

ALBERTLE AND HIS FAMILY

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[2005 was world year of physics and Frontier published several articles to mark the centenary of Einstein's epoch making Theory of Relativity. This piece deals with boyhood days of Albert Einstein—Albertle—and his family against the background of his Jewish roots and history.]

Albert Einstein was born on March 14, 1879 that is 3.14.1879. The 3.14 part coincides with the π (pi)-value in two decimals. His birthday is observed nowadays in the mathematical circle as world Pi-day. Albert's father was Hermann Einstein (1847-1902), a freeman of Buchau.

Much history lies concealed in the expression, “freeman of...” The Jews are an ancient people. In ancient times they were known as the Hebrews. Of all peoples, they have the longest continuous surviving serial record of history. Moses led them from slavery to freedom. In the course of Exodus from Egypt towards Canaan, in the Sinai desert, the great leader presented to his people the *Ten Commandments* dictated to him by God. Moses died. And the Hebrews split up into ten tribes by the time they reached Canaan. They ran into trouble with the Phoenicians and the Philistines who were already there occupying a series of small towns along the coast below Mount Carmel. The Philistines regarded the Hebrews as a dangerous threat and the two peoples often went to war. More often the Philistines were victorious. At the time of Samson the Hebrews scored their first major success. Yet the war between the two peoples went on. Moreover, the entire region, Canaan, lay on the highway between two mighty empires—Egypt and Assyria. As a result, life of the Hebrews was precarious like living in the middle of the busy thoroughfare—the risk of being run over by the speeding heavy vehicles constantly haunting and keeping them ever alert. In 930 BC after the death of Solomon, the political unity of the Hebrews collapsed. The kingdom was split into two independent states—Israel with its capital in Samaria and Judah with its capital at Jerusalem. Egypt engineered the split because they feared the growing strength of the Hebrews under David and Solomon. In about 830 BC, Ahab of Israel, allied with the Phoenicians and other Lavantine peoples, defeated the all-powerful Assyrians in a great battle at Qaraqar. In 721 BC Sargon II, king of Assyria invaded Israel, captured Samaria and deported the Israelites' leaders and most of the people to Mesopotamia. The Assyrians settled their own people in Israel and everything was done to obliterate the traces of the Hebrews from Israel. The smaller kingdom of Judah however survived. But in 586 BC, the Babylonian king, Nebuchadnezzar II, invaded Judah and captured Jerusalem. He destroyed Solomon's temple and transported the leaders and part of the population to Babylon. This episode is known as Babylonian captivity. In 539 BC, Cyrus the great of Persia conquered Babylon and granted leave to the Babylonian captives, the Judeans and their families, now known as the Jews, to return to Jerusalem. For more than five hundred years the Jews lived in peaceful self-government in Jerusalem, interrupted only once by Antiochus of Syria in 167 BC. However Jerusalem fell under the suzerainty of the Roman Empire. The Jews resisted some Roman edicts. Notably the Jews stood out manfully against the edict of worship of Caesar-god. In 70 AD, Titus, the adopted son of emperor Vespasian, after a siege that ranks in bitterness and horror with that of Carthage, took Jerusalem and destroyed the city and the temple together.

Thereafter the Jews were dispersed from Jerusalem. Thus was begun the saga of *Diaspora* spanning about two thousand years. During *Diaspora*, the Jews were allowed to lead isolated cocooned community existence in ghettos around European towns and

cities doing odd jobs only. From Baruch Espinoza's life one gathers that official and professional careers were closed to Jews. In his place of birth, the Duchy of Anhalt-Dessau, Max Muller noticed that the town had its ghetto. The French revolution (1789) swept the system away with one stroke by the Declaration of the Rights of Man (August). Jews in France became free for the first time. Jews elsewhere began to murmur for freedom. In post-Napoleonic German kingdoms and duchies only a few families among Jews were granted leave of existence as "freeman of..." However, the Jews were emancipated in 1867.

With this little bit of a long history of the Jewish people in the background, it is appropriate to turn to Albert's mother, Pauline Koch (1858-1920). Like the Einsteins; the Kochs were part of the Wurttemberg Jewish community. Like her husband, Pauline spoke soft Swabian dialect. Her father was a Stuttgart grain merchant. She brought to the union more than comparative affluence and faced the results of her husband's happy go lucky character with resignation. She also brought a breath of genuine culture, a love of music which was to be genuine culture, a love of music which was to be inextricably entwined with Albert's life and work as well as a wide grasp of German literature. About Hermann Einstein, his grandson who never saw him gives the picture of a jovial hopeful man. Once Albert himself presented to his friend Philipp Frank who recorded the account of Hermann thus: "His mode of life and his Weltanschauung (world outlook) differed in no respect from those of the average citizen in that locality. When his work was done, he liked to go on outings with his family into the beautiful country round Munich, to the romantic lakes and mountains, and he was fond of stopping at the pleasant, comfortable Bavarian taverns, with their good beer, radishes and sausages". "Once when Albert Einstein was approaching the age of seventy, he remembered his father as "exceedingly friendly, mild and wise". Albert's closest friend in childhood, his sister Maja Einstein (1881-1951), junior to him by two years, later cogently summed up by saying "our family was very close-knit and very hospitable."

Albert Einstein was born at Ulm, a small town of Bavaria, lying in the extreme south of Germany. Hermann and Pauline, were married in 1878, they lived at Ulm where Hermann set up a small electrical and engineering workshop. He and his wife lived a few hundred yards away in an apartment of a 4-storied building that was destroyed in an allied air raid during the second World War. Below the building flowed one of the tributaries of the river Blau which again entered the Danube. Ulm is situated at the foothills of the Swabian Alps. The town has history dating back to the 9th century. It was an eminent and thriving member of the Swabian Union of towns. Its big fortress was built in the 16th century. The town of Ulm took part in the struggle of the Protestants against the Catholic Church and the Emperor. At Ulm the Austrian army suffered defeat in the Napoleonic wars. By the Vienna peace treaty of 1809, which sealed Austria's defeat, Ulm became part of the kingdom of Wurttemberg. In 1842 the old fortifications were restored and reconstructed by Prussian engineers, and its twelve forts and turrets adorned the bank of the Danube. A 15th century Gothic cathedral with a 500-foot tower dominated the narrow winding streets with gabled houses. Here in the town whose inhabitants still proclaim, "Ulmense sunt mathematici" (the people of Ulm are mathematicians), Albert Einstein was born.

The 19th century was a period of unification of Germany. In the earlier part of the century Germany was a chessboard of small, weak free kingdoms. Even Max Muller's birthplace, Dessau, in eastern Germany was sovereign—a kingdom so small in size that the king's palace was threatened by throwing stones from across the border in the

revolutionary days of mid-19th century when people demanded unity and rose in rebellion. The German revolution of 1848 was crushed and upon the ruins of the failed revolution rose the Hohenzollern dynasty of Prussia and the iron man of Germany, Otto von Bismarck (count in 1865, chancellor in 1871). His fierce moustache, huge jack boots, spiked helmet and sword evoked fear all around and not for nothing. He humbled Austria, Prussia's only rival kingdom in Germania. He overcame French imperialism in the battle of Metz in 1871, annexed Alsace-Lorraine and imposed an indemnity of 5 billion francs on France. The starved workers of Paris revolted and took over the government for 3 months—the Paris Commune—in the same year, 1871. Bismarck's Prussian army entered Paris and 30,000 communards were executed.

In 1873 there was the worldwide financial crash that continued for some years. This was a time of labour struggles and militant socialism. Hermann's small business was badly hit. In 1880, a year after Albert's birth the family moved to Munich where Hermann and his brother Jakob set up an electrical workshop. The electrical industry was fast expanding but it was at the same time a period of vicious monopolization. Aided by the four big controlling banks of the time—Darmstadter, Discontogesellschaft, Deutsche and Dresden—collectively known as the D-banks, big electrical companies like AEG (General Electric) and Siemens & Halske-Schuckert were devouring smaller electrical units. Under the circumstances the Einsten brothers' business producing dynamos, electric instruments, arc lamps and measuring instruments flourished initially, but failed subsequently. They spent the entire profit in period one on building a house at Sendling, a suburb of Munich. In 1881 a girl, Maja, was born into the family. Almost the same age the two children, Albert and Maja became great friends and the garden surrounding their home in Sendling was their playground.

But Hermann and Jakob were in for a fresh trouble. Their small company could not compete against giants like Siemens and Halske. Their sales and profits began to fall and they somehow survived until 1894 when their business failed.

Though Jews were emancipated in 1867, the German Christians as a whole resented. In 1879 coinciding with the year of Albert's birth, one Wilhelm Marr first coined the word "anti-Semitism" to blame the Jews for all the ills of Germany as well as for the financial crisis since 1873. In politics, Bismarck passed anti-socialist laws in 1878 to suppress working class agitation proclaiming, "the great questions of the day will not be settled by resolutions and majority votes but by blood and iron." Emperor Wilhelm I of Prussia militarised Germany. Army expenditure tripled; the officer corps in the army rose from 3000 to 22500; three year military service became compulsory; all heads of state were to appear in military uniform; from taxi drivers to Emperor Wilhelm—all had to wear military uniforms. Military veterans' organisations increased from 27000 in 1873 to 400,000 in 1890.

The little Albert did not like it. He was a slow dreamy child. Even at age nine he spoke hesitantly. The free-and-easy Swabian way of life and the melodious idiom of soft emotional Swabian dialect clashed with the clanging heavy boots of the Prussian officers and bureaucrats with their harsh clipped speech swarming into southern Germany to enforce law and order of the newly founded Police State. The little boy found Germany a very military place. While on a stroll with his father on a Munich street and upon seeing the army parade the nine-year-old little Albert told his father, "Papa, I don't like all this marching up and down." The father whispered, "we'll worry about it later. Let us go there, there."

In one way the Einsteins failed to fit into convenient slot of religious practice, although many deep-grained Jewish characteristics remained. The family did not attend the local synagogue. It did not deny itself certain food not permissible to Jews. There was also in the family Jakob Einstein, Albert's uncle, who was hard bitten agnostic and non-conformist. Thus Albert was nourished in a non-religious family tradition that had broken with authority—which disagreed, sought independence and had deliberately trodden out of line.

Elementary education in Germany was conducted on a denominational basis and the schools were controlled by the clergy of different religious groups. There was a Jewish school in Munich. But Albert was sent to a nearby catholic school. According to some sources Albert was confronted for the first time with his Jewishness at this Catholic school. A teacher one day produced a large nail saying something like this : “Christ was nailed to the cross with nails like this.” It seems likely that none of the boys took much notice nor did the teacher add that the crucifixion was the work of the Jews, comments Philipp Frank to whom Albert Einstein said that the incident was “a true story.” In fact in later life Albert Einstein insisted more than once that the fact of his Jewishness was only brought home when he arrived in Berlin a few months before the first world war.

When he was five years old, ill in bed, his father gave him a pocket compass. The boy's intellectual system received a jolt. “How does the needle always point the same way, Papa,” asked the boy. “By magnetism. Hush now and go to sleep” replied the father and went out. But the little boy in bed thought, “Magnetism? But how does it float in empty space?” Soon afterwards another influence entered Einstein's life. At six his mother Pauline introduced him to the violin. It did not evoke quick enthusiasm. He was taught by rote rather than by inspiration. After seven years he was aroused by Mozart sonata into an awareness of the mathematical structure of music. His delight in the instrument increased and became a psychological safety valve. In later years the violin became the hallmark of the world's most famous scientist.

Hermann Einstein's pocket compass and Pauline Einstein's violin lessons brought two influences to bear on their son. A third was provided by his uncle Jakob who is a relatively shadowy figure. He was an engineer. He looked after the engineering aspect and the production side of the business. Uncle Jake would often take the little boy out for a bicycle ride and would show him things. Uncle Jake introduced him to *algebra*. Years later Einstein recalled his uncle Jake to his early biographers by a memorable anecdote. “Algebra is a merry science”, Uncle Jake would say. “We go hunting for a little animal whose name we don't know and call it x. When we bag our game we pounce on it and give it its right name.” Uncle Jake's influence on Albert Einstein seems to have been long lasting. In many of Einstein's later attempts to present the theory of relativity to non-mathematicians especially his recourse to analogies with elevators, trains and ships, the influence of Uncle Jake's “little animal whose name we don't know” is clearly discernible.

At the age of 10 Albert entered the Luitpold gymnasium in Munich. The gymnasium never suited his temperament, inclinations and disposition. The classical education had degenerated into a cramming of Latin and Greek grammar, and history into a tedious chronology of boring and the ridiculous. Espicially, he would mix up Emperors charles IV (1346-1378) charles V (1519-1556) and charles VI (1711-1740). The teacher would say, “Einstein, your presence in the class is disruptive and affects the other students. You will stay for detention.” The years went by and Albert passed ordinarily from one class to the next. A quiet, reticent boy he showed no brilliance in the examinations. The critical effect

of the gymnasium created in him a deep suspicion of educational authority. "The teachers in the elementary school appeared to me like sergeants and in the gymnasium the teachers were like lieutenants", he remarked. More than forty years later at the convocation address to the State University of New York, he said, "the worst thing seems to be for a school principally to work with methods of fear, force and artificial authority. Such treatment destroys the healthy feelings, the integrity and self-confidence of the pupils. All that it produces is a servile helot."

However, everything was not bad with the Luitpold gymnasium. In the elementary school he received Catholic instruction. At the Gymnasium he received instruction in the Jewish religion, which was provided for Jewish pupils. Einstein was stirred by the historical and artistic values of the old Testament. Secondly, there was in the gymnasium a teacher by the name of Reuss who really tried to reveal to his pupils the spirit of ancient civilization, its influences on classical and contemporary German culture, and the continuity of the cultural life of epochs and generations. The delight he derived during readings of *Herman and Dorothea*, that masterpiece of romantic sentimentalism, remained deeply engraved in Einstein's memory. He would seek every opportunity to speak with Reuss and gladly submitted to detention whenever Reuss was there to conduct the extra period. Incidentally, this is in sharp contrast to detention punishments in Indian schools where the delinquent student, boy or girl, is locked up just as if an animal is caged. Often the school authority forgets all about the detention-punishment of the student and go home leaving the poor student moaning till someone else rescues. Passing on to Reuss whom Einstein remembered with love and respect one finds the twain meet in a strange situation years later on a Munich street, Einstein at that time was a professor at Zurich, his first publications had already caused shock waves through the circle of physics and mathematics. Wearing an old suit and baggy trousers which had already become the Einstein hallmark among his colleagues, he called on Reuss, his old teacher. But Reuss now retired, had no recollection of Einstein's name. He thought that his caller was on a begging errand. Reuss received him very coldly. Einstein left hurriedly.

The influences of the father's pocket compass, the mother's violin and the Uncle's algebra on the formative mind of young Einstein were immense. There was the fourth, Max Talmey, a young Jewish medical student of Munich. It was a Jewish custom to invite a poor Jew to dinner on Thursdays and Max Talmey visited the Einstein home when Albert was 12. Talmey's elder brother, a practising doctor, introduced his younger brother to what Max called, "the happy, comfortable, and cheerful Einstein home, where I received generous consideration'. In later life Talmey was seized with the idea of a Universal language. He tried to enlist Einstein's support, became interested in relativity and attempted to explain the theory. His own impressions of Einstein, aged twelve, is the only reliable first-hand account that exists : "He was a pretty, dark-haired boy...a good illustration... against the theory of H.S. Chamberlain and others who try to prove that only the blond races produce geniuses", Talmey wrote, "He showed a particular inclination toward physics and took pleasure in conversing on physical phenomena. I gave him therefore as reading matter A. Bernstein's Popular Books on Physical Science and L. Buchner's Force and Matter, two works that were then quite popular in Germany. The boy was profoundly impressed by them. Bernstein's work especially, which describes physical phenomena lucidly and engagingly, had a great influence on Albert, and enhanced considerably his interest in physical science". Soon afterwards noticing Albert's keenness for mathematics Talmey gave him a copy of Spieker's Lehrbuch der ebenen Geometric (Plane Geometry). Thereafter whenever Talmey arrived for Thursday

dinner, Albert would show him the problems solved during the previous week. "After a short time, a few months, he had worked through the whole book of Spieker. He thereupon devoted himself to higher mathematics, studying all by himself—Lubsen's excellent works on the subject. These, too, I had recommended to him... Soon the flight of his mathematical genius was so high that I could no longer follow. Thereafter philosophy was often a subject of our conversations. I recommended to him the reading of Kant. At that time he was still a child, only thirteen years old, yet Kant's works, incomprehensible to ordinary mortals, seemed to be clear to him. Kant became Albert's favourite philosopher...", wrote Talmey.

But suddenly there appeared over his head a terrible tornado that swept him from normal school boy's routine life, ripped off his root as it were and threatened, nay put temporary stop to his educational career. It was 1894. He had one more year to spend at Luitpold gymnasium before he could finish his course, appear in the final examination and acquire the diploma which would ensure him entry to a college or polytechnic or a university. Suddenly there was darkness all around the 15-year-old boy. His father's electrical business failed to a point of no return. The Einsteins' capital was reduced to a naught, No income. They sold out whatever little property they possessed and decided to move lock stock and barrel to Milan, Italy in search of an uncertain new venture there banking solely on the promise of support of some rich relatives on his mother's side who were grain merchants of Genoa. They did it quickly. The 15-year-old had no inkling of the impending catastrophe.

The family moved from Munich, together with uncle Jakob, taking their daughter Maja with them and leaving Albert in a boarding house. The family moved south to Milan. He remained mentally upset at the Bachers boarding house. He suffered nervous breakdown. He obtained doctor's certificate to that effect. Producing the doctor's certificate he would beg leave of absence from the gymnasium for six months when he would go to his parents' new home in Milan. But the gymnasium had other plans. He never fitted into the military type atmosphere of Luitpold. The school authorities had long been looking askance at Albert's scepticism and free-thinking. He was summarily rusticated from the Luitpold Gymnasium. This was one year before the final examination. He was so upset that he decided to renounce his German citizenship. Alone he went off to mountains, crossed the Alps, visited his cousins and other relatives in Genoa and at last rejoined the family in Milan. He spent a year happily with parents and sister in Milan.

But his father was worried because he was a drop-out from school. He had no diploma. The father's expectations in the affairs of his electrical business in Italy proved wrong. The establishment of the electrical factories in Milan and *Pavia* had swallowed up all family savings with no appreciable dividends. At last Hermann Einstein was compelled to tell his son that he found it very difficult to support him in this fashion any longer and that he should return to school before becoming an engineer to join the business. "Even when I was a fairly precocious young man, the nothingness of the hopes and stirrings which chases most men restlessly through life came to my consciousness with considerable vitality", Albert Einstein later remarked in view of those gloomy days in his teens. He decided to participate in that chase. But he would neither be an engineer nor a business man. "Business? Ha! I will become a theoretical physicist", said he. But how?

His education had been halted in midstream. His sister Maja and his cousin Roberts were admitted to the International school of Protestant Families, also known as the Swiss School, in Milan. The father tried to get the son admitted to the Swiss School. But the school took children only upto the age of thirteen and Albert was aged fifteen. The father urged his sixteen-year-old son to forget his “philosophical nonsense” and apply himself to the “sensible trade of electrical engineering”. The lack of a necessary Gymnasium certificate at once made itself felt, since entry to a university was barred without it. There was one possible way out. Conveniently situated over the Alps from Milan, there existed in Zurich, the Swiss Federal Polytechnic School.

[The Polytechnic is variously known by its German, French, Italian and English titles eg. Eidgenossische Technische Hochschule (ETH), Ecole Poly technique Federale (EPF), Svizzera Polytechnica Federale (SPF) and Swiss Federal Institute of Technology (FIT)]. The Polytechnic demanded no Gymnasium diploma. All a candidate had to do was to pass the necessary entrance examination. There was another difficulty. Scholars could join the ETH only after attaining the age of eighteen. In the spring of 1895 Einstein was only sixteen. However it was decided that the risk should be taken and in the autumn he went to Zurich and tried his luck there. In the entrance test examination he failed. The Principal Herr Herzog called the boy in and said, “Einstein, you’ve failed in French, English, Zoology and Botany. But you’ve a superior knowledge of mathematics. I’ve arranged for you to attend the cantonal school in Aarau”. “Yaag! More school!” exclaimed Albert. “Yes” replied Herr Herzog.

With the memory of the Luitpold Gymnasium fresh in his mind Einstein hated the idea of returning to a school. But he had nothing else to do. The Aarau cantonal school, however, turned out to be the right soil for the tender plant. The staff and the pedagogical methods were very progressive. Aarau is a small picturesque town on the Alpine river Aare from whose banks the vineyards climb. He breathed the air of democracy which had been an ingrained feature of the country. But he felt jarred to find the Swiss tradition under which every man appeared eager to spring to arms and kept his rifle on the wall. Democracy grow out of the barrel of guns? Yet militarism was singularly absent. Aarau cantonal school was only twenty miles west of Zurich-Einstein lived in the home of the Headmaster of the school, professor Winteler, whose son Paul, and daughter were of his age and treated him as their brother. Later Paul married Maja. Winteler was friendly and liberal minded, an ornithologist who would often take his students and his own children for walks in the nearby mountains. Teaching resembled university lectures rather than high school instruction. There was a room for each subject rather than for each class. In one of them Einstein found his first class physics teacher, Prof. August Tuschmid. Einstein felt at home. He began dancing in joy and gradually developed dancing skills. In this friendly climate Einstein began to open out. Einstein finished the Aarau school in 1896 and was accepted to the Zurich Polytechnic, ETH, without examinations. Einstein entered the royal road to science. This was cut the Gordian knot that fastened the boy Albert’s neck.

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