ~~at~~ with Marxist  
view point during some discussions  
with co-students, most of whom  
were not interested in politics of  
any sort. Some of stenographers  
~~from~~ who were invariably from  
Kerala, took interest in my  
talking. I used to write a few  
letters to the editor, which were  
typed by them. Some were published  
by the papers; some partly edited  
by them. They were strongly  
Marxian but not as practices or  
interpreted by CPI or CPI or other  
so-called left parties who  
were more interested in regional  
chauvinist issues to get elected.  
I have a couple of copies of a couple of  
them even now. They were in  
the name S. Rajan (not as

INSERT

645(a)

They are  
in the  
black  
covered  
Hirachi  
files

I have ~~all~~ most  
manuscripts with me and  
the typed version of each of them.  
The editor of Indian Express  
(Ahmedabad) had been kind,  
I should say, looking back over.  
Being a young person,  
ideologically charged with Marxian  
ideas (supplemented by the  
writings of Engels, J.D. Bernal  
etc), I have used strong language,  
sometimes raw! ~~It~~ They have  
been suitably edited. I also  
find all my letters appear  
first in the Letters to Editor  
portion, thus my letter title gets

645(b)

full visibility. Also, the column-  
width allotted to me is fairly large.  
The topics range from "Regional  
Imbalances", "Man the Animal"  
which was a rejoinder to a  
long article by Mr. Zafar  
Futehally <sup>and</sup> "National Integration"  
for which I have copies. Other  
items ~~are~~ are: "Two Cultures"  
"Youth in Revolt" "Soviet Arms  
Aid" and one on an article  
by Dr. Sen which had indicated  
that to reduce the number of  
unemployed engineers, there should  
be cut in the number of seats  
in engineering colleges and also  
one by ~~Dr. D. R. Gadgil.~~ D. R. Gadgil.

645(a)

The range of interest are very large, as it had been for me since my age of 16 (even 13 after I came to Bombay and started reading N.S. Iyer's book collections.)

My concern had been to reach the modern benefits for all. It is based on the concept of "scientific materialism" Marxian dialectics etc. I had been (then) pretty much convinced that the Marxian methods of arranging the society <sup>is</sup> vital to reach the benefits to all and Capitalism would fail. At the

~~645~~ 645(d)

I had been strongly against religious palliatives which look down upon material wealth. I was not ready to accept it as a philosophy of life. People All people should enjoy good material lives.

How many of the other items were published I do not ~~the~~ remember now. I have no copies. From the manuscripts & some dates ~~available~~ available, it appears that all my activities for the letters to Editor, had been

645(e)

crowded in the year 1968  
probably ~~starts~~ starting  
April to July 1968. My  
writings do not take the CP I,  
CPM ~~line~~ lines. How I  
could manage so much of  
writings at a time when  
I was very tightly loaded  
with the <sup>rocket</sup> transponder work  
at INCOSPAR (still staying  
at PRL but working in  
OPN Calla's group), my  
colleague C.J. Louis was  
strongly anti-communist!  
We used to argue too. He was

645(f)

more pro-US. But I don't think, I ever told anybody ~~other~~ other than (A.K. Nair & G.K. Pillai) about my letter. See about them in the further write up. The only other person who knew was Jacob Mathews, PS to Bhavsar, who typed the letters for me.

~~I th~~

In those collections there is a series of handwritten notes to Pillai: one dated 18.6.68, 20/6/68, ~~one more~~ ~~dated~~ and 23/6/68. They were in response to letters he had sent. I have no copies of them in my files. ~~I mention~~ They are long

645(g)

letters. I mention in one letter that I had gone through (revisited) a few hundred pages of Marx, Lenin, <sup>J.D.B.</sup> Haldane, J.D. Bernal etc. I refer to the books some Mao's works.

J.D. Bernal's "Freedom of Necessity" — I have referred often.

I thank ~~po~~ Pillai & ~~(through his letter)~~ for

initiating philosophical questions in my mind (through his letters). I have referred a ~~set~~ whole set of them: epistemology, agnostic<sup>ek</sup>

645(h)

I had addressed many contemporary issues of India's emerging extreme left, Europe's

New Left etc. There is also an English poem - one page long - Workers of the World Unite. I don't know whether written by me. Or I had a copy typed & got. No reference in it. If mine that would be my first poem. (I had written in school all last!) My mind apparently had been at a peak!

I find in the end of the third letter "I am awaiting news from your end"

~~I Af~~ As I we would see in the following text, it would have been his attempts to meet

B.T. Ranadive

Go to (645) One A.R. Nair

(645)

Y. Sundararajan which was my  
officially used name there).

See  
~~645~~  
645(a)  
to...

One A.K. Nair who  
retired from Navy ~~as a~~ (Petty  
officer), still young had joined  
~~in~~ a defence - electronics project  
undertaken by N.W. Narasimhan;  
later O.P.N. Calla - we will come  
to him later - was also a project  
leader. That project had many  
such technicians termed Scientific  
Assistants in PRL were from Kerala.  
~~A.K.~~ A.K. Nair was very knowledgeable  
~~with~~ in political economy and  
was deeply interested in communism.  
He liked ~~my~~ me and we used  
to discuss many contemporary  
problems of India in the Marxian -

(646)

Communist - ideological angle, as we understood. He had a friend G.K. Pillai, who was another such naval officer, but ~~not~~ not working in Ahmedabad. He was very active ideologue and was serious about joining Communist movement. We three had a long of discussions and exchanged notes.

We used to ~~be~~ discuss the New Left which was emerging in Europe: Régis Debray, Tariq Ali et al. Also about André Malraux though exactly he did not fall under the category of New Left. We thought that revolutionary ferment was still alive and may come

(647)

Come to India ~~and~~ as well.  
I could even describe ~~it~~ ~~now~~  
that period as ~~an~~ infatuation  
with Marxian revolution,  
dialectical materialism  
and Leninist epistemology.  
I admire Lenin ~~it~~ because  
he was a practical person who  
made Marxism succeed to  
rule a big country.

During 1966 China  
started a major Cultural  
Revolution. I managed to get  
a book on Cultural Revolution by a  
Chinese party person. While I  
could not appreciate CPM for

(648)

having sided with China during the 1962 war, I found that some great persons were with CPM. Also CPI under Dange ~~became~~ started becoming also cheer-leader or stooge for Congress - Indira Gandhi version of socialism.

But my general caution ~~again~~ about deeper involvement in such ~~events~~ uncertain and probably actions leading to violence continued. I never went to any Party office or even meeting arranged by any political party. Maximum daring, I did was to go to the Sastri Kitab Ghar which was the outlet for Communist

(649)

literature including Mao Tse Tung literature. I bought book and read them, spoke about ~~new~~ Marxist principles with some PRL ~~to~~ colleagues and also at TERLS/SSTC when I went for rocket launches. - The intense discussions were with G.K. Pillai, and A.K. Nair, ~~and~~ How much involvement G.K. Pillai had I do not know. A.K. Nair was more like me - fully concentrating on our technical/~~our~~ professional work and having such readings more as a "conscientious" hobby!

But deep inside me

(658)

there was a desire to get involved as a political revolutionary, to change India and make Indian people have better material living conditions. So there was a lingering fight inside: am I fit for it. Though my asthma had faded off after coming to Ahmedabad, general concern about health was a question. Some solace was from the fact that Che Guevara was also an asthmatic. (I read it but did not verify! It was a convenient solace).

Another thing was about the family life. Can I

(651)

abandon my duties? Then my  
sexuality: do I marry, if  
so, how can I ditch my wife?  
The idea of "free love" which  
was in some part of revolutionary  
movement did not appeal  
to me. I somehow felt that  
human sexuality ~~to~~ was much  
more than satisfaction of physical  
desires; there was more of emotional  
bondage. The Party attitude would  
be that it was an bourgeois  
sentimentality.

Above all these considerations  
there was some thing equally  
deep inside me which desired  
to retain my "freedom". Reading

(652)

the communist history (even the ones most sympathetic to the Communist revolution) and reading the Communist ~~new~~ party mouth pieces of CPI & CPM, I found that I did not agree with many of their ~~unde~~ approaches to actual Indian problems. Also the way these papers defended "party line" was at times monstrous.

All the while in my life so far, I had kept up my freedom, in choosing my career up to the point of

(654)

rejecting the affectionate desire of  
K. R. Ramanathan that I  
~~short~~ should join the Astronomy  
Group. Should I then get  
~~into~~ the into a system which  
would make me surrender to  
a Party tyranny. That was  
the reason why I did not  
join any Ashrams, when there  
were situations in Bombay during  
my student life, to get  
attracted to Ashram. ~~Had~~ I  
was not ready to submit to  
the discipline (or tyranny) of  
rigid codes ~~in my~~ all through

(655)

my life.

Also all that what was happening in the European ~~left~~ New left movements, (I got only very filtered versions through our newspapers, EPW and a few other journals) and more importantly the chaotic ~~actions~~ politics of India's ~~the~~ "own" ~~left~~ Left movements from Lohia to Ashok Mehta to George Fernandes and many others and Congress Party left and Communist Parties — all together, made me more and more disillusioned with

(656)

politics, as an activity for me. At the same time I also recognised the importance of politics to make a transformation ~~for~~ of India people's lives.

It ~~is~~ was around that time one day when AK Pillai, AK Nair and I were meeting, Pillai said that he met B. T. Ranadive to explore the possibility of us being involved / inducted in CPM Communist movement. He categorically advised him that we should not get into it at that stage. That advice,

(657)

as told by Pillai, was close to the conclusion I had come to. ~~B~~ That being clear we ~~kept~~ decided to keep up our "revolutionary zeal" to build a new society, as dreamt of by Karl Marx!

For all practical purposes my desire to get into active politics was fully buried and I decided that I need not any more be fettered by the possibility of getting into "revolutionary" work. ~~which would~~ <sup>(@1968)</sup>  
~~means means~~ I would thus lead a normal household

(658)

life. I would marry as constantly  
desired by ~~Pen~~ P & P. My  
various personal dilemmas,  
~~to~~ which I ~~had~~ have  
described elsewhere in these  
notes, would also disappear.

I would concentrate on my  
~~work~~ scientific and engineering  
work, though, of course, I  
would keep in touch with  
reading of Marxist material.

The New Left of the West  
or the "hippy" revolution" of USA  
had no relevance for me. Though  
I had not theorised on it much,  
somehow & it was clear

(659)

for me that "historical evolutionary"  
path of the West was <sup>not</sup>  
<sup>My ideas on them are in the letters to Pillai (three</sup>  
relevant to India. After so <sup>reform</sup>  
<sup>to</sup>  
<sup>earlier)</sup>  
many years, I find it is  
so (@ 2016) for the bulk  
of the Indian people, though  
the elite may want to  
completely transform these schools  
into USA and some parts  
of Europe!

\* \* \*

On the professional  
front also some clarity  
starts emerging. PRL's  
scientific / technical infrastructure

(660)

was very inadequate to meet the desire of Vikram Sarabhai (VS) to set up a good

cosmic-ray - ~~a~~ research capability of contemporaneous class (@1960's).

The world science (NASA, some parts of Europe, Japan and ~~a~~ Soviet Union) ~~#~~ was galloping

as I could read from the proceedings of COSPAR and the journals. Balloon, rocket

and even some initial satellite

experiments demanded ~~a~~

very sophisticated (hi-tech

to use ~~so~~ current day parlance)

(661)

instrumentation: detectors,  
electronics circuitry, testing  
facilities etc. In detectors  
we were nearly zero. The  
Geiger counters were phasing  
out to various forms of  
~~scintillation~~ scintillation counters,  
(NaI etc). The electronics  
circuitry were high speed  
ones: ability to measure  
measure the rising  
times of  $\mu$  micro-second  
pulses and even some  
nano-second pulses. The  
only Phillips oscilloscope

(662)

we had ~~has~~ was only  
of a few kilohertz  
category. The microseconds  
pulses ~~+~~ would not  
even show the rise times!

In general PRL faculty  
appeared to be oblivious  
to these developments.

VS would not be having  
time to get into the  
details. Prof KR Ramanathan  
was of ~~sd~~ a different  
vintage. Prof UR Rao  
who came back from

(663)

USA during 1965 was too junior in the system. He had done some advanced payloads, as a team in USA. He understood. Many in PRL at that time (including me) did not know that he was ~~involved~~ associated with the flight of Mariner which detected "solar wind particles" for the first time in space; ~~the~~ solar wind Bill that time was only ~~in~~ in theory of magneto-hydrodynamics. A master

(664)

piece book was by  
E. N. Parker of Chicago  
University. I had mastered  
that book. ~~But~~ The

payload of Mariner was  
only a simple Geiger tube.

U. R. Rao was aware of  
various scintillation counter  
~~and~~ used ~~for~~<sup>his</sup> rockets and  
satellites and could get

them from his friends  
abroad. But he was  
skill to get his feet wet.

Before he came  
itself, V. S. Iyengar and I

(665)

had decided to get out of the Balloon group, as the chances ~~of~~ of getting a Ph.D. would have been a 10 year + effort or even more. Whatever we do ~~will~~ would go to KKR and if even for him it would be 10 + more year. Then we would be in queue.

We approached Prof P.D. Bhavsar, our assigned guide. He tries to explain that he would try to help us by getting some finished payloads

(666)

from the University of Minnesota  
and his other contacts. He  
was a thorough gentleman  
and a good human being.  
He understood our problems.

But we knew the constraints  
of the <sup>PRL</sup> system. Too little money;  
too little modern infrastructure  
for cosmic ray research or  
other rocket - payload - instruments.  
World science was galloping.

Our work could not ~~be~~  
~~be~~ even "also ran,"  
as was the earlier works of PRL.

So we found out what  
we thought was a solution.

(667)

There was a Pal - Peter's paper on positron - electron population to be studied through cosmic rays. (Pal is Yash Pal).

(My memory now fails on the details of it). It was possible to do some scientific work around using the world wide data and ~~and~~ using some special observations at the PRL's ground neutron monitors.

So we had discussed it with R.P. Kane, the first student of Sarabhai. ~~and~~

(668)

Because of his unmeaning  
~~mathematic~~ statistical  
capabilities, he was still  
able to extract some useful  
information from the world  
wide cosmic ray monitors  
and had regular international  
publication (Nuovo Cimento  
in particular). So we felt that  
he could manage to help us  
~~also~~ also get a few papers  
~~or~~ to get us through Ph.D.  
thesis... He discussed the  
problem, and said we could  
try. But he was not sure

~~==~~

INSERT  
ⓧ

669(a)

While I do not remember the 'detailed processes, & it appears that VSI and I did create a problem for the PRL faculty. If they allow a change, other students may try! Once they join a guide, they were good slaves to do all the work! Any change would create a competition between the guides, which ~~they~~ they do at the beginning to get students. No freedom to change after that. We were innocent of these complexities.

~~670(1)~~

669(b)

How big a problem it was I do not remember. I had heard Rastogi telling somebody that PRL should not get students from the Bombay University any more as they created problems (that VSI & I were both from Bombay University).

Pg Bhavsar not showing direct annoyance or anger was good for us.

Pyramid  
Office file  
Extra sheet

In the file I have about PRL days, I found a two ~~page~~ page note signed by Vikram A. Sarabhai

689(c)

It is a ~~fair~~ beautifully worded note.

~~The~~ ~~in~~ ~~the~~ It describes the processes and the final meeting of Dr. Sarabhai, Dr. Pandya (Acting Dean for Courses) Dr. Bhavsar,

Dr. Nerurkar, Mr. Iyengar & Mr. Sunderanjan." It ~~has~~ says

it has been conveyed to the students ... " Full sentence:

~~but~~ ~~the~~ ~~gist~~ The gist is:

- No such approval as of now
  - However students' problems
  - Gentle chastising that they should not approach other guides
  - There is no "less or more" time for Ph.D.; all guides are same time only!
- Then it puts on us an VSI&YS to

669(d)

discuss amongst themselves  
and decide <sup>on</sup> one ~~who~~ <sup>who</sup> ~~should~~ can  
go to Dr. Kane. The other person  
to discuss with Puj Bhavsar  
& ~~then~~ Nemkar other  
suitable opportunities.

(other) If after this also  
the student ~~opt~~ also desires to  
work with Kane, then he should  
see the Director

Note is dated 30 Nov 1965.

Rastogi to finish the formalities  
for the student who opts to Kane  
to join before Dec 15!

I do not remember what  
exactly happened. ~~But~~ Probably  
VSI & I discussed and decided

669(e)

that he would first join. Then I have to go through other processes.

Probably my discussions with Rhanson & Nemrkar did not yield much results.

Nemrkar had a personality which would frighten ~~the person~~ other person; some feeling of unfriendliness, though he ~~was~~ might & not have intended it.

---

Then go to

p. 669

- - - It was after  
& continue

(669)

would allow a switch over of guides! We said would manage.

Though Bhavsan ~~was~~ <sup>would be</sup> willing, there was no precedent in PRL before, the PRL management, I think

R. G. Rastogi, the Dean, was not in favour of such switch over.

~~I think Sarathai and  
K. P. R. R. were neutral.~~

See insert  
669  
(a)-----

Finally we got the change.

~~It is after~~

It was after that  
P. J. K. Rao had come back  
from USA and joined as  
a fellow in PRL.

(670)

I used to discuss with him a lot on new development. He was full of ideas and enthusiasm. But had little money. He had to fight his way through to get a recognition within the PRL hierarchy and also to get funds for his rocket experiments; he had plans to get into X-ray astronomy. He said that much as he would like to have ~~me~~ me as a student with him, he was afraid of the PRL

(671)

management restrictions, especially because we had just had a switch over. 1965 was full of further events. //

PRL got from the Ministry of Education (there was no Dept of Science & Technology - DST - in those days.) a few scholarships for the Ph.D. students. Uptil then, PRL was paying the research students from its own resources. This scholarship had Rs. 250/- pm plus

(672)

Some other allowances which can be used for research

purposes in PRL. For PRL, it was a lot of money! ~~I~~

But that scholarship came with a rider: the students had to execute a 3 year bond. ~~with~~ PRL gave the

bond papers to all the students to fill up. We were told that the additional part of scholarship beyond Rs. 250/- p.m. ~~would~~

would continue to be paid

by PRL. All students signed up except two: One K. G. Vernekar,

(673)

~~a~~ a student from the senior batch (same as KKR) and I, KGV ~~had~~ was associated with Bhavsar for the sodium vapour rocket experiments. Already one Ramamya Rao was working on it; so KGV had the same problem like VSII & I. His PhD would be inordinately delayed. He had spent about 2 years + and wanted an option to quit. I also ~~argued~~ <sup>discussed</sup> with PRL management that I ~~shortly~~ was morally bound due to the <sup>PRL</sup> advertisement I responded

(674)

to, to serve a three year  
~~ten~~ bond from July 1964

when I joined and not 3 year  
from ~~1964~~ 1965. I ~~thinks~~

~~was no~~ I told them that  
if PRL could give in writing

that from ~~to~~ July 1967, I  
was free to leave, I would

sign the GOI / Ming Education

bond. They were not ready

to do. Even Prof K R Ramanathan

was kind enough to explain

to me, that after signing the

bond, even if I desired a

(675)

Change in a research institution  
and leave PRL, I could carry  
the scholarship with me etc.

My point was that I was  
not willing to be bound

with a research career  
beyond July 1967; I might  
go for other jobs. PRL was  
not clear on that.

\* \* \*  
Seeing all these  
uncertainties <sup>(right after joining Bhavsan, almost from the beginning of 1965)</sup> and also ~~because~~

because of ~~the~~ the uncertainties of  
the work with R.P. Kar <sup>which we were contemplating</sup> (I

was not sure whether we could  
do some good work) I had

(676)

Started looking for jobs.  
I had a successful interview  
at Blue Star, Bombay in  
response to an advertisement  
Research Physicists. Two young  
persons, one man and a woman,  
(I was told that they were  
son & daughter of the owner)  
interviewed me and were  
keen to take me. Rs. 400 +  
some allowances ~~per~~ p.m. They  
The work concerned some  
infrared devices. equipment.  
They said that the work involves

~~678~~ (677)

a lot of travel involving sales and services. I asked them: "where ~~is~~ ~~is~~ ~~is~~ Research?"

"We will do later!" was the ~~the~~ answer. I could realise

that it was mere ~~the~~ marketing and sales. I did not know at that time the poor status of technology development (and therefore requires R&D) in the Indian industry and the gap between national laboratories / ~~and~~ academia and industries.

I had a simplistic view of

(678)

of application of scientific research to people and society ~~the~~ taken from the literal meaning of the words (primarily) by Jawaharlal Nehru. Even the literature in economics (as I was reading EPW) did not have any fine distinction for science. (Unfortunately ~~Indian~~ most Indian economists and policy makers do not have it even now! So the country has become stagnant in innovation!)

(P.T.O)

(679)

I told them that I was not prepared to travel too much and asked them how much it would be. They told at least 3 weeks in a month!

I said ~~them~~ "Then no!"

They were not prepared to leave me. They asked how much you would do. ~~to~~ I said, maximum one week in a month.

My concept was that I was in research for 3 weeks! Still they

did not let me go. They told me to think about it and

that they would also think, <sup>and</sup> I was requested to call them

(680)

next day. Both were very polite and had a charm of their own. Next day I called and ~~was~~ said that I would not like to change the one-week; may be more for some emergencies. They finally had to regret. I was not unhappy. I found that I had opportunities in the job market!

Later I went to attend ~~an~~ an interview for the post of lecturer in the Gorakhpur Univ. More than the job part, I was attracted to by the two way second class travel they would give.

(681)

It was a good opportunity  
~~for~~ to see some parts of  
India with a low cost! In  
my mind PRL's interview and  
holding ~~back~~ back of return  
fare, ~~was~~ had been erased,  
it appears! As a student, I  
did not have to send "through  
proper channel" which was  
a draconian fetter for all  
Govt employees. I think, it  
exists even now!

Travel was exciting.  
Saw some of Gorakhpur.  
Attended interview. They were  
amazed to see my application.

(682)

I was told, "Young man, we are surprised to see applying for this post. ~~I~~ You would definitely get it. But we suggest you drop out and go and continue your research field!"

Either that they were genuinely interested in my career or they had some other candidate in mind. Whichever way, they were people with a conscience. ~~and~~

So I came out; but I got my travel reimbursement!

Then on return,

I had a long gap in connecting train from Lucknow. So decided to see Lucknow. ~~At~~ All my

(683)

were in a travel bag made of "regsin" and with a zipper and to be hung on shoulder. I engaged a cycle rickshaw to show Lucknow and to return to the railway station. I parked my bag in his rickshaw and visited places and would return. Never did it occur to me that he might go away. Was it the vibes? Or was it my naivete? Though I had been in Bombay and seen many cases of pickpockets and other forms of pilferages, I don't know why I was so naive. At one place

(684)

outside the a man when  
coming outside a monument,  
a person at the gate demanded  
money to be paid to him.  
I refused. I knew enough  
of Hindi; ~~that~~ mostly Bombay  
Hindi which had improved  
through the association of  
U.P. friends in my batch.  
That person said so many  
curses and said his misfortune  
would fall on me etc, if  
I did not pay him. I went  
ahead. Came to <sup>the</sup> railway  
station and paid Rs. 10/- which  
was negotiable. He ~~was~~ thanked  
and went away.

(685)

What a divine person he was, I realised ~~on~~ in the next year when I went to Delhi for an interview. That was for an UPSC interview for a Junior Scientific Officer (JSO) at the <sup>Indian</sup> Institute of Tropical Meteorology (IITM), Pune. KAV had also applied for ~~the~~ that job. He probably was called earlier. I travelled alone. When I came to Delhi with the same bag used for Courtkpar visit, with all my possessions, I got

(686)

and was looking for a place to ~~st~~ stay. I was looking for Railway Rest Room etc.

Came a young ~~was~~ man and engaged me in a conversation. He said that he would help.

~~and~~ He took me to a home.

He was talking to them nicely.

He said they were relatives.

And told them that he

would show me some places in Delhi and be

back, and get my accomodation,

I left the bag there.

We ~~taura~~ saw some few places. He explained. Suddenly

(687)

at some point, he was  
missing. I look for  
every where around. No sign  
of him. I did not know

the address of the house.  
I did not even know  
localities! I was worried

But some thing in me, ~~had~~  
gave a calmness, I went

~~one~~ on going from one

place to another. Fortunately

we had gone on foot and

therefore it was ~~so~~ not too

far away. ~~I had~~ Fortunately

I keep <sup>tickets</sup> purse, and money

in my person, a habit I got

(688)

due to Periappa's advice ~~(life tip)~~  
(Tips for life). So I can  
go back to Ahmedabad!

Walked and walked,  
and by recalling some memory,  
I reached the house where  
I had left my bag. They  
were surprised. They said that  
the person who brought me  
(they referred to him by name,  
which I forgot!) came back  
some time ago and said  
that he had left me in  
the hotel to stay and was  
collecting the bag to give.  
He had told them that I

(689)

was tired and did not want to come. I asked them whether they knew where he stayed. They said no and added that ~~he was~~ they were familiar with him but not too close. They knew his parents but they did not stay in Delhi. Also added that they did not know ~~at~~ that he was doing such 'badmaashi'.

They saw my pathetic situation. ~~the~~ I was not then cynical to suspect them. My naivete took them at face value. My biggest problem was that all my certificates were in that bag. ~~The~~ ~~Dr. Rest~~

(690)

were a couple of underwears  
and spare pant and shirt;  
a towel; soap; cheap  
shaving kit. They said that  
they ~~will~~ would try to  
inform his parents and  
took my <sup>Almedabar</sup> address.

So ~~we~~ I walked to  
the railway station. No question  
of any stay in a cheap hotel  
etc. ~~But~~ So I slept in  
a narrow projection in the  
wall & — an ~~ap~~ apology  
for a cot, instead of lying  
on the floor. Next day; got  
up early, washed my face  
etc. No shaving; in those

(691)

days, I was very particular about shaving with the hard 'Bharat' blade (not for me the imported 7'0 Clock which used to be ~~the~~ smuggled into India, in large quantities. I was ~~dedicated~~ dedicated to a "Made in India" product; just as ~~the~~ shunned Coca Cola, an symbol of "American imperialism".)

§ Thus I went to the UPSC interview. How I would have looked? I was also not nervous, it appears. No certificates in hand! I

(692)

had some I-D card, maybe  
PRL one or railway ticket.

I explained to the UPSC  
staff sitting there about  
my plight and requested  
for interview ~~of I-D~~ (My  
name was fully with then

Y. Sundararajan). Some  
hesitation, here and there.

There were many people  
around for interview.

Then finally one  
person told me that I  
would be sent inside and  
it was for the Interview Board

(693)

to decide. He could not guarantee that they would accept to interview ~~me~~ me. Fair enough!

So I went. ~~There was~~ I explained the situation. They were sympathetic. They told me that ~~I~~ on return I should send the original certificate, as it had not been examined here. ~~Then~~ the interview went on: very rigorous. I think, I did well. I thanked them and came ~~away~~ and returned to Ahmedabad empty handed. I don't think I told P & S as they would be worried.

~~694~~ (694)

My biggest worry was to get all the certificates in the Original. Fortunately I had not taken the original M. Sc. degree certificate; it was <sup>at</sup> home. But still, I needed other items too.

Lo and behold! A week or so later, all my certificates, interview call papers etc were received safely by post! Probably the house-holder might have told the 'cheat-person', or he himself might have realised his blunder with an innocent person. Though loss to me the net money he could get

(695)

from my other possessions ~~was~~  
~~to~~ was low! He sent back  
only the vital items; no  
letter of apology; nor his  
address etc. God had been  
kind to me, through human  
beings ~~who~~ whom I trusted  
naively. It was not that I  
was careless. I took care of  
purse, pen etc very carefully.  
Even in the crowded Bombay  
trains, which were (are?)  
notorious for pickpockets,  
and in crowded market,  
I have never lost them.  
I ~~was~~ <sup>was</sup> careful; am careful.  
But this 'trusting'

(696)

people, even strangers was perhaps a ~~bad~~ naive habit I had. Perhaps my ~~ob~~ over obsession with "rationality" and human beings being "rational" might have made me so. Why "Why should they cheat me? I have very little possessions? What I have, even a book is of no value to most people!..." etc.

A great relief. I decided that I would be more careful in future, with my belongings! Not all ~~with~~ would be like the cycle

(697)

rickshaw driver whom I met  
in Lucknow! But ~~I have~~  
fortunately I have met  
such persons later, in  
different contexts; I meet  
them even in such persons  
even now. Goodness had  
not died even in the  
overly utilitarian ~~and~~  
philosophy of modern urban life.  
Of course, I had met  
petty thieves in developed  
countries, as well!

We will come back to  
UPSC results later  
This diversion was

(698)

about my serious search for alternate jobs away from PRL / research etc. Keeping ~~other~~ other options ready before I change, is habit which had come from my Bombay life, due to difficult situations emphasising on "survival". Also Periapappa's one of the "life-tips" had be that: "(In a tree), hold on to another ~~branch~~ branch before you leave your hand from a branch, however uncomfortable it is!".

\* \* \*

INSERT  
in 699 as indicated.

699(a)

Also, as referred to earlier,  
somewhere during ~~to~~ January 1966,  
I would have met VS to  
explain about my difficulties  
in finding a suitable solution  
from Bhavsar & Nerunkar.

↓  
Then go to  
the rest of  
699 as indicated

(699)

Coming back to the ~~pressur~~ pressure on bond,

there was no compromise

<sup>INSERT</sup> given by PRL. ~~△~~ Sarabhai

~~△~~ was too busy to meet. The

699(a)  
etc matter was precipitated by

the then Dean R.G. Rastogi

terminating ~~our~~ ~~Shri~~

Studentship of K.G.V's and

mine. Naturally our stipend

was also stopped. Fortunately

Sarabhai stepped in and

in his own beautiful English,

he restored <sup>immediately</sup> ~~the~~ our status

as students. ~~and that~~ The note

(200)

further states that we had full liberty to use all the facilities of PRL, including library etc.

After some time, he restores our stipends also. But most importantly he realises that something was amiss. Why should students feel like getting out?

I don't know how he dealt with KAV's case. May KAV might have told them that he did not want to stay. Since he was ~~at~~ in the hostel and I staying at Paldi, we did not meet often,

(701)

except at PRL. Moreover we did not take joint decision. We did it independently without consulting each other. KGV was fond of me. He will call me "Sundar".

In my case Sarabhai called me separately to meet me. ~~(because he <sup>was</sup> also aware of the KGV issue)~~ He asked about the research work at PRL and why I ~~found~~ <sup>felt</sup> that nothing much could be done. I

explained to him on scientific and technical grounds about the problems and that I could not wait for a decade

This may be in the first quarter of 1966.

yet unresolved for me.

(202)

or more to get a Ph.D.

"Sir, CoI / UPSC etc  
treat Ph.D. as equivalent  
two years of experience. If  
it takes a decade or more,  
I would be bald by then!"

"No, who told you? Ph.D.  
cannot be treated like that!"

"Sir, please see all  
advertisements of CoI. I can't  
be spending my precious young  
age, on problems which do  
not make a great impact on  
science or give me new  
knowledge!"

"Well then I will give

(703)

you specific challenging &  
scientific problems, which  
are being done with simple  
instruments — study them  
to see what can be done here.

Example the balloon  
experiments by Charakachyan  
Δ Charakachyan. They get  
energy spectrum, ~~with~~ Look  
at them!"

# I knew their work,  
it was done with simple  
Gieger tubes in USSR. To  
that extent Sarabhai was  
right. But they are in

(204)

in different latitudes. I  
tried to reply.

"Sundarajan, I will  
come next week and you  
can then explain".

Next week sharp  
he gave time. I explained  
to him how they had  
the advantage of a vast  
terrace in their country  
steppes, ~~at~~ Sibena etc.

Balloons can fly and  
can be recovered. More

importantly since they  
were above  $45^{\circ}N$ , they

(705)

~~the~~ had the advantage of  
low geomagnetic ~~cut~~ cut off.  
They had had plenty of  
cosmic ray particles coming  
in and giving them robust  
statistics. As they move  
~~in~~ within their country  
they would get 3 to 4  
separate places ~~in~~ in which  
there would be significant  
changes in magnetic field  
& therefore different energy  
particles can come in.

Therefore they could

(706)

Get very good data to draw energy - spectrum ~~curves~~ curves, in those ranges of energy. So they had many papers, which can verify ~~the~~ earlier theories and give new insights.

Unfortunately for us below ~~the~~ Srinagar we have high magnetic cut off and the cosmic ray particles that come in will be much lower. Only higher energy ones can penetrate.

(707)

They are also of interest  
but their number is small.  
and therefore statistics will be  
~~small~~ poor. We need <sup>large sizes</sup> ~~big~~  
scintillators to be flown,  
and they would be costly.

He could understand  
all the details, I told. ~~#~~  
He was perhaps told those  
things before. He was a busy  
person away from such  
detailed research. His practically  
last ~~&~~ student was  
G. Subramaniam who  
wrote ~~an~~ thesis on the  
earlier ~~the~~ vintage Cosmic

(708)

Variations.

He then told me  
"Sundaraman, good that  
you have analysed this  
problem from all aspects  
from science, to experimenter  
to costs etc. I would give  
you another problem<sup>#</sup>.  
Again next week, we  
will discuss!"

Such items went  
on for ~~so~~ many weeks till  
he exhausted his ideas. I  
had given thought to all  
of them earlier; therefore I  
could ~~log~~ logically explain.  
During ~~Most~~ of such meetings, ~~had~~

(709)

~~Dr. Kant~~ Dr. Kamala Chandhry  
of IIM, who ~~was~~ used to  
come regularly to meet  
him, used to be present.

She ~~was~~ would sit separately  
when our discussions (VS & me)  
were going on she used  
to be sitting elsewhere patiently.

VS's room did not have  
airconditioning. He stuck  
to the rule of PRL; <sup>for himself, the Director?</sup> no  
air-conditioning for individuals  
or collective offices. Only  
when there was a need  
for equipment cooling

(710)

a/c was allowed. VS had  
a/c in his ~~own~~ house!

~~But~~ But in PRL rules  
were same for every body.  
That attracts me very  
much to him, in  
addition to his magnetic  
personality.

His discussions  
~~was~~ used to be for about  
30 to 40 minutes, each weekend.  
Only those who were familiar  
with PRL of those days and  
VS's working mode, would  
know how precious it  
was! It was one-to-one  
even when Kamal ben was

(111)

was in the room.

VS started realising that my understanding of the research problems, the methodology of doing them, project managerial aspects etc were very good. ~~How~~ He found that the constraints at PRL were really genuine.

~~Almost~~ After many weeks of such sittings, he asked me, "Sundararajan, we have so far discussed about experiments. Let us leave them aside and why don't you pursue theoretical research?"

My ~~as~~ answer was

(712)

almost spontaneous." Sir,  
I am reasonably good at  
mathematics and theoretical  
physics. But theoretical research  
cannot be done alone. There is  
Prof Pandya here; his interests are  
confined to ~~shell~~ shell theory.  
There is nobody else. Also even  
to discuss ~~issues~~ problems,  
there is none here. It would  
be good to have a group of  
10 persons even with different  
interests. Sir, none of your  
faculty is upto it!" ~~It~~ The  
last statement was an  
irreverent one, but truthful.  
At my age of 22, ~~it~~ I think

(713)

I did not have any fear. I think that is the ambience VS had created in PRL. When we discuss scientific - technical issues, one has to be truthful, even if saying it ~~is~~ was unpleasant.

He also ~~spot~~ spontaneously responded, "Sundararajan: Let us not do any postmortem any more. I want ~~to~~ you to come on the Independence Day; I will come from Bombay. ~~We~~ I want to ~~do~~ see that you get interested in engineering tasks of the Space Programme. You can quit Ph.D and become an engineer in INCOSPAR."

(714)

~~With~~ He led me to the door  
and with a twinkle in his  
eye told: "May be that is your  
independence day!"

What a magnanimity!  
I am a person with no connections.  
No riches. No back up of some  
big persons in India. He was  
a very big person in India!

He ~~is he~~ was hard pressed  
for time. He used to meet  
people in a group ~~and~~ and  
decide ~~issues~~ on issues, as  
he had no time! But for  
me he ~~was~~ gave all those  
precious minutes (and totally  
a few hours) each week  
meticulously. He was able

(15)

to see the truth and logic in my statements, including the irreverent one! I don't know what he saw in me! Obviously he might have assessed that something useful from me would come for India's space programme which was his vision and passion. So even a Sundarajan was not to be ~~let~~ let off; ~~and~~ let him become an engineer!

That was a great turning point in my life. It is at that time I got my UPSC offer: I had

(116)

been selected as JSO! In those days such jobs were not easy to come by. KAV also got it. He decided to go!

Though technically there was a ~~diff~~ dilemma for me, ~~one thing~~ and ~~I did~~ though at that time <sup>[I did not know]</sup> what was in store for me, what VS was going to offer me, I had one thing clear by them.

Sarabhai had shown me a very very special consideration. He wanted me! He was going to adjust things ~~from~~ for me. I would not, at this time,

(217)

go and show him the  
JSo offer letter! No way!!  
I have to trust him  
and ~~not~~ reciprocate all  
the kindness he had  
shown to me, given to me!

There ended any  
desire for further search  
of jobs or going away from  
Sarabhai given jobs/tasks.  
It was a new BOND for  
me with PRL/INCOSPAR and  
the emerging Indian Space  
Program. It was an unwritten  
bond, and not like the  
one imposed by Ministry of Education!

(718)

That was a great turning point in my life — no Ph.D or research career but the tasks of an engineer Sandbhai ~~would~~ would give me a few days from now. There was no further desire to analyse its future; or pros and cons etc. It was as if falling in love; no more questions.

\* \* \*

As promised VS had arranged to meet me after the Independence Day flag hoisting hoisting etc.

(719)

It was in August 15, 1966. He was already Atomic Energy Chairman for about two months. He was still keeping up his promise to me by meeting regularly every weekend.

I remember the <sup>May or</sup> June 1966 Cosmic Ray Symposium held at TIFR. Homi Bhabha was a speaker. I still had gone there as a PRL student. I distinctly remember what HB said: "You all ~~to~~ ~~to~~ have ~~some~~ come up with a lot of new ideas and many new projects to be pursued. It is very good

(720)

Better skill is to ~~know~~ know  
which items to close down  
and we need to close  
them down. Just continuing  
many old ones is no good!"

Later we heard about  
the sudden death, a few  
weeks later; VS ~~became~~  
became ~~Atomc~~ AEC  
Chairman. Still he was  
keeping dates with me. I

~~So what the~~  
~~So the items I~~  
~~have described, the PRL~~  
~~bond~~ ~~board~~ ~~questions, my~~ ~~interviews~~  
~~she~~ ~~would~~ ~~have~~ ~~been~~ ~~in~~ ~~the~~

(724)

There were three persons  
VS, KRR & Prof E.V. Chitr's.  
I was asked to sit down.  
VS had a <sup>typew</sup> paper before him.  
He introduced me to the  
Committee! How well he  
had got his homework done.  
I was amazed. Then he  
said ~~that~~ "Sundharajan  
has to start the career as  
an Engineer in ~~IS~~ INCOSPAR. He  
is very good in Microwaves; he  
can work for ESCES or work  
with Calla who is developing  
rocket borne transporter for  
our sounding rockets..." Prof KRR

(722)

intervened to appreciate my work and interest in electronics relates developmental work. He added that there was a lot of challenging work to build ~~an iono~~ a new ionospheric station in ~~the~~ Trivandrum (Thumba).

I thought "Oh! God! Back again to ionosphere? & repeat of the same old things, replicating from PRL! Then what?"

Fortunately, I did not have to say any thing. Close to six months of interaction with me on <sup>(space)</sup> scientific research problems, & VS knew that I would not like it.

(723)

So he diverted the talk to discuss about the ESCES work and its importance for ~~the~~ satellite communication; and transponder as a support instrument for all rocket experiments. Then asked EVC, "What do you think?" EVC said in his slow talky style, "I think it is better he is put with Calla for the development of transponder. Work is yet to start and Sundararajan will fit in well and be of help in speeding up!"

Maybe VS had

(724)

finalises the matter earlier  
and might have briefed EVC.

So VS told me, "Sundarajan,  
fine. You can start ~~with~~ as  
~~PRL/SST~~ engineer with

PRL/SSTC right tomorrow.

Go to Calla. Administration  
will do all the rest!"

~~VS's work~~ I was also

happy. I had an advanced  
development work to do! And  
a job (I knew it was with  
a better pay). I was aware  
of Calla who was doing his  
~~the~~ work in the same floor  
in which VS sat.