

Early Rocketry

Part 4 America (3)

This continues the Early Rocketry series. Previous parts have covered Russia, France, Britain (1) and America (1) and (2).

Next after this will be Germany and finally Britain (2).

The Joker in the Pack - Marvel / John /Jack Parsons

When looking back at the pantheon of rocket pioneers you see a range of worthies from the great theorists – the obscure Russian teacher Tsiolkovsky, the Transylvanian Hungarian / German Oberth, the early practical exponents – e.g. the 2nd. William Congreve and in America in the 20th. century – Goddard, theorist and rocket builder and the amateur enthusiasts graduating to commercial and Governmental respectability – Wylde, Shesta... but then you get to Jack Parsons.

Jack Parsons – the genius they air brushed out

Marvel Whiteside Parsons, named after his father, was born on 2nd. October 1914 in Los Angeles.

In 1915 after his marital infidelity was discovered Jack's father left the family. Jack's maternal grandparents were in a position to purchase a mansion on millionaires' row in Pasadena and they and Jack and his mother moved there.

After his father left Jack's mother renamed him John and he later became known as Jack.



Marvel / John / Jack Parsons
1914 - 1952
Flawed rocket genius / man of magic

Early years – the start of rocketry

Like so many of his generation, Jack Parsons was captivated by the science fiction novels of Jules Verne and later the many science fiction magazines circulating in America.

He showed early signs of a restless and enquiring spirit and mind. It is perhaps not surprising therefore that he developed an interest in a subject which was regarded in society as wild fantasy, the stuff of Marvel Comics – travel to space and the moon by means of rocketry.

Jack's early schooling record at Pasadena Junior High School was poor and he was sent to a boarding school. He was expelled from there, reputedly after a failed experiment which blew up the school toilets.

He improved at a later private school and then enrolled for a science degree course at Pasadena Junior College. He had to leave this because of financial difficulty and similarly had to leave a degree course which he later started at Sanford University. It is possible that by that time rocket experiments were proving too great a distraction.

Whilst at Junior High School Jack's rather introverted personality had attracted the attention of the school bullies. As can happen in these situations he was befriended and protected by a fellow student, from a very different, poor, background – Edward Forman.

Jack introduced Edward to the magical world of rocketry and the two formed an enduring lifetime friendship. Edward had high innate mechanical skills and the two formed a complementary team, plunging into rocket experiments and building, using black powder (gunpowder) as fuel, resulting in many craters in the immaculate Parsons mansion lawn.

However lessons were being learnt. Jack became aware of the drawbacks of loose powder and the consequent need for an efficient binding medium – which he decided was glue!

As the schoolboys entered the senior years Jack obtained a holiday job at the Hercules Powder Company. He soon made a mark as an exceptionally able worker and gained a knowledge of a wide range of explosives and their manufacture.

A lucky break and success - 1936

In 1936 the pair became aware of a report of a lecture given at the California Institute of Technology (Caltech) under the auspices of GALCIT on the possibility of an above stratosphere aircraft, possibly rocket powered.

GALCIT was the Guggenheim Aeronautical Institute California Institute of Technology.

Either at the lecture or arising from it the pair made the acquaintance of Frank Malina.

Malina was a PhD student working on a thesis on rocket propulsion and the three quickly formed a close knit rocketry research group.

Although rocketry was viewed with scepticism and even derision by the mainstream scientific community and the US Government, GALCIT, with project leader Theodore von Karman, had been conducting rocket research. The trio approached von Karman and, rather surprisingly, bearing in mind only one of them had a degree level education, gave them the use of a room at the Institute. It could be he recognised the potential of the complementarity of the three – Parsons the intuitive experimenter, Forman the engineer and Malina the theorist.

A series of wild, risky experiments followed accompanied by much tinkling of glass and damage to building fabric and von Karman moved them to a collection of old sheds in Arroyo Seco canyons – by a remarkable coincidence used earlier by the great American rocket pioneer Robert Goddard (Touchpaper Winter 2012).

Undeterred the experimenters pressed on and named themselves the GALCIT Rocket Research Group.



**The Rocket Research Group resting at Arroyo Canyons
L. – R Frank Malina, Ed Forman, Jack Parsons**

GALCIT Rocket Research Project - 1937

In 1937 with von Karman's support the Caltech affiliated GALCIT Rocket Research Project was formally constituted.

The Group were re-allotted space at Caltech and experiment continued at a furious pace, to the extent that they became known as the Suicide Squad.

Jack the explosives expert - 1938

In the meantime as an offshoot of work on rocket propellant Parsons had become known in the area as something of an explosives expert, to the extent that in 1938 he appeared as an expert witness in a case where the intelligence head of the Los Angeles Police Department, Earl Kynette, was convicted for the attempted murder by car bomb of a private detective. Parsons was able to demonstrate to the court how Kynette would have constructed the bomb.



**Jack, suitably dressed for court appearance in suit and tie,
with the bomb which he reconstructed**

Marxism

At the time Marxism was exerting a strong influence and the Group appeared to dabble for a time. Jack soon forgot it, but unfortunately the FBI did not.

Experiment and development contracts 1938 - 1942

By 1939 the Group had developed their liquid fuelled rocket to the point where it burned for one minute.

First development contracts - 1939

Preparations were being made for war. Malina had written a report on the possible use of jet (the word rocket was still considered not quite respectable in serious scientific circles) propulsion to assist the take off of heavily loaded aircraft and the GALCIT Rocket Research Project received a grant of \$1000 from the National Academy of Sciences (NAS) Committee on Army Air Corps Research to pursue the subject.

Events were moving fast and in July 1939 GALCIT Rocket Research Project received a \$10000 contract from the NAS Committee for work on the application of jet (rocket) propulsion to military aircraft under the title Air Corps Jet Propulsion Research Project (ACJP)

It was not specified whether the work should apply to increasing the overall flying performance of aircraft or assisted take off, so both were studied.

JATO

For assisted take off the term Jet Assisted Take Off - JATO was adopted – the term rocket was still avoided.

The Group's rocket had been liquid fuelled. However Jack had begun to develop the faith in solid propellant which characterised all his later work.

Liquid Fuel engine design

In the meantime however the military were still demanding a liquid fuel development.. RH Goddard had been assigned this work, but was experiencing difficulties.

At some point Jack turned his mind to the problem and produced the solution – a rocket engine employing red fuming nitric acid as the oxidiser and aniline fuel. Reputedly he had formed the idea after seeing the rust creating effect of nitrous fumes in the laboratory.

This concept was employed by NASA in post war rocket engines.

GALCIT 27 August 1941

The key propellant formulator in the group was Jack Parsons and by August 1941 the group had created a JATO propellant – GALCIT 27. This was a solid propellant consisting of amide (a kind of black powder) fuel, corn starch and ammonium nitrate oxidiser bound with glue with the casing lined with blotting paper.

Jubilation, but then a problem – August 1941 – June 1942 12th. August 1941

The Group thought they had found the ideal solid propellant and on 12th. August 1941 the first successful American JATO flight was made at Wright Field in an Ercoupe light aircraft.



First JATO flight – 12th. August 1941



**Rocketeers at Wright Field, Ercoupe aircraft in
background
L. – R. Jack Parsons, Ed Forman, Frank Molina**

By this time the US Navy had become extremely interested. The looming war in the Pacific would employ large numbers of aircraft taking off from limited carrier decks and short island air strips and a source of take off assistance would be crucial.

The flight so impressed Navy planners that in a very short space of time in January 1942 they had placed a development contract with the Group for a GALCIT 27 JATO unit.

Aerojet – March 1942

By this time it looked like there was a realistic prospect of large Navy orders and a company was formally constituted to handle JATO business.- Aerojet.

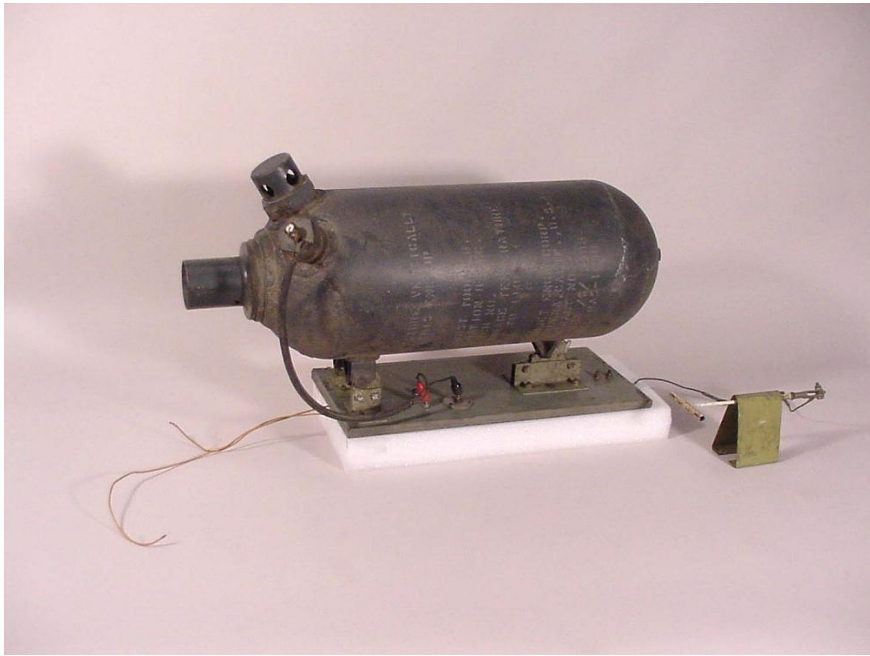
At this point GALCIT 27 suddenly cast a dark shadow over the happy band. Units employing the composition began to blow up in storage, reacting to changes in temperature – a characteristic which might also lead to the unit blowing a hole in the aircraft.

Success – July 1942 Jack Parsons, saviour of Aerojet – GALCIT 53 – July 1942

The Group frantically began a search for an improved composition which would be stable in storage. However they became fixated on the oxidiser. In the meantime Parsons came up with one of the great intuitive leaps in solid propellant rocketry. Ignoring the panic around him he focussed on the binder / fuel.

Of all things he substituted a binder / fuel consisting of common asphalt as used by roofers and tilers. Reputedly the idea came to him when he saw local workmen pouring asphalt for fixing roof tiles and sealing pavement cracks.

The result was the composition GALCIT 53 – the components were mixed then heated and cast into the combustion chamber of a rocket, in this case for assisted take off..



A JATO unit

The performance of GALCIT 53 went beyond the Group's wildest dreams and all other work virtually ceased to concentrate on the formulation.

Jack Parsons had invented a castable, case-bonded, composite rocket propellant.

The fuel was stable, less volatile, casting the asphalt meant it wouldn't settle in the canisters, and it provided a thrust 427% more powerful than GALCIT 27.

GALCIT 61-C – From 1943

Further experimentation produced the variant GALCIT 61-C, which became the standard propellant for the JATO units supplied by Aerojet from 1943.

%

76 Potassium perchlorate oxidiser

24 Binder / Fuel (70 Texaco Asphalt 30 Union Oil Co. lube oil)



Parsons with a JATO casing

Jet Propulsion Laboratory – 1943

In 1943 a further company was formed – the Jet Propulsion Laboratory, still clinging to the phraseology Jet

JATO in WW2 1943 - 1945

During WW2 Aerojet produced 200,000 JATO units, most for the US Navy, including a single order for 40,000, with production rising to 20,000 per month. Such was the pressure office staff worked an extra shift after hours in the unskilled part of the work.

Navy pilots developed an affection for the JATO units, which they called Smokey Joes, partly reflecting the success of JATO in making possible rescue operations in conditions which would otherwise have been impossible. It is estimated that JATO was responsible for saving around 4500 lives over WW2.

From 1939 - the other side of Jack Parsons

Jack's restless mind would not allow him to confine his activity to rocketry however successful and he embarked on a course which would lead eventually to his being ostracised by the deeply conservative American Establishment and scientific community.

Just as rocketry in early days had appealed to him as something wild and fantastic so he turned to the world of esotericism which was finding fertile ground in California.

In 1939 he joined Thelema, the religious movement of the English occultist Alisreir Crowley – the Great Beast. Crowley's views held particular appeal to Jack as they embraced the powers of magic as it related to quantum physics, a way of merging his science fiction fantasies with real life. He threw himself into the movement, to the extent that by 1942 he was leading the Agape Lodge, (1) centre of the California branch of Thelema, where increasingly bizarre rituals were

practised with friends, lovers and acolytes, many female. These happenings could not remain secret and officialdom became increasingly uneasy about their JATO supplier, who worshipped the Devil and was holding what were becoming orgies in his house. However his technical ability remained unchallenged .

In 1945 Thelema welcomed a new member into the Agape lodge - L. Ron Hubbard – an event which would ultimately trigger Parson’s downfall. By this time he had abandoned his first wife in favour of her 16 year old sister Sara – a dangerous liaison vis a vis California state law. However Sara began to transfer her affections to Hubbard. In increasingly desperate attempts to recover her Parson’s began to resort to black magic and voodoo.

(1) *Nothing new under the sun*

In 2006 an author published a book describing his travels around rural villages in buses run by small independent operators, describing bizarre historical events he uncovered. He reached the Somerset village of Praxton, near Bridgwater, and uncovered the story of a Victorian religious commune which had been set up nearby, led by the self styled Reverend Henry James Prince, who believed himself the agent of the Holy Ghost. He and his followers would descend on Bridgwater from time to time where Prince would deliver fiery sermons to the populace.

In an uncanny foretaste of Parsons, the following appears :

‘ The community was known as Agapemone. The name was derived from the Greek word agape, meaning spiritual love, since that was the kind of love which was said to exist there, although the strong suspicion in Bridgwater pubs was that Eros was probably nearer the mark . ‘

Departure from Aerojet - 1944

In the meantime at the end of 1944 a 51% stake in Aerojet was sold to General Tire and Rubber, partly to obtain supplies of chemicals. The corporate hierarchy at General Tire did not like what they saw of Jack's methods and in December 1944 he was unceremoniously paid off.

His expertise was still respected however and over 1945 to 1946 he worked for North American Aviation on the Navajo missile programme.



Navajo launch 1957

He acted as a freelance rocketry consultant, including advising on the rocketry programme of the newly created state of Israel. This led to his being accused of espionage when he took some secret papers home to work on.

By this time the Cold War had got under way and the espionage incident, despite his being cleared, combined with his earlier dabbling in Marxism led to his being classified as a 'subversive'.

The end of rocketry - 1948

By 1948 the FBI had removed his maximum security clearance. Parsons was effectively barred from rocketry work.

Decline – 1948 onwards

Jack took on a variety of low level jobs and established a precarious business operating from the garage of his Pasadena house supplying pyrotechnics and explosives to the film industry.

In an effort to augment funds he joined with L. Ron Hubbard and Sara in a venture which was supposed to buy and sell yachts, investing all his savings.

The venture was a fiasco and Hubbard, accompanied by Sara, decamped with all the company assets, including Jack's savings.

The end - 1952

In 1952 Jack planned to travel to Mexico for a holiday, and possibly to investigate the possibility of staying there. The day before he was due to leave he received a rush order for explosives. Whilst working on it in the course of mixing the extremely powerful explosive fulminate of mercury in a coffee can he dropped it with the inevitable result. The Pasadena Police investigator declared it an accident, but there are still some who express doubts – was it murder or suicide?

Achievements

One of the Early American Rocketry Greats Jack Parson's inspiration provided a significant, if not the most significant, impetus to American rocketry solid propellant development at a time when parallel liquid fuel propellant development was lagging.

Arguably this advanced US Government support for American rocketry by at least two years.

His work established solid propellant as a safe and viable form of rocket propulsion.

It formed the basis for progressive development of solid propellant technology, both in America and Europe, ultimately with a whole range of applications – sounding rockets, booster rockets, space technology, including the NASA Space Shuttle, the Polaris, Poseidon and Minuteman ICBM etc.

In WW2 the JATO assisted take off system made possible by his ingenuity made a major contribution to US Navy offensive capability in the war in the Pacific and as an offshoot was responsible for saving the lives of 4500 men.

The business he led, Aerojet, has continued as a successful enterprise.

The JPL, founded as an associate of Aerojet, ultimately became part of NASA and continues to this day as a space research centre and the foremost centre for robotic engineering in the US.

An impressive catalogue and one which justifies including Jack Parsons among the greats of early American rocketry.

Oblivion

But did this persuade the American corporate scientific establishment to acknowledge his achievements, unclouded by consideration of his lurid private life ? Apparently not – he was consigned to footnotes and is hardly mentioned in NASA historic literature.

L. Ron Hubbard

L. Ron Hubbard went on to found the new religion Scientology in 1953, with its 'bible' Dianetics, with its best known later adherent Tom Cruise, the film actor.

Epitaph

Probably stemming from his father's early desertion of the family, Jack had a strong bond with his mother. When she heard of her son's death she committed suicide.

Some recognition

In 1972 the International Astronomical Union named a crater on the moon Parsons. Was it coincidence that it was on the dark side of the moon?

Les Tucker