

नारा पुरखों का

आर्यभट्ट ने सूर्य पृथ्वी के सम्बंधों को दर्शाया
भास्कराचार्य की गणित संहिता को दुनिया ने अपनाया
कूटनीति और राजनीति में कौटिल्य सबसे आगे
कल्हण के इतिहासों से सोये हुए अतीत जागे
चरक ऋषि की औषधियों से स्वस्थ रहे हरदम तनमन
पाणिनि के सूत्रों के बल पर भाषाओं का हुआ सृजन
इन पुरखों के अधरों पर उपजा था नारा 'जय विज्ञान'
दुनिया के विकसित देशों में खड़ा था भारत सीना तान

भारत के इस स्वर्णिम युग का भी समय अंतिम आया
नालंदा का हुआ विनाश, अज्ञान का सन्नाटा छाया
आए राजा पंडित आदि, महारथी लाखों सैनिक
शताब्दियाँ पर बीत गयीं, न जन्मा कोई वैज्ञानिक
पिछड़ गए, हो गया पतन, ढह गये वे सारे बुद्धि के धाम
कोहरे में खोये भारत को विदेशियों ने किया गुलाम
धनवानों में थी गिनती, अब दरिद्रता का था अपमान
बन गए हम बाज़ार विश्व का, बेचते सिर्फ़ कच्चा सामान

नये उदय में विश्वेश्वर ने सँवारे किसानों के जीवन
स्वामिनाथन की हरित क्रांति से यथेष्ट खाद्य हुआ उत्पन्न
सी वी रामन के परीक्षणों ने किरणों पर प्रकाश डाला
बोस आचार्य ने रेडियो का किया आविष्कार निराला
चंद्रशेखर की सीमा के अंदर रहे ब्रह्माण्ड अपार
हरगोविंद की चिकित्साओं पर सदा रहे जग का आभार
कठिन दिनों में इन ऋषियों ने जमकर लिया था अब यह ठान
देश बने भंडार ज्ञान का, लें हम भी नोबेल सम्मान

राष्ट्र हुआ स्वतंत्र, विकास के राह खड़ी थीं बाधाएँ
शांति भटनागर ने अनुसंधान हेतु बनाई संस्थाएँ
लौट आए भाभा विदेश से, परमाणु की दी शक्ति
रामण्णा चिदम्बरम आदि ने कार्य को दी पूर्ण भक्ति
साराभाई ने देखा सपना, अंतरिक्ष द्वारा प्रगति
ध्वन, कलाम, ब्रह्म प्रकाश ने सपने को दी आकृति
विकासशील इस देश के अंदर नहीं थे ये कार्य आसान
लेकिन उन में यह ज्वाला थी, नया रचेंगे हिंदुस्तान

कम्प्यूटर संचार काल है, यह हमारा है अवसर
रोक नहीं सकता कोई, हर कार्य में हम उत्तमतर
चंद्रमा पर लहराए तिरंगा, यह सपना होगा साकार
मंगल बुध भी दूर नहीं हैं, अब मानेंगे हम न हार
इन सपनों के बीच न भूलें, चलना है, मंज़िल है दूर
कठिनाइयाँ आएँगी, मिलकर मुक्ताबला करेंगे हुज़ूर
ईश्वर से बस एक निवेदन, इस 'विद्यार्थी' का अरमान
फिर से कभी न भूलें हम, नारा पुरखों का 'जय विज्ञान'

श्रीधर नारायणन

naaraa purkhoN kaa

Aryabhatt ne surya prithvi ke sambandho.n ko darshaayaa
Bhaskaracharya kee gaNit sa.nhitaa ko duniyaa ne apnaayaa
kooTneeti aur raajneeti mei.n *Kautilya* sabse aage
Kalhan ke itihaaso.n se soye hue ateet jaage
Charak rishi kee aushadhiyo.n se swasth rahe hardam tanman
Panini ke sootro.n ke bal par bhaaShaa.n ka huua srijaan
in purkho.n ke adharo.n par upajaa thaa naara 'Jai Vigyaan'
duniyaa ke vikasit desho.n mei.n khaRaa thaa Bhaarat seenaa taan

Bhaarat ke is swarNim yug kaa bhee samay antim aayaa
naalandaa ka huua vinaash, agyaan ka sannaaTaa chhaayaa
aaye raajaa paNDit aadi, mahaarathee laakho.n sainik
shataabdiyaa.n par beet gayee.n, na janmaa koi vaigyaanik
pichhaD gaye, ho gayaa patan, Dheh gaye ve saare budhhi ke dhaam
kohre mei.n khoye Bhaarat ko, videshiyo.n ne kiya Gulaam
dhanvaano.n mei.n thee ginatee, ab daridrataa ka thaa apmaan
ban gaye ham baazaar vishwa kaa, bechte sirf kachaa saamaan

naye uday mei.n *Vishweshwar* ne sa.nwaare kisaano.n ke jeevan
Swaminathan kee harit kraanti se yatheShT khaadya huua utpann
C. V. Raman ke pareekshaNo.n ne kiraNo.n par prakaash Daalaa
Bose Acharya ne radio ka kiya aaviShkaar niraalaa
Chandrashekhar kee seemaa ke andar rahe brahmaa.nD apaar
Hargobind kee chikitsaao.n par sadaa rahe jag kaa aabhaar
kaThin dino.n mei.n in rishiyo.n ne jamkar liyaa thaa ab yeh Thaan
desh bane bha.nDaar gyaan ka, lei.n ham bhee Nobel sammaan

raaShTra huua swatantra, vikaas ke raah khaRee thee.n baadhaaye.n
Shanti Bhatnagar ne anusandhaan hetu banayee.n sansthaaye.n
lauT aaye *Bhabha* videsh se, parmaaNu kee dee shakti
Ramanna Chidambaram aadi ne kaarya ko dee poorna bhakti
Sarabhai ne dekhaa sapnaa antariksh dwaaraa pragati
Dhawan, Kalam, Brahm Prakash ne sapne ko dee aakriti
vikaasasheel is desh ke andar, nahee.n the yeh kaarya aasaan
lekin un mei.n yeh jwaalaa thee, nayaa rache.nge Hindustaan

Computer sanchaar kaal hai, yeh hamaara hai avasar
rok nahee.n sakta koe, har kaarya mei.n ham uttamtar
chandramaa par lehraaye tira.ngaa, yeh sapnaa hogaa saakaar
ma.ngal budh bhee door nahee.n hai.n, ab maane.nge ham naa haar
in sapno.n ke beech na bhoolei.n, chalnaa hai, manzil hai door
kaThinaaiyaa.n aaye.ngee, milkar muqaabla karei.nge huzoor
Eeshwar se bas ek nivedan, is '*Vidyarthi*' ka armaan
phir se kabhee na bhoolei.n ham, naaraa purkho.n kaa 'Jai Vigyaan'

Sridhar Narayanan

Glossary of Hindi words and short biographies of the featured scientists

naaraa purkho.n kaa	slogan (naaraa) of the ancestors (purkho.n kaa)
Aryabhatt (pronounced - aaryabhaTTa)	astronomer who lived in Pataliputra (modern Patna) in the 5th century C.E.. He showed in his book <i>Aryabhatiya</i> , long before any western astronomer, that the earth was a sphere and spun around its own axis, with a period of 24 hours. He also postulated that the earth traveled in an orbit around the Sun rather than the other way round, though he did not present explicit proof for this. He talked about the planets also being in orbits around the sun and postulated that these orbits were elliptical. He was also a mathematician with important theories to his credit, which were later transmitted by Arab scholars to the Western world.
surya	Sun
prithvi	Earth
sambandho.n	relationship between
darshaaya	showed, demonstrated
Bhaskaracharya or simply Bhaskara (pronounced – bhaaskaraachaarya)	also referred to as Bhaskara I, he lived in the 7th century C.E. and lived in Saurashtra (in present day Gujarat state) and Asmaka (in present day Andhra Pradesh). Also, lived for some time in Thanesar (near Delhi) under the patronage of King Harsha of Delhi. His treatise, called the <i>Mahabhaskariya</i> , dealt with mathematics as well as astronomy – the latter being the most popular science of his day. He is credited with the being the first to give a formula for calculating the <i>sine</i> function. He also studied and published works on indeterminate equations of the first degree as well as many topics in trigonometry. He rewrote the theory prevalent at that time that the circumference of the circle was a rational number. He proved that the number <i>pi</i> , used in the formula of the circumference or area of a circle was an irrational number. His works were extensively used by Arab scholars who in turn passed them on (with his name lost in the meantime) to the Western world. He wrote an important commentary on Aryabhatta's work, explaining and critiquing many of his theories.
gaNit	mathematics
sa.nhitaa	compendium
apnaayaa	adopted
kooTneeti	strategy
raajneeti	governance, politics
Kautilya (pronounced kauTilya)	also known as <i>Chanakya</i> , he was the minister and adviser to the Mauryan emperor, Chandragupta Maurya. He is credited with bringing Chandragupta to the throne after overthrowing the dynasty of the Nandas of Pataliputra (present day Patna).

	He was extremely influential in the empire that stretched from Takshashila (present day Taxila) in the West to Vanga (present day Bengal) in the east. He wrote the master treatise <i>Arthashastra</i> , that deals with matters of statecraft, diplomacy, economics and governance in great detail. It is a work of the same class as Sun Tzu's work, combined with Confucius style principles of morally upright governance. He is considered one of the pioneers of the realist school of thought in the fields of statecraft and diplomacy.
Kalhan (pronounced kalhaNa)	historian and poet who lived in Kashmir in the 12th century C.E.. His historical masterpiece <i>Rajatarangini</i> , narrates the history of India and particularly of Kashmir from prehistoric times to his day. It is a scientific piece of work, basing its conclusions on an extensive study of original sources, which he cites in his work like modern researchers do.
itihaaso.n	histories; here refers to 'books of history'
soye hue ateet jaage	literally 'sleeping (soye hue) past events (ateet) came to life (jaage)'; figuratively refers to the fact that Kalhan did painstaking primary research to bring long-forgotten historical facts back to light
Charak (pronounced charaka)	Charaka was a physician who lived in in the 6th century BC. He is considered one of the founders of <i>Ayurveda</i> , the Indian healing system based on natural medicines for immediate relief and a complete system of physical and mental health based on the system of exercise called Yoga. Ayurveda is now given official recognition in India as a medical science along with allopathic medicine and the Yunaani system of medicine and involves similar study in modern medical colleges. Charaka's treatise called <i>Charakasa.nhita</i> lays down detailed descriptions of the healing properties of thousands of herbs and other organic and inorganic materials as well as various surgical procedures.
rishi	sage
aushadhiyo.n	medicines
swasth	in good health
hardam	always
tanman	body and spirits (<i>tan</i> refers to the body and <i>man</i> to the mind)
Panini (pronounced paaNini)	Panini was a grammarian who is believed to have lived in the 6th-5th century BC in Shalatula (present day Attock, Pakistan). His major work, <i>Ashtaadhyayi</i> (also referred to commonly as the <i>Ashtaka</i>), gives a comprehensive scientific theory of phonetics, phonology and morphology. He is considered the father of Sanskrit grammar and in that sense, the father of many Indian languages that descended from or at least borrowed from Sanskrit. He organized the Sanskrit alphabet as we know it today, which is also the used by

	almost every Indian language including Hindi. In this well-organized alphabet, sounds are classified according to how they are produced in the mouth and vocal chords. He conducted a deep study of the sounds that can be possibly made by a human and based the alphabet on this study. This has ensured that almost any word (even non-native words) can be written pretty unambiguously and any word written can be accurately pronounced (since each letter has a one-to-one relationship with a unique sound). This level of organization of the alphabet is not found in any other language system in the world. Similarly, Sanskrit grammar is extremely organized with a system of rules that ensures that once you know those rules, the language can be followed almost perfectly (without the frequent exceptions to grammatical rules that are found in most languages). Since Sanskrit is the mother of many Indic languages, PaaNini is also considered the father of these languages as well.
sootro.n	in this context, it refers to books of formulae; sootra is also a synonym for formula but can mean a book of formulae
ke bal par	on the strength of which; in this context, it would mean ‘on the basis of’
bhaaShaao.n	languages
srijan	creation
purkho.n	ancestors
ke adharo.n par	on the lips (adharo.n) of
upajaa	got created, was born
naaraa	slogan
Jai Vigyaan	Victory (jai) to Science (vigyan)
vikasit	developed (vikasit) countries (desho.n)
Bhaarat	ancient name for India and the current official name in Hindi
seena taan	proudly – a figurative use that in a literal sense means ‘chest extended’
swarNim yug	golden (swarNim) age (yug)
samay antim aaya	literally - its time (samay) came (aaya); figuratively – came to an end
Nalanda (pronounced - naalanda)	a University of great learning in a place of the same name in current day Bihar state. This Buddhist center of learning, founded in the 5th century CE attracted scholars from all over the world, including Huein Tsang and Fa Hein from China, whose travelogues throughout India form an important source for reconstructing the civic life of the country in their times. Innumerable scholars from Sri Lanka, Korea, Tibet and all over the Buddhist world visited Nalanda as it was the biggest centre of Buddhist learning in the world at the time. This University was destroyed by the armies of Mohammad Bakhtiar Khilji in the 12th century C.E. - the monks studying

	there were executed and all the books in its vast library (considered by many to be the largest in the world at that time) were burnt. Some of the texts, particularly of the Tantric Buddhist tradition popular in Tibet, survived since copies existed in Tibet (until the Chinese Communists destroyed many of these during the Cultural Revolution of Chairman Mao). It was, to a great extent, on the basis of the Nalanda texts that Tibet retained its central position as the repository of Buddhist knowledge well into the 20th century.
vinaash	destruction
agyaan ka sannaaTaa chhayaa	the deathly silence (sannaaTaa) of ignorance (agyaan as the opposite of gyaan = knowledge) prevailed (chhaayaa)
raajaa paNDit aadi	Kings (raajaa), scholars (paNDit) etc.(aadi)
mahaarathee	literally – great (maha) charioteer (rathee, rath=chariot); figuratively – great warriors, bravehearts
laakho.n sainik	hundreds of thousands of (laakho.n) soldiers (sainik)
shataabdiyaa.n par beet gayee.n	but (par) centuries (shataabdiyaa.n; shat = hundred in Sanskrit) passed (beet gayee.n)
na janmaa koi vaigyaanik	no scientist (vaigyaanik) was born (janma)
pichhaD gaye	became backward (underdeveloped)
ho gayaa patan	the decline (patan) happened (ho gaya)
Dheh gaye ve saare buddhi ke dhaam	all the (ve saare) houses (dhaam) of intelligence/knowledge (buddhi) got razed to the ground (Dheh gaye)
kohre mei.n khoye	lost (khoye) in the mist/fog (kohre)
videshiyo.n	videshi = foreigners (in this context refers primarily to the British but also the French, Portuguese, Danish and Dutch all of whom established small colonies in India)
dhanvaano.n mei.n thee ginatee	were counted (thee ginatee) amongst the wealthy (dhanvaano.n mei.n; dhan = wealth hence dhanvaan = wealthy)
ab daridrataa ka thaa apmaan	now (ab), the ignominy (apmaan) of poverty (daridrataa)
ban gaye ham baazaar vishwa kaa	we became the market (baazaar) for the world (vishwa) – refers to the fact that the British killed the local industry so that there would be a market for the manufactured goods of Manchester and other industrial centers in Britain
bechte sirf kachaa saamaan	sold (bechte) only raw materials (kachaa saamaan)
naye uday mei.n	in the new dawn (refers to the Indian renaissance, when, with the acquisition of modern education, albeit by a small number in the elite, Indians started entering new professions, including science and engineering – this education would eventually lead to independence)
Vishweshwar	Dr. Sir Mokshagundam Visweswaraya was an engineer who rose to be <i>Diwan</i> (Prime Minister) of the princely state of

Sir. M. Visweswaraya <i>(pronounced – vishveshvaraiyaa)</i>	Mysore in the early 20th century. He built the first system of modern irrigation in modern times in South India. He also envisioned and pursued several other public projects of an engineering nature and laid the foundations for modern engineering education in the country. He is considered the father of modern Indian engineering and greatly increased the profile of the profession amongst Indians.
sa.nwaare kisaano.n ke jeevan	improved (sa.nwaare) the lives (jeevan) of farmers (kisaano.n) – refers to the vast irrigation projects that made the region one of the most productive rice-growing regions of India even today, with up to four crops every year
Swaminathan Dr. M. S. Swaminathan <i>(pronounced - swaaminaathan)</i>	Geneticist, who is considered the father of the Green Revolution in India, along with Nobel Prize winner Norman Borlaug. By introducing, new kinds of hybrid seeds, along with scientific techniques of farming suitable for the Indian context, they contributed to the manifold increase in the production of foodgrains in India within a short period in the late 1960s. India, which was a food deficient country before this, ended up being a net food exporter since then.
harit kraanti	Green (harit) revolution (kraanti) – refers to the period in the second half of the 1960s when agricultural production increased manifold due to the introduction and rapid spread of new high-yield seeds and scientific farming techniques
yatheShT khaadya huaa utpann	ample quantities (yatheShT) of food (khaadya) got produced (huaa utpann)
C.V.Raman Dr. Sir C. V. Raman <i>(pronounced- raaman)</i>	Dr. Sir Chandrasekhara Venkata Raman (or C. V. Raman as he is universally known in India) was India's first Nobel Prize winner in the Sciences in 1930 for Physics (Rabindranath Tagore got the Nobel for literature before him in 1913). The Nobel Prize was awarded to him for his work on the scattering of light and for the discovery of the effect now known as the Raman Effect. He worked in the Calcutta University at the time the Prize was awarded to him and later on worked in the Indian Institute of Science before endowing (with his own funds) and running the Raman Research Institute named after him.
pareekshaNo.n	parikshaN = investigations. In a scientific sense, it can also mean experiments
kiraNo.n par prakaash Daala	threw light (prakaash Daala) on rays of light (kiraNo.n) – refers to the investigation of the properties of light by Sir C. V. Raman and his discovery of the Raman Effect of scattering of light
Bose Acharya Dr. Jagdish Chandra Bose	Though a biologist by training and known for his research on the life of plants, he is credited with being the first to invent the radio. He demonstrated a working radio much before Marconi, though unfortunately due to the colonial mindset of

<i>(pronounced jagadeesh cha.ndra bos)</i>	the age, his contribution was never recognized and he is now forgotten outside India. Interestingly, he is not recognized for this in spite of the fact that he actually published his discovery in the <i>Proceedings of the Royal Society, London</i> on April 27, 1899, over two years before Marconi's famous wireless communication on December 12, 1901. In fact, Marconi used Bose's device in his <i>experiment</i> and acknowledged this publicly in writings of the time, yet nobody thought it fit to mention Bose at any time. While Bose had no interest in the commercial aspects of the radio and was a pure scientist, Marconi took up Bose's invention and made it a commercial success. Yet, incredibly, the world still remembers Marconi and not Bose as the inventor of the radio. Such is the effect of colonialism!
Aacharya	teacher; professor (a title often given in ancient times to any great teacher) and usually added after the name. For instance, Bhaskaracharya (listed above) was given the name Bhaskara by his parents by is commonly referred to along with the honorific 'aacharya'
aaviShkaar	invention
niraalaa	unique
Chandrashekhar Dr. Subramaniam Chandrashekhar <i>(pronounced – subramanyam chandrashekhar)</i>	Physicist and astronomer, Chandrashekhar was a Tamilian but born in Lahore (now in Pakistan) in 1910. He was a nephew of the other Indian Nobel laureate in physics, Sir C. V. Raman. He won the Nobel prize in Physics in 1983, though the prize was a belated recognition of the work done for his doctoral dissertation in 1930. Chandrasekhar worked for almost his entire career at the University of Chicago and its Argonne Laboratory in southern Wisconsin. Students of his at the University of Chicago went on to win Nobel Prizes, some before he did! He is famous for the 'Chandrashekhar limit' – which says that stars that are white dwarfs cannot be more than 1.44 times the mass of our Sun. He was also the earliest to postulate the existence of Black Holes. This suggestion was publicly ridiculed by many eminent scientists at the time but was eventually accepted after other evidence emerged for Black Holes. This was the reason for the delay in awarding the Nobel Prize to him (53 years after the original work was published). NASA's upcoming X-Ray observatory satellite, scheduled to join the Hubble Space Telescope in Space in the near future, is named the <i>Chandra X-Ray Observatory</i> in his honour.
chandrashekhar kee seemaa	Chandrashekhar's limit (seema) – see above
rahe brahmaa.nD apaar	the limitless/infinite (apaar) universe (brahmaa.nD) remains within the purview (of the Chandrashekhar's limit)

Hargobind	Har Gobind Khorana, born in Raipur (near Multan) Punjab in 1922, won the Nobel Prize in medicine in 1968 for his work on interpreting the genetic code and its function in protein synthesis. He worked at the University of Wisconsin at Madison and the Massachusetts Institute of Technology.
Har Gobind Khorana (<i>pronounced as written</i>)	
kee chikitsaao.n par	on the remedies (chikitsaao.n) of
sadaa rahe jag kaa aabhaar	the world (jag) will always be (sadaa rahegaa) in debt (aabhaar)
kaThin dino.n mei.n	in difficult (kaThin) days (dino.n)
in rishiyo.n ne	these sages (rishiyo.n ; rishi = sage)
jamkar liyaa thaa ab yeh Thaan	resolved (liyaa thaa Thaan) determinedly (jamkar)
desh	country
bha.nDaar gyaan kaa	treasury (bha.nDaar) of knowledge (gyaan)
Nobel sammaan	the honour (sammān) of the Nobel (prize) – 3 out of the 6 people in the paragraph won the Nobel and at least one more Bose, richly deserved it even though colonial considerations ensured that he did not get it (he was in much earlier times than the others)
raaShTra	nation
swatantra	independent
vikaas ke raah khaRee thee.n baadhaaye.n	obstacles (baadhaaye.n) stood in the path (raah khaRee thee.n) of development (vikaas)
Shanti Bhatnagar Dr. Shanti Swaroop Bhatnagar (<i>pronounced shaanti svaroop bhatnaagar</i>)	Dr. S. S. Bhatnagar was a world-renowned Chemist, who is best remembered for establishing a large number of Scientific Laboratories for various disciplines across India. He was the first head of the Council of Scientific and Industrial Research (CSIR), the body that controls all the Government Funded laboratories in areas of basic research (except those involved in nuclear, space and defence research). He was an Urdu, Hindi and Sanskrit scholar <i>par excellence</i> , in addition to being a scientist. He owned a number of manuscripts in Mirza Ghalib's own handwriting (handed down to him through an ancestor who was a contemporary poet of Ghalib) and gifted these manuscripts to the Punjab University at Lahore, where he taught for many years before taking over the CSIR position. The annual National Awards for Scientific Achievement in India are named after him.
anusandhaan hetu	for the purpose of (hetu) research (anusandhaan)
sansthaaye.n	institutions of knowledge
lauT aaye	returned home
Bhabha Dr. Homi Jehangir Bhabha	Born in 1909, Homi Jehangir Bhabha was born in a well-off Parsi family of Bombay. He is remembered as the father of nuclear research in India. An acclaimed physicist working in the University of Cambridge, he was elected to the prestigious Fellowship of the Royal Society in 1940 at the age of 31, one

<i>(pronounced – homee jaha.ngeer bhaabhaa)</i>	of the youngest ever. He returned to India in 1939 and worked at the Indian Institute of Science (I.I.Sc.), where Nobel Laureate Sir C. V. Raman was the Head of the Department of Physics at the time. He was also a mathematician and worked on that field as well at the I.I.Sc. In 1945, with the funding of the rich Tata family of industrialists and philanthropists, he set up the Tata Institute of Fundamental Research in Bombay. This later gave birth to the Atomic Energy Establishment in Trombay in 1947, renamed the Bhabha Atomic Research Centre (BARC) after his death in 1966. He was instrumental in developing applications of nuclear technology to the needs of development. Under his leadership of the nuclear research programme of India between 1944 and 1966, several milestones were achieved, most importantly the building of the first nuclear research reactor of Asia, <i>Apsara</i> , in 1956 and that too completely indigenously. Subsequently, other reactors were built, one of which, <i>Cirus</i> , was built with Canadian assistance.
videsh	abroad; foreign lands
parmaanuu	atom
shakti	power
Ramanna Dr. Raja Ramanna <i>(pronounced – raajaa raamaNNaa)</i>	Dr. Raja Ramanna, a physicist who served as the Head of the Bhabha Atomic Research Centre, the Secretary of the Department of Atomic Energy (who heads India's nuclear research establishment) and also a Union Minister for Science and Technology for a brief period, is credited as being the father of India's first atomic explosive device, tested in 1974. Besides being a renowned scientist, he is also an accomplished pianist.
Chidambaram Dr. Rajagopala Chidambaram <i>(pronounced - raajagopaala chidambaram)</i>	A person who likes to keep a low profile and concentrate on his work, Dr. Chidambaram played a critical role, perhaps the central role, in both tests of India's nuclear weapons in 1974 and again in 1998. He was the designer of the nuclear weapon besides also being the father of India's thermonuclear weapon. While the processes for the production of the fissile material are available in the public domain (though still very hard to do in practice), the critical information that is very tightly controlled is the actual weaponization of this fissile material. Dr. Chidambaram played a central role in the design of the weapon itself.
aadi	etc.
kaarya ko dee poorna bhakti	gave full (poorna) dedication (bhakti) to their work (kaarya)
Sarabhai	Visionary, scientist, successful industrialist, educationist – the number of titles that can legitimately go to Vikram Sarabhai

Dr. Vikram Sarabhai <i>(pronounced vikram saaraabhaai)</i>	are many more than the ones listed above. He is best remembered as the founder of the Indian Space Research Organization (ISRO) but he set up a large number of very successful organizations in a variety of fields, including the Physical Research Laboratory in Ahmedabad, India's premier laboratory for research in Physics, the Indian Institute of Management in Ahmedabad (consistently rated as the best Business School in Asia and now emerging as a top institute comparable even to the best in the US), ORG-MARG (India's earliest and till this day the biggest market-research agency) and Darpana Academy, a leading institute for Indian classical dance forms. He was born into a business family in Ahmedabad in 1919, studied physics at Cambridge and returned to India to work on Cosmic Ray research under Sir C. V. Raman at the Indian Institute of Science. He was also the head of the atomic research establishment after the death of Homi Bhabha before he simultaneously set up and headed the Space Research establishment. He envisioned that India should be second to none in the application of Space to the development of the country. His vision has been completely realized now, with ISRO having the ability to design, fabricate and launch its own satellites using its own launchers. ISRO is the market-leader worldwide in civilian remote sensing applications, with the largest constellation of earth observation satellites in the world, larger than the US LANDSAT program and Europe's SPOT series of satellites. Furthermore, the data of the Indian Remote Sensing satellites system (IRS) is of higher quality and resolution than those available from LANDSAT and SPOT. India also operates one of the largest constellations of domestic communication satellites in the world today. Vikram Sarabhai's vision has thus been completely fulfilled by ISRO, which is arguably the most successful research establishment in India today. Incidentally, he also brought into India one of the first computers in the country just a few years after the first one was invented, and used it to develop models for sales of soap for his soap-making company – Swastik Oil Mills at a time when few even in the Western world thought that computers had any non-scientific application. He was an advocate of computerization of Indian industry and Government as early as the 1950s and he envisaged that computers would become small and inexpensive when nobody thought this was possible.
sapnaa	dream; in this sense it also means vision (as in the vision of a visionary)
antariksh dwaaraa	progress (pragati) through (dwaaraa) outer space (antariksh)

pragati	(again, Sarabhai laid out his vision of the use of outer space for developmental applications when even the US and USSR were focusing on its military applications due to the Cold War)
Dhawan Prof. Satish Dhawan <i>(pronounced - sateesh dhawan)</i>	Prof. Satish Dhawan was a stalwart in the field of scientific research in India. An institution builder, he headed ISRO in the period after Vikram Sarabhai's untimely death while simultaneously serving as the Director of the Indian Institute of Science in Bangalore. He was, before coming back to India, a Professor at the prestigious California Institute of Technology (Caltech) but returned to serve the country. It was due to his scientific leadership coupled with his unique management abilities that ensured that ISRO remained an organization with systems geared towards effective research and free from the usual bureaucratic stranglehold of Government Institutions. He made a critical contribution towards converting Vikram Sarabhai's vision into reality and initiated programmes both for launchers and satellites. During his leadership, the first Indian built satellite, <i>Aryabhata</i>, was sent into space (followed by other satellites), the first Indian launcher <i>SLV-3</i>, launched an Indian satellite into orbit, and the IRS and INSAT programmes of earth-observation and multi-purpose communication-cum-meteorological satellites were launched. India's spaceport at Sriharikota has been renamed the Satish Dhawan Space Centre in his honour. Prof. Satish Dhawan also played a critical role in advancing India's capabilities in the field of aeronautics. His sterling contribution, along with that of Dr. Valluri of the National Aeronautical Laboratories, led to India being a world-leader in the use of composites to aircraft, perhaps more so than even in the US (though there aren't many Indian aircraft designs to incorporate this into). He played an important role in the initiation and initial development of India's Light Combat Aircraft programme (which is light because it uses the maximum % of composite materials of any fighter aircraft in the world).
Kalam A.P.J. Abdul Kalam <i>(pronounced - abdul kalaam)</i>	Space Scientist, father of India's missile programme and India's 11th President, Dr. Avul Pakir Jainulabdeen Abdul Kalam was the Director of the <i>SLV-3</i> programme, which launched the first Indian launcher into space. He later led the Defence Research and Development Laboratory, and led India's Integrated Guided Missile Development Programme to success. The programme consists of five missiles, the <i>Agni</i> IRBM, <i>Prithvi</i> SRBM, <i>Akash</i> long-range SAM, <i>Trishul</i> quick-reaction short-range SAM and <i>Nag</i> anti-tank missile. He also played a central role, along with Dr. R. Chidambaram (listed

	above) in the nuclear weapons tests of May 1998. An accomplished Veena (ancient Indian musical instrument) player, he is an embodiment of India's syncretic culture – he considers his inspiration and his favourite book to be the Holy Quran, but has profound knowledge of the Bhagavad Gita (a Hindu religious book of moral sayings), the Bible and other religious texts. He is a poet in his native language, Tamil, as well as in English. He was born in Rameswaram (presently in the state of Tamil Nadu) in 1931 and obtained his education locally and in St. Joseph's College, Trichy, before his interest in aerospace took him to the Madras Institute of Technology. He was the Scientific Advisor to the Government of India, the Head of the Defence Research and Development Organization and just before becoming President, was a Professor at the Anna University, where he intends to return to his favourite vocation of teaching after his term as President of the Republic is completed.
Brahm Prakash Prof. Brahm Prakash <i>(pronounced - brahma prakaash)</i>	A metallurgist of great eminence, he worked in the Atomic Energy Programme and as the Head of the Department of Metallurgy at the Indian Institute of Science for many years before taking up a leadership position in the Space Programme as the Head of the Thumba Space Center (later renamed the Vikram Sarabhai Space Centre) – the premier facility for Space Research in India, especially for solid-fuelled rocket engines. He played a leadership role in the <i>SLV-3</i> programme to launch the first Indian satellite from Indian soil using an Indian-built launcher. He and Prof. Satish Dhawan had a symbiotic relationship and both of them collaborated to set up the foundations on which the successes of ISRO were built later on. He was born in Lahore in 1912 and was associated with Dr. Shanti Swaroop Bhatnagar (listed earlier). He obtained doctorates in India, as well as at MIT in the US.
vikaasasheel is desh ke andar	in this developing (vikaasasheel) country (desh)
kaarya	work/task
aasaan	easy
jwaalaa	ardour/enthusiasm (also means fire which is metaphorically equated with ardour)
nayaa rache.nge Hindustan	we will build (rache.nge) a new India (nayaa Hindustan)
Computer sanchaar kaal hai	it is the age (kaal) of the computer and communications (sanchaar)
yeh hamaaraa hai avasar	it is our opportunity (avasar) – it can also mean 'it is our advantage'
har kaarya mei.n ham	we are superlative (uttamtar) in every task (kaarya)

uttamtar	
chandramaa	moon
lehraaye	flutters
tira.ngaa	tricolor – commonly used to refer to the Indian national flag, which has three bands (ti = three, ra.ngaa = colored)
yeh sapnaa hogaa saakaar	this dream (sapnaa) will come true (hoga saakaar); literally hoga saakaar means ‘will take a concrete shape’
ma.ngal	the planet Mars
budh	the planet Mercury
ab maane.nge ham naa haar	literally – we shall not accept defeat figuratively – we shall not be stopped by anything
manzil	destination
kaThinaaiyaa.n aaye.ngee	difficulties (kaThinaaiyaa.n) will come (aaye.ngee)
milkar muqaabla karei.nge huzoor	my dear sir (huzoor), we shall confront (muqaabla karei.nge) them (difficulties, stated above in kaThinaaiyaa.n) together (milkar)
Eeshwar	God
nivedan	request
Vidyarthi (<i>pronounced vidyaarthee</i>)	student; seeker of knowledge (<i>nom de plume</i> of yours truly)
armaan	wish/desire
phir se kabhee na bhoolei.n ham	may we never again forget
naaraa purkho.n kaa	the slogan (naaraa) of the ancestors (purchho.n kaa)
jai vigyaan	‘Victory to Science’

Select key to pronunciation

<i>a</i>	pronounced like the <i>u</i> in <i>cut</i> or <i>custard</i>
<i>aa</i>	pronounced like the <i>a</i> in <i>part</i> , <i>dart</i> etc.
<i>i</i>	short vowel pronounced like the <i>i</i> in <i>pit</i> , <i>is</i> etc.
<i>ee</i>	long vowel pronounced like the <i>ee</i> in <i>sheet</i> , or the <i>ea</i> in <i>heat</i>
<i>u</i>	short vowel pronounced like the <i>u</i> in <i>put</i>
<i>oo</i>	long vowel pronounced like the <i>oo</i> in <i>cool</i> , <i>shoot</i> etc.
<i>e</i> or <i>ei</i>	pronounced like the <i>a</i> in <i>late</i> or the shorter vowel like the <i>e</i> in <i>pet</i>
<i>ai</i>	pronounced like the <i>a</i> in <i>cat</i> or the <i>i</i> in <i>kite</i>
<i>o</i>	pronounced like the <i>o</i> in <i>go</i>
<i>au</i>	pronounced like the <i>o</i> in <i>God</i> or like the <i>ou</i> in <i>count</i>
<i>n</i>	pronounced in the dental way (with the tongue touching the back of the teeth) like the <i>n</i> in <i>fun</i>
<i>N</i>	retroflex (hard) sound pronounced with the tongue quickly moving from the back to the front of the upper palate while

	the sound is being made – this sound is not common in the English language except in the <i>half</i> form just before other retroflex sounds (e.g. the <i>n</i> in <i>canteen</i>)
<i>t, d, th, dh</i>	dental sounds made by touching the tongue to the back of the teeth
<i>T, D, Th, Dh</i>	palatal sounds made by touching the tongue on the upper palate
any letter followed by <i>h</i>	depicts aspiration of the letter
<i>G</i>	the special sound that comes from the back of the mouth – of Arabic origin and not found in other languages except the words borrowed from Arabic/Persian. It is hard for a non-native speaker to make out the difference between <i>G</i> and <i>g</i>
<i>q</i>	once again, the letter is of Arabic origin and is not to be found in most other languages of the word. Sounds like <i>k</i> but the sound comes from the back of the mouth without aspiration
<i>Sh</i>	a sound that is specific to Indic languages and to the best of my knowledge, is not used in any language outside India. It is a deeper sound than <i>sh</i> . The sound <i>Sh</i> is made by curling up the tongue more than is done for <i>sh</i> .
<i>R</i>	retroflex <i>D</i> sound – native to Indic languages. There is no equivalent sound in other languages. It sounds like <i>D</i> but is made by quickly moving the tongue from the back of the upper palate towards the front while the sound is made. There is also an aspirated version of <i>R</i> in Hindi (retroflex version of <i>Dh</i>) but it is not present in this poem
<i>.n</i>	nasalized <i>n</i> sound – not common in Western languages