PROFESSOR LEO MOSER -- REFLECTIONS OF A VISIT

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Professor Leo Moser[1] was known throughout the Mathematical Community as a significant researcher and excellent lecturer.

I first met Leo during the Summer Research Institute in the Theory of Numbers held at the University of Colorado in 1959. After talking with him and hearing his lectures during the Institute, I felt that arrangements would have to be made in the near future for a visit to Nebraska. During the academic year 1962–63 while Professor Moser was on a lecture tour for the MAA, I invited him to present two research lectures to the Nebraska Section on May 3 and 4, 1963. He responded: "Professor D. W. Western of Franklin and Marshall College is my booking agent and I will write him immediately and find out whether it would be possible to clear May 3rd and 4th for me and thus enable me to give the lectures in Nebraska." His generosity was revealed in a subsequent letter in which he asserted: "According to a letter just received from Professor D. W. Western, I am to lecture in Cleveland, Ohio on May 1st and 2nd and in St. Petersburg, Florida on May 6th and 7th. Assuming connections are not too bad I should be able to get to Nebraska in time. If I find that the connections are not easy then I can move the Cleveland date back by one week I imagine. My talks at Nebraska will be on Number Theory and have the general title "Some New Applications of Generating Series."

As usual his lectures were delivered with vigor, humor, and clarity. Following his last lecture I invited him to my office in order to discuss some of his results, and during our conversation the subject of mathematical limericks was mentioned and he asked if I would like to record some of his and other's limericks. (I had previously received his permission to record his lectures.)

The main purpose of this paper is to present a transcription of these limericks and other verse, recorded on May 4, 1963.

Hiawatha Designs an Experiment

Hiawatha, mighty hunter,
He could shoot ten arrows upward,
Shoot them with such strength and swiftness
That the last that left the bull-string
Ere the first to earth descended.

This was commonly regarded
As a feat of skill and cunning.
Several sarcastic spirits
Pointed out to him, however,
That it might be much more useful

[1] Professor Moser died February 9, 1970 at the age of 48. The author wishes to express his appreciation to Mrs. Moser for her permission to publish this paper.

If he sometimes hit the target.
"Why not shoot a little straighter
And employ a smaller sample?"
Hiawatha, who at college
Majored in applied statistics,
Consequently felt entitled
To instruct his fellow man
In any subject whatsoever,
Waxed exceedingly indignant,
Talked about the law of errors,
Talked about truncated normals,
Talked of loss of information,
Talked about his lack of bias,
Pointed out that (in the long run)
Independent observations,
Even though they missed the target,
Had an average point of impact
Very near the spot he aimed at,
With a possible exception
of a set of measure zero.
"This," they said, "was rather doubtful;
Anyway, it didn't matter
What resulted in the long run:
Either he must hit the target
Much more often than at present,
Or himself would have to pay for
All the arrows he had wasted."
Hiawatha, in a temper,
Quoted parts of R. A. Fisher,
Quoted Yates and quoted Finney,
Quoted reams of Oscar Kempthorne,
Quoted Anderson and Bancroft
(practically *in extenso*)
Trying to impress upon them
That what actually mattered
Was to estimate the error.
Several of them admitted:
"Such a thing might have its uses;
Still," they said, "he would do better
If he shot a little straighter."
Hiawatha, to convince them,
Organized a shooting contest.
Laid out in the proper manner
Of designs experimental
Recommended in the textbooks,
Mainly used for tasting tea
(but sometimes used in other cases)
Used factorial arrangements
And the theory of Galois,
Got a nicely balanced layout
And successfully confounded
Second order interactions.
All the other tribal marksmen,
Ignorant benighted creatures
Of experimental setups,
Used their time of preparation
Putting in a lot of practice
Merely shooting at the target.
Thus it happened in the contest
That their scores were most impressive
With but one solitary exception.
This, I hate to have to say it,
Was the score of Hiawatha,
Who as usual shot his arrows,
Shot them with great strength and swiftness,
Managing to be unbiased,
Not however with a salvo
Managing to hit the target.
"There!" they said to Hiawatha,
"That is what we all expected."
Hiawatha, nothing daunted,
Called for pen and called for paper.
But analysis of variance
Finally produced the figures
Showing beyond all peradventure,
Everybody else was biased.
And the variance components
Did not differ from each other's,
Or from Hiawatha's.
(This last point it might be mentioned,
Would have been much more convincing
If he hadn't been compelled to

Estimate his own components
From experimental plots on
Which the values all were missing.)
Still they couldn't understand it,
So they couldn't raise objections.
(Which is what so often happens
with analysis of variance.)
All the same his fellow tribesmen,
Ignorant benighted heathens,
Took away his bow and arrows,
Said that though my Hiawatha
Was a brilliant statistician,
He was useless as a bowman.
As for variance components
Several of the more outspoken
Made primeval observations
Hurtful of the finer feelings
Even of the statistician.
In a corner of the forest
Sits alone my Hiawatha
Permanently cogitating
On the normal law of errors.
Wondering in idle moments
If perhaps increased precision
Might perhaps be sometimes better
Even at the cost of bias,
If one could thereby now and then
Register upon a target.

* * *

Chicago's mathematical forces
Despite their numerous resources
Always adorn
With the Lemma of Zorn
At least ninety percent of their courses.

* * *

Professor Adrian Albert said who
Can tell me a theorem that's true
The ones that I know
Are simply not so
When the characteristic is two.

* * *

Eduard Čech by God's grace
Was the first man on Earth to trace
That sordid and dreary
Cohomology theory
Of a subnormal bicompact space.

* * *

A mathematician confided
That a Möbius strip is one sided
And you get quite a laugh
When you cut it in half
Because it stays in one piece when divided.

* * *

Mathematicians try hard to floor us
With a non-orientable torus
The bottle of Klein
They say is divine
But it is so exceedingly porous.

* * *

Once a man whose name wouldn't rhyme
Found an unbelievably large prime
But with no place to store it
He had no use for it
So Dick Lehmer got it for a dime.

* * *

A mathematician named Moser
Well-known as a problem proposer
Sent some that were silly
To his brother named Willy
Could he stump him? The answer is no, sir.

* * *

There was a young man from Racine
Who invented a brain-like machine
It knew digits in π
And found cube roots of i
And sang a few hymns in between.

* * *

Where are the zeroes of zeta of s?
Bernhard Riemann made a pretty good guess:
"They're all on the critical line," said he
"And their density is t over $2\pi \log t$."

Now the statement of Riemann has set off a trigger,
And many a good man with vim and with vigor
Tried to prove with mathematical rigor
What happens to zeta as mod t gets bigger.

The names of Hardy, Landau, and Cramér
And Littlewood and Titchmarsh are there.
But in spite of their skill and in spite of finesse
In locating the zeros, no-one's had success.

In 1914, G. H. Hardy did find
An infinite number that lay on the line.
But unfortunately his theorem won't rule out the case
That there may be some zeros in some other place.

Oh where are the zeros of zeta of s?
We must know exactly, we cannot just guess.
For in order to refine the prime number theorem,
The path of integration must not get too near 'em.
(by Tom Apostol*)

* * *

There was a young fellow named Ben
Who could only count modulo ten
He said when I go
Past my last little toe
I shall have to start over again.

* * *

The binary system is fun
For with it strange things can be done
And two as you know
Is a one and an oh
And five is one hundred and one.

* * *

The marvelous things a computer can do
Makes an idiot out of the highest IQ
But there's one consolation
In this observation
It can't even add up to two.

* * *

Here's to uncle Albert E.
Pundit of relativity
You'll know him by his fiddler's locks
and by his utter lack of socks.

Here's to uncle Oswald V.
Lover of England and her tea
He is that mathematician of note
Who needs four buttons to button his coat.

* * *

Condemned for defending the masses
Scourged for defaming the lasses
Not moved by disgrace
He has come to this place
To teach the class of all classes.
(Student – University of Minnesota,
written on the occasion of B. Russell's
visit in 1942–1943)

* * *

A function from feeling inferior
Felt life monotonically drearier
With a hell of a yell
That jumped into L
And converged to the limit superior.

There once was a hairy baboon
Who always breathed down a bassoon
For he said it appears
That in millions of years
I will certainly hit on a tune.

* * *

Let x stand for beauty, y manners well-bred,
Zed fortune (this last is essential).
Let L stand for love, our philosophers said,
Then L is a function of x, y, and zed
Of the kind that is known as potential.
Now integrate L with respect to dt
(t standing for time and persuasion).
Then between proper limits it's easy to see
The definite integral marriage must be.
(A. S. Eddington — A very concise demonstration. L.M.)

* * *

Said a monkey as he swung by his tail
To his children both female and male
From your offsprings my dears
In some millions of years
May emerge a professor at Yale.

But who could dream in those
times immemorial
That from those creatures arboreal
Professor Uhler would evolve
Who had the courage and resolve
To calculate one thousand factorial.

* * *

Nature and nature's law lay hid by night
Then God said "Let Newton be,"
and all was light,
This could not last, the Devil shouting "Ho
Let Einstein be," restored the status quo.

* * *

A mathematician named Moser
Was able to regain his composure
When a pair of young men
Claimed their distance was ten
But were unable to prove this disclosure.

* * *

A mathematician O'Flaherty
Invented a new singularity
Where the Z plane corrodes
And the function explodes
Well you'll have to admit it's a rarity.

* * *

The subject of today's instruction
Is to perform mathematical induction.
The steps are easy as one two three
If you want to get clued just listen to me.

You want to prove a theorem then
To prove it for every integer n
You prove it first for n equal one
And then the induction is begun.

The proof goes on in the following way
You assume it next for n equal k.
If you can show it then for $k + 1$
Then the induction is truly done.
(To be sung to the tune of
"Three Little Fishes")

* * *

* Prof. Apostol points out that the oral tradition has produced some changes in his verses. He offers the original, guaranteed correct, version of what turns out to be a *song*, sung to the tune of "Sweet Betsy from Pike". Our efforts to locate the melody have failed. *Editor.*

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This statement of Riemann's has been like a trigger,
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Have attempted to find, with mathematical rigor,
What happens to zeta as mod t gets bigger.

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And Hardy and Littlewood and Titchmarsh are there,
In spite of their efforts and skill and finesse,
In locating the zeros no one's had success.

In 1914 G. H. Hardy did find,
An infinite number that lay on the line,
His theorem, however, won't rule out the case,
That there might be a zero at some other place.

Let P be the function π minus li,
The order of P is not known for x high,
If square root of x times log x we could show,
Then Riemann's conjecture would surely be so.

Related to this is another enigma,
Concerning the Lindelöf function $\mu(\sigma)$
Which measures the growth in the critical strip,
And on the number of zeros it gives us a grip.

But nobody knows how this function behaves,
Convexity tells us it can have no waves,
Lindelöf said that the shape of its graph,
Is constant when sigma is more than one-half.

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