

## HIAWATHA'S LIPID

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Americans seem to follow their Puritan ancestors in thinking it proper to follow pleasure by pain; hence the after-dinner speech. When attending the Sixth Annual Symposium on Lipids in San Francisco February, 1958, invited by Dr. Larry Kinsell and my travel made possible by Mr. Alex Poniatoff of the Ampex Corporation, I was told on arrival for the symposium banquet that I would have to reply for the guests. Fortunately I had fortified myself with several martinis for the trek downtown from that neo-colonial edifice, the Hotel Claremont, to Sprenger's Fish Restaurant; on arrival I sought inspiration in innumerable manhattans—taken, of course, because they were good for me since the day's immobility of listening to papers on atheroma and serum cholesterol had no doubt silted up my vessels, and alcohol is one of the few effective solvents. From it "Hiawatha's Lipid" crystallized out.

Though intelligible only to others present at the day's session and banquet, it is given wider publicity than any after-dinner speech should have merely because those at the banquet who were too somnolent to hear it asked to see it so that they might know whether it was as bad as they supposed. There is no glossary, and perhaps explanation is needed that (a) a "quokka" is a marsupial (that is, it carries its nipples in a bag) which has a ruminant's digestion like a cow (which doesn't); (b) "UFA" stands for "Unesterified Fatty Acids" in those parts of the United States that do not call them "NEFA" or "Non-Esterified Fatty Acids" (these symbols also stand for "Unsaturated Fatty Acids" and "Non-Essential Fatty Acids," but the initiated always know what they are talking about).

\* Magdalen College, Oxford, England. Printed by kind permission of California Corporation for Biochemical Research.

From his briefcase Hiawatha  
 Took his paper for the meeting,  
 Typed in triple-spacing and in  
 Triplicate on foolscap paper;  
 Glanced upon the crowd before him,  
 Critical and very hostile,  
 Like the lions in the arena  
 Waiting for a Christian victim,  
 As the surgeons in some theater  
 Wait impatiently the patient;  
 Saw them with their notebooks waiting,  
 Saw the tape recorder ready  
 Gleaming in its chromium plating  
 By the Ampex Corporation  
 And preserving all the nonsense  
 Spoken by the previous speakers,  
 As the snow upon the prairies  
 Uselessly records the footprints,  
 So preserving all the nonsense  
 Spoken by the previous speakers.

*Introduction*

Hiawatha, taking courage,  
 Started on the Introduction,  
 Giving first a brief description  
 Of the Proto-Keysian period  
 When all fats in equal measure  
 Raised cholesterol in serum:  
 Butter, sardines, walrus liver,  
 Margarine, or safflower seed oil,  
 Or arachidonic acid,  
 Or the body fat of quokkas,  
 Or adrenals of the muskrat,  
 Or the milk of female reindeer—  
 As these fats in equal measure  
 Raise cholesterol in serum,  
 As the rain in San Francisco  
 Fills the ditches in the roadways  
 (So at least thought Hiawatha)  
 So these fats in equal measure  
 Raise cholesterol in serum.

Then the Meso-Keysian period  
 When it's known from work of others  
 Quantitative variations  
 Do occur when different lipids  
 Are included in our diets,  
 Plentifully in our diets:  
 Butter, sardines, walrus liver,  
 Margarine, or safflower seed oil,  
 Or arachidonic acid,  
 Or the body fat of quokkas,  
 Or adrenals of the muskrat,  
 Or the milk of female reindeer—  
 Do not in an equal measure  
 Raise cholesterol in serum;  
 As the smoke is wind-swept upward  
 Randomly with Brownian movement  
 Wandering above the wigwam,  
 So these fats in different measure  
 Raise cholesterol in serum.

Then the Neo-Keysian period  
 When arithmetic will tell us  
 By an intricate equation  
 What cholesterol in serum  
 We will have when we have eaten  
 (And don't vomit having eaten)  
 Butter, sardines, walrus liver,  
 Margarine, or safflower seed oil,  
 Or arachidonic acid,  
 Or the body fat of quokkas,  
 Or adrenals of the muskrat,  
 Or the milk of female reindeer;  
 Count the double bonds and add by  
 Electronic automation  
 On a digital computer  
 From the Ampex Corporation.  
 There's no need to estimate it—  
 All cholesterol in serum  
 Follows now the Keys equation;  
 As the caribou in summer  
 Migrate by accustomed pathways

And predictably are herded,  
 Dietetic computation  
 Of the double bonds in lipids  
 With a slide-rule calculation  
 Gives you now a neat prognosis  
 Whether you will die tomorrow  
 From a thrombus in your vessels—  
 Myocardial infarction  
 Or ischaemic heart diseases—  
 As a cork pushed in a bottle  
 Stops the wine from flowing freely  
 (Vin rosé of California);  
 Atheromatosis also  
 Is predicted by this method,  
 By this skilful Keysian method.

Others are not quite so lucky:  
 Larry's lowered lipid levels (1)  
 After vegetable seed oils—  
 Polyethenoic acids  
 Or essential fatty acids  
 From the vegetable seed oils—  
 Follow a more simple pattern,  
 So at least thought Hiawatha  
 In unpublished observations:  
 As the sun comes up in morning,  
 As the sun goes down in evening,  
 So the laws of lipid levels  
 Are predictably determined—  
 Saturated fatty acids  
 Raise cholesterol in serum,  
 Polyethenoic acids  
 Lower serum lipid levels—  
 So at least thought Hiawatha  
 In unpublished observations.

#### *Methodology*

After this review of others  
 Hiawatha turned to methods  
 (Methodology, he called it  
 Making it more scientific—  
 Longer words are scientific);  
 Talked about silicic acid,  
 Mead's silicic acid column,

How he trapped the different lipids  
 As he used to trap the beaver.  
 Then he pushed them back and forward—  
 Countercurrent distribution—  
 As the frightened hare or reindeer  
 Runs at random back and forward.  
 Then he boiled them up with potash,  
 Alcoholic potash mixture,  
 Following the rules established—  
 Riemenschneider's "skilful witchcraft"  
 So politely called by Mattson  
 (Personal communication)—  
 As the dinner in the stewpot  
 Is boiled up by Minnehaha,  
 So he boiled them up with potash  
 And the double bonds determined  
 Spectrophotometrically.  
 Then he used the latest method,  
 Gas-chromatographic method  
 Introduced by James and Martin  
 Showing peaks upon the paper  
 Like the Rockies at the sunset,  
 Like the mole hills in the prairies.  
 Thus he estimated lipids  
 And he wondered if it mattered,  
 Wondered secretly about it  
 With unpublishable wond'ings.

#### *Results*

Thus supplied with diverse methods  
 Hiawatha took some serum  
 From his arm by venipuncture  
 And cholesterol determined;  
 Why he had no clear conception  
 But there's wild enthusiasm  
 For cholesterol in serum;  
 As the children round the camp fire  
 Dance and shout in exultation,  
 So there's wild enthusiasm  
 For cholesterol in serum:  
 Why it rises on infusion  
 Of suspended phospholipids  
 (Ethanolamine and choline

Joined to phosphaditic acid  
With unsaturated acids—  
Polyethenoic acids—  
Also saturated acids,  
From the glycerol projecting  
Like the branches of a cactus),  
Coming out from unknown tissues—  
Red cells, liver, spleen and kidneys,  
Atheromatous aortas,  
Hepatectomized adrenals;  
Why it falls when you have eaten  
Polyethenoic acids  
Or essential fatty acids.

Thinking that this single value  
For the level in his serum  
Might not be sufficient data  
To establish without question  
What the normal value should be,  
Hiawatha with his cunning  
Took a logarithmic table,  
Photographed a page at random  
For a lantern slide of figures,  
Showed it very confidentially  
With his back toward the audience  
Talking fast and very softly  
At the figures thus projected  
Which were very small and many  
Like the sands upon the seashore;  
And the audience, not hearing  
What he spoke toward the blackboard  
Very softly, very swiftly  
Like the gentle brook in springtime,  
Thought him wise and very clever  
To have got so many figures  
And their standard deviations,  
Arithmetical progressions,  
Geometrical regressions  
And regression coefficients;  
Praised his industry, his brilliance,  
And applauded his statistics,  
For they had not understood him  
Nor could read his logarithms.

Having thus established clearly  
What the normal value should be,  
Hiawatha took a patient  
Who had grave thrombotic symptoms,  
Used his methods on the serum  
(Methodology he called it),  
Found a curious lipid in it—  
Ante-iso-*trans*-oleic;  
Recognized it by the usual  
Gas-chromatographic method,  
By the humps upon the paper  
Like the Rockies at the sunset,  
By the bumps upon the paper  
Like the mole hills in the prairies,  
By a very curious spicule  
Like the tower of Hotel Claremont  
Coming in a new position  
Which unquestionably proved it  
Ante-iso-*trans*-oleic;  
Called it Hiawatha's UFA  
"Hiawathianic acid";  
No one else had found this lipid  
In the serum of a patient;  
Called in Hiawatha's syndrome,  
Hiawatha's lipodosis,  
But he did not know his patient  
Had been bitten by a viper—  
*Viperus Russelianus*—  
And in Russell's viper venom  
There is but one type of UFA—  
Ante-iso-*trans*-oleic,  
Hiawathianic acid.

#### *Therapy*

So he started quick to treat him;  
Gave him safflower oil and corn oil,  
Gave him pints and quarts of corn oil,  
Gave it by infusion, also  
Gave it by inunction, also  
Poured it down, *per os*, his pharynx,  
(As the beaver in the flood time  
Being drowned in swirling waters  
Soon becomes a bloated carcass),

Every orifice was needed  
For administ'ring the doses  
Of essential fatty acids;  
But the patient still had in him  
Ante-iso-*trans*-oleic,  
Hiawathianic acid.

So he tried specific treatment;  
Gave some linoleic acid  
(Octadecadienoic),  
Gave arachidonic acid,  
Named you might suppose from peanuts,  
But it is not found in peanuts  
And is plentiful in spiders,  
So perhaps he spelt it wrongly—  
So "arachnidonic acid,"  
Like arachnoidea mater,  
Which, as everyone remembers,  
Is the inmost spidery mother  
Which ensheaths and wraps the cortex;

But the patient still had in him  
Ante-iso-*trans*-oleic,  
Hiawathianic acid,  
Which had come, if he had known it,  
From the Russell's viper venom.

*Summary*

The moral of this story is then  
Take some care when you have eaten  
Butter, sardines, walrus liver,  
Margarine or safflower seed oil,  
Or arachidonic acid,  
Or the body fat of quokkas,  
Or adrenals of the muskrat,  
Or the milk of female reindeer;  
To avoid thrombosis don't get  
Bitten by a Russell's viper  
Which has but one type of UFA—  
Ante-iso-*trans*-oleic,  
Hiawathianic acid.

REFERENCES

1. L. KINSELL and FRISKEY MICHAELS, BEVERIDGE and BRONTE-STEWART, MALMROS, AHRENS, HIAWATHA; 1953 and after: *Archives of Internal Medicine*, Volume 90, page 11.