

Hiawatha Designs an Experiment

by M. G. Kendall

Hiawatha, mighty hunter
He could shoot ten arrows upwards
Shoot them with such strength and swiftness
That the last had left the bowstring
Ere the first to earth descended.
This was commonly regarded
As a feat of skill and cunning.

One or two sarcastic spirits
Pointed out to him, however,
That it might be much more useful
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 men on
Any subject whatsoever,
Waxed exceedingly indignant
Talked about the law of error,
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 the 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 that he wasted.

Hiawatha, in a temper,
Quoted parts of R. A. Fisher
Quoted Yates and quoted Finney
Quoted yards of Oscar Kempthorne
Quoted reams of Cox and Cochran
Quoted Anderson and Bancroft
Practically *in extenso*
Trying to impress upon them
That what actually mattered
Was to estimate the error.
One or two of them admitted
Such a thing might have its uses
Still, they said, he might 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)
Randomized his shooting order
In factorial arrangements
Used in the theory of Galois
Fields if ideal polynomials
Got a nicely balanced layout
And successfully confounded
Second-order interactions.

All the other tribal marksmen
Ignorant, benighted creatures,
Of experimental setups
Spent 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 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 his 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
Did analyses 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, one should acknowledge
Might have been much more convincing
If he hadn't been compelled to
Estimate his own component
From experimental plots in
Which the values all were missing.
Still, they couldn't understand it
So they couldn't raise objections
This is what so often happens
With analyses of variance.)

All the same, his fellow tribesmen
Ignorant, benighted heathens,
Took away his bow and arrows,
Said that though our Hiawatha
Was a brilliant statistician
He was useless as a bowman,
As for variance components
Several of the more outspoken
Made primeval observations
Hurtful to the finer feelings
Even of a statistician.

In a corner of the forest
Dwells alone my Hiawatha
Permanently cogitating
On the normal law of error
Wondering in idle moments
Whether an increased precision
Might perhaps be rather better
Even at the risk of bias
If thereby one, now and then, could
Register upon the target.