

Marthanda Varma Sankaran Valiathan

Indira Nath

M. S. Valiathan, as he is popularly known, can be best described as an intellectual wanderer par excellence. Folk history would remember him as the first physician scientist of modern India who married medicine to technology, thereby bringing relief to many and enhancing national pride in medical devices and biomaterials. He was a wanderer geographically in his early professional life like so many doctors of that era. In later years, his nomadic nature took him to cross many disciplines and address many intellectual challenges. But always he remained a wanderer even when physically rooted to south India.

From a boy to a man

Valiathan was born on 24 May 1934 in Mavelikara, a bustling town rich in history, 70 miles north of Thiruvananthapuram, Kerala. His early education was in the local Government High School, where he had teachers who seem to have influenced him greatly and whom he remembers even today, with fond gratitude: Kesavan Unnithan in Malayalam, Raja Raja Varma in English, Samuel in Chemistry, Neelakanta Pillay and Nanukuttan Nair in Biology. The School is now a fancier polytechnic. His studies received a shock when in 1947, in the name of education reform, all subjects were taught in Malayalam even when equivalent words for science subjects were not available in that language. This was further exaggerated by the fact that by 8th standard the pupil had to make a choice of prefixed package of subjects. Since he was averse to mathematics, mainly because the teacher used corporal punishment, he selected Hindi, chemistry, biology and physiology, a selection that he regrets as it was devoid of mathematics, physics, history and sociology. A similar practice continues to this day after 10th class which may explain the lack of interdisciplinary approach and limited education that Indian children are forced into at an early age. He seemed to have decided to become a doctor as many of his close relatives were doctors and also realized that doctors were generally respected in the

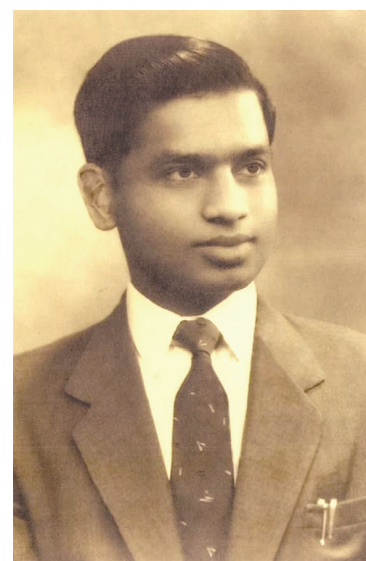
community. As was the norm at that time he needed to undertake an Intermediate examination after school which meant moving to the big city of Thiruvananthapuram. Not only did this involve a social adjustment but it also meant that he had to learn the science subjects in English with additional subjects like Physics and Mathematics. He enjoyed the university ambience and reading his favourite 'Under the Greenwood tree'. Tragedy struck when two weeks prior to the examination his father to whom he was very close died. Comforted by his sister he managed to pull himself out of his grief and sat for the examination. As an indication of greater things to come he managed to get a first class.

Transformation to a 'curious' surgeon

In 1951 the first medical school opened in Thiruvananthapuram and he was admitted in the first batch of students. As expected this was an exciting phase and like other young medical students he felt he had reached the pinnacle and would become a doctor in a short time. Soon, he was dreaming of obtaining FRCS from UK which was highly respected in India. He appears to have selected to do surgery with a romantic notion and not as a conscious well thought out choice. However, from the description that Valiathan gives of his medical education, things do not seem to have changed much in all these decades. Both then and now emphasis in most medical schools was placed on memorizing facts with little in the way of curiosity-driven approach.

Valiathan promptly took the boat to UK as soon as he finished his training in the Thiruvananthapuram Medical School. This was quite an adventure for a boy from Mavelikara. It was not till he got exposure to the course in the Royal College of Surgeons that he realized the defects in his earlier fact-based knowledge. His curiosity got its first stimulus perhaps in England which stayed with him and drove him to question all through his life. This was perhaps a peculiar stage in his life, a combination of a moral desire to be a clinician and a

surgeon to alleviate the pain of patients combined with a materialistic desire to be respected. By the standard of post-colonial India, FRCS and MS were the high mark of a surgeon. Yet it is at this stage of his life that he discovered his innate intellectual desire to understand the nature of things, be it in medical or other disciplines. The two do not mix well while working for FRCS which is a skill-based qualification, but they could be approached satisfactorily while working for MS which requires writing a dissertation/thesis. Thus he remembers with admiration Last who made him realize that anatomy of the human body was architecture based on function. In contrast, Wells whom he met in Liverpool for the MS degree seldom taught facts but aroused curiosity by posing questions based on the clinical aspects of a patient. At this stage in life, which I consider was perhaps a transformational stage, he oscillated between practical aspects of treating patients with a desire to know more about the 'why' and 'how' of disease processes. Is that when the first signs of the 'wanderer' appear? Or was it always there subsumed by the factual nature of Indian education? For millennia Indians were used to sitting under the banyan tree listening to Gurus and Buddhas. Few emerged from the trance of such teachings to think afresh. Maybe



Valiathan in UK.

LIVING LEGENDS IN INDIAN SCIENCE

it needed an external stimulus to open the 'inner eye' of Valiathan.

Experimental questioning began with his thesis work for M.S. He went as a Fellow to John Gibbon of the Jefferson Medical College, Philadelphia in 1960s. He was drawn by the drama of cardiac surgery, though his M.S. thesis was stimulated by the legendary A. K. Sen and addressed hepatic factors in the accumulation of abdominal fluid in cirrhosis, which gave him an M.S. in Liverpool in 1962. Gibbon had invented blood pumps and accessories for extracorporeal circulation which enabled him to the first open heart surgery in the 50s.

He returned to India with great pride in his achievements abroad and like many returning Indians faced acute disappointment at the lack of job opportunities and most importantly the lack of recognition of his talents. Even today many Indian intellectuals and professionals have little capacity to identify latent brilliance or unusual talents in individuals. Our monuments are testimony to the anonymity of the various sculptors and architects who built them and whose names are not recorded anywhere. Union Public Service Commission (UPSC) was instrumental in not selecting him for the faculty position in the then nascent Pondicherry Post-Graduate Institute and the Maulana Azad Medical College. He spent his time haunting the corridors of KEM hospital where he met brilliant surgeons of that time. When Indo-China war broke out he applied for a short commission and was selected; at the same time he got an offer from the Post-Graduate Institute of Medical Education and Research (PGIMER), Chandigarh which was also at a nascent stage of development to its mega status today. Being an academic at heart he selected the latter. So from Mavelikara in Kerala having benefited from the cultures of US and UK, Valiathan wandered into another adventure to face the culture shock in a city which was new and beautiful but which was strongly rooted in the culture of Punjab.

Though PGIMER, Chandigarh had only 250 beds, work was rather slow. Two events changed his life; his interest in cardiac surgery got revived as there was a unit of cardiac surgery, and he met a Punjabi dental surgeon, Ashima, who had joined after a brilliant career. Marriage to Ashima involved intricate but successful negotiations to convince both

the Punjab and the Kerala families. While undergoing the Arya Samaj ceremony in 1964, and hearing the Sanskrit mantras he realized that Punjab was not so far, as the mantras were reminiscent of what he used to hear in Kerala.

By 1965, both Ashima and Valiathan were ready to move again, this time to Johns Hopkins in Baltimore, he to train in cardiac surgery while she took up orthodontics. It was also the year when their daughter Manna was born. The following years were exciting both from intellectual and family points of view. The ecosystem was ripe for intellectual curiosity and freedom of thought and action. His Chief, Gott was involved in thrombo-resistant surface called GBH-graphite-benzalkonium-heparin-by coating prosthetic materials. Valiathan thus got exposed to biomaterial sciences and developed a technique for thoracic aortic bypass using a GBH coated shunt and avoiding a left heart bypass. This won him at a very young age the Hunterian Professorship of the Royal College of Surgeons, his first award which he rates as his most satisfying one out of all those that followed later. He moved to Washington as a resident and cherishes the memory of his experience at Hufnagel's department at the Georgetown University. Hufnagel had a busy programme in cardiac and vascular surgery and was the legendary pioneer who implanted a prosthetic valve in the descending thoracic aorta when machines did not exist for heart lung bypass. His experience led



MS and Ashima Valiathan in USA 1965.

to an FRCS Canada in cardiac surgery. His association with Hufnagel continued through his life time. By now he had acquired 3 FRCS and one M.S. degree in addition to the honour of Hunterian Professorship. He was materially and intellectually comfortable but his 'India virus' as Hufnagel phrased it troubled him and he wanted to get back to India. He faced disappointment time and again and was puzzled as to why none of the people to whom he had written replied to him. India is a strange country; on the one hand it appoints committees to bring back our 'brains' and on the other hand no one in power considers it proper to reply to letters from those seeking jobs either from India or from abroad. This dichotomy in attitude has lost us many brilliant people whom we now eulogise as 'India born' or 'of Indian origin' once they get recognition elsewhere.

Thanks to a chance association with the then Ambassador B. K. Nehru he was offered an adhoc job in Safdarjung Hospital in 1972 for the princely sum of Rs 650 per month. Since the 'India virus' infection was not cured, he and more importantly his family came back this time to New Delhi. He was clear that this was a temporary assignment and that he had as yet not found his permanent abode. During this time he prepared a paper on Biomaterials, a new field and took it to the DG CSIR, Nayudamma. The latter in turn consulted the then Director IIT Chennai, who offered Valiathan a job to teach quantitative physiology and biomaterials. After a time, he realized that he could not practise research or fabrication as the emphasis at that time was on education only. He had the opportunity though to practice cardiac surgery as he had a joint appointment at the Railway Hospital which had just created these facilities. But by now though the India



Valiathan with Charles Hufnagel.

virus had been conquered the ‘creativity virus’ was all consuming. Looking at his state materially any one else would be tempted to ask: what more do you want? You are teaching brilliant students and doing cardiac surgery at one of the best centres of that time?

Medical devices and Sree Chitra Tirunal Institute, Thiruvananthapuram

In 1970, the Kerala Government set up several autonomous institutions for local problems. Sree Chitra Tirunal Centre was born in Trivandrum in 1974 in a building gifted by the Maharaja. Many CSIR institutions were similarly housed in erstwhile royal palaces during the post-independence era of ‘scientific temper’ instilled by Nehru. Valiathan was inducted initially as Professor of Cardiac Surgery and became its Director at the age of 40 years and continued in that position from 1974 to 1994. He had the advantage of a clean slate as he moved to an empty building with no staff, furniture or equipment! That tested Valiathan’s skills to the utmost as he had to undertake not only reconstruction of an existing building but also build new ones to provide all facilities, recruit specialized staff for cardiology, neurology and supportive disciplines and purchase equipment. After twenty months, with support from the family, the Kerala Government and famous well wishers and talented faculty, the first open heart surgery was undertaken at Chitra Tirunal Institute. Valiathan would say ‘It was as if all the personal contacts and efforts I had made

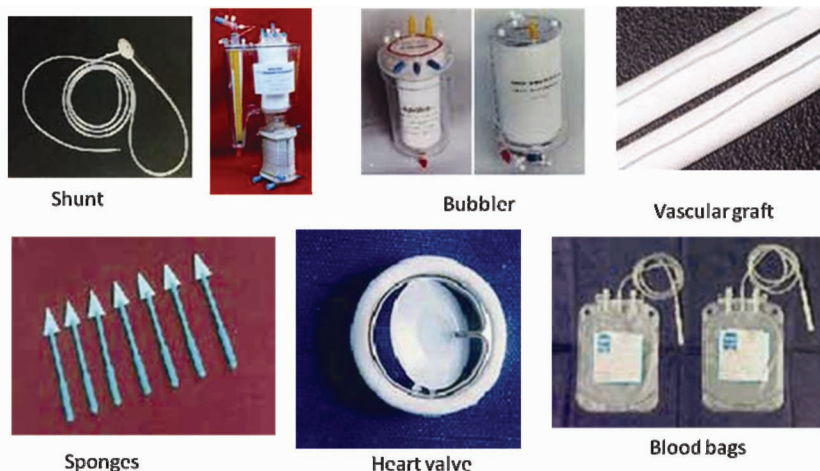
during my apparently futile years in Delhi and Chennai were suddenly bearing fruit in Thiruvananthapuram’.

Having established a first rate cardiac surgery unit, it was time to get back to his love for medical devices and biomaterials. With collaboration from Vasant Gowarikar of VSSC and Sivaraj Ramaseshan of NAL, his earlier student S. Bhuvaneshwar and Venkatesan from MES, he decided to work on developing blood bags and prosthetic heart valve using PVC and titanium respectively. The Biomedical Technology Wing of the Chitra Medical Centre came into being in a 28-acre campus surrounding the Stalemond Palace donated by the Royal Family. Bioengineering research was initiated in the outhouses of the Palace and new laboratories built with matching grants from DST and the Kerala government. The then Prime Minister Morarji Desai, who was very enthusiastic of the combination of technology with medicine laid the foundation stone for the Laboratory Block housing diverse technology specialists such as polymer chemists, polymer technologists, mechanical engineers combined with biologists and medical specialists such as pathologists, toxicologists and veterinarians. This in combination with the Biomedical Technology Wing saw vibrant and unprecedented activity. Chitra, as it is popularly called, became an Institute of national importance and a deemed university by an Act of Parliament in 1979. This was no mean achievement as Morarji Desai who first promoted it resigned and the whole process of passing the Bill had to be started all over again to finally become a reality. The enactment came in 1980 when Chi-

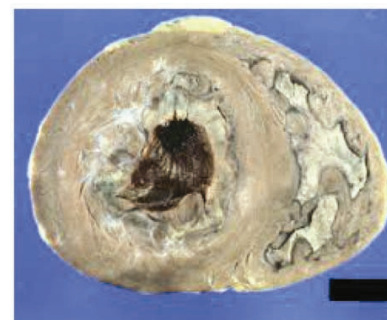
tra attained the status of a University which could award degrees. The programmes for D M, M Ch and Ph D started the same year and attracted candidates from all over India. The next two decades saw the growth of Chitra from an empty building under the State Government into an Institute of national importance under the Government of India with three campuses in Trivandrum; hospital services which made a name nationally for open heart surgery, microneuro surgery and intervention procedures; a unique technology development programme which developed and successfully transferred for production a blood bag, oxygenator, tilting disc heart valve, hydrocephalus shunt and a prosthetic vascular graft which brought royalty to the Institute; and an academic programme for D M, M Ch, Ph D and other post-doctoral courses which attracted postgraduate students from all over India. Social sciences were added in 1992 by making a start for the Achutha Menon Centre for Health Science Studies. The Institute had over 900 employees and a ‘brand’ which was nationally recognized. It had won the National Technology Award for the success of the Chitra Valve. Valiathan likes to say that Chitra was his Karma Bhumi.

Medical curiosity of Kerala

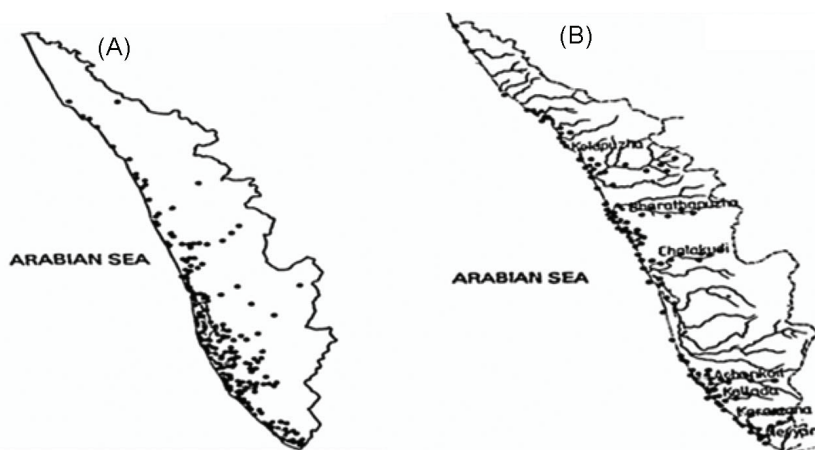
Kerala had many medical curiosities which interestingly are less seen in the 21st century. The highest incidence of placental malignancies, pancreatic stones, mucoid vasculopathy and endomyocardial fibrosis (EMF) are some of them. Valiathan being a cardiac surgeon was interested in the unique syndrome of tropical endomyocardial fibrosis which was mainly prevalent in Kerala. Globally



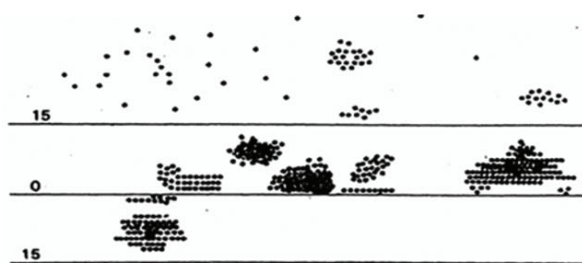
Medical devices invented in Sree Chitra Tirunal Institute.



Heart with endomyocardial fibrosis (EMF).



Distribution of EMF patients (A) and monazite deposits (B) in Kerala.



Epidemiology of global EMF in relation to 15° of equator (o).
Source: *Curr. Sci.*, 1994, **67**(2), 99.

a similar picture was observed in Nigeria, Uganda, Rwanda, Mozambique and Brazil. It affects young adults, children and women who basically develop symptoms attributable to thickened walls of the heart chambers leading to constriction of blood flow. The distribution of cases was observed to be within 15° of the equator. Valiathan's group studied both nutritional and environmental factors. Of interest was the geochemical basis found in Kerala. The distribution of EMF patients roughly matched the distribution of monazite deposits in the state. His surgical team developed interventions to reduce the severity of the cardiac condition whereby the enlarged restricted heart was able to improve its function. Though the incidence of EMF has reduced, the investigations of that time remain as classical approaches to the disease and are quoted even today.

Nevertheless as he neared 60 years of age he felt restless as he realized that technology development needed an industry to support it if the devices were to be available to the public. This seemed rather difficult as such industry was nascent. Moreover, the trade union attitude of the staff and the lack of interest in cli-

nicians for technology development were discouraging. Thus he had no desire to continue past his formal retirement age in 1994, even as he was asked to do so by his colleagues, the Department of Science and Technology, and the Chairman of the Chitra Governing Body.

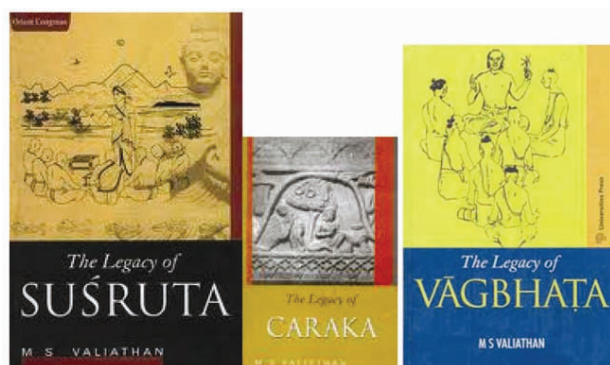
Higher education

His next move was to Manipal as Vice Chancellor of Manipal Academy of Higher Education (MAHE). While waiting for his flight in Mumbai, he met Ramdas Pai who informed of the conferment of Deemed Status to the Manipal University and invited him to join it. Since his wife was already at MAHE and his daughter was offered a faculty position, this seemed a good move to make. He turned a new page, gave up cardiac surgery, technology and entered the field of higher education field. Fortunately, he did not have to bother with day-to-day problems of running an university, raising funds, etc. but was able to concentrate more on education as a determinant of human development. The medical students entering the colleges are some of

the best brains in the country and yet as they go through their courses they appear to lose their curiosity and original thinking as the incentive is to mainly develop skills. Valiathan was to again build another institution starting with new buildings, adding colleges and launching international campuses in Sikkim, Nepal, Malaysia and exploring Africa and the Caribbean. This was at a time when the government rules needed to be changed to start Indian centres outside India. Though Indians taught all over the world, India did not have nor encourage Indian universities to go outside its borders. The contribution of Valiathan and MAHE in giving Indian higher education a reputation overseas cannot be underestimated. Since I came from AIIMS and was proud of our education system, I was surprised that in Malaysia, where I had gone as Dean of a Medical School, everyone, commoner and professional, was more familiar and proud of MAHE than AIIMS! It seemed as if any Malaysian trained in Manipal Campus in India and Malaysia was considered better than others. I recall in Planning Commission's deliberations in the 1990s, Valiathan was trying to impress on the then Finance Minister the need to permit Indian Universities to open campuses in other countries.

Ayurveda biology

I personally think that Valiathan played a large role in the renaissance of Ayurveda that we are seeing today. Though this branch of medicine has been practised in continuity for millennia in India, it had remained static in research and in innovation. The reasons for this are in much debate. However, it is evident that in the 20th century the pharmaceutical companies began to explore traditional medicines across the world. Chinese medicines were being exported as alternative medicines and Brazilian farmers were growing herbs of interest. However, Indian physicians were content with treating the large population with Ayurvedic, Siddha and Unani medicines but did not try to understand the basis of these practices, leave alone trying innovation and research. Valiathan first met Vaidyaratnam PS Varier at Kottakkal while giving a memorial lecture on *Susruta*. Following this lecture he realized the wealth of medical knowledge in the



Renaissance of Ayurveda Biology

ancient texts and decided to delve further which required relearning his 'rusty' Sanskrit. It was not till he retired as Vice Chancellor and was given Homi Bhabha Fellowship in 1999 that he found an able guru in Sri Raghavan Thirumulpad of Chalakudy, Kerala for a study of *Caraka Samhita* and it took him three years to understand the difficult treatise and published a popular book which was published by Orient Longman in 2003 and reprinted thrice. It was also translated into Malayalam by DC Books in 2005. This was followed by his book on *Suśruta* under guidance of Rajagopalan and Ramankutty of Kottakkal. It was matter of satisfaction to him that this book was released during the World Ayurvedic Congress 2006 in Pune. Having spent years in the company of *Caraka* and *Suśruta* made him examine the way Ayurveda was being practised currently. If the India virus had infected him earlier in the US it was now the 'Call of Ayurveda for the scientist' that made him wander into this fascinating area. It was not so much the lack of clinical research or herbal drugs that interested him so much as the fundamental concepts and procedures that were enunciated in the texts. With his lucid lectures around India, he was instrumental in stimulating modern scientists from across the country to study Ayurveda afresh using modern tools and coined the phrase Ayurveda Biology. He received support for a Science Initiative from Dr R. Chidambaram, the Principle Scientific Advisor to the government to study what was called Ayurveda Biology. Initially, *Prakriti* (nature/primal motive force) phenomenon so central to the phenotyping of patients

was being explored using genomics, the effect of *Rasayana* (science of rejuvenation and longevity) on ageing, on DNA chain breaks and the microstructures of mercury derived *Bhasma* (metal or gems converted to ash by controlled incineration) were explored. These are leading to publications in cited journals. DST has now started a new sectional committee for Ayurveda which is attracting modern scientists.

These studies would initially look at the genomic basis of *Doshaprakritis* and of anti-*Dosha* plants; metabolic and immunologic changes in *Panchakarma*: effect of *Rasayana* on the healing of DNA chain breaks and ageing markers of *Drosophila*; and the microstructure of a mercury-derived *Bhasma*. Interest in traditional medical practices as depicted by Ayurveda, yoga, Chinese medicine and nutraceuticals has now become a global phenomenon. The Indian Academy of Sciences released Valiathan's paper 'Towards Ayurvedic Biology' at its Annual Meeting in November 2006 as a decadal document of the Academy.

Recognitions

Valiathan received many honours, including the Fellowships of the three Academies of Science in India; of Medicine; of Engineering; of the Third World Academy; Awards named after RD Birla, OP Bhasin, Basanti Devi Amir Chand, Jawaharlal Nehru; Dhanwantari, Aryabhata medals. He received civilian honours in the form of State Award from the Government of Kerala and *Padma Sri*, *Padma Bhushan* and *Padma Vibhushan*



Padma Vibhushan

New Orchid in the firmament: *Paphiopedilum M S Valiathan*, 2014

from the Government of India. The Society of Thoracic Surgeons U.S. and the American College of Cardiology elected him as a member; he was elected the President of the Association of Indian Universities in 1993 and President of INSA in 2002. He even has an orchid named after him, *Paphiopedilum M S Valiathan*, 2014. Most importantly his family is with him after many years of mobility due to professional demands and the medical community considers him a legend to be emulated. Yet he does not rest on his laurels. In his words 'Maybe a tinge of regret touches me like a fleeting shadow when I remember that I forfeited a chance to learn the playing of Veena from my mother and gaining of proficiency in Sanskrit from my teacher Rama Sastri in Mavelikara'.

I rather suspect he will discover some other curiosities to investigate. As he mentioned recently, 'far from grudging, I admit that nomadism agrees with me and invigorates me with fresh doses of energy'. Where will Valiathan wander next? Wherever he goes, to spatial or intellectual regions, India and her people are sure to benefit.

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