

WINGS OF FIRE

An Autobiography



AVUL PAKIR JAINULABDEEN ABDUL KALAM has come to personally represent to many of his countrymen the best aspects of Indian life. Born in 1931, the son of a little educated boatowner in Rameswaram, Tamilnadu, he had an unparalleled career as a defence scientist, culminating in the highest civilian award of India, the Bharat Ratna.

As chief of the country's defence research and development programme, Kalam demonstrated the great potential for dynamism and innovation that existed in seemingly moribund research establishments. This is the story of Kalam's rise from obscurity and his personal and professional struggles, as well as the story of *Agni*, *Prithvi*, *Akash*, *Trishul* and *Nag* - missiles that have become household names in India and that have raised the nation to the level of a missile power of international recognition.

At the same time as he has helped create India's awesome weaponry, Kalam has maintained the ascetic rigour of his personal life, working 18 hours a day and practicing the veena. With characteristic modesty, Kalam ascribes the greatness of his achievement to the influence of his teachers and mentors. He describes the struggles of his boyhood and youth, bringing alive everyday life in a small town in South India and the inspirational role of educators. He describes the role of visionary Indian scientists, such as Dr Vikram Sarabhai, and of the creation of a coordinated network of research institutions. This is also the saga of independent India's struggle for technological self sufficiency and defensive autonomy – a story as much about politics, domestic and international, as it is about science.

Arun Tiwari worked under Dr APJ Abdul Kalam for over a decade in the Defence Research and Development Laboratory (DRDL), Hyderabad. He is currently Director, Cardiovascular Technology Institute, Hyderabad, where he is pursuing Dr Kalam's vision of developing cost-effective medical devices using indigenous defence technology.

Dr Kalam is now India's President. He was elected to India's office by a huge majority in 2002.

Cover photograph: Courtesy *The Week*, a Malayala Manorama Publication
Picture by B Jayachandran

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A P J Abdul Kalam with Arun Tiwari



Universities Press

Universities Press (India) Private Limited

Registered Office

3-5-819 Hyderguda, Hyderabad 500 029 (A.P.), India

Distributed by

Orient Longman Private Limited

Registered Office

3-6-272 Himayatnagar, Hyderabad 500 029 (A.P.), India

Other Offices

Bangalore / Bhopal / Bhubaneswar / Chandigarh / Chennai
Ernakulam / Guwahati / Hyderabad / Jaipur / Kolkata
Lucknow / Mumbai / New Delhi / Patna

© **Universities Press (India) Private Limited 1999**

First published 1999

Eleventh impression 2002

ISBN 81 7371 146 1

Typeset by

OSDATA, Hyderabad 500 029

Printed at

Published by

Universities Press (India) Private Limited
3-5-819 Hyderguda,
Hyderabad 500 029

To the memory of my parents

My Mother

Sea waves, golden sand, pilgrims' faith,
Rameswaram Mosque Street, all merge into one,
My Mother!
You come to me like heaven's caring arms.
I remember the war days when life was challenge and toil—
Miles to walk, hours before sunrise,
Walking to take lessons from the saintly teacher near the temple.
Again miles to the Arab teaching school,
Climb sandy hills to Railway Station Road,
Collect, distribute newspapers to temple city citizens,
Few hours after sunrise, going to school.
Evening, business time before study at night.
All this pain of a young boy,
My Mother you transformed into pious strength
With kneeling and bowing five times
For the Grace of the Almighty only, My Mother.
Your strong piety is your children's strength,
You always shared your best with whoever needed the most,
You always gave, and gave with faith in Him.
I still remember the day when I was ten,
Sleeping on your lap to the envy of my elder brothers and sisters
It was full moon night, my world only you knew
Mother! My Mother!
When at midnight I woke with tears falling on my knee
You knew the pain of your child, My Mother.
Your caring hands, tenderly removing the pain
Your love, your care, your faith gave me strength
To face the world without fear and with His strength.
We will meet again on the great Judgement Day, My Mother!

APJ Abdul Kalam

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Preface

I have worked under Dr APJ Abdul Kalam for over a decade. This might seem to disqualify me as his biographer, and I certainly had no notion of being one. One day, while speaking to him, I asked him if he had a message for young Indians. His message fascinated me. Later, I mustered the courage to ask him about his recollections so that I could pen them down before they were buried irretrievably under the sands of time.

We had a long series of sittings late into the night and early under the fading stars of dawn—all somehow stolen from his very busy schedule of eighteen hours a day. The profundity and range of his ideas mesmerized me. He had tremendous vitality and obviously received immense pleasure from the world of ideas. His conversation was not always easy to follow, but was always fresh and stimulating. There were complexities, subtleties, and intriguing metaphors and subplots in his narrative, but gradually the unfolding of his brilliant mind took the form of a continuous discourse.

When I sat down to write this book, I felt that it required greater skills than I possessed. But realising the importance of this task and regarding it an honour to have been permitted to attempt it, I prayed earnestly for the courage and calibre to complete it.

This book is written for the ordinary people of India for whom Dr Kalam has an immense affection, and of whom Dr Kalam is certainly

one. He has an intuitive rapport with the humblest and simplest people, an indication of his own simplicity and innate spirituality.

For myself, writing this book has been like a pilgrimage. Through Dr Kalam, I was blessed with the revelation that the real joy of living can be found in only one way—in one's communion with an eternal source of hidden knowledge within oneself—which each individual is bidden to seek and find for himself or herself. Many of you may never meet Dr Kalam in person, but I hope you will enjoy his company through this book, and that he will become your spiritual friend.

I could include in this book only a few incidents among the many narrated to me by Dr Kalam. In fact, this book provides only a thumbnail sketch of Dr Kalam's life. It is quite possible that certain important incidents have been inadvertently dropped and that the contribution of some individuals to the projects co-ordinated by Dr Kalam has gone unrecorded. Since a quarter-century of professional life separates me from Dr Kalam, some important issues might also have remained unrecorded or have been distorted. I am solely responsible for such shortcomings, which are, of course, completely unintentional.

Arun Tiwari

Acknowledgements

I wish to express my gratitude to all the people involved in the writing of this book, especially Mr YS Rajan, Mr A Sivathanu Pillai, Mr RN Agarwal, Mr Prahlada, Mr KVSS Prasada Rao and Dr SK Salwan, who were very generous in sharing their time and knowledge with me.

I am thankful to Prof. KAV Pandalai and Mr R Swaminathan, for critical reviews of the text. I thank Dr B Soma Raju for his tangible, but always unspoken support, for this project. My sincere thanks go to my wife and unsparing critic, Dr Anjana Tiwari, for her tough comments, accompanied with her gentle support.

It has been a pleasure to work with Universities Press, and the co-operation of the editorial and production staff is much appreciated.

There are many fine people, such as the photographer Mr. Prabhu, who have selflessly enriched me and this book in ways beyond measure. I thank them all.

And finally, my deepest gratitude to my sons, Aseem and Amol—for their unfailing emotional support during the writing, and because I seek in them that attitude towards life which Dr Kalam admired, and wanted this work to reflect.

Arun Tiwari

Introduction

This book is being released at a time when India's technological endeavours, to assert its sovereignty and strengthen its security, are questioned by many in the world. Historically, people have always fought among themselves on one issue or another. Prehistorically, battles were fought over food and shelter. With the passage of time, wars were waged over religious and ideological beliefs; and now the dominant struggle of sophisticated warfare is for economic and technological supremacy. Consequently, economic and technological supremacy is equated with political power and world control.

A few nations who have grown very strong technologically, over the past few centuries, have wrested control, for their own purposes. These major powers have become the self-proclaimed leaders of the new world order. What does a country of one billion people, like India, do in such a situation? We have no other option but to be technologically strong. But, can India be a leader in the field of technology? My answer is an emphatic 'Yes'. And let me validate my answer by narrating some incidents from my life.

When I first began the reminiscences that have gone into this book, I was uncertain about which of my memories were worth narrating or were of any relevance at all. My childhood is precious to me, but would it be of interest to anyone else? Was it worth the reader's while, I wondered, to know about the tribulations and triumphs of a small-town boy? Of the straitened circumstances of my schooldays, the odd jobs I did to pay my school fees, and how my decision to become a

vegetarian was partly due to my financial constraints as a college student—why should these be of any interest to the general public? In the end, I was convinced that these were relevant, if not for anything else but because they tell something of the story of modern India, as individual destiny and the social matrix in which it is embedded cannot be seen in isolation. Having been persuaded of this, it did seem germane to include the accounts of my frustrated attempt to become an Air Force pilot and of how I became, instead of the Collector my father dreamed I would be, a rocket engineer.

Finally, I decided to describe the individuals who had a profound influence on my life. This book is also by way of a submission of thanks, therefore, to my parents and immediate family, and to the teachers and preceptors I was fortunate to have had, both as a student and in my professional life. It is also a tribute to the unflagging enthusiasm and efforts of my young colleagues who helped to realise our collective dreams. The famous words of Isaac Newton about standing on the shoulders of giants are valid for every scientist and I certainly owe a great debt of knowledge and inspiration to the distinguished lineage of Indian scientists, that included Vikram Sarabhai, Satish Dhawan and Brahm Prakash. They played major roles in my life and in the story of Indian science.

I completed sixty years of age on 15 October 1991. I had decided to devote my retirement to fulfilling what I saw as my duties in the

sphere of social service. Instead, two things happened simultaneously. First, I agreed to continue in government service for another three years and, next, a young colleague, Arun Tiwari, requested me to share my reminiscences with him, so that he could record them. He was someone who had been working in my laboratory since 1982, but I had never really known him well until the February of 1987 when I visited him at the Intensive Coronary Care Unit of the Nizam's Institute of Medical Sciences in Hyderabad. He was a mere 32 years old, but was fighting valiantly for his life. I asked him if there was anything he wanted me to

do for him. "Give me your blessings, sir," he said, "so that I may have a longer life and can complete at least one of your projects."

The young man's dedication moved me and I prayed for his recovery all night. The Lord answered my prayers and Tiwari was able to get back to work in a month. He did an excellent job in helping to realise the Akash missile airframe from scratch within the short space of three years. He then took up the task of chronicling my story. Over the last year, he patiently transcribed the bits and pieces of my story and converted them into a fluent narrative. He also went through my personal library meticulously and selected from among the pieces of poetry those that I had marked while reading, and included them in the text.

This story is an account, I hope, not just of my personal triumphs and tribulations but of the successes and setbacks of the science establishment in modern India, struggling to establish itself in the technological forefront. It is the story of national aspiration and of co-operative endeavour. And, as I see it, the saga of India's search for scientific self-sufficiency and technological competence is a parable for our times.

Each individual creature on this beautiful planet is created by God to fulfil a particular role. Whatever I have achieved in life is through His help, and an expression of His will. He showered His grace on me through some outstanding teachers and colleagues, and when I pay my tributes to these fine persons, I am merely praising His glory. All these rockets and missiles are His work through a small person called Kalam, in order to tell the several-million mass of India, to never feel small or helpless. We are all born with a divine fire in us. Our efforts should be to give wings to this fire and fill the world with the glow of its goodness.

May God bless you!

APJ Abdul Kalam