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Chemical Poetry

Unit 2 Through Verse

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Chemical Equilibrium

Inevitable as gravity
Impartial as rain
Constant as the moon's phases
Balanced simplicity.
Accounting for quantity,
Temperature and pressure
Destination always,
Of the molecular dance.
Electrons flying, colliding
Atoms recombining with
Preordained fates.
A chance to change states,
To become again
The product you once were.

Acetylsalicylic Acid

Long before Bayer
In Germany made
Aspirin over
A hundred years ago,
Hippocrates in Greece
Was boiling willow bark
For birthing mothers.
Its hot bitter tea
Soothed their pain.
And their screams of labor
Faded to screams of new life.

Today we modern Americans
Ponderous creature wielding iPhones
Riding in steel chariots
Fueled by combusting hydrocarbons
Pop over 50 million
Little white tablets
Every day.

Soothing sore backs,
Bum knees.
Countless hangovers, even
Sometimes broken hearts.
Busting up clotted blood, unhappy
Children of a fat-filled diet.
Oh, many-purposed Aspirin,
You make us forget –
Our pain.

Like dissolves like

She said to him
Before taking his hand
And leaping over the
Cement embankment guarding
The temperamental ocean.

The fell as if suspended
In a colloid solution
Each hypotonic
To the other's
Hypertonicity.

Concentration gradient
Of molecular recombination.

Salvation by Neutralization

Paper mill on the Potomac
Happy accident of
Equilibrium chemistry.
Acid river, from abandoned coal mines.
pH 4.5, no fish, no life, no thrive.
Through Appalachian valleys
[3.16228E-5] hydrogen ions,
or H_3O^+ , call it what you like,
per voluminous Liter
Of dry, dead river water.

Unlikely savior, milling paper
On the river bank
Spews a little Calcium Carbonate
From its outtake gate.
And a sewage treatment plant
Living breathing bacteria
Making carbon dioxide which recombines
Suddenly bicarb, naturally alkaloid—
Artificially produced—
Neutralization reaction
So much going on,
Beneath the surface of
Mr. Washington's river.

Happy accident,
pH normalizes to 7.2.
Life returns, fish, frogs,
Water beetles, crayfish.
Man taketh away,
But through chemistry
He returneth,
The bounty of the land.

According to Gibbs

What is constant about change?
That's the essential question here.
Balance the properties, pushing
Towards products and reactants,
The chemical dance
Of delta's H, S, and G,
What's constant about thermodynamics?
Opposing forces of enthalpy and entropy,
Moderated by Gibbs:
 $\Delta H - T\Delta S$
Unstoppable as a roaring train
Waterfall of entropy.

Hot Chocolate Energetics

Le Châtelier sat
In a chateau high
In the Swiss Alps
Sipping hot chocolate
Thinking thermodynamics
A frigid mountain breeze
Hop cup on his chilly fingers
Steamy lines of dissipating
Heat energy rising like smoke
Dissociation
Of atomic energetics.

Balance in Time

All Equilibria are satisfied
Simultaneously
K has no bearing on rate.
A reaction can happen
In an instant
Or last a thousand years
(or a million)
Equilibrium describes
The direction of change
The balance of species.
Whenever it
Is achieved.

Diprotic Acid

Euphoric phosphoric
Acid deprotonating.
Diprotic ends
To justify the means.
Ship one hydrogen down,
And then another.
Is it generosity?
No, just a demonstrated need,
A gradient of positivity
And charge imbalance,
Pulling hydrogens South
To orbit another planet.
"Titrate this" I say.
Two changes,
Losing it again,
Twice as generous.
Though, second time,
Hesitation.

Big brackets

Mass Balance

Big ole' brackets

Coefficiency

Unknown concentration,

Concentrate on my concentration.

Swirl - flavor 1 plus flavor 2,

Consensus-based problem solving.

The class dynamic is at equilibrium,

Equivalence,

Not end point.

Activity Coefficients

Equilibrium constants
Are not really constant at all.
But what is?
In this dynamic system,
Our spinning, gyrating world.

The activity of our coefficients
Depends on the radii of our ions.
Like the man said,
Size does matter.
Atoms in the Garden of Eden.

A more nuanced portrayal,
Than simple concentration.
Concentrate on your activity,
Hybrid of [conc] and gamma,
Ionic strength in my bionic arms,
Atmospheres of charge.

A stronger solution
Decreases the impact of
Any individual ion,
Lowers its atomic attractiveness
To other species.
Keeps it longer in solution,
That's what solubility is.

So we put these letters behind concentration,
Why always the Greek to symbolize
Powerful forces?
Like stand-in Gods.

Greater ionic solution strength,
Means greater ionic atmosphere charge.

The ion individual, out of charge balance,
Suddenly fits in. The Greek is needed.

But when ions are weak,
Concentration ratios rule.
Unity is approached but never reached,
Limit of inescapable size
The limitless ion.

We Are Chemists

Makers of future
Deoderants, food additives,
Button-pushers, and equation balancers,
Analytical and calculated,
Never calculating,
Well, maybe, sometimes,
Collaborative and colligative,
Deprotonating ideas,
Dissolving.
Our intellectual
Solubilities
Rationally redefining our
Surroundings
And each other.