***LASER* (Journal of the Southern Californian Skeptics) ~**

"R. Feynman on Papp Perpetual Motion Engine"

One time [in 1966] some students came over to my house with one of those magazines about automobiles --- Roadrunner, or something like that. In it there was an article about a marvelous new engine which works on a new principle for getting power, and it's really quite remarkable. You don't have to buy fuel for the car; the fuel is injected into the cylinders when the engine is manufactured and lasts about six months. Then you have to bring it back to have it recharged. The engine is air-cooled and can make a car run 60 miles per hour on the freeway.

There was a picture of the engine and its inventor, Mr. Joseph Papp, who had come to the United States from Hungary. He's standing next to the engine, making measurements on it with a panel full of dials. Various people had looked at the engine and made various remarks about it in the article. Mr. Papp was going to demonstrate his engine in Los Angeles, and the students wanted me to go along with them to see it.

I told them nothing has enough power to go for six months like that, unless it's a nuclear reactor, which it surely is not. 'Fakes are always coming out,' I said, 'and the guy's probably trying to get investors to invest in his engine.'

Then I told them some stories about perpetual motion machines, such as the one in a London museum which was in a glass case.It had no wires connected to it, yet it turned around and around. 'You have to ask yourself, 'Where is the power supply?' I said. In that case, it was some air coming up through a little tube installed in one of the wooden legs holding up the glass case.

The students talked me into going along with them to see the demonstration. It was held in a refrigerator company's parking lot, an L-shaped area. The engine was down at one end of the lot, while the people, about 30 or so, were at the bend of the L, some distance away.

Mr. Papp talked about how the motor worked, using vague and complicated phrases about radiation, atoms, different levels of energy, quanta, and this and that, all of which made no sense whatsoever, and would never work.

But the rest of what he said was important, for every fraud has to have the right characteristics: Mr. Papp explained that he had tried to sell his engine to the big automobile companies, but they wouldn't buy it because they were afraid it would put all the big oil companies out of business.

So there was obviously a conspiracy working against Mr. Papp's marvelous new engine. Then there was a reference to the magazine articles, and an announcement that in a few days the engine was going to be sent to the Stanford Research Laboratory for validation. This proved, of course, that the engine was real. There was also an invitation to

prospective investors to get in on this great opportunity to make large amounts of money, because it was very powerful. And there was a certain danger!

There were quite a few wires running from the engine down to where Mr. Papp and the spectators were standing, into a set of instruments used for measurement; these included a variac, a variable transformer with a dial which could put out different voltages. The instruments were, in turn, connected by a cord to an electrical outlet in the side of the building. So it was pretty obvious where the power supply was.

The engine started to go around, and there was a bit of disappointment: the propeller of the fan went around quietly without the noise of an ordinary engine with powerful explosions in the cylinders, and everything --- it looked very much like an electric motor.

Mr. Papp pulled the plug from the wall, and the fan propeller continued to turn. 'You see, this cord has nothing to do with the engine; it's only supplying power to the instruments,' he said. Well, that was easy. He's got a storage battery inside the engine. 'Do you mind if I hold the plug?' I asked? 'Not at all,' replied Mr. Papp, and he handed it to me.

It wasn't very long before he asked me to give me back the plug. 'I'd like to hold it a little longer,' I said, figuring that if I stalled around enough, the damn thing would stop.

Pretty soon Mr. Papp was frantic, so I (Richard Feynman) gave him back the plug and he plugged it back into the wall. A few moments later there was a big explosion:

A cone of silvery uniform stuff shot out and turned to smoke. The ruined engine fell over on its side. The man standing next to me said, 'I've been hit!' I looked at him, the whole side of his arm was torn open, you could see all the muscle fibers, tendons --- everything. I helped him over to a chair to sit down. The youngest student in the group knew what to do. 'Make a tourniquet out of a tie for that man!' he told me. He gave orders to everybody, and began to give artificial respiration to another man who was lying on the ground. It was really quite wonderful to see this young student take over with all those grown men around. By the time the paramedics came, we realized that there were three men injured, the one lying on the ground most seriously: he had a hole in his chest (so the artificial respiration wasn't effective) and he ultimately died. The other two men survived.

We were all shaking.

I turned to the young man who had been so capable in coping with the unexpected tragedy.

'I don't usually drink.' I said, 'but let's go over to a bar and have a drink to calm our nerves.'

We went into a bar and ordered a drink, I was surprised to discover that the young man who had been the most mature of all of us was underage-he couldn't get a drink. We started to talk about the engine. One man, an investor who had brought an engineer with

him to see the demonstration, said, 'My engineer advised me to stand mainly behind the corner of the building and just peer out during the demonstration, because these new engines are sometimes dangerous. Somebody else pointed out that Mr. Papp had previously done some work with rockets, and the explosion looked like fuel when it goes off.

My idea was that had Mr. Papp sent his engine to the Stanford Research Institute as announced, the game would be up in a few days. Therefore an explosion just big enough to destroy the engine would keep the game going a little longer; it would show the tremendous power of the engine, and, most importantly, it would provide a reason for investors to put more money into the project, now the engine had to be rebuilt. We all agreed that the explosion was much larger than Mr. Papf probably intended.

After such an explosion with the resulting fatality and injuries, there was, of course, a lawsuit. Mr. Papp sued me for ruining his engine, charging that my stalling around with the cord caused him to lose control of it. Caltech has a legal department to protect its errant professors, so they talked to me. I told them I thought he didn't have much of a case: he would have to prove how the engine worked, and he'd have to demonstrate that in fact, taking the cord off caused the explosion.

The case was settled out of court, and Mr. Papp was paid something. I guess there's a certain amount of wisdom in not going to court, even when you're right, but I cost Caltech a certain amount of money by going to that demonstration.

I still think I correctly diagnosed what was happening with a reasonable probability.

And, of course, nothing has been heard of Mr. Papp's new engine since.

(Richard Feynman, PHD)