Inaugural Address—19th Annual Meeting of Aero Medical Society of India

Dr. B. N. Sinha*

Mr. Chairman, DGAFMS, Professor Baldev Singh, Air Cdre. Verma and other Officers, my esteemed seniors Maj. Gen. S. L. Bhatia and General Rao. I am very happy to meet you all, particularly these two seniors of mine, who have always encouraged me in my professional life for last so many years.

I have many good friends in this audience; I am not new to this hall because I was here in 1974 to read a paper on "Spinal Injuries in Particular Relation to Aviation Medicine". I have accepted this honour for the simple reason that I am a chronic student of medical science, I feel I have yet to learn a lot and any opportunity where facts can be gathered and put in shape, particularly from the point of view of medical education, is most welcome to me.

I am greatly honoured that one of my ex-students, who was one of my brilliant products from King George's Medical College, Lucknow, is the DMS (Air), Air Vice-Marshal D. N. Gupta.

I could not refuse his invitation, supplemented by a very hospitable letter by Air Chief Marshal Moolgavkar. I would like to thank you all for giving me this courtesy and also for making me a Fellow of your Society which is so distinguished in its own subject. May I start off by saying that I have known something about the history of this Institute. I have been here earlier in many capacities, apart from being your invitee, to the Bangalore Medical College and therefore, I have been taking interest in the development of this part of Aviation Medicine, and I know that you have advanced to a very large extent by your own efforts.

> "Age is like a mountain high—
> Rarer the air and blue—a little hard climb and a bit of fatigue, but oh–what a wonderful view."

I never imagined that I shall be able to see in my lifetime so many good things and developments in medical education.

I have had the privilege of meeting the father of the Indian Air Force, Air Marshal Mukerjee. I remember with what difficulty Air Vice Marshal S. P. Bhatia and Air Marshal Ajit Nath, who later became DGAFMS, brought up this Institution against great odds. It was a pleasure for me to go around and see your equipments, the stimulating study that you carry out, which is one of the best, not only in this country but in this part of the world. I am told that no such institution exists either in South East Asia or in Middle East or Eastern Europe. There were good old days when the boys from this Institution were sent to Farnborough in Hampshire for training, and they produced some of our Indians well trained who came back and took over charge here, and have done a great credit to this Institution and to the soil.

I am also aware of the fact that you are having a training programme on a wider scale where medical practitioners, civil aviation doctors, and other scientists of allied branches, come for their training and gaining experience. You also train some students from outside this country with the permission of the Government of India.

* President, Indian Medical Council; Emeritus Professor, Orthopaedic Surgery, Lucknow University; Honorary Brigadier; Honorary Consultant to the Armed Forces Medical Services; Fellow of the Aero Medical Society of India.

As far as I am concerned, knowledge is never localised, it belongs to humanity in every phase, and it is in this concept that we have as students claimed our experience in every part of the globe, and allowed everybody also in the world to come and take part in whatever we have.

Ladies and gentlemen, your diploma course in Aviation Medicine is recognised by the Medical Council of India, and one good thing that I saw in your notification is, that it is a qualification conferred by the Bangalore University. I do not know if the luminaries, the Vice Chancellor or other authotities of university are present here ; in case not, I would like to convey to them, through you, Sir, that they should feel proud of the fact that such a big and good Institution of Aviation Medicine exsits affiliated to their university. I am making that point for various reasons, one of them being that the atmosphere of a University, is supposed to have a certain amount of Universality, the point that I referred to before. And therefore, to justify the name of the Bangalore University in this historical place like Bangalore, it is in the fitness of things that they give you all possible encouragement and opportunity to develop this particular branch of science which is so badly needed for our Nation.

There are many allied branches in Aviation Medicine which require to be developed and what is more, to be carefully studied and mastered by our own people. I am sure if the University and this Aviation Medicine Institute put up suggestions before the Government something positive will happen.

Intellectual Flight is always an upward one. Blessings and honour, glory and power are not the attributes of a scientific life. and therefore only one reward you can have if you succeed, i,e., an iota of knowledge has been contributed to the literature and you are a very lucky man ; if not, you can have the gratifying reflection of having made an honest attempt, which is a great reward in itself.

The lives of most scientists have been spent that way. You take your own branch when in 1952 the Aero Medical Society was formed. It was considered to be of no consequence. Later on in 1957 when you got an Air Force Medical School, which later on became the School of Aviation Medicine and got affiliated to the University in 1967 and Diploma was started, a certain importance was given to you. As far as I am concerned, I hope majority of you will agree with me, the world is divided into two parts, the medical men and the non-medical men ; and mind you in keeping strictly with the concept of our Constitution, sex-less, class-less, colourless, creed-less, so that wherever there is man, a doctor has got to step in there. And that is why when the medical services are essential for the upkeep of the pilots and for the civilians who fly with them. This reminds me of a very nice poem which I read many years ago

"The Lord and the Doctor ; we like adore,
But at the brink of danger and not before,
when the danger is passed, they both are requitted,
The Lord is forgotten and the Doctor slighted."

This is to emphasise that the medical services are essential for an organisation of the Science of Aviation. May I therefore, suggest here that the Ministry of Tourism and Civil Aviation, Government of India should also consider utilizing the services of the specialist medical staff of this institute for their Medical Board Examinations. The efficiency of the Pilots and other staff in Air Lines Services require a proper appraisal of their health standards.

This is true in many other situations of human activity. The non medical people know that we doctors may become patients but majority of them will not be able to become doctors, and therefore, it will be wiser for them to give us all possible help to develop new technology in medicine to raise our efficiency and the standard of health for the benefit of all concerned.

Apart from my reference above to the Bangalore University may I mention that University education and research has a certain degree of continuity. Professor Baldev Singh and some others are present here, who retired several years ago, but the various university organisations are utilizing their services as Emeritus Professor or Research Professor for the simple reason that they want these scientists to be associated with them to benefit by their records of failures and successes which may give rise to arguments of great value in seminars or academic conferences. I feel that occasional re-

flections of a life long experience may prove to be a drop of wisdom to solve very tricky problems.

I have therefore a submission to make to the Bangalore University as well as to the Ministry of Defence that they may consider to utilize the services of some of our able Doctors of merit in different fields, research workers in the Army, in one capacity or the other, such as National Professors, Research Professors, or Honorary consultants etc. A sense of dignity and a suitable position befitting their services which they gave during the rich and active years of their lives, will encourage them to accept to offer their contribution. This will not only maintain 'esprit de corps' which is essential in the teaching profession or any scientific pursuit, but will also encourage the younger people to look upto a chance of recognition of their contribution in their future life when they retire. The History of Science and the cultural heritage of India have made it clear that all beautiful edifices of knowledge have an essential base as their foundation, which always is at the bottom to sustain the super structure; so that the significance and the sequence of all the experiences past and present can help the institution in the periodical assessment and evaluation of the various observations.

All research work has two facets (i) about which Air Vice Marshal Gupta has mentioned and that is its orientation from the point of view of utility, (ii) The basic or the fundamental research which is usually not done from the point of view of any material usefulness but only to get at the mysteries of nature. They both have to go together and the scientist has to convince all others and the administrators about the value of this type of work.

In this context I would like to mention a story; You may be knowing that Faraday was the man who demonstrated the Electrical current by bringing a magnet near a coil of iron. He invited the scholar statesman Mr. Gladstone, the then Prime Minister of England, to visit his laboratory and explained this experiment to him. Mr. Gladstone asked "What is the good of it?" Professor Faraday replied "Sir, one day you may be able to tax it."

Ladies and gentlemen, you all see Electricity in its various forms to-day and enjoy its boon, as well as, pay taxes which explains the point that I have been trying to make above.

Please permit me to mention that I have had the opportunity of going through many of your research plans as a member of the Armed Forces Medical Research Committee for a number of years and I wish to congratulate the medical officers and the scientists who have had the privilege of working in this Institute of Aviation Medicine. I believe many other research problems have been taken in hand under the able leadership of your officers and I am sure you realise that the horizon of knowledge is ever getting more and more distant and therefore calls for a continued activity.

One should study history in order to learn the relevant facts about the past experiences and activities of the human race, and also attempt a philosophical interpretation of them. Careful study reveals that the earth crust was formed four thousand million years ago. And out of the gigantic river of time it has only managed to dam up a tiny rivulet of 7,000 years of human history, at the cost of a lot of hard work, many adventures and a great deal of curiosity. But what are 7,000 years of human history compared with thousands of millions of years of the history of the universe?

Ancient history recorded in mythological references of the pre-inca says that the stars were inhabited and the Gods came down to them from the constellation in Sumarian, Assyrian, Babylonian and Egyptian inscriptions. The Greek mythology, Ramayana and Mahabharat have similar references. We shall not be surprised when we learn in the Ramayana that Vimanas, i. e. flying machines, navigated at great heights with the aid of quicksilver and a great propulsive wind. The Vimanas could cover vast distances and could travel forwards, upwards and downwards. Enviably manoeuvrable space vehicles. This quotation comes from the translation by N. Dutt, 1891:

'Bhima flew with his Vimana on an enormous ray which was as brilliant as the Sun and made a noise like the thunder of a storm.' (C. Roy, 1889).

The first book of Mahabharata reveals the intimate history of the unmarried Kunti, who not only received a visit from the Sun God, but also had a son by him, a son who is supposed to have been as radiant as the Sun himself. As Kunti was afraid, even in those days of falling into disgrace, she laid

the child in a little basket and put it in a river, Adhirata, a worthy man of the Suta cast, fished the basket and the child out of the water and brought up the infant.

Later on in the 15th century Leonardo Da Vinci wrote about a devise of flying with drawings. On 15th October 1783 man made his first ascent in a baloon and a French apothecary Pillatre de Rozier, became the first man in the space. The history of the aviation in the early days was closely associated with physicians like John Jeffries. The flight of Coxwell and Glaisher in 1862 brought out inadequacy of the man in hostile environments when Glaisher became unconscious and Coxwell was nearly paralysed from lack of oxygen. Paul Bert, a physician was the first to advocate the use of oxygen and wrote the first book on Aviation.

The flying machines used in the second World War were toys by modern standards. Still accident rate was very high and it was found that 80% of the deaths and disabilities occurred not due to enemy action or faulty machinery, but due to human factors. This weakness in the man machine complex involved the medical profession in aviation intimately. The high accident rate due to human factors made the Air Force authorities aware of the possibilities that doctors could be of some help. As a result an Air Force Aviation Medicine Team studied the problem and there was drastic reduction in the accident rate among allied flyers in France. Advances in technology have placed more and more demands on the medical profession to fit the man to the machine. Man is used to terrestrial living and his evolution has made him fit only to live within a limited range of barometeric pressure, thermal changes and low speed of movement and acceleration. Modern sophisticated aircraft make heavy demands on the human operator in these respects which often exceed the maximum human tolerance. Here again, the doctors have to evolve methods to reduce the stress and increase the ceiling of tolerance to the hostile environment which threatens the pilot's very survival. The Man has to be matched with aircraft so that he becomes an integral part of the system. In this attempt of physical and emotional integration, Air Force medical scientist has an important role to play. He must select a physically and psychologically fit person and maintain him at the peak of the fitness at all times. I am glad that this aspect is being covered in one of the symposia on aircrew maintenance. The normal role of doctor in prevention and treatment of diseases, and rehabilitation of the sick and injured aircrew also requires specialised knowledge and research., e.g.,

(1) The upper atmosphere raises problems of *Hypoxia and low temperatures.* The reduced air pressure results in expansion of gases in the body cavities leading to serious discomfort and even serious consequences. *The dissolved nitrogen gas in body fluid precipitates decompression sickness.*

(2) The effects of speed and change of direction in the 3 dimensions without a viable reference point lead to the problem of *G forces and disorientation.*

(3) Medical Scientist must keep pace with the rapidly advancing technology to ensure that the flyer is always kept matching and capable of withstanding stresses and strain placed on him.

(4) Members of Aeromedical Society in general and Institute of Aviation Medicine, in particular have not only to carry out these tasks but also have to think of the *future.*

(5) "Arya Bhatt" is the first step India has taken in the space age, This appears only a vision yet but the time is surely approaching fast when medical scientists will be involved with problems of *weightlessness, claustro-phobia, inflight meals, loneli. ness of the aerospace* etc. The Aeromedical scientist would do well to prepare for the needs of Indian space man of the future.

(6) *A trained pilot* is a valuable national asset and so are the highly expensive sophisticated aircraft. Aircraft accidents, which may lead to loss of one or both must be reduced at all costs.

(7) *Aeromedical scientist* is closely linked in designing safety equipments, safe ejection mechanisms and technique of *survival in mountain, desert, jungle and sea* aud finally treating and *rehabilitating* the injured.

(8) *Accident prevention* also involves a critical analysis of the accident, specialised knowledge of pathology, toxicology, and imagination to recreate the circumstances. The lessons learnt from the

study of the past accidents are essential for future flight safety.

(9) Members of the Society working for harmonious relationship between the man and the machine would soon be faced by *ever increasing challenges* with further developments of the aircraft industry. The task requires closest cooperation between the doctor and the technical side of aero-industry both for military and civil aviation.

(10) Members of the Society are also respon sible for medical aspect of *civil aviation* in India, fitness of aircrew and their maintenance. I am glad to know that your members have rendered assistance to the inflicted in all national calamities and that a well trained and efficient *aeromedical casualty evacuation organisation* renders assistance to sick and injured in remote areas.

(11) Your medical *para trooper* flight are ever ready to render medical assistance even in remote areas, and hostile country.

May I mention here my privilege and experience in having visited the NASA at Houston, Cape Kennedy and Huntsville in 1973 where I saw magnificient scientific and technical research centres. It was a great education, and initiated thoughtful reflections on many stories and scientific papers that I had the opportunity to go through in a casual reading habit. It will be reasonable to assert that there is a lot of knowledge in store for us. Many questions like landing on the Moon, were absurdity in the past but are realities today.

The idea of life in other planets is yet to be solved for the recent report of the space Ship on Mars have failed to detect one. The idea that life can only flourish under terrestial conditions has been made obsolete by research. It is a mistake to believe that life cannot exist without water and oxygen. Even on our own earth ther are forms of life that need no oxygen. They are called "anaerobic bacteria". A given amount of oxygen acts like poison on them. Why should there not be higher forms of life that do not need oxygen?

The researches which are being utilised for human service are known to you. The majority of medical life-saving machines come from America. They are products of the systematic evaluation of the results of atomic research, space travel and military technology. They are the products of a novel collaboration between industrial giants and hospitals in America which is leading medicine to new triumphs almost daily.

Thus the Lockheed Company which makes Starfighters, and the famous Mayo Clinic cooperated to develop a new system of nursing based on computer techniques. The designers of North American Aviation, following suggestions by the medical profession, are working on an 'Emphysema belt' which is intended to make it easier for patients with lung trouble to breathe. The NASA space authorities produced the idea for this diagnostic apparatus. The apparatus, actually conceived to measure the impact of micro-meteorites on spaceships, registers minute muscular spasm in certain nervous diseases.

Another life saving by-product of American computer technology is the 'PACEMAKER'. It is a battery-driven mini generator which is introduced under the skin. From it the doctors insert a connecting cable through the superior vena cava to the right auricle of the heart. The heart is then stimulated to rhythmical movements by regular surges of current. It beats, when the battery of the 'heart machine' is burnt out after 3 years, it can be changed by a comparitively simple operation.

General Electric, the American concern, improved this little miracle of medical technology last year when it developed a two speed model. If the wearer of this 'PACEMAKER' wants to play tennis or run to catch a train, he simply moves a bar magnet up and down for a moment over the spot where his built-in generator is located. His heart promptly works at a higher speed.

Not a day passes without something brand new being invented somewhere in the world, every day another question can be struck from the list of impossibilities as answered. Edinburgh University received a preliminary grant of £ 270,000 from the Nuffield Trust for the development of an intelligent computer. The prototype of this computer was put into conversation with a patient, and afterwards the patient could not believe that he had been talking to a machine. Professor Dr. Michie, who designed this computer, claimed that his machine was beginning to develop a personal life.

The new science is called futurology. Its goal is the planning and detailed investigation and understanding of the future by all technical and mental means available. "Think tanks" are springing up all over the world; what they amount to are monasteries of scientists of today, who are thinking of tomorrow. One hundred and sixty four of these "Think tanks" are at work in America alone. They accept commission from the government and heavy industry. The most celeberated "Think-tank" is the Rand corporation at Santa Monica in California. The U. S. Airforce were responsible for its foundation in 1945.

Let me mention that the purpose of such conferences where so many eminent people have graced the audience should be to record their truthful observations. We need not agree on every point, but if we can stir up our thinking to come to certain conclusions after academic discussion it is always worth the effort.

Let me end this talk with a prayer:

"Point out the way
However dimly and lost amongst the host
As does the evening star
to those who tread their path in darkness"

Ladies and gentlemen I have great pleasure in inaugurating this conference.

Thanking you.