



Researches Relevant to Theosophy

Vol. 1, No. 4

A quarterly publication devoted to the collection of researches in the sciences and humanities that are relevant to theosophical studies.

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Gene-Edited Babies Born

104 Exoplanets Found in 3 Months

A Happy Life May Not Be a Meaningful Life

Creating Babies with No Sperm or Eggs

Electric Plane with No Moving Parts

And more

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Editorial

One of the suggestions that we have received from our readers is that we should try to link the new research to related topics in theosophical literature.

We thank the readers who gave this suggestion. Whenever possible, we try to put comments at the end of the research summary about related passages in theosophical literature. Most research items, however, are of a general nature that theosophists can use in their talks, writings or studies. They are often topics that are not even mentioned in theosophical literature.

It is hoped that more people will be involved in the gathering of research information. We appreciate your feedback. You may contact us at <http://theoscience.org/index.php/contact/> or comment on the website of Researches Relevant to Theosophy.



Researches Relevant to Theosophy

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Contributions to this publication are welcome. Email to the editors the title, date, source and summary of the research report, together with the full citation of the source or sources, whether website, book or article.

*Health & Medicine
Psychology*

Date: December, 2018

Source: *Science Daily*;
Psychological Science

Anxiety and Depression Linked to Arthritis and Heart Disease

People with anxiety and depression were 65% more likely to have a heart condition, 64% to have stroke, 50% to have high blood pressure and 87% to have arthritis. This was the finding of a study in the University of California Department of Psychiatry after researchers examined the health data of 15,000 adults over a four-year period.

According to Dr. Aoife O'Donovan, a senior author of the study: "These increased odds are similar to those of participants who are smokers or are obese. However, for arthritis, high anxiety and depression seem to confer higher risks than smoking and obesity."

The researchers, however, did not find a link between depression and anxiety with cancer.

Source: *Science Daily*, December 17, 2018.

Psychology

Date: October, 2018

Source: *Science Daily*;
Cognitive Neuroscience

Brain Wave Device Improves Memory

Commercial devices that use sound and lights to stimulate theta brain wave activity have been found to improve memory performance. This was the finding of a research conducted at the Center of Neuroscience at the University of California (Davis), published in *Cognitive Neuroscience*.

The devices, using oscillating patterns in sounds and lights, produces theta waves in the brain with a frequency of 5-6 cycles per second. Theta waves are produced when the brain is actively monitoring something. The Center had earlier found that increased levels of theta brainwaves improve performance in tasks that involve memory.

Prof. Charan Ranganath commented that "What's surprising is that the device had a lasting effect on theta activity and memory performance for over half an hour after it was switched off."

Source: Brooke M. Roberts, Alex Clarke, Richard J. Addante, Charan Ranganath. Entrainment enhances theta oscillations and improves episodic memory. *Cognitive Neuroscience*, 2018; 9 (3-4): 181

DOI: 10.1080/17588928.2018.1521386

Science Daily, <https://www.sciencedaily.com/releases/2018/10/181022172959.htm>; October 22, 2018

Biology
Health & Medicine
Earth Sciences

Date: December, 2018

Source: *Journal of Alzheimer's Disease*; *Science Daily*

Mexico Air Pollution Linked to Early Alzheimers

Children in Mexico City exposed to the high air pollution were found to have brain markers that are associated with Alzheimer Disease. This was the finding of an international team of researchers which compared brain samples of cerebrospinal fluid CSF of children and teens in Mexico City and other areas which are less polluted. They looked into a marker called Non-P-Tau (Non-phosphorylated tau antibody) as well as the sizes of the axons of the brain. Axons are the long thread-like part of a nerve cell through which impulses are conducted from cell to cell.

This means that those who are exposed continuously to air pollution to fine particulate matter and ozone above the current US EPA standards are more at risk in developing Alzheimer Disease.

Source: *New Scientist*, *Journal of Alzheimer's Disease*, vol. 66, no. 4, pp. 1437-1451, 2018. Dec. 12, 2018; DOI: 10.3233/JAD-180853

<https://www.sciencedaily.com/releases/2018/12/181221123805.htm>

Space Sciences

Due: December, 2018

Source: *NASA/Jet Propulsion Laboratory*; *Science Daily*

Voyager 2 Enters Interstellar Space

The Voyager 2 Probe has gone outside of the heliosphere of the solar system and entered the space between the stars. Voyager 2 was launched in 1977 or 41 years ago to study the outer planets. It is now 18 billion kilometers away from the Earth. It takes 16.5 hours for its messages traveling at the speed of light to reach the Earth.

Voyager 2 is the second space probe that has left the heliosphere, the protective bubble of particles and magnetic fields around the Sun. But the end of the heliosphere is not yet the outer limits of the Solar System. Outside the heliosphere is the Oort Cloud, a mass of objects that are still under the gravitational influence of the Sun. It will take 30,000 years for Voyager 2 to fly beyond it.

According to Nicola Fox, director of the Heliophysics Division at NASA Headquarters, "Our studies start at the Sun and extend out to everything the solar wind touches. To have the Voyagers sending back information about the edge of the Sun's influence gives us an unprecedented glimpse of truly uncharted territory."

Voyager 2 is the second probe that has crossed beyond the heliosphere. The first one was Voyager 1 which flew beyond it in 2012. Both were launched in 1977 with five-year missions.

Source: NASA/Jet Propulsion Laboratory. "NASA's Voyager 2 probe enters interstellar space." ScienceDaily. ScienceDaily, 10 December 2018. <www.sciencedaily.com/releases/2018/12/181210113820.htm>.

Earth Sciences

Due: December, 2018

Source: *Nature*; *Science Daily*

Greenland Ice Sheets Melting at Phenomenal Rate

As an effect of global warming, the mile-thick ice sheets of Greenland have been melting at a very rapid rate compared to 3 or 4 centuries ago.

In a study published in *Nature*, glaciologists of Woods Hole Oceanographic Institution, found that the accelerating melting of the sheets began in the mid-1800s. Sarah Das, co-author of the study, said: "We found a fifty percent increase in total ice sheet meltwater runoff versus the start of the industrial era, and a thirty percent increase since the 20th century alone."

This melting is one of the key factors in the world's sea level rise.

Source: Luke D. Trusel, Sarah B. Das, Matthew B. Osman, Matthew J. Evans, Ben E. Smith, Xavier Fettweis, Joseph R. McConnell, Brice P. Y. Noël, Michiel R. van den Broeke. Nonlinear rise in Greenland runoff in response to post-industrial Arctic warming. *Nature*, 2018; 564 (7734): 104 DOI: [10.1038/s41586-018-0752-4](https://doi.org/10.1038/s41586-018-0752-4)

Science Daily, <https://www.sciencedaily.com/releases/2018/12/181205133942.htm>

Space Sciences

Date: December, 2018

Source: *The Astronomical Journal*; *Science Daily*

104 Exoplanets Found in 3 Months

Astronomers have found more than one hundred planets outside our solar system in only three months by using a combination of ground telescopes and space-based telescopes.

These discoveries will play a major role in the research on life in the universe. The advances are mainly due to the success of the Kepler Space Telescope launched in 2009 for the purposes of searching for exoplanets. Its observations were checked and confirmed with the use of land telescopes. Some of the exoplanets had very short orbits or less than 24

hours.

The research team involved scientists of the University of Tokyo and the Astrobiology Center of the National Institutes of Natural Sciences.

Sources: John H. Livingston, Ian J. M. Crossfield, Erik A. Petigura, Erica J. Gonzales, David R. Ciardi, Charles A. Beichman, Jessie L. Christiansen, Courtney D. Dressing, Thomas Henning, Andrew W. Howard, Howard Isaacson, Benjamin J. Fulton, Molly Kosiarek, Joshua E. Schlieder, Evan Sinukoff, Motohide Tamura. Sixty Validated Planets from K2 Campaigns 5-8. *The Astronomical Journal*, 2018; 156 (6): 277
DOI: 10.3847/1538-3881/aae778

Science Daily, 3 December 2018. <www.sciencedaily.com/releases/2018/12/181203111612.htm>.

Education

Psychology

Due: December, 2018

Source: *Nature; Science Daily*

Later School Day Helps Students

A study in two schools in the United States showed that when schools start at a later hour, students appeared to be more alert, had better school performance and class attendance. The study was made with the Seattle School District which delayed the secondary start time by nearly an hour.

The research showed that the students increased their average sleep by 3 minutes, with a 4.5% increase in the grades of the students. The paper published in *Science Advances* stated that “the later school start time is associated with a better alignment of sleep timing with the circadian system (reduced social jet lag), reduced sleepiness and increased academic performance.”

Source: *Science Advances*, “Sleepmore in Seattle: Later school start times are associated with more sleep and better performance in high school students,” by Gideon P. Dunster, et al., Dec. 12, 2018, Vol. 4, No. 12, DOI: 10.1126/sciadv.aau6200

New Scientist, December 22, 2018

Biology

Health & Medicine

Date: December, 2018

Source: *New Scientist*

Transfusion with Artificial Blood to Be Tested

Scientists in the University of Bristol, U.K., have developed artificial blood from stem cells from bone marrows. They nurtured them to multiply and produced functioning red blood cells.

In 2019, ten healthy volunteers will be transfused with a teaspoon of a fluid that contains these cells. They will contain a mild radioactive tracer, to check how they function and survive.

If this experiment works, then there will be potentially limitless supply of blood for transfusion.

Source: *New Scientist*, December 22, 2018

Biology
Health & Medicine

Date: December, 2018

Source: *The Lancet; New Scientist*

Baby Born Through Uterus Transplant

A 32-year-old woman in Brazil who received a uterus transplant has given birth to a healthy baby girl. This was the first successful birth involving uterus transplant. Ten previous attempts in the US, Czech Republic and Turkey had ended in failure.

After the transplant of the uterus, the woman was given drugs that would suppress the immune system from rejecting the new organ. Then she was given her own fertilized eggs which were produced by in vitro fertilization, where her eggs were fertilized by a sperm outside of the body. The baby was born by caesarian section after 35 weeks and three days of pregnancy. During the delivery, the uterus was removed to end the therapy using immunosuppressant drugs.

Source: *The Lancet*, "Livebirth after uterus transplantation from a deceased donor in a recipient with uterine infertility," by Dani Ejzenberg, et al, Vol. 392, Issue 10165, p. 2697-2704, December 22, 2018. DOI: [https://doi.org/10.1016/S0140-6736\(18\)31766-5](https://doi.org/10.1016/S0140-6736(18)31766-5)

New Scientist, Dec. 15, 2018

Space Sciences

Date: December, 2018

Source: *New Scientist*

This Time, a White Hole Theory

We have all heard of black holes, those regions in space where gravity is so powerful that it sucks in everything in its immediate vicinity into a point called singularity.

Now astrophysicists are theorizing about the existence of "white holes," which is the opposite of black holes, where matter is being spewed out.

Physicist Carlo Rovelli of Aix-Marseille University in France states that:

“The reason to suspect white holes exist is that they could solve an open mystery: what goes on at the center of a black hole. We see great amounts of matter spiraling around black holes and then falling in. All this falling matter crosses the surface of the hole, the ‘horizon’ or point of no return, plummets towards the center, and then? Nobody knows. . . .

“Quantum effects can . . . prevent infinite density from forming at the center of a black hole. In this case, it is the discreteness of space-time itself, predicted by quantum theories of gravity such as loop quantum gravity (which I work on) that does the trick. There are no infinitely small points where density can become infinite. Space is composed of individual units, or quanta, which are small but finite. Falling matter can squeeze into a super-dense state, called a Planck star, but no more. And then? Then matter can do what matter commonly does at the end of a fall: bounce.”

Source: *New Scientist*, Dec. 15, 2018. “If you think black holes are strange, white holes will blow your mind.”

Biology

Health & Medicine

Date: December, 2018

Source: *New Scientist*

Gene-Edited Babies Born

A Chinese scientist has announced that he had created twin babies whose genes had been edited using the CRISPR gene-editing technique. He Jianku defended his experiment in the face of widespread condemnation by other geneticists who considered that “it would be irresponsible to proceed with any clinical use of embryo editing until safety issues — which can include unwanted changes to DNA — have been resolved” (*New Scientist*).

“While some researchers have used CRISPR to edit human embryos, these have all been destroyed. He is the first scientist to implant any into a uterus to cause pregnancy. The resulting babies could be the first humans to one day pass on intentional mutations to their own children” (*New Scientist*).

The Chinese scientist explained during the 2nd International Summit on Human Genome Editing in Hong Kong that he recruited eight HIV-positive males who had HIV-negative partners for the experiment. He disabled the CCR5 gene, which makes a protein that allows HIV to infect cells. He said that he felt proud of his work.

In the meantime, China’s vice minister for science and technology, Xu Nanping, said that this experiment “blatantly violated China’s relevant laws and regulations,” and that he had ordered the trial to be stopped and

the scientists to be investigated.

Source: *New Scientist*, Dec. 15, 2018, "The gene editing revelation that shocked the world."

Social Sciences
Psychology

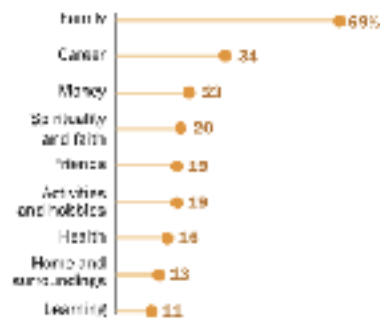
Date: November, 2018

Source: Pew Research Center

Source of Life's Meaning for Americans

Americans most likely to mention family when describing what provides them with a sense of meaning

In an open-ended question, 55 of Americans who mention what provides them with a sense of meaning



Source: Survey conducted Sept. 8-11, 2017, among U.S. adults. "Where Americans Find Meaning in Life."

PEW RESEARCH CENTER

Pew Research Center found that Americans consider the family as the main source of meaning in their lives. In a survey conducted in late 2017 and published Nov. 20, 2018, the top six things that the respondents were family, career, money, spirituality and faith, friends and activities and hobbies.

Source: Pew Research Center, November 20, 2018, <http://www.pewforum.org/2018/11/20/where-americans-find-meaning-in-life/s>

Technology
Earth Sciences

Date: November, 2018

Source: *New Scientist*

Electric Plane With No Moving Parts Raises Hopes for Clean Air Travel

A new kind of plane has been developed by a team of inventors in the Massachusetts Institute of Technology which does not use propellers or jets engines. It uses electrodes on its wings to produce ions that push against the surrounding air. The first unmanned small plane flew for 12 seconds at a distance of 55 meters.

"The idea of producing aircraft thrust via an electric field, known as electroaerodynamics, was first explored in the 1960s. Electrodes are used

to create an electric discharge that produces electrically charged atoms or molecules in the air. An electric field then accelerates these ions towards the back of the plane. Collisions with air molecules produce a thrust force in the opposite direction, pushing the plane forwards” (*New Scientist*).

The plane had a wingspan of 5 meters, weighs 2.45 kilograms, but “it produces more thrust per unit of power than a standard jet engine.” The problem it faces is an efficient battery that would not be too heavy. Lynnette Dray at University College London estimates that “it will be at least 30 years before batteries can get even a small passenger jet, such as a Boeing 737, into the air.

Note: H. P. Blavatsky wrote of the advanced technology of the Atlanteans that including “flying vehicles” from which the Hindus derived their knowledge.

“It is from the Fourth Race that the early Aryans got their knowledge of “the bundle of wonderful things,” the Sabha and Mayasabha, mentioned in the Mahabharata, the gift of Mayasur to the Pandavas. It is from them that they learnt aeronautics, Vriwan Vidya (the “knowledge of flying in air-vehicles”), and, therefore, their great arts of meteorography and meteorology.” (SD vol. 2, p. 426)

She wrote also of their knowledge of a force which was rediscovered by John Kelly and which Bulwer Lytton described as “vril.” Such a force, she says:

“. . . is the terrible sidereal Force, known to, and named by the Atlanteans MASH-MAK, and by the Aryan Rishis in their Ashtar Vidya by a name that we do not like to give. It is the vril of Bulwer Lytton’s “Coming Race,” and of the coming races of our mankind. The name vril may be a fiction; the Force itself is a fact doubted as little in India as the existence itself of their Rishis, since it is mentioned in all the secret works.

“It is this vibratory Force, which, when aimed at an army from an Agni Rath fixed on a flying vessel, a balloon, according to the instructions found in Ashtar Vidya, reduced to ashes 100,000 men and elephants, as easily as it would a dead rat. It is allegorised in the Vishnu Purâna, in the Râmâyana and other works, in the fable about the sage Kapila whose glance made a mountain of ashes of King Sagara’s 60,000 sons,” and which is explained in the esoteric works, and referred to as the Kapilaksha—“Kapila’s Eye.” (SD vol. 2, p. 563)

Source: *New Scientist*, Nov. 24, 2018

Physics
Psychology

Date: January, 2018

Source: *Quartz*

The Idea that Everything is Conscious is Gaining Academic Credibility

Panpsychism is the view that consciousness permeates all reality. “Rather than being just a unique feature of human subjective experience, it’s the foundation of the universe, present in every particle and all physical matter” (Olivia Goldhill, *Quartz*, Jan. 27, 2018).

The panpsychist’s view, says Goldhill, “is increasingly being taken seriously by credible philosophers, neuroscientists, and physicists, including figures such as neuroscientist Christof Koch and physicist Roger Penrose.”

“Consciousness is a fundamental feature of physical matter; every single particle in existence has an “unimaginably simple” form of consciousness, says Goff. These particles then come together to form more complex forms of consciousness, such as humans’ subjective experiences. This isn’t meant to imply that particles have a coherent worldview or actively think, merely that there’s some inherent subjective experience of consciousness in even the tiniest particle.”

“Interest in panpsychism has grown in part thanks to the increased academic focus on consciousness itself following on from Chalmers’ “hard problem” paper. Philosophers at NYU, home to one of the leading philosophy-of-mind departments, have made panpsychism a feature of serious study. There have been several credible academic books on the subject in recent years, and popular articles taking panpsychism seriously.”

“Consciousness is a fundamental feature of physical matter; every single particle in existence has an ‘unimaginably simple’ form of consciousness, says Goff. These particles then come together to form more complex forms of consciousness, such as humans’ subjective experiences. This isn’t meant to imply that particles have a coherent worldview or actively think, merely that there’s some inherent subjective experience of consciousness in even the tiniest particle.”

Note: H.P. Blavatsky in her The Secret Doctrine, states:

“Everything in the Universe, throughout all its kingdoms, is conscious: i.e., endowed with a consciousness of its own kind and on its own plane of perception. We men must remember that because we do not perceive any signs — which we can

recognise — of consciousness, say, in stones, we have no right to say that no consciousness exists there. There is no such thing as either “dead” or “blind” matter, as there is no ‘Blind’ or ‘Unconscious’ Law.” (SD vol. I, p. 274)

Source: Quartz, Jan. 27, 2018, <https://qz.com/1184574/the-idea-that-everything-from-spoons-to-stones-are-conscious-is-gaining-academic-credibility/>

Space Sciences
Earth Sciences

Date: October, 2018

Source: *Inverse*

China Orbiting a Second “Moon” to Save Money

China plans to send an artificial moon in 2020 to replace the streetlights of Chengdu. This was announced by Wu Chunfeng, Chairman of Chengdu Aerospace Science and Technology Microelectronics System Research Institute. According to him, the satellite will have eight times the brightness of the moon and will have a “dusk-like glow” that can illuminate an area of 50 miles. The Institute hopes that the satellite will contribute the equivalent of 20 billion yuan (US\$2.9 billion) within five years after launch.

This is not the first attempt at such an idea. In 1993, Russia launched a 65-foot aluminum space mirror that reflected sunlight to the Earth, but on earth it only looked like a bright star in the sky.

Source: Inverse, October 17, 2018. https://www.inverse.com/article/49977-china-space-moon-streetlights?utm_campaign=science-innovation-2018-10-18&utm_medium=inverse&utm_source=newsletter

Education

Date: September, 2018

Source: *Straits Times*

Singapore Abolishes Ranking in Schools

Singapore’s Ministry of Education announced on Sept. 28, 2018, that ranking will no longer be included in the report card of the student. Other information that will now be excluded are class and level mean, minimum and maximum marks, or underlining or coloring of failing marks. The Minister of Education Ong Ye Kung said that this shows students that “learning is not a competition.”

The Ministry also announced that all examinations for Primary 1 and 2 pupils will be removed. Assessments will not be counted for an overall grade. Instead, qualitative descriptors will be used instead of marks and grades.

Note: Theosophical schools do not use ranking and comparison to motivate students. They are encouraged to pursue excellence, which means being the best of what they can be, without comparing them to other students. Within the schools, therefore, there are no contests or competitions where students are pitted against each other.

Source: *Straits Times*, Sept. 28, 2018, https://www.straitstimes.com/singapore/education/learning-is-not-a-competition-no-more-1st-2nd-or-last-in-class-for-primary-and&xtor=CS1-10?utm_source=facebook&utm_medium=social-media&utm_campaign=addtoany

Archaeology History

Date: February, 2018

Source: BBC

Mayan Structures Found under Jungle of Guatemala

A vast network of Mayan buildings or structures were found in the jungles of Guatemala. Using a laser device called Lidar (light detecting and ranging), archaeologists were able to detect about 60,000 ruins under the forest canopy.

Researchers previously estimated that the Mayan people had a population of five million about 1,500 years ago. According to archeologist Franciso Estrada-Belli, “With this new data it’s no longer unreasonable to think that there were 10 to 15 million people there, including many living in low-lying, swampy areas that many of us had thought uninhabitable.” (BBC)

Note: The Secret Doctrine refers to the work of Auguste le Plongeon “Sacred Mysteries among the Mayas and the Quiches, 11,500 years ago”, who showed the identity between the Egyptian rites and beliefs and those of the people he described. The ancient hieratic alphabets of the Maya and the Egyptians are almost identical.

H.P.B. suggests that there was an ancient connection between the Central American peoples, the Mayas and other races, and the Egyptians by means of a connecting Atlantis.

Source: BBC, Feb. 2, 2018, https://www.bbc.com/news/world-latin-america-42916261?intlink_from_url=http://www.bbc.com/news/topics/c1038wnxyy0t/archaeology&link_location=live-reporting-story

Psychology
Technology

Date: April, 2018

Source: *New Scientist*

Google with your Mind

Two scientists at the Massachusetts Institute of Technology has developed a device that could detect what one is thinking, send Google queries and get replies from the Internet.

Arnav Kapur and Pattie Maes, the developers, called it AlterEgo, consisting of a headset that puts sensors in seven areas on the cheeks, jaw and chin, and which detects signals in these speech-related areas. In a demonstration with *New Scientist* writer Chelsea Whyte, Kapur was asked several questions such as the population of Santiago, Chile, the square root of 360,005 and the product of two large numbers. Kapur just repeated the questions in his mind. The computer responded with the correct answers. In a test with eight people, AlterEgo could recognize words and numbers with 90% accuracy.

AlterEgo is just one of several artificial intelligence softwares being developed to read thoughts through brain waves or nerve signals. The implications can be alarming. The technology now is still in its infancy, but it seems only a matter of time before such devices can really read our thoughts with high accuracy.

Source: *New Scientist*, April 7-13, 2018

Biology
Health & Medicine

Date: April, 2018

Source: *New Scientist*

Creating Babies with no Egg or Sperm

A number of discoveries and researches have opened up the possibility of making babies without the use of egg or sperm from the parents. A bioengineer of the Massachusetts Institute of Technology, Yue Shao, published in 2017 his findings when he was still at the University of Michigan that the cells he was working with seemed to have assembled themselves into what appeared to be early-stage human. A year before that, Japanese researchers in Kyoto University were able to produce mice babies from eggs that were made from adult skin cells.

This has important implications on the possibility of having babies for people who are infertile. Coupled with growing research on the possibility of letting the fetus grow outside the body using artificial sacs, a new way of reproduction seems no longer remote.

Hank Greely, a bioethicist and lawyer at Stanford University in California, said, "My guess is this would be a major way of having babies

100 years from now.”

Note: H. P. Blavatsky's The Secret Doctrine spoke of various modes of reproduction, one of which is the following: "a kind of Parthenogenesis, "virginal reproduction," when the egg-cells are formed within the body, issuing from it in atomic emanations and becoming matured outside of it" (SD vol. 2, p. 657)

Source: *New Scientist*, April 14-20, 2018

Physics

Biology

Psychology

Date: December, 2018

Source: *Psychology Today*

Human Senses Can Directly Observe the Quantum

The human senses have been found to be capable of detecting objects in the quantum level that they may one day be the answer to many questions about physics.

The human eye, for example, has been found to be capable of perceiving single photons of light including “radical aspects of the quantum nature of light, especially superposition and quantum entanglement/non-locality” (*Psychology Today*). According to Rebecca Homes, a physicist of the Los Alamos National Laboratory, results of such studies could produce “evidence of something is going on beyond standard quantum mechanics.” One team of researchers include quantum physicist Paul Kwiat and Nobel Prize winner Anthony Leggett.

Human hearing has similar remarkable capacities. Biophysicist A. J. Hudspeth of Rockefeller University says: “The healthy human cochlea is so sensitive that it can detect vibration with amplitude less than the diameter of an atom, and it can resolve time intervals down to 100ps [or millionths of a second] . . . The human ear detects energy levels 10-fold lower than the energy of a single photon in the green wavelength.”

Human touch is also able to discriminate to the nanoscale [billionths of a meter]. Human smell can discriminate over one trillion olfactory stimuli.

Researchers have found that some people, especially in Asian cultures (Tibetan, Indian and East Asian), have been training themselves to directly perceive fundamental properties of nature. “In [William] Bushell’s own research into the sensory-perceptual abilities of highly advanced, long-term, adept practitioners of special forms of observational meditation, he began to realize that some of these practitioners were actually specifically and explicitly attempting to study

light with their own highly trained visual capacities including attempting to perceive the most elementary, fundamental ‘partless particles’ of light.”

Note: Theosophy speaks of the human capacity to perceive things outside of normal modes of perception. This is also confirmed in yogic teachings, such as “anima” or the capacity to see atomic or subatomic objects. These however differ from the faculties of the senses mentioned above.

Sources: *Psychology Today*, “Experiments Suggest Humans Can Directly Observe the Quantum,” by William C. Bushell and Maureen Seaberg, Dec. 5, 2018, <https://www.psychologytoday.com/us/blog/sensorium/201812/experiments-suggest-humans-can-directly-observe-the-quantum>

Education Psychology

Date: November, 2018

Source: *Psychology Research and Behavior Management, Science Daily*

Yoga and Mindfulness Improve Emotional Health of Third-Graders

A study made by Tulane University showed that third graders who manifest anxiety were helped in their well-being and emotional health after practicing yoga and mindfulness activities.

A group of 20 students underwent special yoga practice while a control group of 32 students underwent the usual school care including counseling. The yoga practice included breathing exercises, guided relaxation and yoga postures. The researchers used two instruments to assess the change in the students: the Brief Multidimensional Students’ Life Satisfaction Scale-Peabody Treatment Progress Battery version and the Pediatric Quality of Life Inventory.

“The intervention improved psychosocial and emotional quality of life scores for students, as compared to their peers who received standard care,” said principal author Alessandra Bazzano, associate professor of Global Community Health and Behavioral Sciences at Tulane University School of Public Health. “We also heard from teachers about the benefits of using yoga in the classroom, and they reported using yoga more often each week, and throughout each day in class, following the professional development component of intervention.”

Note: Theosophical schools make meditation and mindfulness part of the education of students, starting from preschool levels. For very small kids, it is called “observing silence,” and more formal exercises on meditation are taught to higher level students. In addition, they are taught self-awareness processing of their

internal states, such as stress or emotional distress. These have been found to be very effective in removing internal distresses such as anxiety, depression, resentment, hurt, etc.

Sources: www.sciencedaily.com/releases/2018/04/180410100919.htm

Alessandra N Bazzano, Christopher E Anderson, Chelsea Hylton, Jeanette Gustat. **Effect of mindfulness and yoga on quality of life for elementary school students and teachers: results of a randomized controlled school-based study.** *Psychology Research and Behavior Management*, 2018; Volume 11: 81
DOI: 10.2147/PRBM.S157503

*Psychology
Social Sciences*

Date: February, 2018

Source: *Scientific American*

A Happy Life May Not Be a Meaningful Life

Studies show that people distinguish between a happy life and a meaningful life. While the two are correlated, they are not the same.

For example, people who have money can fulfill their desires and may describe themselves as happy. However, wealth seems to make little difference in having a meaningful life. This was confirmed by another study that shows that people in more economically advanced countries tend to be happier, but they found life less meaningful, as compared to people from poorer countries.

Spending time with friends make bring about happiness, but not meaningfulness. On the other hand, spending time with loved ones (such as family) is perceived as meaningful even if not necessarily happy.

In her article in the *Scientific American*, Stanford University researcher Daisy Grewal concludes:

“The findings suggest that pure happiness is about getting what we want in life—whether through people, money, or life circumstances. Meaningfulness, in contrast, seems to have more to do with giving, effort, and sacrifice. It is clear that a highly meaningful life may not always include a great deal of day-to-day happiness. And, the study suggests, our American obsession with happiness may be intimately related to a feeling of emptiness, or a life that lacks meaning.”

Note: Theosophical teachers, while recognizing happiness as a prerequisite to the higher life, regarding something higher than personal happiness as important. H. P. Blavatsky wrote that "Occultism is not . . . the pursuit of happiness as man understands the word; for the first step is sacrifice, the second

renunciation" (Blavatsky, Collected Writings, 8:14). At the same time, classic treatises such as Light on the Path states that: "Kill out desire of comfort . . . but be happy as those are who live for happiness."

Source: Scientific American, Feb. 18, 2014, <http://completeintelligence.com/wp-content/uploads/A-Happy-Life-May-Not-Be-a-Meaningful-Life.pdf>

Biology
Earth Sciences
Space Sciences

Date: October, 2018

Source: *National Geographic Magazine*

Life Found Thriving 2,000 Feet Underground

Cyanobacteria have been found to be living 2,000 feet underground where there is hardly any sunlight, water and nutrients. These bacteria seem to thrive anywhere (desert, oceans and space stations) and they had been responsible for providing oxygen into the atmosphere.

This has relevance to the search for life in other planets, such as in Mars, where an underground lake was recently discovered.

Source: *National Geographic Magazine*, Oct. 1, 2018, https://www.nationalgeographic.com/science/2018/10/news-cyanobacteria-photosynthesis-mars-extraterrestrial-life/?cmpid=org=ngp::mc=crm-email::src=ngp::cmp=editorial::add=inside_20181008::rid=19323013

Education

Date: October, 2018

Sources: *Journal of Education for Students Placed at Risk;*
Science Daily

Relationships More Important Than Funding in Improving Schools

A study in Michigan, U.S.A., found that the network of relationships among school officials, teachers, parents and the community has three- to five-times higher impact than funding or financial capital. Such relationships are usually termed "social capital."

The study covered 5,003 students and their teachers in 78 schools, where the teachers were asked to complete a questionnaire on relationships and involvement of the community in school matters. They got data on financial cost per student from state data. Then they compared these to the student performance of the students in state tests to measure learning.

Roger Goddard, co-author of the study, found that "Social capital was not only more important to learning than instructional expenditures, but also more important than the schools' poverty, ethnic makeup or prior

achievement.”

He further said, “Sustained interactions over time focused on children's learning and effective teaching practice are the best way for people to build trust and build networks that are at the heart of social capital. We need intentional effort by schools to build social capital. We can't leave it to chance.”

Note: Theosophical schools consider parental involvement as crucial for the growth and development children. The schools therefore sponsor events or programs where the parents are present, and parenting seminars are conducted for them. The parents are also asked to come and have conference with teachers on a one-on-one basis to discuss concerns, talents and potentials of the children.

Sources: Serena J. Salloum, Roger D. Goddard, Dan Berebitsky. Resources, Learning, and Policy: The Relative Effects of Social and Financial Capital on Student Learning in Schools. *Journal of Education for Students Placed at Risk (JESPAR)*, 2018; 1 DOI: [10.1080/10824669.2018.1496023](https://doi.org/10.1080/10824669.2018.1496023)

Science Daily, October 25, 2018, “Why relationships -- not money -- are the key to improving schools: Study finds social capital has 3-5 times the impact of funding.” 25 October 2018. <www.sciencedaily.com/releases/2018/10/181025103300.htm>.

Physics

Date: September, 2018

Source: *Quanta Magazine*

“Quantum Atmospheres” May Reveal Secrets of Matter

The quantum properties of a material may extend into a “quantum atmosphere” that surrounds it and have led physicists to find new phases of matter beyond the solid, liquid and gas phases that we commonly know. This is a new theory proposed by the 2014 Nobel Prize in Physics winner Frank Wilczek of the Massachusetts Institute of Technology in a paper written together with Qing-Dong Jiang, a physicist of Stockholm University.

They propose to probe into the thin aura that surrounds materials which they term the quantum atmosphere which could manifest basic quantum properties that can be extraordinary. This could be tool for exploring new materials. For example, some materials can have magnetic monopoles, point-like magnets with a north pole but not south pole. Another unusual material is the topological insulator, where on the surface the electrons flow, but on the inside the electrons are immobile. Thus it acts as a conductor on the outside but is an insulator on the inside. It has

potential use in quantum computers. “They seem very innocent,” says Wilczek, “but somehow they’ve been hiding in secret.”

Note: Theosophical literature have postulated that physical matter has additional states to the three commonly known (solid, liquid, and gaseous) before science came to make the same discovery. H. P. Blavatsky called these “ethereal,” while Annie Besant and C. W. Leadbeater called them “etheric.” In their book Occult Chemistry, these etheric states are the result of breaking down atoms into the more fundamental particles that compose them. In modern science, this is the field of research of quantum physics.

Source: Quanta magazine, Sept. 25, 2018, <https://www.quantamagazine.org/quantum-atmospheres-may-reveal-secrets-of-matter-20180925/>