

Почтуприемная "Укрспоста"

Москва.

25th Jan. 69.

Dear Alan,

Many thanks for your very interesting letter which I have just received. I was very sorry to hear that the first letter has evaporated into thin air since I have not received it back.

-Anyway, as you prophetically put it, it was a missile.

The point was your "Nature" letter - I find it very interesting indeed but cannot reproduce your result about thermal absorption in intergalactic space. I do not now have my figures handy but I found that for $T \sim 10^5 \text{ K}$, adiabatic history and critical density, $(\Omega = 1; q_0 = \frac{1}{2}; \Lambda = 0)$ the optical depth around $z \sim 2.5$ is only a few percent. - from memory. $\tau \sim 6 \times 10^{-3}$. The only way of getting anywhere near $\tau = 1$ at $z \sim 2.5$ is to have isothermal history with $T = 10^4 \text{ K}$ but this result is inconsistent with the Gunn and Peterson results which require a higher temperature

in the range $1.4 < z < 2.2$. It also contradicts the observed upper limit on the extragalactic Lyman α radiation observed in the Russian experiments from satellites (Kurt and Sunyaev, 1967 in "Cosmic Research" ("Kosmicheskoe Uchebnoye"). I am therefore slightly unhappy about your final remark in your paper - although I am prepared to accept that the spectrum may turn over but I cannot really think of an appropriate mechanism.

The original letter was a joint letter with Rashid Sunyaev with whom I have been working a lot recently - he did the calculations independently and obtained the same answer. I would be very grateful if you could clarify your calculation for us. If we are correct in our interpretation, I think we have a puzzle on our hands since it is difficult to think of some way of getting such a turn over. I have also talked with Slish about this (the same Slish of Williams/Slish self-absorption - he's quite a young chap - like Phil. -) and he feels that there must be a turn-over because besides seeing

Centaurus, he said that Debes also saw the Galactic Centre.
What is the possibility of Centaurus and Galactic Centre being
extremely bright at 2.1 Mctz so that the spectrum doesn't need
to turn over?

Well, other things - life here is quite tremendous - I
am enjoying it very much and am very busy - it is like a new
lease of life getting down to real research again. I too am now
taking a very long look at Cambridge and its sub-Pavlovian
techniques.

To answer your question, I arrived in the USSR in 6th
September and immediately went to Georgia for a conference on
Gen. Rel. which was great fun. I will be here until the
beginning of August when my sister has decided to get herself
married and informed me that my presence is essential to the
success of the wedding!

I was 10 days in Georgia and suffered under the
tremendous hospitality of the Georgians - I don't know how much I told
you in my last letter but at every opportunity they gave one wine,
brandy, vodka, food - everything. I claim I have now seen most

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Russian astronomer in their cups - if not actually throwing up! - (2 cases of very distinguished people!!)

Like you I am amassing money at a tremendous rate but with the difference that I cannot take it out of the country - I can see ~~me~~ ^{myself} returning with piles of furs, caviare, Russian paintings - all these things just to get rid of all my roubles.

I had tremendous fun at Christmas time: Every night a different party at a different Embassy - they decided I was a very useful single unattached male and such beings are pure gold to Ambassadors wives who have to entertain crowds of wives, daughters of their and other Embassies. I had particular success with the British Ambassador (or rather, his daughter) and was invited to the Embassy for tea and drinks before the ballet - very cozy having elegant tea with the Ambassador and his wife and daughter. Then off to the ballet in the Halls - so much more convenient! - then after the ballet, off to another party down here - the Halls - you know, I suspect I really am a mob or something. Anyway, after these celebrations ~~the~~ my Russian friends insisted on my having a Russian New Year - after all this let I

Collapsed into bed for 2 days - I must be getting old! It is very interesting but most Russians seem to have the great ambition to be bourgeois or provincial exactly in the sense which we try to avoid - I suppose they will get over it.

Things keep happening - yesterday I was at the press-conference for the 4 Russian cosmonauts - a very great honour for me indeed - it really was a bit dull with written questions receiving written replies but it was interesting to see them in the flesh. I have been to Sepekhov and seen the instruments ^{that} ~~they~~ are working in the 30-100 MHz band and at present chasing pulsars (they have discovered the first Russian pulsar!) (by chance!!).

Most of my time is spent with theoreticians and it is very stimulating. I have been working a lot with Zeldovich and Poroshkevitch - everyone is very friendly - Also I have had a few discussions with Rustum Dakesamenski about spectra and he is of the opinion that lots of the Willcous et al et al et al is so much crap - he is more polite than this but this is the gist of his work. Have you got any opinion about the reliability of the statement that the mean spectral index of radio sources at 178 MHz

does not change down to $2 \times 10^{-26} \text{ W m}^{-2} \text{ Hz}^{-1}$. I feel you know
as much as anyone about this question and can give me a definitive
answer. I know Phil's calibrations are suspect at low ν -
Could you put me straight on this sometime, if you have time?

I am very impressed with your plans which seem very sensible
indeed, both astronomically and socially.

My plans are at present hazy to say the least - I have
at least become very keen about theoretical physics and now believe
I am much improved at physics in general (which wasn't difficult!!).

At present I intend returning to Cambridge to join the academic
labour exchange!! I feel I must return for a year to Cambridge
to disseminate my new found knowledge and try to inject some life
into the bloody old department which really, now that I look
at it, qualifies for my "Dullsville of the Year" award - There
is so much which could be done if only people had a bit of life.

There are my immediate plans but if things look like being
as stultifying as they threaten to be, I will look around. If all
else fails I'll buy a cottage somewhere in the middle of the Highlands

And translate stuff from Russian to English!!!

However, life is much too interesting and exciting just now to contemplate dull thoughts like the distant future - Research is also going well - I am giving about a lecture every 2 weeks just now - all in Russian (to say with pride!).

Well, very best wishes - please write if you have time - I'm glad marriage is proving such a happy state for you - please give my best wishes to Mary, who I have, of course, never met - when are we to get together for a chin-wag? - give it a thought.

Malcolm.

P.S. Temperatures a constant -25°C - -30°C just now but at least I'm prepared for it this time - fur coat, fur hat - heavy boots.

PPS - Please give my best wishes to Chris P. and all the others out there.