

IN 1844 SAMUEL F. B. MORSE sent the first telegram. I believe it went from Washington to Baltimore and the message was, "What hath God wrought?" This was one of the exciting ways of announcing a breakthrough in science and technology. The entire history of science is filled with similar pronouncements. You may recall that there was a Babylonian monarch of some biblical notoriety who once called his a-go-go dancers to a halt and exclaimed, while peering anxiously at the wall, "What hath God wrote?" This, of course, is not very good English but it is very good Babylonian and certainly appropriate for that particular occasion. The scientific message that is contained in this paper will undoubtedly be greeted with many kinds of pronouncements,

denouncements and other types of nastiness. I believe almost all of us are well acquainted with the familiar pattern of criticism that follows any philomathic paper regardless of its intellectual and literary merit. For that reason, as well as certain other reasons, I will admit at this point that I did not write this paper. I found this paper. I am willing to admit that it took a good bit of ingenuity to find it. I feel, however, that it took a good deal more ingenuity to write it. Therefore I must regretfully refuse to accept credit for it.

Internal evidence will show you that the paper reports a scene in which poet Robert Browning is talking to his wife Elizabeth and Andrea Del Sarto, whom Browning called "the faultless painter."

The Anti- Brownian Movement

By Melburn R. Mayfield

The Brownian Movement or What's a Heaven for? or The Anti-Brownian Movement or What the Hell for?

Will you two please understand that the Brownian Movement is not a socio-political excursion into the sordid and the uncouth. As a matter of fact, it is *Brownian* Movement, not *Browning* Movement. There exists a relatively unknown biologist whose name is Robert Brown and he did detect some kind of movement of particles in a liquid about the time I was 16 years old. I think this is a discovery of some value. After all, I am somewhat involved with biology myself; you know—thorns and snails and dew on the hillside and that sort of thing. But Elizabeth, you don't need to be concerned about my politics; and, Andy, you should not be concerned just because somebody else is wondering what a heaven is for. Even a scientist ought to have that privilege. Of course he will never really know what it is for. His grasp probably exceeds his reach already. This whole mess has been dragged up by that scrawny little Alfred Austin. He's been after me in the papers for years, and he probably just heard of the Brownian Movement and couldn't resist himself. Anyway I am not in trouble with the civil-rights people or even the Poverty Program yet, so Betts you lie back down and rest for awhile, and

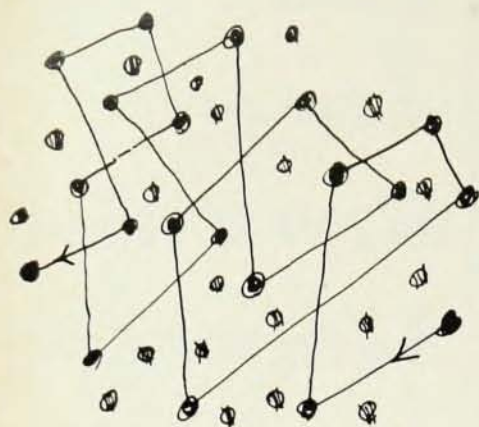
Andy go paint something faulty. I need to think about this.

Maybe I ought to write something about this Brownian Movement that will put me in a good light regardless of what the papers say. I probably should check to see that friend Tennyson hasn't written something already. Now that he's a cabinet member, with foundation money, he's always digging around in this business of the earth moving eastward, and filling the skies with airy navies and that sort of nonsense. Let's see, what's his area code? —Oh, Al? Bob here. You heard anything about the Brownian Movement? No, my Lord, Al, it is *not* my movement. It's a scientific kick, and one of us ought write knowledgeably about it. . . . Oh, you'd like me to ghost this one for you—Locksley Hall style? Righto. Well, thanks Al. See you in Court.

Now—this Brownian Movement has got to move. Let's see—ah—"Eng-land swings like a pendulum do"—no, that's catchy, but it's hard to work with. Wonder how Brown got onto this particle movement anyway. Is it possible that all things are made out of itty-bitty, teeny-weeny pieces? And how could one find out? Maybe like this . . .

A recently discovered manuscript appears to record some serious thoughts of Robert Browning on the physics of his day and some that was to come. It promises to add nothing whatsoever to the history and philosophy of science.

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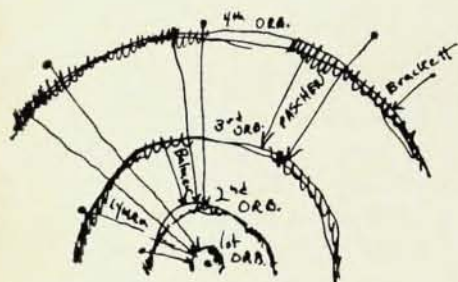
As I dipped into the fluid
All those little clods of dirt,
Saw them move and hit each other
Without seeming to be hurt,

As they frittered on the surface
Going every which-a-way,
Fast and slow, but always random,
All those tiny bits of clay,

Came to me a mighty wisdom,
Far beyond the normal size,
And I heard in tones of thunder
"This is worth a Nobel Prize."

Quickly then I wrote my paper
So the world might understand:
Everything is made of pieces—
Sea and sky and grain of sand.

Pieces far too small for seeing,
Like the atoms of the Greek,
Pieces moving round each other
In a crazy hide-and-seek.



What should be my next
achievement?
Shall I seek out more renown?
Find a fuller explanation
Of this movement, name of Brown?

First I'll write a new proposal,
Then I'll ask for time release
So my ardent meditations
Will not ever have to cease.

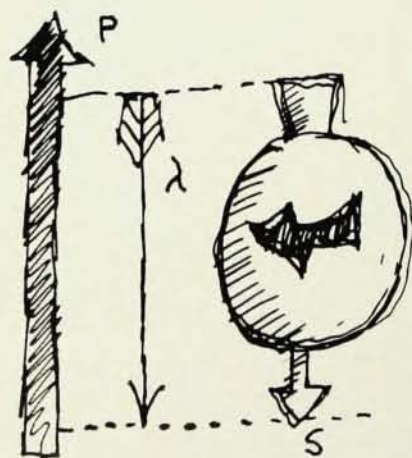
I will ponder on the makeup
Of these tiny moving things.
All are small but some are smaller?
Whirling round in busy rings?

Big ones plus and others minus?
Some without a charge at all?
Protons, neutrons and electrons?
Nice new names for me to call.

These should be the fundamental
Parts that make our universe.
Still I feel there must be others
(Even though I feel in verse).

I predict that every atom
Has a heavy central core,
And electrons fly around it—
Orbits to be named by Bohr.

Protons pushing other protons
(As they must by nature do)
In amongst the friendly neutrons
Need some mighty sticky glue



To remain in close communion
In their nucleonic sphere.
What could hold them tight
together?
What could make them all adhere?

What indeed except a quantum
Of a special type and mass.
(It won't even be predicted
For a hundred years, alas.)

Still it's clear in my own thinking
That the necessary glue
Is a quantum, called a pion,
With two brothers, K and mu.

H. Yukawa will predict them
When the 'thirties are half gone;
Twelve more years before they find
them
In the Berkeley cyclotron.

All these things were in the fluid
Where my movement was observed:
Protons, pi's, electrons, muons,
Neutrons, K-ons, all conserved.

If I only had machinery
Like the latest Bevatron
To bombard the heavy nuclides,
Energy I'd find had gone.

Energy that had to be there,
Yet it made such quick escape
That the virgin mass which lost it
Couldn't truly call it rape.

Pauli first to think about it,
Fermi later gave it heed.
What was lost was a neutrino
With no charge, no mass, just speed.

Finding this elusive "nothing"
Will take twenty years at best.
It will be what Fermi called it,
When it finally comes to rest.

One peculiar little motion
In my fluid wonderland
Should have been a right-hand
motion,
But it was the other hand.

Had I owned a clever chamber
Like the one that Wilson made,
I'd have seen what took a hundred
Years and big foundation aid.

I'd have seen the plus electron
And the minus being born,
Fathered by a healthy photon
From whose strength the pair were
shorn.

I would call it "pair production,"
Photon energy to mass—
Photons being parts of light waves
Of a very special class.

Up to now all my electrons
Have been minus—all alike—
Now I've got a plus electron;
What to call this lucky strike?

Plus electrons do not linger,
Moving to annihilate
Any careless true electrons
At an astronomic rate.

Minus-plus they plunge together,
Bursting into gamma rays,
Rushing back to where they came
from;
Microseconds mark their days.

This is truly antisocial,
Not a kindly way to act.
Antiëlectron I shall call it,
And it prob'ly is a fact.

Antiprotons, antineutrons
Also live somewhere in space,
Merging into antimatter
Never leaving any trace.

What a shock for future spacemen
When they land on antiearth,
There to face annihilation.
Flesh and antiflesh give birth

To a cosmic surge of photons,
Undetected through the years,
Till they bring a burst of static
To the Jodrell Bank great ears.

We are hanging to this planet
By our feet and gravitons,
Particles that make the forces
Gravity depends upon.

Antiplanets need these forces,
In an antiearthy way,
For the antifolks who live there
Antiday by antiday,

Antitime upon their hands and
Antimoney in their banks.
Music by the anti-Beatles
Soon will join the "anti" ranks.

"Antiheim" I think I'll call it,
My new antiuniverse,
Antiheim, where things are better
(Everything is antiworse).

Antiheim is not the limit,
Not the antiliving end.
Superantifragilnova
Lurks around the cosmic bend.

Here the baryons and mesons,
Superlarge, but very strange,
Group themselves in odd
arrangement,
Energized in such a range,

Undetected, unsuspected,
Until synchrotron debris,
Photographed in bubble chambers,
Lets them out for all to see.

Thus my patient observations
And my theories neatly drawn
Could have brought a science
noontime
Long before the science dawn.

Could have—but it didn't happen,
Though my records all are clear:
Photographs and antidata,
And I have them all right here.

What deterred me from the glory
That I earned before my time?
Antiscience Neilsen ratings
Cut me off without a dime.

Left me dead without a sponsor,
Shut out by a soccer game.
Left me just my notes and pictures
And a share of antifame.

Oh well, as a great poet will prob-
ably say, "It's better to have
loved. . . ." And to be very honest,
I feel good about the Brownian Move-
ment, but not about the anti-Brown-
ian Movement. Well, the whole anti-
situation—all fifteen antiparticles, anti-
matter, antigalaxies, antiwhatever—if
these really do exist, then what the
antiheaven for? □

