ஹன்தான பவுர | හන්නන පවුර | Hanthana Pavura

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Alumni Association of the University of Peradeniya Ottawa Chapter - Canada

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Anura Herath: Secretary

Turadeva Ratnayaka: Treasurer

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Renuka Subasinghe: Director, Membership

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PRESIDENT'S MESSAGE: *NOTHING IS IMPOSSIBLE*

Two years ago I accepted the presidency of AAUPOC having shunned serving in formal committees all my life. In spite of my other commitments with the association, I felt that it is my obligation sooner or later to serve our friendly group as well as indirectly our beloved Alma Mater in an official capacity. Now, having come to the end of my second term as the President, it is with great pleasure I write this message to reflect upon my rewarding and satisfying experience. Thanks to my friends for coming forward to take active roles as a part of the Executive Committee and for being supportive throughout the past two years displaying great team work.

Year 2019/2020

We had a very active year being able to host five successful events: Spring Festival coinciding with Sinhala/Tamil New Year, Upahara Gee Padura, Summer Picnic, Health Walk and our premier social event, Hanthana Night 2019. The events had record levels of participation enjoyed by the member families and community friends. With regards to the financial aspects, AAUPOC was able to continue with the donation for 10 scholarships of the total value of nearly Rs. 400,000 to the Peradeniya University. Additionally, we also supported a first year orphaned student, who faced a financial crisis, with a donation of ~ Rs. 300,000, bringing the total AAUPOC contribution for that year to nearly Rs. 0.7 million, while leaving a modest surplus towards our reserve funds.

Year 2020/21

With the excitement and enthusiasm of the new EC, we were almost about to start off our activities with our first event of the year, Spring Festival in April 2020. Unfortunately, the world changed dramatically with the onset of the present pandemic imposing severe restrictions for social gatherings. For few months, we all were pondering when, hopefully soon, our lives will be back to normalcy. Challenges appeared to be insurmountable. Gradually, it became apparent that our social events and traditional fundraising activities were not going to materialize in the foreseeable future. In our 2020-June Newsletter we emphasized the need for our adaptation to the stringent social constraints that we have to face, and our determination to move forward sticking to the moto *"Life finds a way"*.

We decided to exploit the opportunities available in the virtual world to adapt and accomplish our goals, leaning more towards an educational theme of activities to serve our members and communities.

Educational Activities:

We were able to launch a highly successful webinar series, attended by the local community as well as an audience around the globe. It boosted the recognition and profile of the Ottawa Chapter at the international level, which would facilitate achieving our noble objectives in the future.

Webinar 1- October 18, 2020:

"Why We Need to Control STRESS Levels and Ways to Do It"

Speaker: Dr. Lal Fernando, Professor in Psychiatry, at the Schulich School of Medicine & Dentistry, Western University, Canada. Dr. Lal Fernando is also an alumnus of the University of Peradeniya, Faculty of Medicine.

Webinar 2- December 13, 2020:

"New COVID Therapeutics and Vaccines"

Speakers: Dr. Deepthi Jayasekera, Infectious Disease Specialist, Clinical Professor of Western University, in California, U.S.A and Dr. Dushyantha Jayaweera, Professor in Clinical Medicine of University of Miami, Florida, U.S.A.

It was a remarkable development that our second webinar was the outcome of an international collaboration between two Sri Lankan communities from Canada and the USA, the two countries separated by the longest, yet regarded as the friendliest border. AAUPOC very much appreciates the collaborative support given by the Sri Lanka Foundation International in Los Angeles, California.

Webinar 3 - February 13, 2021:

"Is My Depression for Real, Stress or Brain Chemistry Related? Treatment Options"

Speaker: Dr. Lal Fernando

Social and Entertainment Activities:

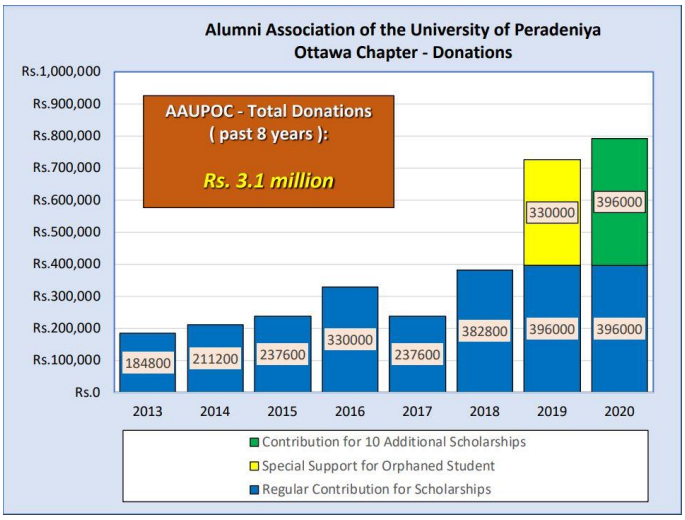
As we set out in June Newsletter, we also had the determination to maintain our tradition in hosting our flagship entertainment event Hanthana Night 2020. For obvious reasons, it was clear that we wouldn't be able to do it in the regular format with stage performances and a large social gathering, and had to resort to a virtual format. Quite naturally, there was some initial skepticism. However, with the great display of the 3Ds (dexterity, determination and dedication) by our members in both artistic and technological skills, and bringing together our community talents, Hanthana Night became a reality with a huge success which brought high praise by our friends around the Globe, even prompting others to follow us. I would like to thank all the performers and the Organizing Committee for their enthusiasm, dedication and hard work.

Implementation of AAUPOC Electronic Media for Sponsorships & Fundraising:

When we lean towards virtual activities our backbone is the website. Thanks to the dedication of the Editor and our Web & Graphic specialist, significant improvement were made to allow posting of special articles, video recordings of our past events and webinars for on-demand access, advertisements to attract sponsorships by corporate sponsors to support the scholarship program, etc. Thanks to the contributors, highly successful four issues of our biannual Newsletter were published with a variety of high quality general interest and scientific articles, poetry, photography, artistry, etc.

Fundraising and Donations for Scholarships:

The foremost charitable objective of the AAUPOC is to support the needy students and educational programmes at the University of Peradeniya and in Sri Lanka in general. Under the prevailing economic hardships in the communities around the world, we started off our fundraising campaign to meet our scholarship target quite nervously and with serious doubts. However, with the great generosity of the members, community friends, and corporate sponsors of our events, this year we were able to raise funds to a record level enabling us to double our regular donation to ~Rs. 800,000 allowing us to offer 20 scholarships to students in desperate needs in our motherland at this difficult time. As an Alumni Chapter we have demonstrated an exemplary accomplishment reaching a total donations of Rs. 3.1 million over the past 8 years, as shown in the chart below.



I would like to take this opportunity to thank our Sponsors: Sarath Amarakone (MTI Groups), Ericka Ushliyanage (Mortgage Alliance), Aruna Peiris (Right at Home Realty), Samiddha Ariyasinghe (SAMARY Mortgages), Dulaksha Herath (Right at Home Realty); and our Advertisers: Nilupuli & Arjuna Heiyantuduwa, Priyanthi & Mahen Perera, Sumudu Fonseka, and Mogan Sellathurai.

In summary, as a relatively young little association, AAUPOC can be extremely proud of what we have collectively accomplished over the past 8 years in terms of our charitable, social and educational goals, particularly this year under the prevailing economic and social constraints which the world has been going through. It has been a great pleasure to serve the AAUPOC as the President for the past two years with much credit to the support given by the members of the Executive Committees, the members at large and the Sri Lankan community in Ottawa. Thanks to our Parent Alumni Association at Peradeniya for the administrative support provided for our scholarship program.

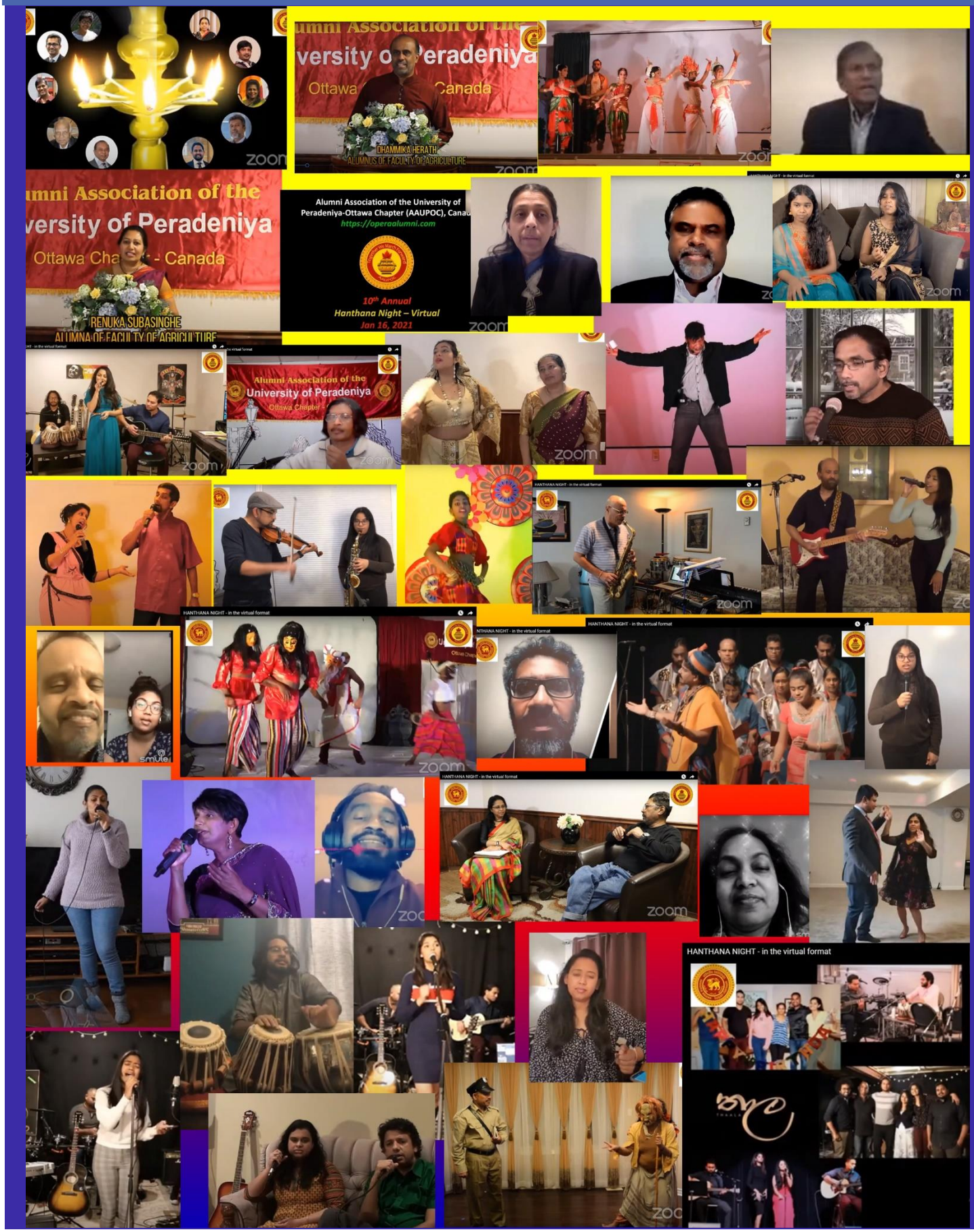
"There are many things that seem impossible only so long as one does not attempt them" - André Gide, Autumn Leaves

Thank you all!

Nimal De Silva, Ph.D.

The President, AAUPOC

HANTHANA NIGHT IN VIRTUAL FORMAT - 2020



THE FIRST COMPREHENSIVE GLOBAL PROTOCOL FOR MEASURING TRANS FATTY ACIDS

Dr. Nimal Ratnayake

Dr. Nimal Ratnayake, with the invitation of World Health Organization (WHO) has developed the first comprehensive global protocol for measuring *trans* fatty acids (TFAs) in foods. Dr. Ratnayake was the founder president of the Alumni Association of University of Peradeniya Ottawa Chapter (AAUPOC). In his scientific carrier, Dr. Ratnayake has held many positions in the field of Fats and Oils and he was the senior research scientist and former head of the Nutrition Research Division of Health Canada. Dr. Ratnayake has contributed to establishing many national and international guidelines, policies, and analytical methodologies in the fields of Food Safety and Nutrition. Currently, he is serving as an advisor on dietary fats to WHO and RESOLVE to SAVE LIVES (an initiative of Vital Strategies, NY, USA).

Dr. Ratnayake's contribution was recently (December 23, 2020) published by WHO and available online in the link provided below:

https://apps.who.int/ Global protocol for measuring fatty acid profiles

WHO recommends using this protocol for monitoring and surveillance of TFA content in processed and ready-to-serve foods prepared using partially hydrogenated oils. The development of this protocol for worldwide use is timely as WHO is appealing to its member states to eliminate industrially-produced TFA from the global food supply by 2023. Reduction of industrially produced TFAs in food supply is important because regular consumption of TFAs originating from partially hydrogenated oils (also known as industrially produced *trans* fatty acids) increase the blood level of low-density lipoprotein (LDL) cholesterol and the risk of coronary heart disease. To minimize the risk of heart disease, the daily consumption of *trans* fats should be less than 2 grams.

Dr. Ratnayake's cutting edge research at Health Canada over a period of 25 years established an internationally recognized analytical procedure for measuring TFAs in foods and in addition, demonstrated the high content of industrially produced TFAs in processed foods as well as in human milk in Canada. These research findings led to the Canadian Government's enactment of a mandatory declaration of TFA content in food labels in 2005 and provided evidence for banning the use of partially hydrogenated oils in food preparations in 2018. Processed and ready-to-serve foods currently sold in Canada are free of industrially produced TFAs.

But many countries, especially developing countries in Asia and Africa, still use partially hydrogenated oils in various food preparations.

These developing countries are expected to benefit from the WHO global protocol for measuring fatty acid profiles of foods, in their efforts in monitoring the TFA content in their food supply and eventually eliminating the use of partially hydrogenated oils in food preparations.

AAUPOC would like to congratulate Dr. Ratnayake for his remarkable international contributions.

"Every achievement is a servitude. It compels us to a higher achievement"- Albert Camus

NEWLY APPOINTED VICE CHANCELLOR FROM OUR ALUMNI

Our valued member, Udith K Jayasinghe, a Senior Professor (Chair) of Agribusiness Management, has been appointment as the Vice-Chancellor of the Wayamba University of Sri Lanka from September, 2020.

Prof. Jayasinghe obtained his B.Sc. (Agriculture) degree with First Class Honors in 1994 from the Faculty of Agriculture, University of Peradeniya and has completed his M.Sc. (Agricultural Economics) from the Postgraduate Institute of Agriculture in Sri Lanka. He obtained his PhD from the University of Guelph, ON, Canada, in the year 2004 in the area of food and agricultural economics and business.

He has contributed towards scientific publications and has held many positions including memberships in several technical committees in his field of specialization in Sri Lanka.

Prof. Jayasinghe was awarded a number of prestigious awards in Sri Lanka and also received the Fulbright scholarship for the Post-Doctoral Fellowship at University of Massachusetts, USA and the Endeavour Post-Doctoral Research Fellowship at the Monash University, Australia.

AAUPOC would like to congratulate its alumni member Prof. Jayasinghe for his accomplishments in his career and for his role as a Vice-Chancellor of a Sri Lankan National University.

WELCOME NEW ALUMNI

DILANTHA FERNANDO

It is our great pleasure to inform you that Dr. Dilantha Fernando of the Department of Plant Science at the University of Manitoba has joined the AAUPOC as a new member.

Dr. Fernando was born in Colombo, Sri Lanka. He received a B.Sc. (Honours) in 1981 with specialization in Botany from the University of Peradeniya and received his M.Sc. in Microbiology from the University of Kelaniya, Sri Lanka. He received his Ph.D. in Plant Pathology from Oregon State University, USA in 1991.

Dr. Dilantha Fernando joined the Department of Plant Science at the University of Manitoba, MB, Canada in 1998. He is currently serving as a professor, Department of Plant Science and the Dean of Studies, St. Paul's College at the University of Manitoba.

His research has made a tremendous impact on Canadian agriculture and the discipline of plant pathology. He has demonstrated innovative research in plant disease in advancing biological control of crop diseases in Canada and contributed for many research publications. In the year 2020 he was awarded the Canadian Phytopathological Society Award for Outstanding Research, considered as the Society's most prestigious award. The honour recognizes outstanding research involving new concepts, discovery of new phenomena, or principles in plant pathology or novel applications of existing principles.

(Link: https://news.umanitoba.ca/plant-scientist-wins-national-pathology-award/).

AAUPOC cordially welcomes Dr. Fernando as a new member of the association and wish him the very best.

IROSHAN INDIKATIYA HEWAGE

Iroshan graduated from the Faculty of Veterinary Medicine and Animal Science at the University of Peradeniya in the year 2005 and obtained his Master's degree in Biomedicine, from Glasgow UK in 2009. He came to Canada in 2012 for his graduate studies. Iroshan completed Master's degree in Veterinary Medicine from the University of Calgary in 2015. Iroshan and his family moved to Ottawa in late 2016. He currently serves as a Research technician at the University of Ottawa and runs his Property Management Company, PropertyDo (Pvt) Ltd. in Sri Lanka to serve the Sri Lankan expats with their property needs.

Iroshan's wife, Thilani Ranasinghe was a Chartered Architect in Sri Lanka and currently works as a Designer in Ottawa.

Iroshan and Thilani have 8-year-old twin boys and an 18-months old baby boy. When they are not at home you can find them exploring nature and travelling. Iroshan is also an avid reader, a writer and enjoys experimental cooking.

SUBAGYA PERERA AND SACHINI PERERA

Subagya Perera and his wife Sachini Perera are graduates from the University of Peradeniya, Faculty of Science. Subagya moved to Ottawa in January 2020 to continue his graduate studies.

Subagya entered the University of Peradeniya in the year 2010 and graduated in 2015 with a specialization degree in mathematics. He completed Master's degree in Mathematics in the spring of 2020 at the University of Southern Mississippi, USA.

Subagya recently joined the Department of Mathematic, Faculty of Science at University of Ottawa for his Ph.D. studies. Subagya plays rugby, enjoys photography and travelling during his leisure time.

Sachini entered the University of Peradeniya, Faculty of Science in 2012 and graduated in the year 2017. Sachini is currently continuing her Ph.D. studies in Chemistry at the University of Texas, Dallas.

"The cave you fear to enter holds the treasure you seek."—

Joseph Campbell (1904-1987)

COVID-19 IN ANIMALS: THE GLOBAL EVIDENCE

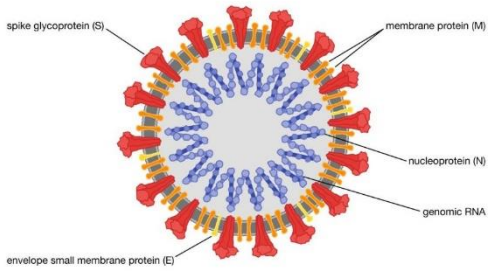
By Subhashinie Kariyawasam, BVSc, PhD.

College of Veterinary Medicine, University of Florida, Gainesville, FL

(An alumna of University of Peradeniya, Faculty of Veterinary Medicine)

Coronavirus Disease of 2019. The outbreak of Coronavirus Disease of 2019 (COVID-19) was first reported in the city of Wuhan in China's Hubei Province during December 2019 and has spread to nearly all countries of the world in only a few months (1). Due to this rapid emergence, the World Health Organization (WHO) declared COVID-19 an international public health emergency on January 30, 2020, and later a pandemic on March 11, 2020 (2). The causative coronavirus, first designated as 2019 novel coronavirus (2019-nCoV) (3), was renamed as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) by the International Committee on Taxonomy of Viruses based on its morphology under electron microscopy (3). As of January 23, 2021, more than 96 million confirmed cases and more than 2 million confirmed deaths have been reported worldwide from 224 countries (4). Despite the use of various control measures and insights suggested by research, the virus continues to spread, rapidly affecting all human life norms across the globe with unprecedented economic and social disruptions. SARS-CoV-2 is the third coronaviruses that have had global outbreaks in the past two decades, following the severe acute respiratory syndrome coronavirus (SARS-CoV) outbreak in 2002 and the Middle East respiratory syndrome coronavirus (MERS-CoV) outbreak in 2012 (5). Unlike other human coronaviruses that cause self-limited upper respiratory disease, these three coronaviruses cause atypical pneumonia and severe lower respiratory disease. However, the transmissibility rate, the number of infected people, and the spatial range of epidemic areas of SARS-CoV-2 are much greater than those of SARS-CoV and MERS-CoV (6). As a result, the ongoing outbreak of COVID-19 has posed an extraordinary threat to global public health.

SARS-CoV-2. Coronaviruses (CoVs) are large, enveloped viruses about 80-220 nm in diameter, with icosahedral symmetry. They are composed of a non-segmented, single-stranded positive-sense RNA genome, so the genome can be read as mRNA and directly translated into viral proteins by host cell ribosomes as opposed to negative-sense RNA viruses, which require the synthesis of positive sense antigenome before translation (7). Coronaviruses are classified into four genera based on their genetic properties, namely Alphacoronavirus (α-CoV), Betacoronavirus (β-CoV), Gammacoronavirus (γ-CoV), and Deltacoronavirus (δ-CoV) (7-9). SARS-CoV-2 is a β-CoV possessing a 30-kb long genome that shares 79.6% and 96% sequence identity with SARS-CoV and Bat-CoV, respectively. Structurally, the SARS-CoV-2 membrane contains four major structural proteins: spike (S) glycoprotein, small envelope (E) glycoprotein, membrane (M) glycoprotein, and nucleocapsid (N) protein (7-9).



Structure of SARS-CoV-2 (31).

The S glycoprotein found in the uppermost layer of the virus mediates viral attachment to the Angiotensin-Converting Enzyme 2 (ACE2) present on the target host cell during infection, thereby playing a significant role in CoV pathogenesis, determining host and tissue tropism, and host immune response. Consequently, the S protein and its Receptor Binding Domain (RBD), which mediates viral attachment to the host ACE2 receptor, have been the primary targets for diagnostic assay, vaccine and therapeutic development efforts. The S protein is the structure responsible for the ultrastructural "crown-like" appearance of the virus (ergo the viral name "corona") (10). Like other CoVs, mutational and recombination events can occur in SARS-CoV-2, which may influence pathogenicity, infectivity, host range, tissue tropism, and most importantly, zoonotic spillover events.

CoV diseases in animals. CoVs infect many non-human species, including companion animals, livestock, poultry, laboratory animals, wild animals, and aquatic animals. Typically, CoVs belonging to γ-CoV and δ-CoV genera cause

disease in birds and the members of α-CoV and β-CoV cause disease in mammals, including bats, rodents, civets, pigs, horses, cattle, and humans (5, 10, 11). Most CoV diseases in animals are localized to respiratory and/or gastrointestinal tracts. However, some diseases, such as feline infectious peritonitis in domestic cats and other *Felidae* family animals (lion, cheetah, wildcat), bovine coronavirus infection in cattle, equine coronavirus infection in horses and donkeys, infectious bronchitis in poultry, and ferret systemic coronavirus infection in ferrets are systemic diseases involving multiorgan systems, result in high morbidity and mortality rates (5). In general, CoV diseases in livestock and poultry are considered a major threat to global animal agriculture.

SARS-CoV-2 virus diseases in animals. Substantial evidence suggests that similar to SARS-CoV and MERS-CoV, SARS-CoV-2 also originated in bats (12, 13), followed by a potential spillover from bats to Sunda pangolins (*Manis javanica*), which then served as the intermediate host before infecting the human host (14, 15). Pangolins have a weak immune system, making them highly susceptible to new pathogens.

The susceptibility of a particular host species to SARS-CoV-2 is determined by the absence or presence of the ACE2 receptor and the sequence homology. Protein alignment and phylogenetic analysis of full-length ACE2 protein revealed ACE2 of macaques and chimpanzees are the closest to humans with 94.9–99% sequence identity followed decreasingly by cats, raccoon dogs, palm civets, Malayan pangolins, European rabbits, dogs, ferrets, swine, cattle, bats, and chickens (16). Based on the ACE2 amino acid composition at residue positions involved in the ACE2-virus binding interface, cat and non-human primate sequences were the closest to the human sequences while chicken and mouse sequences were the most distant (16). This suggests mice (and perhaps rats) and chickens are less susceptible to SARS-CoV-2 compared to non-human primates and cats who are highly susceptible to the virus.

Based on comparative genome analysis between the sequenced SARS-CoV-2 and other sequenced CoVs, the bat CoV strain RaTG13-2013 showed the highest relatedness to SARS-CoV-2 with ~96% identity at the nucleotide level (9, 12). It has also been suggested horseshoe bats are the likely source of the ancestral SARS-CoV-2 from which the outbreak virus originated (9). Although scientists have yet to discern how long the virus has been circulating in an animal reservoir before infecting humans, it is speculated that the virus may have been maintained in bats for several decades prior to the first cluster of COVID-19 infections in humans at the Human Seafood Wholesale market in Wuhan, where a variety of live wild animals were sold (17, 18). This potential zoonotic (animal to human transmission) origin of the virus, together with its extremely high rate of droplet transmissibility and mutation rate, underscores the importance of understanding the role of animals in COVID-19 transmission both public health and animal health standpoints.

Since the beginning of the pandemic, sporadic cases of COVID-19 have been reported from both companion and wild animals. The first two documented cases were two dogs and one cat sent to a quarantine facility in Hong Kong, China, after their owners were tested positive for the virus (19, 20). These animals did not develop clinical signs of respiratory disease but were confirmed positive for the virus through detection of viral RNA in the upper respiratory tract using reverse transcriptase-polymerase chain reaction (RT-PCR) followed by sequencing, as well as measuring serum neutralizing antibodies against the virus. Subsequently, a few additional cases of COVID-19 positive cats and dogs with respiratory disease were reported from other countries, such as Belgium, France, Germany, Russia, and the United States. (9). The source of SARS-CoV-2 to infected pets was presumed to be an infected individual in the same household (both indoor and indoor-outdoor pets) or the neighborhood (indoor-outdoor pets). The current knowledge is that the cats are more susceptible to COVID-19 than dogs, and the cats can readily transmit the virus to naive cats (21). Despite the very high prevalence of COVID-19 in humans, only a handful of dogs and cats were reported to be positive, indicating that SARS-CoV-2 is not easily transmissible to these animals under natural conditions. This notion was further supported by two commercial laboratories in the U.S. which did not detect a single positive animal after testing thousands of specimens collected from dogs and cats in the U.S., South Korea, Canada, and Europe for SARS-CoV-2 RNA by RT-PCR (22).

In addition to pet animals, five tigers (two Malayan and three Amur tigers) and three African lions at a zoo in the U.S. (Bronx Zoo in New York City, NY) developed COVID-19 in April 2020, presumably after acquiring the virus from an asymptomatic zoo employee (23). During the same time period, four mink farms in the Netherlands reported

outbreaks of COVID-19 (24, 25). The mortality rate in minks, which ranged from 3.1% to 9.8%, was the highest reported mortality rate in any animal species due to COVID-19. Both adult mink and kits were affected by the disease as confirmed by viral RNA presence in throat swabs and viral antigen in respiratory tissues by RT-PCR and immunohistochemistry, respectively. Although the adult animals developed respiratory signs, such as labored breathing and watery to mucoid nasal exudates, the affected kits mostly died without any premonitory signs. Postmortem examination revealed acute intestinal pneumonia in nearly all mink that died at the peak of the outbreaks. It was presumed that mink acquired the virus from infected farm employees before transmitting the virus to other minks on the farm (26). Shortly after, Denmark, Spain, Sweden, Italy, Greece, and the U.S. also reported COVID-19 in farmed mink (27). Infections in mink gained more publicity compared to infections in other non-human species due to the reports of a new variant of the virus evolved in mink through mutation and potential mink to human transmission of the virus, which was not observed with other animals, as well as massive culling programs ensued to avoid future spillover events to humans (27, 28). The next animal infection was confirmed in South Africa, where a puma in a Johannesburg Zoo contracted the virus from an infected handler (29). Most recently, in January 2021, San Diego Zoo Safari Park in the U.S. reported COVID-19 infection in three western lowland gorillas (30). These gorillas developed a cough and nasal congestion and confirmed COVID-19 by demonstrating the presence of SARS-CoV-2 RNA in their feces at the California Animal Health and Food Safety Laboratory System.

In addition to natural infection observed in many animal species as described above, some animals developed COVID-19 following experimental exposure, suggesting their suitability as animal models to study pathogenicity, vaccines, and therapeutics. Recent findings demonstrate that golden Syrian hamsters, ferrets, and raccoon dogs are susceptible to SARS-CoV-2 and are able to transmit the virus to naive hamsters, ferrets, and raccoon dogs, respectively (9, 10). Other potential laboratory animal models are non-human primates, such as African green monkeys and rhesus macaques, because they mimic human infection upon viral inoculation (9).

Concluding remarks. Current literature suggests that SARS-CoV-2 originated in bats and circulated in this reservoir for an unknown period of time before spilling over to an intermediate host and then to humans. Many animal species are susceptible to the virus, but the severe disease was observed only in farmed mink. Although human to animal transmission and intra-species (animal to animal) transmission was documented, animal to human transmission was not observed with the rare exception of mink to human transmission. However, viral mutations may result in the emergence of new variants of SARS-CoV-2, which may increase infectivity, transmissibility, virulence, and host range. Therefore, it is important to take a One Health approach by strengthening the medical-veterinary collaboration to avoid additional zoonotic spillover events. Similarly, it is important to monitor susceptible animals for the signs of disease, report any suspected cases to relevant authorities immediately, minimize interactions between healthy and diseased, wear appropriate personal protective equipment when working with animals, and improve biosecurity in farms and zoos for effective control of this pandemic.

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"It is not the strongest of the species that survives, nor the most intelligent. It is the one that is most adaptable to change."—Charles Darwin, (1809-1882)

CAT'S DESIRE

IN MEMORIAM: 1993-2008

By Kumudini Nicholas, B. Sc. (Hon.), M. Sc.

(An Alumna of University of Peradeniya, Faculty of Science)

Gently you stroked my whiskers,
Then ruffled my soft orange hair,
You comforted your weary head in between my paws, as if I was a soft cuddly bear.
I let you rest on my body; as I always did with loving care.

You kissed my brows and made my day bright,
When I curled on my 'oval bed' and slept 'tight'.

I would welcome you in my dreams, although I am color-blind,
Oh! How well you knew to wake me and release me from my lazy grind.

Yawn, I did; with wide eyes you watched me donning a loving stare.
You then placed your finger in my opened 'snare'.
It tasted like sugar; I did not much care.
I bit it gently…
You loved my bite; kept it in to feel the sting! So rare!

You touched my rosy paw-pads and asked me whether I felt ticklish,
I wish I could tell the truth; I did not wish to get you squeamish.

Your thoughtful gestures to care for my life made my soul warm,
Did you know that my eternal wish would be to return to you in human form?

A tear welled-up in the corner of my eye – reflected your sweet gentle face,
To you, I could never say good bye - I hope you would never get me replaced.

අම්බරුවෙකුගේ සිහිනය

'මුදුනේ යන ගොන් රජුනේ
තොප බලයෙන් කොළ මඩිනේ
ඊලඟ යන නාම්බනේ
තොප බලයෙන් කොළ මඩිනේ'
(කමත් කවි)

මුදුනේ යන
ගොන් රජුන්ගෙ
බානේ ඇමිනිලා ඉන්න
රජු එකතැන කරකැවෙද්දි
වටේ යමින්
කොළ මඩින්න

ගොම්පස් යදිමින්
ගොවි රජු
පසු පස එනවා දකින්න
සිවුපදයේ අඬහැරයේ
රජාගේ වරුණේ අහන්න

නාම්බන්ගෙ ඇස් වහලා
බැත අහුරක්
හොරෙන් බොන්ඩ

මඩවගුරේ
අඩ නින්දේ
රස කර කර
මේ සිහිනය
මං ආසයි
වමාරන්න

ශ්‍රී ලංකාවේ සෞන්දර්ය කලා විශ්වවිද්‍යාලයේ පර්යේෂණ හා ප්‍රකාශන ඒකකයේ අනුග්‍රහය යටතේ මුද්‍රණයෙන් එළිදක්වන ලද මවිසින් රචිත 'මෙහෙයුමේ අවසන් හඬපටය' නැමැති කාව්‍ය සංග්‍රහයෙන් තෝරාගත් කාව්‍ය නිර්මාණයක් හන්තාන පවුර මෙවර කලාපයේ පල කිරීම සඳහා ඉදිරිපත් කරමි.

වාග් සංඥාර්ථයන්හි ප්‍රකට ව පෙනෙන කේවල අර්ථ සන්නිවේදනයට වඩා අප්‍රකට බහු අර්ථ ජනනය වන පරිදි මෙම කාව්‍යමය පඨිතයන් පෙළගැසීමට ප්‍රයත්න දරා ඇති බව මෙම කෘතියේ පෙරවදනේ දී දක්වා ඇත.

මංගල සේනානායක

(මහාචාර්ය, සෞන්දර්ය කලා විශ්වවිද්‍යාලය, ඇල්බට් චන්ද්‍රවංකය, කොළඹ 07, ශ්‍රී ලංකාව)

නිර්නාමික පෙම්වතා

- කෙටිකතාව

සුන්දර පේරාදෙණිය සරසවියේදී හමුවූ අහිංසකම මිතුරා වූ සේනාධීරත් මාත් එක් කාල ඉසව්වකදී පියමං කළ සිහින මාවත්, සමපාත වූ මංසන්ධියේදී හමුවූත සුමිත්‍රා නම් වූ සුන්දර සරසවි මානවිකාව හා බැඳුණු කතාවේ, සොඳුරු අඳුරු මතක සටහන් කෙසේ නම් මකා දමන්නද? අරුණාලෝකයෙන් පහන්වී බොහෝ කලක් නිරවුල්ව තිබූ මා මනස, ව්‍යාකූල වූයේ දිනෙක හදිසියේම සේනගේ වැඩිමහල් සොහොයුරිය මා හමුවීමට පැමිණියාට පසුවය. අකලට වියපත්ව ඇගේ රුවැති රුව මැකී ගොස්ය. කතාබහ සෙමින්ය.

"ලොකු දූත මේ මගෙ බැච්මේට් කෙනෙකුගේ අක්ක. අම්මිට කියන්න මේ ආන්ටි ආවා කියල. දූ...මේ ආන්ටිටත් එක්කම උදේ තේ මේසේ ලෑස්ති කරන්න."

තේ මේසේදී අපි බොහෝ දේ කතා කළෙමු.

"හරිනං අක්කල බලන්න මමයි එන්න ඕනෑ. සමාවෙන්න අක්කෙ. කාලෙකින් ඒ පැත්තෙ නාවට. මතකනේ ඒ දවස්වලත ඔයාලගේ මහ ගෙදර අපේම ගෙදර වුණා. නිවාඩු දවස්වල අපි එහෙ නැවතිලා පාඩම් කෙරුවෙ. කොච්චර නං අක්කලා අම්මලා අපිට කන්න බොන්න දීදී සැලකුවද? ඒවා අමතක නෑ අක්කේ."

ඇය මඳ සිනා පෑවා මිස කිසිවක් නොකීවාය.

"සේනට දැන් කොහොමද අක්කේ?"

හිත පතුලේ කැකෑරෙමින් තිබූ ප්‍රශ්නය මම ඇසීම්.

"අනේ සුමනිරන්න මල්ලී, මං ආවෙත් ඒ හින්දමයි. දන්නවනේ උන දේ පහුගිය කාලෙ පුරාවට. හොඳ වෙනවා; ගෙදර එනවා. ආයිත් ලෙඩේ ඇවිස්සෙනව. ඉස්පිරිතාලේ ගෙනියනවා. දෙවි පිහිටෙන්, දැන් සේන මල්ලිට ගොඩක් සනීපයි. ඒත් මේ දවස්වල ඉස්පිරිතාලේ. නිතරම ඔයා ගැනත් සුමිත්‍රා කියලා කෙනෙක් ගැනත් අහනවා. ඇවිත් එයාව බලලා යන්න මල්ලි."

"හරි අක්කේ. සේනව අමතක වුණා නෙමේ. ඒත් මේ රාජකාරි හින්දයි එන්න බැරි උනේ. වැඩිය ලංකාවෙ හිටියෙත් නෑනේ. ඉක්මනටම එන්නං අක්කේ."

"මල්ලි දන්නව ද ඒ සුමිත්‍රා ඉන්නෙ කොහෙද කියලා?"

ආපසු යාමට සුදානම් වූ අක්කා හදිසියේම විමසුවාය.

ලොකු දූ දෑස් ලොකු කොට මා දෙස වික්ෂිප්ත බැල්මක් හෙලුවාය. බිය වූ මා බිරිඳ එපා යැයි සෙමින් ඔලුව වනා ඉඟි කළාය.

"අක්කට දැන් හොස්පිටල් යන්න පමා වෙනවනේ. අපි හෙමිං හොයල බලමු."

සිය සොහොයුරා වෙනුවෙන් ඇය හෙලූ කඳුළු හා වැලපීම් හමුවේ අප කාගේත් දෑස් තෙත් විය.

"නාත්තේ මගේ ක්ලිනිකල් ප්‍රැක්ටිස් ලබන සති තුනම මානසික රෝහලේ. මාත් එන්නං ඔයත් එක්ක. අපි ගිහිං සේන අංකල්ව බලමු. පව්!"

දිගු කල්පනාවක නිමග්නව සිටි ලොකු දූ පැවසුවා ය. ඇගේ මැදිහත්වීමට අකමැති වූ මා බිරිඳ, එපා යැයි වහා ඉඟි කළාය.

"හරි දුවේ අපි ඒක ඒ වෙලාවට බලමුකො."

දියණියට කෙටි උත්තරයක් දුන් මම, අපේ කතා බහ වෙනතකට හැරවූවෙමි. පසුගිය විසි වසරක කාලය පුරාවට ශාන්ත වූ ප්‍රාණ ගුණයෙන් ප්‍රමුදිතව තිබූ මගේ සිත, ඉවත ලූ පිත්තල බඳුනක් සේ ක්‍රමයෙන් අවර්ණාව අඳුරුවන්නට විය. මගේ මතකය සරසවියේ අපේ සිව් වසරක කාලයට යළි පියඹා ගියේය.

සියනෑ කෝරලේ ඈත ගොවි ගම්මානයක ගුරු යුවළකට දාව ජන්ම ලාභය ලැබූ පවුලේ බාලම හා එකම පිරිමි දරුවා වූ සේනාධීර, උපන් දා සිටම මාපියන්ගෙන් නොමඳව ලැබුණු ආදරයද, බහ තේරුම් ගත් අවධියේ සිටම ලද හොඳින් ශිල්ප වඩා දැනුමේ මුදුන් පෙත්තට ම යන්නැයි යන නිරන්තර ඔවදන්ද, නිසාමදෝ පොත් ගුල්ලෙකු වූ ඔහු ඉගැනීම් කටයුතු හොඳින් කළ තැන්පත් චරිතයක් විය. පාසැලේදී හා සරසවියේදී ඔහුගේ විකට නාමය "කාලගෝල" විය. මේ නිසා ද යම් හීනමානයකින් පෙළුණු ඔහු ජීවන ප්‍රශ්ණ හමුවේ මඩේ සිටවූ ඉන්නක් බඳු විය.

"මචං සුමනි.....; සුමිත්‍රා මට වඩා උඹට හිතවත් නේ. මට එයාව හිච් කරගන්න උදව් කරපං කෝ."

අප තනි මංසලේ කතිකාවක යෙදුණු දිනෙක සේන කළ මේ බැගෑපත් ඉල්ලීම පසුව හිසරදයක් විය.

"මචං සේන... ඔය වගේ දෙයක් උඹට තියෙන හදිසියට කෙල්ලෙක්ගෙන් ඩෝං කියල අහන්න බෑ. එයාල හිතන පතන හැටි වෙනස්. විශේෂයෙන්ම සුමී වගේ කෙල්ලෙක්. ඒකට ක්‍රමයක්, පිළිවෙලක්, වේලාවක් තියෙනවා."

එදා සිට මම සුමිත්‍රාගේ චිත්තාභ්‍යන්තරයේ සැඟව සිටින ඈ පතනා ඇගේ උරුමක්කාරයා කෙබඳු කෙනෙකු දැයි සෙවීමට නිරන්තර උත්සාහයක යෙදෙන්නට විමි. ඊට අදාළ කතාබහ, ඈ සමඟ පෞද්ගලිකව ද මිතුරියන් ඉදිරියේ ද කරන්නට තරම් මම නිර්භය වූවෙමි.

"සුමනි මොකෝ මං ගැන ඔච්චර හොයන්නේ?"

දිනෙක කෝල සිනාවකින් මුව සරසාගෙන සුමී හඳිසියේම මගෙන් ඇසුවා ය.

"නෑ..නෑ.. මේ.. මේ..අපි දන්න කෙනෙක් ඔයා ගැන හීන මවනවා. ඒත් දැන් නං මටත් ලෝබයි වගේ"

අපේ කතා ඇසී, දෙබරයට ගල් ගැසුවාක් සේ ඇවිස්සී, කෑ මොර දුන් කෙල්ලන්ගේ සමච්චල් මැද තීරණාත්මක වූ සංවාදක් එදා එතැනින් නැවතුණි.

"ඈ බං සුමති, උඹ මොකාටද අඳින්න එන්නේ?"

"හරකා හැරෙන්නේ පොල් පැලේට වගේ"

කටකාර කෙල්ලන්ගේ ප්‍රතිචාරය එය විය.

මගේ කල් මැරීම හමුවේ නොඉවසිලිවන්ත වූ මා මිත්‍ර සේන, ඔහුගේම ප්‍රේම ප්‍රකාශන මාධ්‍යය යළිත් අත්හදා බලන්නට විය. ඒ නිර්නාමිකව සුමිත්‍රා නැවතී සිටි සංඝමිත්තාවට පෙම්පත් තැපෑලෙන් යැවීමයි.

"මේ; මට ආයෙත් අර පිස්සා ලව් ලෙටර් එකක් එවලා."

දිනෙක මාත් ඇගේ හොඳම යෙහෙළියනුත් ඉදිරියේ සුමිත්‍රා ලිපියක් දිග හරිමින් පැවසුවා ය.

"මම ඔයාට විතරයි මේ ලෝකෙන්ම ආදරේ සුමී! අපි අපේ අනාගතය ගැන කතා කරමු. ලබන සිකුරාදා හවස පහට ෆැකල්ටි ලයිබ්‍රරියට ඔයා තනිවම එන්න."

ප්‍රේමය උතුරා යන පෙම් හසුනේ කව්‍යතාවය ද, රචනා ශෛලියේ කලාත්මක අගයන් ගැන ද, මම මවිත වූවෙමි. නිර්නාමික පෙම්වතා සිය අහිංසක ප්‍රේම ප්‍රාර්ථනාව සංවේදීව එහි ලියා තිබිණි. හදවතම දැවෙන්නාක් මෙන් මට දැනිණි. තොරතෝංචියක් නැති යෙහෙළියන්ගේ බැන වැදීම් ද පසුබිමින් ඇසිණි.

"ඔයා දන්නව ද සුමනි? කලින් ලියුමේ මේකා මේ කෙල්ලට එන්න කියලා තිබුණේ අරුනාචලම් හෝල් එකට උඩින් තියෙන අර පාළු සමර් හට් එකට. අපිටත් බය හිතුණා එතෙන්ට යන්ඩ. මේ පාර නං කොහොම හරි අපි මූව අල්ලනවා. කොන්ද නැති පෙන්දෙක්."

සැබෑ අහිංසක ආදරය තිබුණේ කොහිදැයි දැන සිටි මා කෙල්ලන්ගේ කෝපය හමුවේ නිරුත්තර වූවෙමි.

ලිපියේ සඳහන් වෙලාවට කලින් පුස්තකාලයට අවට ඔත්තු බැලූ සුමිත්‍රාගේ යෙහෙළියෝ පසුව පුස්තකලට පිවිසුණාහ. එහෙත් සැක කළ හැකි කිසිවෙකු එහි නොවීය. ඉන් වඩාත් කුපිත වූ යෙහෙළියෝ රෑන ලිපි එවන මිස්ට "නිර්නාමික" කවුරුන්දැයි සෙවීමට යුහුසුළුව සිය කපටි දැල් එලුවෝය. එහෙත්, ඔවුන්ට සාක්ෂි ලෙස තිබුණේ, ලිපියේ අත් අකුරු හා 'පැණිදෙනිය' නම් තැපැල් මුද්‍රාව පමණෙකි. සේනගේ මේ නිර්නාමික පෙම්පත් ගනුදෙනුව ගැන දැන සිටියේ මා පමණෙකි. ෆැකල්ටියේ සියලු වැඩ ඉංග්‍රීසියෙන් කළ බැවින් ලිපියේ සිංහල අකුරු සේනගේ යැයි කිසිවෙකු හැඳිනුවේ නැත.

නිර්නාමික පෙම්වතා ලෙස සුමිත්‍රාට ලියූ අවසන් පෙම් හසුනෙන්, සරසවි පුස්තකාලයේ හත්වෙනි මහලට පැමිණෙන්න යැයි, ඔහු ඈට ආරාධනා කළේ මහත් වූ බලාපොරොත්තු ඇතිව ය. ලිපිය ලද පසු ඇය, ඔහු දන්වා යැවූ ස්ථානයට තනිව පැමිණිය හොත්, ඈ මුණගැසෙන බලාපොරොත්තුවෙන් වෙනදා මෙන් වෙනත් තැනක සැඟවී නොසිට, දන්වා යැවූ පරිදිම පුස්තකාලයේ හත්වෙනි මහලේ අන්තිම මේසයේ රැඳී සිටින්නට එදා ඔහු තීරණය කර තිබිණි. ආදර කවි පබඳිමින් ආයාචනාත්මකව ලියූ පෙම් හසුන නිසා, ඈ හදවතේ ඔහු කෙරේ ආදරයත් මෝදුවී ඇතැයි යන තදබල විශ්වාසයක් ඒ වනවිට ඔහුගේ සිතේ රෝපණය වී තිබිණි. දේශනශාලාවේදී, පර්යේෂණාගාරයේදී ඔවුනොවුන්ගේ ඇස් යාවූ නිමේශයේ, ඈ ඔහු වෙත හෙලූ දයාදු බැල්මක් ද ඊට අනුබල සැපයීය.

ඒ තීරණාත්මක මොහොත ළඟා වූයෙන් සුමිත්‍රා හමුවීම සඳහා මහ පුස්තකාලය වෙත සේන පිය නැගීය. ෆැකල්ටියේ දිගු අළු පැහැති කොරිඩෝවේ සුදු සීලිමේ මුල්ලක බැඳ තිබුණු මකුළු දැලක පැටළුණු කුඩා කෘමියාට ළංවෙන මකුළුවෙකු හඳිසියේ මා නෙත ගැටිණි. ඒ දර්ශනය දුටු සැණින් සේනව නැවත්වීමට මගේ සිත හඬගා කීවද, අපහසුවෙන් එය යටපත් කර ගතිමි. මා එතරම් සසළ වූයේ මන්දැයි මටම සිතා ගත නොහැකි විය.

සේන පිටව ගොස් හෝරා දෙකකට පසුව මම වූස් කැන්ටිමට ගියෙමි. ඒ වනවිටත් ඔහු එහි පැමිණා සිටියේය. සිදුව තිබුණේ ඔහු නොසිතූ දෙයකි. රකුසු වෙස් ගත් සුමිත්‍රාගේ යෙහෙළියෝ, සේන සුමිත්‍රාව බලපොරොත්තුවෙන් සිටි තැනට හඳිසියේම කඩාවැදී ඔහුව වටකර තිබිණි. පලායාමට නොහැකිව පිටුපස බිත්තියටත්, ඉදිරියෙන් සමච්චලයෙන් බලා හිඳින කෙල්ලෝ රෑනටත්, ඔහු එදා කොටු විය. තල් අත්තට ගල් වැටෙනක් මෙන් හිස් මුදුනට වැටෙන වචනසර ඔහු ඉවසා සිටියේ ඉතා අපහසුවෙණි.

" හඃ... අද අහුවුණා... මෙයයි එහෙනං මෙච්චර කල් අපිව රවට්ටලා නමක් ගමක් නැතුව ලියුං එව එව හොර ගල් ඇහිලුව ඝට හොර **නිර්නාමික පෙම්වතා .....?** "

"චිඃ විතරක්!"

"ඒ අතු අල්ලන්න ඔහේ කවුද ? දවල් හින දකින්න එපා හලෝ. ඒකිට තමුසෙ වගේ කෙනෙක් ගැලපෙනව ද?"

"අනික, කැමති වුණත්.....?"

" දික්තලාට, කාලගෝල වගේ හිටියි."

හදිසියේ කඩාපාත්වූ අකුණු වර්ෂාව පහව ගියේ, දෙස් දෙවොල් තබමින් කෙල්ලෝ රෑන නික්ම ගිය පසුවය. මාපිය, නෑදෑයින් හා ගැමියන්ගේ ගරු සැලකිලි විනා නින්දා අපහාස, රැවුම් ගෙරවුම් ඔහුට නුපුරුදුය. මිනීමැරුමක් කොට පළා යමින් සිටියදී පොලිසියට කොටු වූ අපරධකරුවා, ඔහු විය එදා. නිදහසට කරුණු නොවිමසාම අධිකරණයේ දී නඩුව අසා, බරපතල වැඩ ඇතිව සිරගතවූ සිරකරුවෙකු බවට 'නිර්නාමික පෙම්වතා' පත් වූයේය.

එදා සිට විරහව නම් වූ මහා රුක්ෂය වසාගෙන, නින්දා අපහාසයෙන් උපන් ලැජ්ජාවේ විෂ කටු වැල් ලියලා වැඩී, ඒ විෂ කටු ඔහු ගත සිත පාරමින් වේදනා දෙන්නට විය. අනතුරුව දේශන හා පර්යේෂණ මඟ හැර ගුහාගත ජීවිතයට පෙම් බැඳි ඔහු සුසුම් හෙළමින් බලාගත් අත ඔගේ බලා සිටින්නට විය.

සේනගේ හදිසි කඩා වැටීම හඳුනාගත් අපි වදෙන් පොරෙන් ඔහුව සරසවියේ වෛද්‍යවරිය වෙත කැඳවා ගියෙමු. ඈ ඔහුට කාරුණික වුවාය. පැය දෙකක පමණ දිගු වූ වෛද්‍යවරියගේ උපදේශන සාත්තුවෙන් ඔහුගේ මුහුණ ආලෝකමත් විය.

වැව අයිනේ වලාකුළු බැම්මේ හිඳගත් සේනට රළ බිඳෙන හඬ ඇසුණේ ශෝකාකූල ඉකි බිඳුමක් සේය. ඔහු මෙන්ම තනිව හිඳ, සැඳෑ සිරි නරඹන්නෝ වැව් දියවර දෙසද, ඉමක් කොනක් නැති අහස දෙසද, බලා හිඳ හුදෙකලා සුවය සුවසේ විඳ ගන්නේය. බෝට්ටු සවාරි යන්නෝ නැඟූ ප්‍රීති සිනා ඔහු සිත සැනසීය.

'කවදා හෝ මගේම වෙන සුමිත්‍රා කෙනෙක් මට හමුවෙනු ඇති. මෙලොව උපත ලබන සැමකෙකුටම, මේ මහ පොළොව මත මුල් ඇද ගැනීමට, ආදරය නම් පහස, තෙතමය අවැසිය. මිනිසාට ලැබෙන උතුම්ම වස්තුව ජීවිතයයි. ජීවිතාන්තය දක්වා සිරගතවූවන්ද, මේ මිහිතලය මත ජීවත්වේ.'

එසේ සිතූ ඔහු දුක් දොම්නස් අකාමකා දා සුවසේ හුස්ම ගත්තේය. අඳුරු ජීවිතයට සහන් එළිය යළි සෙමින් ගලන්නට විය. කාලය සෙමින් ගෙවී යන්නට විය.

"සුමිත්‍රා, සුමති එක්ක හිච් වෙලා!

අද හවස ලෙක්චර්ස් ඉවර වෙලා කොල්ලො කෙල්ලෝ උන් දෙන්නව මල් බකට් කරන්න යනවලු"

සරසවිය පුරා පැතුරුණු ආරංචියෙන් සේන අමාරුවෙන් වාරු කරගත් ජීවිතයට යළි කනකොකා හඬන්නට විය. සේනට සුමිත්‍රාව යාළු කරදෙන බවට පොරොන්දු වූ, ඔහු හා දිවෙන් දිව ගාගෙන සිටි හොඳම මිතුරාද ද්‍රෝහී වීමෙන් ලත් අපේක්ෂා භංගත්වයේ අඳුර සේනගේ සුපසන් මුහුණ යළි ගිල ගත්තේය. ගුහාගත ජීවිතයේ යාන්තමට දැල්වුණු සහන් එළි කෙමෙන් නිවී ගොස් ජීවිතයට අඳුර කාන්දුවී සෝසුසුම් ජීවන ගීතය බවට පත් විය.

ඔහුට මුහුණාදීමේ අපහසුව නිසා මම ඔහුගෙන් කෙමෙන් දුරස් වූයෙමි. දහසක් ජීවන අරගල මැද වුව, ප්‍රේම පාරාදීසයක මිහිර සමඟින්, ජීවන කාල නදිය නොනැවතී ගලා ගියේය. නිර්නාමික පෙම්වතා කාලයේ මතක වළාකුළු අතරේ දියවී මැකී ගියේය.

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සේනගේ අක්කා පැමිණ සතියට පසු මම සේන බැලීමට මානසික රෝහලට ගියෙමි. ලොකු දූ මඟ හැර මේ ගමන යාමට මා දැරූ සියලු වෑයම් අසාර්ථක විය. ඉදිකටුවට ඇමිණූ නූලක් සේ ඈ මා පසුපස ආවාය.

"නාත්ති බය වෙන්න එපා. මං ඔයාලගේ අතීතය අවුස්සනේ නෑ. මං දැන් ලොකු ළමයෙක්. සෙකන්ඩ් ඉයර් මෙඩිකල් ස්ටුඩන්ට් කෙනෙක්. මම සේන අංකල්ගේ කේස් එක ස්ටඩි කෙරුවා. මං ගොඩක් දේවල් දන්නවා. අපි යමු."

මම නිරුත්තර වූවෙමි. කාල අගහිඟකම් නොවූවද, ඉඳහිට හෝ සේනගේ සුවදුක් සොයා බැලීමට නොහැකිවීම ගැන ද උපන් බලවත් පශ්චාත්තාපයෙන් ඔහු සිටිනා වාට්ටුවට ඇතුල්වෙත්ම හද ගැස්ම වැඩිවී ගතම අප්‍රාණික වන්නාක් මෙන් හැඟිණි. සේනගේ සොයුරිය එහි පැමිණ සිටීම අස්වැසිල්ලක් විය. හදූ යොයුන් විය කාල රාක්ෂයා විසින් ඔහුගෙන් උදුරා ගොසිණි. අප දුටු විගස රෝගී දෑස් අප කවුරුන්දැයි විමසන්නට විය. අවසන සේනගේ දෑස් මා දියණිය ළඟ නතර විය. ඔහුගේ හැකිලී ගිය මුහුණ කලඑළි වී, මලානිකව ගිලී ගිය ඇස් දීප්තියෙන් බබළන්නටත්, ක්ෂණිකව කඳුළින් දොරේ යන්නටත් විය. වියැලී ගිය දෙතොල් සෙමින් සෙලවිණි.

"**සුමිත්‍රා....!** ඔයා ආවා එහෙනං මාව බලන්න. ඔයා ආපු එක මගේ පපුවට බරට දැනෙනවා. කොහොමද සුමී ඔයා දන්නේ, මං මෙහේ ඉන්නවා කියලා?"

රූකඩයක් මෙන් කෘෂව ගිය සර්වාංගය ගස්සා ප්‍රොත්සාහිව ඔහු ඒ වචන වලට ප්‍රාණය පිම්ඹෙය. දියණි අසරණාව මා දෙස බැලීය.

"මමයි මවං කිව්වේ."

දිගු නිශ්ශබ්දතාවකට පසු මම උත්තර දුන්නෙමි.

"ආ මවං සුමනි; උඹත් ආවා එහෙනං මාව බලන්න. මවං උඹ හුඟක් වෙනස් වෙලානේ. වයසට ගිහිංනේ. මොකද කෝස් ලෝඩ් එක වැඩිද? සුමිත්‍රා..., ඔයා නං තවත් ලස්සන වෙලා. සුමී....; මේ මගේ අම්මා"

අමාරුවෙන් දකුණත ඔසවා සේනගේම සොයුරිය පෙන්වමින් ඔහු පැවසීය. ඈ කඳුළු සඟවා ඉවතට ගියා ය. ඒ අවසරයෙන් කළ සංඥාවට මම ඔහුට ළං වූවෙමි.

"මවං ..... සුමනි; මට දැන්.... හොඳයි. මම කැම්පස් ආපු ගමන්..... කෙළින්ම සුමිත්‍රාගෙන් අහනව. මට කැමති ද කියලා. උඹ මට උදව් කරනවා නේද?"

කනට කොඳුල රහසට පිළිතුරු වචන නොමැති වූයෙන් මම හිස සැලුවෙමි.

සේන ඔහුගේ මව සේ හඳුන්වා දුන්නේ ඔහුගේ සොහොයුරියවයි. වතුපිටිද, හරකාබානද, විකුණා සේනට වියදම් කොට ඒ නිෂ්ඵල බව දැනී ලද සිත් තැවුලෙන් ඔත්පලව මව මිය ගියේ බොහෝ කලකට පෙරදීය. ඔහු සුමිත්‍රා ලෙස අප දියණිය හඳුනාගැනීමේ අරුමයක් ඇද්ද?

ආ පයින්ම ආපසු යා නොහැක. අපහසුවෙන් හෝ ඔහු ළඟ රැඳිය යුතු විය. ඒ හෝරාව වර්ෂයක් තරම් දිගු යැයි මට හැඟිණි. මම සේනගෙන් ඇස් ඉවතට ගත්තෙමි. සේනගේ අක්කාත් අප දියණිත් එකිනෙකා වැළඳ කඳුළු සලන, හඳ සසල කළ ශෝකී චිත්‍රය, වාට්ටුවේ කොට බිත්තියට ඉහළින් දැල් අතරින් මම දුටුවෙමි.

හිරෝෂිමාවට හෙලූ පරමාණු බෝම්බයෙන් මියගිය සිසුවියකගේ අත් ඔරලෝසුව හදිසියේ මගේ මතකයට නැඟිණි. එය හිරෝසිමා කෞතුකාගාරයේ තාමත් තිබේ. අටයි පහළොවට එහි වේලාව නතර වී ඇත. එය නතරවී ඇත්තේ එක්දහස් නවසිය හතළිස් පහ වසරේ අගෝස්තු හය වෙනිදාය. මා මිතුරු සේන නම් වූ නිර්නාමික පෙම්වතාගේ හිත තාමත් සරසවියේ තෙවැනි වසරේ නැවතී තිබේ යැයි මට සිතුණි.

රචනය: දොන් සුසිල් ප්‍රේමරත්න

ආදී විද්‍යාර්ථී, පේරාදෙණිය විශ්වවිද්‍යාලය

ඉංජිනේරු පීඨය

“Life is a song, sing it; life is a struggle, accept it; life is a tragedy, confront it; life is an adventure, dare it.” — Mother Teresa (1910-1997)

THE FROZEN ONES

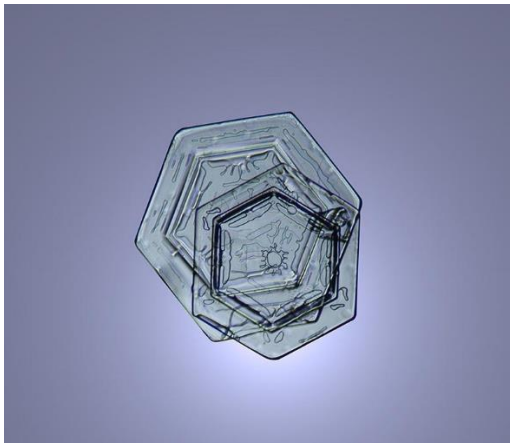
By Dimuthu Jayawickrama, B.Sc (Hons), Ph.D.

(An alumnus of University of Peradeniya, Faculty of Science)

Experiencing snow for the first time is unforgettable. What is snow? Is it merely water in its solid state (precipitation in the form of ice), but not the kind of ice that can be in a home-freezer? Why not? These "Frozen Ones" are created about ten thousand feet up in the sky with water "vapor" with the help of some tiny particles (dust) under freezing conditions. Formation of morning frost also involves water vapor depositing as solid water or ice. In contrast, in a freezer, liquid water is converted rapidly into ice. Snow is a crystalline material *(Figure 1).*

(Figure 1)

This means a snow crystal is made of repeatable identical individual units, just like that found in salt and sugar. Therefore, technically a single entity of snow is a crystal and more than one crystal together is a snowflake. On the other hand, snowflakes (basically a stack of snow crystals) (Figure 2) do not have long-range repeatable units. So there is a fundamental difference between snow crystals and snowflakes. However, snowflake is a general term used to describe both snow crystals and flakes. A typical snow crystal may contain 10^{18} water molecules and weighs ~ $3\ 10^{-8}$ kg.



(Figure 2)

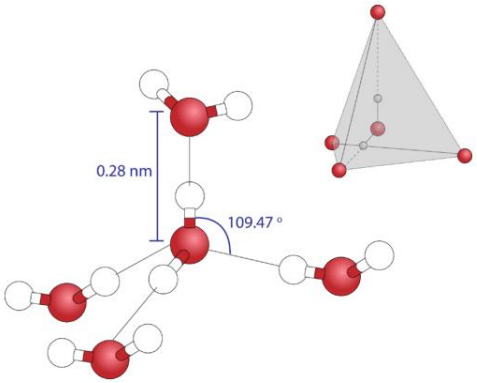
Why is snow white (without seven dwarfs☺)? A snow crystal is colorless and transparent just like liquid water. Then how do we see it? Under certain conditions, we can see certain transparent objects. For example, we can easily see a glass window if there is dirt on it due to light reflected from dirt, but hard to see a clean glass window because light transmitted through. Similarly, light that scatters, off the facets of a snow crystal makes the shape of snow crystals to be visible.. A mass of snow, which is a collection of many crystals (flakes) appear as white because light scatters in all directions off the surface of all crystals, more or less equally. In fact, snow has slight blue hue because most of other wavelengths in the visible light are absorbed and only blue is reflected.

Snow crystals are typically six sided and have a six-fold symmetry (i.e., six equal sides). Because of the six-fold symmetry, snow crystals repeat the same pattern every 60^0 on a flat surface. The shape and the size of individual crystals changes with humidity and temperature. Ukichiro Nakaya explained this phenomenon in the snow crystal morphology diagram

(https://www.researchgate.net/figure/The-Nakaya-snow-crystal)

The shape of crystals is directly related to properties of water. Two molecular properties that shape snow crystals are the bent shape and hydrogen bonds of water molecules.

Four other molecules in a “tetrahedral” shape surround each water molecule.

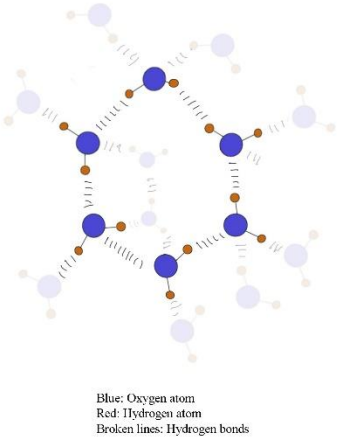


(Figure 3)

Source: https://chem.libretexts.org

The arrangement of water molecules in hexagonal shape (Figure 4) expands as the snow crystal grows.

(http://www.snowcrystals.com/science/science.html)



(Figure 4)

Naturally, the corners of snow crystals have more access to free water vapor molecules than those at other areas. As additional water vapor molecules deposit to expand the crystal, more water vapor molecules would be diffused and deposited at the periphery, until it is physically impossible to expand the crystal any further. These crystal growth activities occur while the crystal randomly tumbles in the sky. As a result, all the crystal surfaces have the chance of seeing similar surroundings. This phenomenon of crystal formations leads to a symmetrical structure, and a snow crystal is born. In reality, most of the crystals are not symmetric. That is because; it is not easy to pack billions and billions of water molecules into a specific pattern under ever changing atmospheric conditions (Figure 5).

(Figure 5)

There are no seven- or eight- sided snow crystals. Three-sided crystals are formed under rare conditions. Occasionally twelve-sided crystals/flakes are observed due to almost perfect alignment of two crystals. (Figure 6)

(Figure 6)

How about identical snow crystals? It is theoretically possible to have two identical snow crystals if two follow the same conditions and route to earth. But a slight variation in the environment can change the morphology of crystals.

It is extremely remote to observe typically identical snow crystals.

However it is possible to create identical snow crystals in a laboratory environment, as Professor Ken Libbrecht succeeded at the California Institute of Technology.

(http://www.snowcrystals.com/)

Photographing snow crystals is frustrating, yet at the same time fun and rewarding. It would be frustrating because snow crystals disappear or starts to deprive fine features within few seconds due to melting (solid to liquid) or sublimation (solid to vapor).

A number of techniques can be used to photograph snow crystals. The simplest approach could be to use a phone camera attached with a macro lens clip. Canadian photographer, Don Komarechka, uses a standard camera

with super macro lens and macro flash. Moscow based Alexey Kljatov has developed fairly inexpensive tool with a point shoot camera and reverse attaching lens.

(ref: https://petapixel.com)

The snow crystals/flakes shared in this article are photographed using a homemade microscopic rig, which is somewhat similar to what Professor Libbrecht had documented.
(http://www.its.caltech.edu/~atomic/snowcrystals/photo2/photo2.htm)

(Figure 7)

(Figure 8)

This approach allows one to use colored filters to illuminate crystals from behind and generates colorful snow crystal photographs. The first person to photograph snow crystals was Wilson Bentley (1865-1931) from Vermont, USA. He used a homemade microscopic camera and natural light to produce ~5000 photographs, even before the invention of film cameras.

Well, next time when it snows, jump out and experience the esthetic beauty of snow crystals. You might see most of the features with your naked eyes but, a magnifying glass would give you a better visual satisfaction. I can assure you that you will not be bored watching 'Frozen Ones', as each snow crystal is unique (at least microscopically).

"In the depths of winter, I finally learned that within me there lay an invincible summer."—

Albert Camus (1913-1960), philosopher, author, and journalist

Photographed by Janaki Amarasinghe (An Alumna of University of Peradeniya, Faculty of Agriculture)

PROTECTING YOUR HEALTH AND SAFETY WHEN USING PRODUCTS WITH HARMFUL CHEMICALS

By Martin Nicholas, Ph.D.

(An alumnus of the University of Colombo, Faculty of Science)

(Former Manager, Evaluation Division, Consumer and Hazardous Products Directorate, Health Canada)

Throughout our lives we have been using both personal products (e.g., soap, toothpaste, shampoo, etc.,) and household products (e.g., dish-soap, drain-cleaners, etc.,) which contain chemicals. Although many chemicals would pose a health risk if they're not handled safely, most often we do not pay attention to safety when using products available in the market. Undoubtedly, Covid-19 has nudged us to be more vigilant about products that we use which could adversely affect our health.

Some chemicals in regularly used products could be dangerous because they might cause skin burns (e.g., drain-cleaners), fires (e.g., organic solvents), and explosions (e.g., mixing cleaners) if not handled safely. Therefore, regular household products with chemicals should be only used according to the instructions to protect you from harm given on the product label.

In addition, materials used for Do-it-Yourself (DIY) projects (e.g., painting, using composite wood, etc.,) and some hobbies (e.g., pottery, art, cement crafts, etc.,) often require the use of professional grade chemicals. These products, therefore, could pose even greater risks to health and safety than the usual consumer products.

It is evident that the Covid-19 pandemic has led people to explore new hobbies and activities. In some cases, it could result in exposure to harmful chemicals. Therefore, taking time to learn about potential dangers from chemical ingredients in the products we handle would be important to adequately protect ourselves from harm while we enjoy our hobbies.

This article provides some information and guidance on how to protect yourself from harm when using chemical products or working with chemical substances/ mixtures in your basement, garage, a dedicated workroom or elsewhere in your home.

Let's take a look at what measures we could take to protect ourselves from harm.

In Part 1, safety information is provided for the general use of household chemicals. In Part 2, guidance is given to those venturing to do projects and hobbies leading to a greater risk of exposure to the harmful effects of chemicals.

Part 1: The use of general household products

1.1. General instructions when using products containing chemicals

- It is advisable that one follows the instructions on the label every time one uses a household chemical. The label should include instructions on how to use and store the product safely. It should also show hazard symbols and cautionary statements of potential hazards.
- Never mix household chemical products together. Some mixtures can produce harmful gases.
- Ensure proper ventilation by opening windows or doors and running exhaust fans, during and after using the product.
- Wash your hands with soap and water after using the product
- Use the appropriate personal protective equipment or PPE described in the next section.

1.2. Personal Protective Equipment (PPE)

Source : https://www.familyhandyman.com

Thanks to Covid-19, everyone has learned of PPEs and the value of using masks and gloves. Masks are just one example of a variety of PPEs used to protect us. When working with chemicals there are many types of PPEs which are important. In addition to masks, we often need gloves

to protect our hands and safety glasses or goggles to protect our eyes.

Please note the following regarding PPE:

- ❖ Wear the proper protective equipment that is specified on the product label or recommended in safety information you gathered.
- ❖ Protect your skin by wearing gloves when necessary--the kind of gloves to wear depends on what you will be handling (keep in mind that you might have an allergy to latex).
- ❖ wear eye protection when necessary--goggles protect the eyes from splatter and debris. Safety glasses may be sufficient for many activities
- ❖ wear protective clothing (such as a smock) --that suits the application.

An example of protecting yourself with PPE

Spray paint is toxic, and cheap masks don't offer much protection. The best way to avoid permanent brain damage is to use an activated carbon mask—more expensive, but worth the money.

1.3. Storing your Chemicals

- Store in original containers and according to instructions.
- Keep all safety information provided.
- Store paints, solvents, gasoline, fuels, varnishes and other products that may release harmful fumes or catch fire, outside of your home.
- If possible, store products in a separate area which is not connected to your home's ventilation system.
- Avoid storing chemical products in places where the temperature fluctuates or varies a lot.
- Regularly check containers for leaks or damage.

1.4. General Information about Adverse Effects from Exposure to Chemicals:

Some chemicals have acute effects on one's health, while others have chronic effects and some have both. Acute reactions to chemicals are those that appear soon after exposure (such as a rash or a burn) and last a relatively short time. Chronic effects such as cancer or developmental disorders may develop more slowly, often after frequent exposure to chemicals, and have longer lasting effects. Taking all these things into consideration would help one to make safer choices.

The following are some examples of how this exposure could occur:

Route of Entry	Mechanism of Entry
Mouth	ingestion, inhalation of gases, vapours, mists, fumes, dusts, or smoke
Nose	inhalation of gases, vapours, mists, fumes, dusts, or smoke
Eyes	absorption from fumes, splashing, or eye rubbing
Skin	absorption into the body from direct contact, or a local effect at the site of exposure (for example, a rash or burn)

Part 2. Use of products containing potentially toxic Chemicals when doing leisure activities

2.1. Using Chemicals for your hobbies, DIYs and/or home business

There are many things to keep in mind for using material safely when planning and performing tasks with chemicals, such as DIYs or hobbies. You may use material more frequently than what you do with regular household chemicals. If you decide to extend your hobby to produce items using chemicals for sale, then you may have to consider chronic health effects with the more frequent use over long periods. In addition, one may use larger volumes of chemicals more than the amount used by a hobbyist. In this case, it is advised to consult safety data sheets (SDSs) of the materials for health and safety information.

Before starting any DIY project, make sure you're aware of how to keep you and your family safe by checking the following: Chemical safety for Do-It-Yourself (DIY) projects

2.2. Housekeeping when doing hobbies or DIYs

The environment where your Do-it-Yourself projects are done (e.g. where arts and crafts are created) will also impact how safe the entire process is. It is essential that you keep work areas clean, neat and organized at all times with proper storage, labelling and clean up. Establishing good housekeeping practices helps keep you safe.

Points to note:

- make all storage easily accessible to avoid exposure incidents.
- choose appropriate, well marked containers (keep in original containers where possible).
- store chemicals which will react together separate from each other.
- keep containers covered/closed at all times.
- pour substances slowly and carefully.
- avoid situations where dust is created.
- never sand a dried piece, or grind a glazed piece inside your home.
- control dust by wet mopping or vacuuming (never sweep).
- clean up spills immediately with a wet cloth, sponge or mop. Don't sweep up dried material with a broom.
- dispose of waste materials safely by contacting your local municipality for information.
- See below for information on the importance of having good ventilation.

2.3. Good Ventilation

A source of fresh air protects you from exposure to hazardous levels of potentially harmful airborne substances. An open door or window is not necessarily the most adequate ventilation. Whenever possible, it is much more effective to open two windows or doors at either side of the work area to provide proper ventilation. The type of work process you are doing will determine the type of ventilation you need. You need appropriate and controlled ventilation when using more harmful substances or doing things which release toxic material into your home.

Keep your work areas well ventilated when refinishing furniture, using paints, varnishes, glues, and adhesives, or other renovation projects which may create dust or release chemical fumes. Open windows and doors, run your exhaust fans, and work outdoors, if possible.

Even in ventilated areas, respirators are recommended when working with materials such as pottery, concrete, contact cement, epoxy, varnishes and other hazardous materials and solvents.

2.4. Some Specific activities which could expose you to harmful chemicals while releasing them into your work area

The following are specific references for protecting your health and safety while undertaking some activities which could expose you and your work area to chemicals.

When doing hobbies, you should guard against exposure to the following:

1. Volatile Organic Compounds (VOCs); and
2. Silica

***2.4.1. Hobbies which could lead to exposure to VOCs** (e.g. painting):*

Painting - General Information/Precautions

- The potential hazards from paints are primarily associated with some of the vehicles/solvents (e.g., aliphatic and aromatic hydrocarbons, ketones, and alcohols; see Solvents) and pigments (e.g., lead carbonate, chrome yellow, cobalt arsenate).
- Use premixed paints to avoid inhalation of dry pigments/dyes/powders.
- Use water-based products or observe the precautions on hazard-labeled products to reduce the potential hazards from solvents.
- Be aware that small amounts of formaldehyde, bleach and phenol used as preservatives in some paints may cause allergic reactions in sensitive individuals. If sensitive to these chemicals, the use of PPE would be a good precautionary action. Also, contact the manufacturer of the paints you intend to use.

2.4.2. *Hobbies which could lead to exposure to Silica dust (e.g.* cement and concrete crafts and pottery)

Working safely with cement and concrete

Components in cement include calcium oxide, lime, silica, aluminum, iron compounds, and small amounts of magnesia, sodium, chromium, sulfur, and potassium compounds. Potential health effects include skin/eye burns, respiratory effects if inhaled, and gastrointestinal burns if ingested.

Cement (as described above) and concrete are dangerous to inhale and get in one's eyes because they contain silica

which is known to cause cancer. It is advisable to pay attention to the following:

- Use of safety glasses and a Silica-certified dust mask or respirator.
- Being aware of the direction the wind is blowing, when working outside with cement/concrete.
- Use of gloves to protect your hands. Latex/nitrile gloves have been reported to be very durable even when used while mixing material.

Check the following link for more details on doing cement and concrete crafts safely.

With the use of the appropriate PPE one could carry out DIY projects and do arts and crafts safely. It is advisable to learn more of the potential chronic hazards from long term use if one wishes to do this at a semi-professional level.

2.5. References:

Check the following links for Arts and Crafts

- Information for Art Class Teachers: Chemical Safety (PDF is available)
- Harmless Hobby? Watch Out for Toxic Art Supplies
- Use arts and crafts materials safely.

Note: You could use the following link to order free safety publications from Health Canada.

Following is a summary of ways to reduce risks to your health and safety and what to do if you or someone in your home gets injured or sick through exposure to chemicals.

Summary of Ways to Minimize Risks
Know your materials. *Read warnings and labels. Take extra care when using unfamiliar products.*
Limit exposures. *Substitute more hazardous materials with less dangerous ones. Avoid exposures to toxic materials.*
Stay clean. *Use protective gear and practice good hygiene and waste disposal.*
Have good ventilation and Clear the air. *Control dusts, filter air, add clean air, and remove fumes with proper exhausts.*
Store materials properly. *Keep out of reach of children. Keep labels on all products.*

What to do if someone is exposed

If you think someone has been harmed:

Call a Poison Control Centre or your health care provider right away. You can find phone numbers for the Poison Control Centre nearest you by searching Poison Control Centre + (your province or territory) on the Internet.

Tell the person who answers the phone what the product label says. There should be first aid instructions surrounded by a border on the back or side of the product label. Bring the product container with you when you go for help. Report the incident to Health Canada.

Stay safe during this ongoing pandemic

Finally, I wish that you will be safe and free from all harm from Covid-19 even when you may be doing new activities or hobbies at home using chemicals. I thank Kumudini Nicholas for reviewing and editing the article and making valuable suggestions.

By Dudula Vilasini Premaratne, Dip (Physiotherapy) SL, Dip (Nursing) Canada, MCSP UK

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HISTORY OF HYDROPONICS: A METHOD OF GROWING PLANTS WITHOUT SOIL

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Hydroponics is a technique of "Horticulture" that falls under the subset of "Hydroculture". Hydroponics are defined as "*growing plants without soil by using a mineral nutrient solution in an aqueous solvent*" (Hydroponics, 2021). The word "Hydroponics" comes from two Greek words, "hydro" and "ponos" which means "water" and "labor". Hydroponic growing is widely used and has become a viable method to harvest vegetables (e.g., tomatoes, lettuce, cucumber, pepper, etc.) under controlled conditions. The growth of the hydroponics systems and the evolution of its design has a long history beyond our knowledge and imagination.

The techniques of Hydroponic has a long history dating back in 600 BC. The earliest reported colossal hydroponic growth is known as *"The Hanging Garden of Babylon*" (Resh, 2013). Babylonian king, Nebuchandnezzar II, constructed the *Hanging Garden* for his wife, which is considered as a great engineered structure of history. The hanging garden was irrigated by water from the nearby "Euphrates" river. The water from the river was lifted by a giant water wheel and supplied through terraces to plants grown in water at each terrace level. It could have been a difficult task without modern technology; however, they achieved the water lifting and supplying by using chain pumps.

They had grown a variety of plants and trees such as flowers, food and ornamental plants, as well as fruits trees in this hanging garden. Continuous flow of water through the terraces of the hanging garden clearly shows us the usage of the "*Nutrient Film Technique*[1] " which is one of the most common methods of the modern hydroponic system.

Figure 1: The Babylonian Hanging Garden (Source: Google Images)

The "Babylonian Hanging Garden" has laid a strong foundation for the development of the hydroponic growing system currently being used in the modern world. However, we do not exactly know whether a similar or different technique had been used at the famous "*Sigiriya Garden*" of Sri Lanka.

"Chinampas" known as "*The Floating Gardens of the Aztecs*" (10th & 11th century) can be considered as the second example for the foundation of the modern world's hydroponic systems. "Tenochtitlan", now the Mexico City, was a fortress city completely surrounded by water and had an enormous population. People built "*Chinampas*", the floating gardens, which was another masterpiece of ancient engineering. They converted the marshy wetland of "Lake Texcoco" into arable farm lands (Figure 2).

[1] NFT is where plants are grown with their roots contained in a plastic film trough or rigid channel through which nutrient solution is continuously circulated

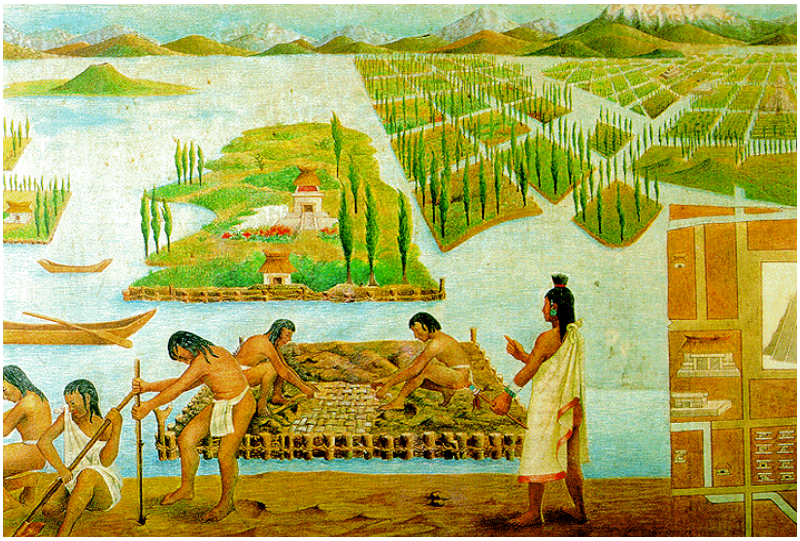

Figure 2: "Chinampas" in the Mexico City (Source: Google Images)

Farmers weaved sticks together to form a giant raft of 300 feet long and 30 feet wide and piled mud from the bottom of the lake on top of the raft to create a layer of soil (Figure 2). These rectangular floating gardens were anchored to the lake by willow trees planted at the corners. This network of garden extended for 22,000 acres across the surface of the lake.

They planted corn, beans, squash, tomatoes, peppers, and flowers in their floating garden. The history of "Aztecs" clearly gives us an idea of how the ancient people used the giant rafts for planting which led to the development of raft based hydroponic systems used today.

There were no records of scientific research on plant growth and crop nutrients until the 1600s. After 5 years of experiments, in 1600, a Belgian national Jan van Helmont found that plants obtain nutrient substances from water. In 1699, an Englishman, John Woodward found that plant growth was a result of certain substances in water, but derived from soil, rather than water itself.

De Saussure (1804), Boussingault (1851), and Sachs & Knobs (1860-1861) followed previous scientists and their findings to research more on water culture, plants' preferences for nutrients (high or low demand nutrients) plant's nutrient uptake priorities, and the need of macro & micro nutrients for a plant growth. Potential of "Nutriculture" for large-scale crop production was introduced during 1925 – 1935. Finally, Dr. W. F. Gericke of the University of California ended up with the term "Hydroponics" and carried out hydroponic experiments in the laboratory in 1929 by growing vegetable crops including root crops.

In the1945s, the US air force solved their problems of providing fresh vegetables for the individuals by practicing hydroponics. The US army established a 22-ha project in Chofu, Japan after the Second World War.

After 1950s, hydroponics growing started to spread around the world and countries like Spain, Holland, England, Germany, Sweden, etc., are performing very well in terms of hydroponics. More and more researches on hydroponics will leads to a better production of food in terms of quality and quantity in future.

Recent publication by Gary W. Hickman on *"Greenhouse Vegetable Production Statistics – 2011 edition",* stated that the world hydroponic food production is about 35,000 ha. There are some countries that have very large hydroponic gardens, including vertical growing systems, to produce fresh vegetables and fruits. *Aerofarms* of New Jersey (USA), *Badia* farms of Dubai (UAE), *Green Spirits Farms* of Michigan (USA), *Intelligent Growth Solutions* of Dundee (Scotland), *World Food Building* of Linkoping (Sweden), *Plenty* of Seattle (USA), *Sky Greens* of Singapore, *Spread* of Kyoto (Japan), *Sunqiao* of Shanghai (China), and *Urban Crop Solutions* of Kotrijk (Belgium) are some of the most famous and successful hydroponic producers around the world. Market value of the global hydroponics industry was predicted to have grown up to USD 27.33 billion in 2020 from USD 19.95 billion in 2015 (Business Wire, 2016). The farm gate value of greenhouse vegetable production of Canada, in 2019, is 1.6 million CAD (664,449 Mg) of which more than 90% is contributed by Tomatoes, Peppers and Cucumber (AAFC, 2019 – https://www5.agr.gc.ca).

The US has nine developed indoor farms and more farms are in development stages. For an example, Figure 3 shows the largest vertical aerofarm in New Jersey, which grows 20 types of leafy greens. It produces 1.7 million pounds of leafy greens each year.

Figure 3: AeroFarms of New Jersey, USA

(Source: www.maximumyield.com)

According to the statistical data, Canada has 1761 ha of hydroponic greenhouse production (AAFC, 2019 – https://www5.agr.gc.ca). It includes the growth of tomatoes, cucumbers, pepper, and lettuce. Hydroponics growing has been adapted in different situations from outdoor to indoor during the last 65 years. Currently, there are many research studies being carried out to further advance the hydroponics growth, including exploring the use of sea water, alternative energy sources such as solar energy and energy from incineration of wastes, use of treated wastewater as water and nutrient sources, and simple systems for increasing efficiencies including reuse of resources etc.

Figure 4: A vertical hydroponic greenhouse (Source: Google

Acknowledgement:

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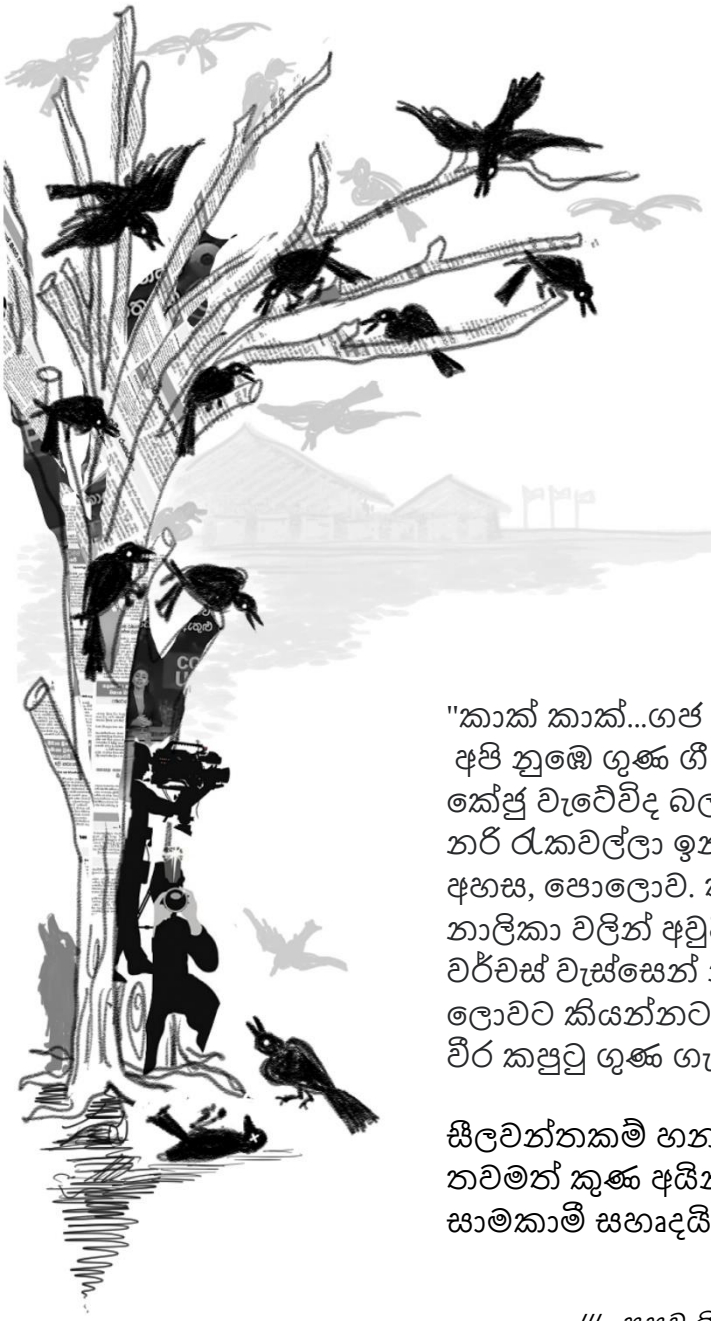

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කුණු පැක්ටේරිය වටකර
කළු දියවැල් බසී ගලා
මැවුණු උයන්වතු වටකර
නිල් වූ පෙම්වතුන් රඟන
උයනේ මැද මාර ගසක
සුසුම් හෙලති රැස්වී කපුටෝ
හඬා වැටෙති උන්ගේ මිතුරෝ

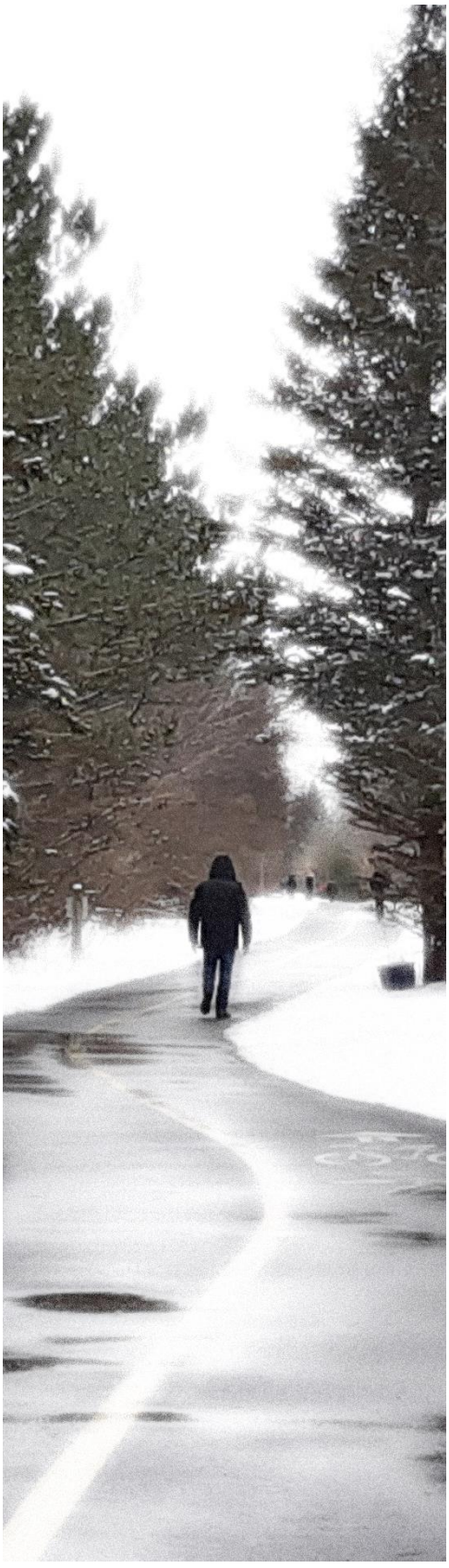
කුණු කන්නට එක් රොක් වී
ඉදහිට පරොසින් දැඟළු
සගයෙකු මියගොස් තනිවම සැතපෙයි දෙරණේ

"කාක් කාක්...ගජ මිතුරේ
අපි නුඹෙ ගුණ ගී ගයනා"
කේජු වැටෙවිද බලමින්
නරි රැකවල්ලා ඉන්නා
අහස, පොලොව. තරු, මිණිමුතු
නාලිකා වලින් අවුදින්
වර්චස් වැස්සෙන් නාගෙන
ලොවට කියන්නට සැරසේ
වීර කපුටු ගුණ ගැයෙනා

සීලවන්තකම් හන්දා
තවමත් කුණ අයින් නොකොට
සාමකාමී සහෘදයින් ඈතින් පියවර මැන්නා

----///--පසුව ලියමි--///----
නගරෙන් ආ සුළි සුළඟට
ගඟ අසබඩ ගම්මානේ
කුරුළු කූඩුවක් කැඩිලා ..
මියගිය ඒ කුරුළු පැටව්
පස් වී යයි නිසොල්මනේ
හිවිතුරු ඒ වනාන්තරේ
පස සරුකර නිරන්තරේ .....

කොරෝනා මැවූ විලාසිතා



බිය වන්න දෙයක් නැත
සඟ වන්න දෙයක් නැත
වයිරසය මුළු ලොවම පැතිරුණා
මුළු ලොවම රැක ගන්න තැනූ මුඛ ආවරණ
කෙනෙකුගේ හිතියට මුල්වුණා

කට වසා ඉන්න බැහැ
නිතර දොඩමලු නිසා
තැනුවාලු ආවරණ මුව වසා
රැක ගන්න ජීවිතය
රැක ගන්න අඹු දරුවෝ
සැරසෙන්න පළඳින්න මුව වසා

මුව වසා ගැලවෙන්න
බැරිම තැන ඉවසන්න
හැදුවාලු ලෝගුවක් ඇඟ වසා
දැන් ඉතිරි වී ඇත්තේ
ඔලුගෙඩිය පමණමයි
හිස් වැසුම එය වසා පැළඳුවා

දෙපතුල වසා ගන්න ඇන්දාය පා සඟල
දැම්මාය අත් දෙකට ආවරණ සරසලා
දැන් ඉතින් නොපැකිළිව ඉදිරියට යා හැකියි
කුළුණු මෙත් ගුණ ඇතිව දෑතේ දුර දිග බලා
කොවිඩ් ව ජය ගන්න එක්වෙලා!

නැටුම හා ගායනය තවම මනසට සුවයි
පැය දෙකක් විඳ ගන්න ලපටි හිරු ගේ කිරණ
දැන් ඔන්න මොඩනා, ෆයිසරුත් ඇවිල්ලා
එන්නතද විඳ ගනිමු සන්තොසින් එක්වෙලා!

කරුණා රත්නායක

(Mother of alumna Renuka Subasinghe)

අරුණෝදය

කදු අතරින් ඉර පායා එනවා
ලස්සන ලස්සන රටා මවලා
පාට පාට මුලු අහස පුරා
කැටයම් දහසක් හැඩ කරලා
පුළුන් වලාකුළු අතරින් රිංගා
සඳ පලුවත් එබිකම් කරති
දවල් කනා නම් බකමූණා
රෑ රජ කරලා මහ වනයේ
හීන් සීරුවේ ගස් බෙනයට වී
කරබාගෙන සිටියා
කපටි රජා වූ කළු කපුටා
අහස පුරා කළු සළු වඩනා සේ
කාක් කාක් හඬමින් ඉගිලීලා
නෑදෑයින් එක් රොක් කෙරුවා
සියතුන් නගනා කිවි බිවි නාදෙන්
ගෙවිලියගෙන් නිදි දුව පැන යයි
කිරි ටික දෙව් පසු අම්මා වටේට

නගුටත් උස්සා "උම්බෑ" කියලා
හොඳ ලස්සන නැටුමක් නැටුවා
සුදු ඇදගෙන සුදු කොක්කු වගේ
ළමා පැටව් පාසැල් යනවා
උගතුන් බිහි වී ලක් මැණිගේ නම
ලෝකයෙ මුල් තැනකට ගන්නට
ආසිරි පතමි මේ දරු කැල වෙත
උදෙන්ම අවදිව තේ ටික බීලා
ගොවියො ගොවිබිම් වෙත ඇදෙති
පිට රටකට අත නොපා සිටින්නට
බත බුලතින් පිරි රටක් සදන්නට
යෝධ බලය ශක්තිය පතමි
අහස පුරා හොඳ රටා මවලා
සාරී ගොඩක් විසිරී තිබිලා
මද නල හමලා ලස්සන සළු ටික
නිල අහසෙ සැගවිලා ගියා

කුසුමා විද්‍යාරත්න *(Mother of alumni Indu and Ashoka Vidyaratne)*

රසගුණ පිරි කිතුල් තලප

කිතුල ගස ශ්‍රී ලංකාවේ සෑම පළාතකම පාහේ වැවෙන තාල වර්ගයට අයත් ගසකි. විශේෂයෙන්ම ශ්‍රී ලංකාවේ මධ්‍යම කඳුකරයේ කිතුල්ගල ප්‍රදේශයේ බහුලව දැකිය හැකි ගසක් වන අතර එම ගමට නම ලැබී ඇත්තේ කිතුල් ගස් බොහෝ සේ දක්නට තිබෙන නිසාම වන්නට ඇතයි අනුමාන කල හැකිය. ශ්‍රී ලංකාවට අමතරව ආසියානු කලාපයේ රටවල් වන ඉන්දියාව, බුරුමය සහ ඉන්දුනීසියාව යන රටවලද කිතුල් ගස් වැවෙනු දක්නට ලැබේ.

කප්රුක යයි අප හොඳින් දන්නා පොල්ගස මෙන්ම කිතුල් ගසද ශ්‍රී ලාංකික ජන ජීවිතයට බොහෝසේ ප්‍රයෝජනවත් වන බව සඳහන් කල හැකිය. කිතුල්මල කපා තෙලිදිය පෙරා උණුකර හුකුරු සාදා ගැනීම සහ කිතුල් බඩය තලා කිතුල් පිටි සාදා ගැනීම ශ්‍රී ලාංකිකයින් විසින් බොහෝ කාලයක සිට කරනු ලබන දේවල්ය. ඊට අමතරව කිතුල් ගසේ කඳෙන් මෝල් ගස් සාදා ගැනීමත් කරනු ලැබේ.

කිතුල් පිටි සෑදීම සඳහා පළමුවෙන්ම කිතුල් ගස කපා එහි බඩය කඳෙන් ඉවත් කරගැනීම අවශ්යය. ඉන් පසුව කිතුල් බඩය වන්ගෙඩියක දමා කොටා ගන්න. ලොකු භාජනයක් ගෙන එහි කට වැසෙනසේ රෙද්දකින් බැඳගන්න. මෙම රෙද්ද උඩට කිතුල් බඩ දමා වතුර දමමින්, මිරිකමින් සෝදන්න. මෙසේ කරන විට කිතුල් සාරය සමග වතුර භාජනය තුලට එකතුවේ. ඉන්පුසුව මෙම සාරය පිරුණු භාජනය නොසෙල්වන ලෙස පැය විසිහතරක් නිරුපද්‍රිතව තිබෙන්නට හරින්න. දවසක් පමණ භාජනය නොසෙල්වෙන ලෙස තැබීමෙන් පසුව වතුර පෙරාගත් කල කිතුල් පිටි රෝස පාටින් යුතුව භාජනයේ පතුලේ තැන්පත්වී ඇති බව දක්නට ලැබේ. මෙම රෝස පැහැයෙන්යුතු පිටිය අව්වේ වෙලා ගැනීමෙන් පසුව කිතුල් පිටි ලෙස භාවිත කල හැකිය. කිතුල් පිටි වලින් කිතුල් තලප ලෙස සකස්කර ආහාරයට ගැනීම ඉතාම ගුණ දායක වන අතර විශේෂයෙන්ම ගැස්ට්රයිටිස් රෝගයෙන් පෙලෙන අයට සුදුසු ආහාරයක් ලෙස අප අතර පිළිගැනීමක් ඇත.

<u>කිතුල් තලප සාදා ගන්නා ආකාරය:</u>

කිතුල් පිටි කෝප්ප 1
වතුර කෝප්ප 3
ලුණු තේහැඳි 1/2

පළමුවෙන්ම කිතුල් පිටි භාජනයක දමා වතුර එක්කර ලිපේ තබා කැටි නොගැසෙනසේ හැන්දකින් කැලතිය යුතුය. විනාඩි කිහිපයක් ලිපතබා හැඳි ගමෙන් පසුව එය බාගත යුතු වන්නේය. ලිපෙන් බා ගන්නා විට තලපයක්සේ ගනවී තිබිය යුතුය.

<u>කිතුල් තලප සඳහා හොද්ද පිළියෙළ කර ගන්නා ආකාරය:</u>

තලාගත් සුදුළුණු බික් 2
ගම්මිරිස් කුඩු තේහැඳි 1/2
පොල්කිරි කෝප්ප 2
ලුණු තේහැඳි 1/2
සීනි කෝප්ප 1

සුදුළුණුල ගම්මිරිස්ල පොල්කිරි සහ ලුණු එකට එකතු කර ලිපතබා කැටි නොගැසෙනසේ පිළියෙළ කරගන්න.

ඉහත සාදාගත් පොල්කිරි හොද්ද කිතුල් තලප වලට එකතු කර කෑමට ගන්න.

දයන්ති ලියනරත්න *(Mother of alumna Deepani Waidyaratne)*

Note from the Editor

Dear Reader,

Once again it is a great pleasure to publish the AAUPOC biannual Newsletter for your leisure reading especially at the contempt of current unprecedented time of global pandemic.

As our previous issues, the efforts of our authors' exploring scientific findings, health and safety information, and their talents and creations in a unique way are commendable. It has always been a remarkable experience to work with such enthusiastic authors and talented creators to bring a variety of articles together.

This edition of our Newsletter also is a collective effort of excellent team work. I cannot thank Deepani Waidyaratne enough for the creative illustration of our Newsletter which has always been admired by our readers.

I also would like to extend my gratitude to the sponsors for selecting AAUPOC Newsletter and the Website (http://operaalumni.com/) to advertise their businesses in support of AAUPOC needy students' scholarship fund. Thank you for your generosity and being part of this year AAUPOC scholarship campaign.

My sincere thanks for the excellent review help by Nimal De Silva, Anura Herath, Kumudini Nicholas and Ajith Samarajeewa. Their valued support made this issue a great success. Last but not least, I appreciate the suggestions and constructive ideas from the current executive committee for the improvement of the AAUPOC Newsletter.

While thanking all of our authors for their valued contributions for this edition, you all are invited to share your knowledge and creations in the future editions.

Please do not hesitate to send us your suggestions for the further improvements of the AAUPOC Newsletter and the Website to aaupoc@yahoo.ca.

I truly hope this issue of our Newsletter would have brought you some reassurance at this inexplicable time in our lives.

Best wishes to you and yours!

Dayani Mohottalage