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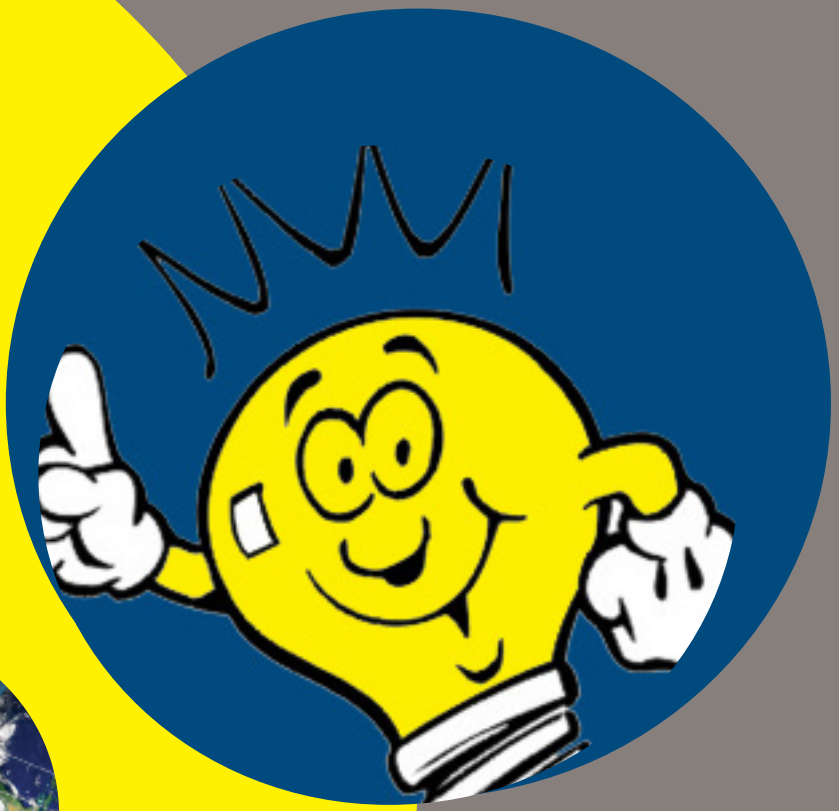

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EN - Editorial

Why look for conspiracy when stupidity can explain so much?

Johann Wolfgang von Goethe

Dear readers,

Back in the Middle Ages things were pretty simple: You fell sick, you called in the local priest to read some prayers over you, but at some point you died. It was obvious that God loved you so much that he wanted you in heaven. If you were an alchemist, you'd be looking for the philosopher's stone, trying to turn base metals into gold. You'd try mixing different substances together and, if you survived, you'd either discover the sought for mixture or move on to try something else. There would be no suits for medical malpractice or scientific scrutiny and criticism of your chemical methodology because nobody else knew any better.

One would expect that, thanks to scientific progress, things would be much more different today and, in fact, they are. Our particle accelerators are peering deeper into the quantum cosmos while different types of telescopes uncover the secrets of the macro-universe. Vaccines and medical advances have eradicated some of the deadliest diseases that used to kill people by the thousands in the not so distant past while engineers build better, faster, more useful, and more eco-friendly machines that improve everyday life on our planet right now, not in some vague future. There is just one thing that hasn't changed and that's the human mind and the shackles of sciolism under which it has lain since the beginning of time.

Those of you who are unfamiliar with the traditional term sciolism are probably aware of one of its outcomes: pseudoscience. According to the British Dictionary, sciolism is "the practice of opinionating on subjects of which one has only superficial knowledge" and its origin can be traced back to Late Latin sciolus, which was a term used to refer to someone with a smattering of knowledge.

RO - Editorial

Neînțelegerea și neglijența cauzează mai multe neplăceri în lume decât reaua voință și răutatea

Johann Wolfgang von Goethe

Dragi cititori,

În Evul Mediu lucrurile stăteau destul de simplu: dacă erai bolnav, chemai preotul să citească niște rugăciuni pentru tine, dar la un moment dat mureai. Era evident că Dumnezeu te-a iubit atât de mult încât te-a vrut în ceruri. Dacă ai fi un alchimist, ai fi în căutarea pietrei filozofale, încercând să transformi metalele de bază în aur. Ai încerca amestecarea substanțelor diferite și, dacă ai supraviețui, ai descoperi fie un amestec sau ai trece la a încerca altceva. Nu ar exista procese pentru malpraxis medical sau control științific și critică a metodologiei tale chimice pentru că nimeni altcineva nu ar ști mai bine.

Ar fi de așteptat ca, datorită progresului științific, lucrurile să fie mult mai diferite astăzi și, de fapt, ele sunt.

Acceleratoarele de particule pătrund mai adânc în cuantumul cosmic în timp ce diferite tipuri de telescoape descoperă secretele macro-universului. Vaccinuri și descoperiri medicale au eliminat unele dintre cele mai grave boli care în trecutul nu atât de îndepărtat ucideau oameni cu miile în timp ce inginerii construiesc mai bine, mai rapid, mai util, și mai multe mașini ecologice care îmbunătățesc viața de zi cu zi pe planeta noastră chiar acum, nu într-un viitor vag. Există doar un singur lucru care nu s-a schimbat și anume mintea umană și cătușele sciolism- ului sub care a zăcut de la începutul timpului.

Aceia dintre voi care sunt nefamiliarizați cu termenul tradițional de sciolism sunt, probabil, conștienți de unul dintre rezultatele sale: pseudoștiința. Potrivit dicționarului britanic, sciolismul este "practica de a inocula idei subiecților care au doar cunoștințe superficiale", iar originea sa poate fi localizată în termenul latin sciolus, care a fost un termen folosit pentru a se referi la cineva cu o brumă de cunoștințe.

Pseudoscience, on the other hand, is “a discipline or approach that pretends to be or has a close resemblance to science” but, of course, has no scientific basis at all. In fact, pseudoscience has a closer affinity to superstition rather than science.

In the past, pseudoscience could be explained away as comprising the remnants of ancient practices that eventually evolved into what we actually call sciencetoday. For example, astrology arose out of man’s inner need to examine the wonders that could be observed in the heavens above and make associations that would help make sense of what occurred on the earth below. As soon as the nature of the celestial phenomena began to be understood, the foundations of modern astronomy were laid and astrology became just a lackey that tried to adapt scientific discoveries to a philosophical system which could not avoid but slip farther and farther away from the observable universe every time an astronomical advancement was confirmed.

Nowadays, the pseudoscience that plagues the worldwide web, our social media, and the world of cheaply available paperback publications arises in a much more complex way.

The deluge of information that rages all around us in our TV sets, our car radio, the tablet we grab when we need a moment to relax, our mobile smart phones with their internet connectivity, and, last but not least, the computer screens that open up a brand new world through games, applications, multimedia presentations, and a whole lot more mystify our minds with a veil of data that seems to create the impression of knowledge or, even worse, understanding. Unfamiliar with the scientific methodology and principles, yet confident enough to word hypotheses and draw conclusions, modern sciolists misuse the jargon they picked up on line to formulate scientific sounding statements that capture the impressionable mind even though they cannot stand to pass the simplest verification process.

Phrases like “energy field”, “life force”, “detoxification”, “dialysis” and more are misused on a daily basis to create the impression of authenticity and validity. Incompatible arguments or theories are merged to create a system of thought that can neither be tested nor confirmed. And, whenever discrepancies or outright mistakes in these theories are pointed out, the critics are swiftly silenced with personal attacks or the remonstration that they are not “open-minded” enough.

Pseudoștiința, pe de altă parte, este «o disciplină sau o abordare care pretinde a fi sau are o asemănare apropiată de știință», dar, desigur, nu are nici o bază științifică. De fapt, pseudostiinta are o afinitate mai aproapiată de superstiție, decât de știință.

In trecut, pseudoştiinţa ar putea fi definită ca și cuprinzând resturile de practici antice care au evoluat în cele din urmă în ceea ce noi numim de fapt știință azi. De exemplu, astrologia a apărut din nevoia interioară a omului de a examina minunile care au putut fi observate pe bolta cerească și de a face asocieri care ar ajuta la a dezvălui un sens al evenimentelor petrecute pe pământ. De îndată ce natura fenomenelor cerești au început să se înțeleagă, bazele astronomiei moderne au fost stabilite și astrologia a devenit doar un lacheu care a încercat să se adapteze la descoperirile științifice, la un sistem filozofic care nu a putut evita distanțarea graduală de universul observabil de fiecare dată când un progres astronomic a fost confirmat.

În prezent, pseudoştiinţa care împânzește web-ul la nivel mondial, mass-media noastră socială, și lumea publicațiilor disponibile ieftin, apare într-un mod mult mai complex. Potopul de informații care se dezlănțuie peste tot în jurul nostru, în momentul când urmărim posturile noastre de televiziune, radio-ul din maşina noastră, tableta pe care o luăm atunci când avem nevoie de un moment de relaxare, telefoanele noastre inteligente cu conectivitate la internet, și, nu în ultimul rând, ecranele de computer care deschid o nouă lume prin jocuri, aplicații, prezentări multimedia, precum și multe altele, mistifică mintea noastră cu un văl de date, care pare să creeze impresia de cunoaștere sau, chiar mai rău, înțelegere.

Nefamiliarizați cu metodologia și principiile științifice, dar suficient de încrezători pentru a formula ipoteze și a trage concluzii, scioliștii moderni folosesc eronat jargonul preluat online pentru a formula declarații de rezonanță științifică ce surprind mintea impresionabilă, chiar dacă acestea nu pot trece cel mai simplu proces de verificare. Expresii ca «câmp energetic», “forța de viață”, “detoxifiere”, “dializa”, sunt flosite incorect zi de zi pentru a crea impresia de autenticitate și valabilitate. Argumente sau teorii incompatibile sunt unite pentru a crea un sistem de gândire care nu poate fi nici testat, nici confirmat. Și, ori de câte ori discrepanțe sau greșeli simple în aceste teorii sunt evidențiate, criticii sunt rapid reduși la tăcere cu atacuri personale sau reproşuri că aceștia din urmă nu sunt suficient de «open-minded».

In the midst of such misrepresentation of science and lack of understanding of basic scientific principles, it is a great relief to realize that there is still hope in the new generation of scientists that persists in formulating hypotheses, designing experiments, collecting data, interpreting results, drawing conclusions, and publishing their thoughts in the European Pupils Magazine. Since *bona fortuna* brought us together in this endeavor, let's "detox" ourselves from the sciolism and pseudoscience that permeate our everyday lives and sail off into the scientifically enlightenedworld that lays before us thanks to the ideas and efforts of the budding scientists who submitted contributions to this latest issue of EPM.

În mijlocul unei astfel de denaturare a științei și a lipsei de înțelegere a principiilor științifice de bază, este o mare ușurare a realiza că încă mai există speranță în noua generație de oameni de știință care persistă în formularea de ipoteze, proiectarea experimentelor, colectarea de date, interpretarea rezultatelor, în a trage concluzii, și a publica gândurile lor în Revista EPM. Din moment ce bona fortuna ne-a adus împreună în acest efort, haideți să ne «dezintoxicăm» de sciolism și pseudoștiință care pătrund în viața noastră de zi cu zi și să navigăm în lumea științifică veritabilă care ne este dezvăluită datorită ideilor și eforturilor oamenilor de știință care au depus contribuții în acest ultim număr al EPM.

BG - Editorial

Недоразуменията и пренебрегването са донесли повече зло на света, са донесли повече зло на света,

Йохан Волфганг фон Гьоте

Уважаеми читатели,

В Средновековието нещата бяха доста прости: Вие се разболявате, извиквате местния свещеник да прочете някои молитви над вас, но в един момент вие умирате. Очевидно бе, че Бог те обича толкова много, че сте иска в небето. Ако сте били алхимик, бихте търсил философския камък, опитвайки се да превърнете неблагородните метали в злато. Ще се опитвате смесване на различни вещества и, ако е сте оцелял, ще откриете търсената смес или ще преминете към опитам нещо друго. Няма да има изследвания за медицински злоупотреби или научен контрол и критика на вашия химична методика, защото никой друг не я познава по-добре.

Можеше да се очаква, че, благодарение на научния прогрес, нещата ще бъдат много по-различни днес, и в действителност, те са. Нашите ускорители на частици проникват дълбоко в квантовия космос, а различни видове телескопи разкриват тайните на макро-вселената.

GR - Editorial

Γιατί να ψάχνουμε για συνωμοσίες όταν η ανοησία μπορεί να εξηγήσει τόσα πολλά;

Γιόχαν Βόλφγκανγκ Γκαίτε

Αγαπητοί αναγνώστες,

Κατά το Μεσαίωνα τα πράγματα ήταν σχετικά απλά: Ασθενούσες, καλούσες τον τοπικό ιερέα να σε «διαβάσει», αλλά κάποια στιγμή πέθαινες. Ήταν προφανές πως ο Θεός σε αγαπούσε τόσο πολύ ώστε σε ήθελε στον ουρανό. Αν ήσουν αλχημιστής, θα αναζητούσες τη φιλοσοφική λίθο, προσπαθώντας να μετατρέψεις συνηθισμένα μέταλλα σε χρυσό. Θα προσπαθούσες να αναμείξεις διάφορες ουσίες και, αν επιζούσες, είτε θα ανακάλυπτες την ουσία που αναζητούσες είτε να συνέχιζες τις προσπάθειές σου. Δεν υπήρχαν αγωγές για ιατρικά σφάλματα ούτε επιστημονικός έλεγχος ή κριτική επί της χημικής μεθοδολογίας που ακολουθούσες καθώς κανένας άλλος δεν γνώριζε κάτι περισσότερο από εσένα.

Θα ανέμενε κανείς πως, χάρη στην επιστημονική πρόοδο, τα πράγματα θα είχαν βελτιωθεί σήμερα και, πραγματικά, έτσι έχει γίνει. Οι επιταχυντές σωματιδίων φτάνουν βαθύτερα στο κόσμο της κβαντικής φυσικής, ενώ διαφορετικά είδη τηλεσκοπίων αποκαλύπτουν τα μυστικά του μακρόκοσμου.

Ваксини и напредъка на медицината са ликвидирали някои от най-смъртоносните болести, които са убивали хора с хиляди в не толкова далечното минало, докато инженери изграждат по-добри, по-бързи, по-полезни и по-екологични машини, които подобряват всекидневния живот на нашата планета точно сега, а не в някакво неясно бъдеще. Има само едно нещо, което не се е променило и това е човешкият ум и оковите на дилетантство, под които то е лежало открай време.

Тези от вас, които не са запознати с традиционното наименование дилетантство вероятно са наясно с един от неговите резултати: псевдонауката. Според британския речник, дилетантство е "практиката на мнения по теми, от които някой има само повърхностни познания" и неговия произход може да бъде проследен до късния латински sciolus, който е термин, използван за обозначаване на човек с повърхностни познания. Псевдонауката, от друга страна, е "една дисциплина или подход, който претендира да бъде или е с близка прилика с науката", но, разбира се, няма научна основа. В действителност, псевдонауката има по-тесен афинитет към суеверието, а не към науката.

В миналото, псевдонауката може да бъде обяснена, като съдържаща останките от древни практики, които в крайна сметка се превърнали в това, което ние всъщност наричаме наука днес. Например, астрологията идва от вътрешната потребност на човека да разгледа чудесата, които могат да бъдат наблюдавани в небето горе и да прави асоциации, които биха помогнали да има смисъл от това, което е станало на земята долу. Веднага след като естеството на небесните явления започна да се разбира, основите на съвременната астрономия бяха положени и астрологията се превърна просто в лакей, който се опитваа да адаптира научни открития за философска система, което не може да се избегне, но се приплъзва далеч и по-далеч от наблюдаемата Вселена всеки път, когато един астрономически напредък бъде потвърден.

В днешно време, псевдонауката, разяжда световната мрежа, нашата социална среда, и в света на евтино наличните публикации с меки корици възниква в много по-сложен вариант. Потопът на информация,

Τα εμβόλια και η εξέλιξη της ιατρικής έχουν εξαλείψει κάποιες από τις πιο θανατηφόρες ασθένειες που θέριζαν ανθρώπους κατά χιλιάδες στο πρόσφατο παρελθόν ενώ οι μηχανικοί σχεδιάζουν μηχανές που είναι καλύτερες, ταχύτερες, χρησιμότερες, και πιο φιλικές προς το περιβάλλον, βελτιώνοντας την καθημερινή μας ζωή αυτήν ακριβώς τη στιγμή, όχι σε κάποιο ασαφές μέλλον. Υπάρχει μόνο ένα πράγμα που δεν έχει αλλάξει και αυτό είναι το ανθρώπινο μυαλό και τα δεσμά τη ημιμάθειας υπό την οποία υποφέρει από την αρχή του κόσμου.

Όσοι δεν γνωρίζουν τον όρο ημιμάθεια (sciolism) είναι πιθανότατα εξοικειωμένοι με ένα από τα αποτελέσματά της: την ψευδεπιστήμη. Σύμφωνα με το Βρετανικό Λεξικό, με τον όρο ημιμάθεια (sciolism) αναφερόμαστε «στην έκφραση γνώμης επί αντικειμένων για τα οποία έχει κανείς μόνο επιφανειακή γνώση» και η ετυμολογία της ανάγεται στη Μεσαιωνική Λατινική λέξη *sciolus*, που είναι ο όρος που χρησιμοποιούταν για κάποιον που διέθετε ελάχιστες γνώσεις. Ψευδεπιστήμη, από την άλλη, είναι "κλάδος ή προσέγγιση που εμφανίζεται να προσομοιάζει σε επιστήμη" αλλά, ασφαλώς, δεν έχει καμιά επιστημονική βάση. Στην πραγματικότητα, η ψευδεπιστήμη έχει στενότερη συνάφεια με τις προλήψεις παρά με την επιστήμη.

Κατά το παρελθόν, η ερμηνεία που δινόταν σχετικά με τις ψευδεπιστήμες ήταν πως αποτελούσαν απομεινάρια αρχαίων πρακτικών που σταδιακά εξελίχθηκαν στους κλάδους που ονομάζουμε σήμερα επιστήμες. Παραδείγματος χάριν, η αστρολογία εμφανίστηκε από την εσωτερική ανάγκη του ανθρώπου να ερευνήσει τα θαύματα που μπορούσε να παρατηρήσει πάνω στους ουρανούς και να τα ερμηνεύσει έτσι ώστε να νοηματοδοτήσει ότι συμβαίνει κάτω στη γη. Μόλις η φύση των ουρανίων φαινομένων άρχισε να γίνεται κατανοητή, τέθηκαν τα θεμέλια της σύγχρονης επιστήμης της αστρονομίας και η αστρολογία μετατράπηκε σε έναν απλό λακέ που προσπαθούσε να προσαρμόσει τις επιστημονικές ανακαλύψεις σε ένα φιλοσοφικό σύστημα το οποίο δεν μπορούσε παρά να παραπαίει όλο και πιο μακριά από το παρατηρήσιμο σύμπαν κάθε φορά που επιβεβαιωνόταν ένα νέο αστρονομικό επίτευγμα.

Τη σημερινή εποχή, οι ψευδεπιστήμες που μαστίζουν το διαδίκτυο, τα κοινωνικά μέσα, και τον κόσμο των φτηνών εκδόσεων ανακύπτουν μέσα από πιο περίπλοκες διαδικασίες. Η πλημμυρίδα πληροφοριών που μας κατακλύζει μέσω της τηλεόρασης, του ραδιοφώνου που έχουμε στο αυτοκίνητό μας, του τάμπλετ που χρησιμοποιούμε για να χαλαρώσουμε,

която бушува около нас в нашите телевизори, нашата кола, радиото, таблета, който вземете, когато имате нужда от време, за да се отпуснете, нашите мобилни смартфони с тяхната интернет свързаност, и не на последно място, компютърните екрани, които отварят чисто нов свят чрез игри, приложения, мултимедийни презентации, и много повече мистифицират умовете ни с воал от данни, които изглежда създават впечатление за знания или, още по-лошо, за разбиране.

Запознати с научната методология и принципи, но достатъчно уверени, за да формулират хипотези и да направят изводи, модерни дилетанти злоупотребяват с жаргона, който те публикуват онлайн, за да формулират научно звучащи изявления, които улавят впечатлителния ума, въпреки че те не могат да устоят на най-простия процес на проверка.

С фрази като “енергийно поле”, “жизнена сила”, “детоксикация”, “диализа” и др. се злоупотребява на дневна база, за да се създаде впечатление за автентичност и валидност.

Несъвместими аргументи или теории се обединяват, за да се създаде система на мисли, която не може нито да бъде тествана, нито потвърдена.

И всеки път, когато несъответствия или окончателни грешки в тези теории са посочени, критиците са бързо умълчани с лични нападки или демонстрация, че те не са “отворено мислещи” достатъчно.

В разгара на такива документи с невярно съдържание на науката и липсата на разбиране на основни научни принципи, е голямо облекчение да се разбере, че все още има надежда в новото поколение от учени, че продължава да съществува с формулирането на хипотези, проектиране на експерименти, събиране на данни, интерпретиране на резултатите, направени изводи и да публикува своите мисли в списанието на европейските ученици.

Тъй като добросъвестната Фортуна ни събра в това начинание, нека “детоксикацираме” себе си от дилетантство и псевдонаука, която прониква в ежедневието ни и отплаваме в научно осветения свят, който се открива пред нас, благодарение на идеите и усилията на начинаещите учени, които са дали принос към този последен брой на EP*M*.

των έξυπνων κινητών τηλεφώνων με τις δυνατότητες σύνδεσης στο διαδίκτυο και, τέλος, μέσω των οθονών των ηλεκτρονικών υπολογιστών που μας ανοίγουν έναν ολοκαίνουριο κόσμο παιχνιδιών, εφαρμογών, πολυμεσικών παρουσιάσεων, και πολλών άλλων συσκοτίζει το μυαλό μας με ένα πέπλο δεδομένων που μοιάζουν να δημιουργούν την εντύπωση της γνώσης ή, ακόμη χειρότερα, της κατανόησης. Καθώς δεν είναι εξοικειωμένοι με την επιστημονική μεθοδολογία και τις αρχές που τη διέπουν αλλά νοιώθοντας αρκετή αυτοπεποίθηση, ώστε να αρθρώσουν υποθέσεις και να συνάγουν συμπεράσματα, οι σύγχρονοι ημιμαθείς καταχρώνται την ορολογία που έχουν διαβάσει στο διαδίκτυο για να διατυπώσουν θεωρίες που ακούγονται επιστημονικές και συναρπάζουν κάθε ευκολόπιστο άτομο παρότι οι θεωρίες αυτές δεν μπορούν να αντέξουν ούτε στην απλούστερη διαδικασία επιστημονικής επαλήθευσης. Καθημερινά γίνεται κατάχρηση φράσεων όπως «ενεργειακό πεδίο», «δύναμη ζωής», «αποτοξίνωση», «διάλυση» κ.ά. προκειμένου να δημιουργηθεί η εντύπωση αυθεντικότητας και αξιοπιστίας. Ασύμβατα επιχειρήματα ή θεωρίες συγχωνεύονται για να δημιουργήσουν τέτοια συστήματα σκέψης που δεν μπορούν ούτε να ελεγχθούν ούτε να επιβεβαιωθούν. Και, όποτε επισημαίνονται αποκλίσεις ή εξόφθαλμα σφάλματα σε αυτές τις θεωρίες, όσοι ασκούν κριτική αναγκάζονται να σιωπήσουν με συνοπτικές διαδικασίες, είτε μέσω προσωπικών επιθέσεων είτε με το αντεπιχείρημα πως δεν είναι αρκετά «ανοιχτόμυαλοι».

Στο μέσον τέτοιας παραποίησης της επιστήμης και απουσίας κατανόησης βασικών επιστημονικών αρχών, αποτελεί μεγάλη ανακούφιση, όταν διαπιστώνει κανείς πως υπάρχει ακόμη ελπίδα στη νέα γενιά επιστημόνων που επιμένουν να διατυπώνουν υποθέσεις, να σχεδιάζουν πειράματα, να συλλέγουν δεδομένα, να ερμηνεύουν αποτελέσματα, να συνάγουν συμπεράσματα, και να δημοσιεύουν τις σκέψεις τους στο Περιοδικό των Ευρωπαίων Μαθητών. Καθώς, τύχη αγαθή, συναντηθήκαμε σε αυτή την προσπάθεια, ας «αποτοξινωθούμε» από την ημιμάθεια και την ψευδεπιστήμη που διαποτίζουν την καθημερινότητά μας και ας ανοίξουμε πανιά για τον επιστημονικά διαφωτισμένο κόσμο που κείται εμπρός μας χάρη στις ιδέες και τις προσπάθειες των εκκολαπτόμενων επιστημόνων που υπέβαλαν τις εργασίες τους σε αυτό το τελευταίο τεύχος του EPM.

IT- Editorial

A questo mondo l'Incomprensione e la pigrizia causano più errori dell'astuzia e della malvagità; o, perlomeno, queste ultime sono più rare

Johann Wolfgang von Goethe

Cari lettori,

Prima del Medioevo le cose erano semplici: tu cadevi ammalato, chiamavi il prete per recitare le preghiere per la tua guarigione e, nel frattempo, tu morivi. Era ovvio che Dio ti amava a tal punto da volerti con lui in Paradiso. Se tu fossi stato un alchimista, avresti cercato la *Pietra filosofale*, per trasformare metalli volgari in oro. Cercheresti di mescolare svariate sostanze tra di loro e, se fossi sopravvissuto, troveresti altre sostanze da mescolare oppure cercheresti qualcos'altro. Non potevano esserci accuse di malasanità, contestazioni o critiche per le tue metodiche, perché nessuno conosceva qualcosa di più.

Dato il notevole progresso scientifico, ci si aspetta che le cose siano molto differenti oggi e, infatti, lo sono. I nostri acceleratori di particelle studiano efficacemente il Cosmo quantico, mentre i nostri molteplici modelli di telescopi vanno scoprendo i segreti del macro universo. Vaccini e medicine avanzate hanno eliminato diverse tra le malattie mortali che uccidevano migliaia di persone fino a pochi anni fa, così come gli ingegneri costruiscono macchinari migliori, più velocemente ed eco-compatibili, che migliorano la nostra vita sul pianeta … e proprio oggi, non in un nebuloso futuro. C'è una cosa che non è cambiata: la mente umana e le sue limitazioni cognitive, con le quali l'uomo convive fin dall'inizio dei tempi.

Chi di voi non abbia familiarità col significato del termine *saccente* (*sciolism* in inglese) sarà, però, attento a una delle sue conseguenze:

la *Pseudoscienza*.

ES- Editorial

¿Por qué pensar en la conspiración, cuando la estupidez puede explicarlo todo?

Johann Wolfgang von Goethe

Queridos lectores,

En la Edad Media las cosas eran bastante simples: si caías enfermo, se llamaba al sacerdote local para que leyera algunas oraciones, pero en breve ibas a morir. Era obvio que Dios te amaba tanto que te deseaba en el cielo. Si usted era un alquimista, estaría buscando la piedra filosofal, intentando convertir metales en oro. Intentarías mezclar sustancias diferentes y, si sobrevivieses, descubrirías la mezcla buscada o pasarías a probar otra cosa. No habría trajes para negligencia médica o escrutinio científico, ni una crítica de su metodología química porque nadie más sabía más que usted.

Se podría esperar que, gracias al progreso científico, las cosas serían mucho más diferentes hoy en día y, de hecho, lo son. Nuestros aceleradores de partículas están observando más profundamente el cosmos cuántico, mientras que diferentes tipos de telescopios descubren los secretos del macro-universo.

Las vacunas y los avances médicos han erradicado algunas de las enfermedades más mortíferas que solían matar a miles de personas en un pasado no tan lejano, mientras que los ingenieros construyen máquinas mejores, más rápidas, más útiles y más ecológicas que mejoran la vida cotidiana en nuestro planeta en este momento, no en un futuro vago. Sólo hay una cosa que no ha cambiado y esa es la mente humana y los grilletes de los "falsos eruditos" bajo los cuales ha estado presente desde el principio de los tiempos.

Secondo il British Dictionary, *sciolism* è *la pratica* di esprimere opinioni su soggetti che si conoscono solo superficialmente; la sua origine potrebbe risalire al latino *sciolus*, usato per riferirsi a persone con basso grado di conoscenza. *Pseudoscienza*, d'altro canto, *è una disciplina o un approccio che pretende di essere analogo (o abbia notevole affinità) con la Scienza*. In effetti, però, la *Pseudoscienza* ha maggiore corrispondenza con la superstizione, piuttosto che con la Scienza.

Nel passato, *Pseudoscienza* poteva essere spiegata semplicisticamente con le reminiscenze delle pratiche antiche che poi hanno dato origine alla moderna scienza. Per es., l'*Astrologia* ha preso l'avvio dalle necessità personali dell'uomo di osservare le meraviglie del cielo per correlarle alle realtà e necessità terrene. Man mano che erano compresi i fenomeni celesti, questi costituivano le basi della moderna Astronomia. Inizialmente, l'Astrologia era utile supporto all'adattamento delle scoperte scientifiche al sistema filosofico per poi, man mano che le conoscenze astronomiche progredivano, allontanarsi sempre più dalle conoscenze razionali.

Oggigiorno, le Pseudoscienze che imperversano nella rete, nei nostri social media e nel mondo di libri e riviste ultra economici, aumentano sempre più. Il flusso di informazioni che ci subissa da TV, autoradio, tablet nei momenti di riposo, cellulari con la eterna connettività a internet e infine, ma non ultimo, il computer, che spalanca un nuovo mondo attraverso giochi, applicazioni, presentazioni multimediali, ecc., disorganizza le nostre menti con un flusso di dati che dà solo l'impressione di possedere la conoscenza e, il che è peggio, la capacità di comprendere. Sconoscendo metodologia e principi scientifici, appena abbozzato il concetto di ipotesi e conclusioni finali, i moderni *saccenti* (*sciolists*) non usano appropriatamente quello che trovano *on line* per comunicare correttamente i risultati scientifici appresi, e vivono per convincere delle loro pseudoconoscenze le menti sensibili, consci che non possono riuscire a superare i più semplici sistemi di verifica. I termini come *Campo di energia*, *Forza vitale*, *Detossificazione*, *Dialisi*, e molti altri, sono abusati giornalmente per dare l'impressione di autenticità e autorevolezza. Teorie e argomenti incompatibili sono mescolati per portare a conclusioni incomprensibili e difficili da verificare e, nei casi in cui siano evidenziati discrepanze ed errori evidenti, tali voci vengono velocemente messe fuori gioco denunciandole come *attacchi personali* o come ottuse esternazioni di menti non abbastanza *aperte*.

Aquellos de ustedes que no están familiarizados con el término tradicional de "falsos eruditos", son probablemente conscientes de uno de sus resultados: "la pseudociencia". Según el Diccionario Británico, el concepto de "falso erudito" está relacionado con "la práctica de opinar sobre materias sobre las cuales uno sólo tiene un conocimiento superficial" y su origen se remonta al latín tardío, siendo un término usado para referirse a alguien con conocimientos ligeros sobre algo. La pseudociencia, por otra parte, es "una disciplina o enfoque que pretende ser o tener un parecido cercano a la ciencia", pero, por supuesto, no tiene ninguna base científica en absoluto. De hecho, la pseudociencia tiene una afinidad más cercana a la superstición más que a la ciencia.

En el pasado, la pseudociencia podría ser explicada como la que abarca los restos de las prácticas antiguas que eventualmente evolucionaron a lo que en realidad llamamos la ciencia en nuestros días. Por ejemplo, la astrología surgió de la necesidad interior del hombre de examinar las maravillas que se podían observar arriba en los cielos y hacer asociaciones que ayudarían a dar sentido a lo que ocurría abajo en la tierra. Tan pronto como se empezó a entender la naturaleza de los fenómenos celestes, se establecieron los cimientos de la astronomía moderna y la astrología se convirtió en un lacayo que intentó adaptar los descubrimientos científicos a un sistema filosófico que no podía evitar deslizarse más y más lejos del universo observable hasta que cada avance astronómico era confirmado.

Hoy en día, la pseudociencia que afecta a la web mundial, a nuestras redes sociales y al mundo de las publicaciones de bolsillo de bajo costo, surge de una manera mucho más compleja. El diluvio de información que nos rodea en nuestros televisores, la radio de nuestro coche, la tablet que usamos cuando necesitamos un momento para relajarnos, nuestros teléfonos móviles inteligentes con su conectividad a Internet y, por último pero no menos importante, las pantallas de los ordenadores que abren un nuevo mundo a través de los juegos, aplicaciones, presentaciones multimedia, y mucho más, confunden nuestras mentes con un velo de datos que parece crear la impresión de conocimiento o, peor aún, la comprensión. Desconocidos de la metodología científica y los principios, pero lo suficientemente seguros como para expresar sus hipótesis y sacar conclusiones,

Oltre tali mistificazioni della Scienza e mancanza di comprensione dei principi scientifici basilari, ci è di conforto sapere che le nostre speranze sono riposte in una nuova generazione di scienziati che persistono nel formulare ipotesi, pianificare esperimenti, raccogliendo dati, interpretando risultati, scrivendo conclusioni e pubblicando le loro considerazioni su **European Pupils *Magazine***. Con la *bona fortuna* che ci ha coinvolto in questa attività educativa-scientifica, ci siamo *detossificati* dallo *Sciolism* e dalle Pseudoscienze che permeano giornalmente le nostre vite, e dirigiamo verso il mondo della razionalità scientifica che si trova davanti a noi grazie agli sforzi dei potenziali scienziati che ci propongono contributi da pubblicare sul nostro **EP*Magazine***.

los científicos modernos abusan de la jerga que toman de Internet para formular afirmaciones científicas que capturan las mentes impresionables, incluso cuando no pueden hacer una simple verificación de los procesos. Frases como “campo de energía”, “fuerza de vida”, “desintoxicación”, “diálisis” y más, son mal utilizadas cada día para crear la impresión de autenticidad y validez. Argumentos o teorías incompatibles se fusionan para crear un sistema de pensamiento que ni puede ser probado ni confirmado. Y, cuando se indican discrepancias o errores absolutos en estas teorías, los críticos son rápidamente silenciados con ataques personales o con la protesta de que no son lo suficientemente “abiertos de mente”.

En medio de esa tergiversación de la ciencia y la falta de comprensión de los principios científicos básicos, es un gran alivio darse cuenta de que todavía hay esperanza en la nueva generación de científicos que persiste en formular hipótesis, diseñar experimentos, recolectar datos, sacar conclusiones y publicar sus ideas en la Revista de los Alumnos Europeos. Dado que la “buena fortuna” nos ha unido en este esfuerzo, vamos a “desintoxicarnos” de los falsos eruditos y la pseudociencia, que invaden nuestra vida cotidiana y naveguemos hacia un mundo científicamente iluminado que se muestra ante nosotros gracias a las ideas y los esfuerzos de los prometedores científicos que presentaron sus contribuciones en este último número de EPM.

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No sex, we are flowers

Nowadays everyone knows that flowers are the organs by which plants have sexual reproduction; particularly, we know the *stamens* are the male elements and the *carpels* (known as pistils) the female ones. The stamens produce pollen, which fertilizes ovules contained into carpels. Anyway, in the past, people thought differently. They were convinced that plants reproduced themselves by asexual way only (by talea, margotta, and so on) and also the seed was, in their opinion, a way to reproduce; because considered as a germinated portion of the body of the mother plant.This way to think descended by the general culture, so used, that was the one Bible and the ancient Greek knowledge emanated.

The holy Christian book says that God created plants the third day and animals the sixth, and these had been created male and female.So, it is excluded any type of sexuality. Also the great Greek philosopher –*Aristotle*– said that plants, being motionless, haven't the possibility to mate. So, at those times, talking about sex referred to plants was unthoughtful and search into their detailed reproductive organs, was nonsense. The religious and culture authorities denied their existence. And flowers? Flowers, coloured and perfumed, had been created for the human visual and olfactory pleasure. No one would put such a sinful sexuality on these creatures.

They were considered the virginity and purity symbol (if you think about the candid lily innocence); in fact, also today, a woman who had lost her virginity we say she had been "deflowered". This phobia of the sex vision toward flowers began to decrease in the XVII Century, when the scientific revolution introduced men to think by their own mind.

The invention of the microscope led to the meticulousness exploration of the anatomy of the plants. Some botanical physicians: Marcello Malpighi (Italian), Nehemiah Grew and Thomas Millington (both of them English) hazarded the hypothesisthat the sexual reproductive organs of the plants were the same flowers. They supposed especially that the male organ was the stamen (containing pollen) and the female ones were the carpel (containing the ovum). Therefore, they thought that *from the fertilization between pollen and ovum rose the seed*.

Niente Sesso, siamo fiori

Al giorno d'oggi tutti sappiamo che i fiori sono gli organi con cui si realizza la riproduzione sessuata delle piante; in particolare, siamo a conoscenza che gli stami rappresentano gli elementi maschili e i carpelli (detti pistilli) gli elementi femminili. Gli stami producono il polline,il quale va a fecondare gli ovuli che sono racchiusi nei carpelli. Tuttavia, nei tempi passati, la gente la pensava diversamente.

C'era la radicata convinzione che le piante si riproducessero esclusivamente per via asessuata (per talea, margotta, eccetera); ed anche il seme era ritenuto un caso di tale modalità riproduttiva; in quanto considerato come una porzione germinativa del corpo della pianta madre.

Siffatto modo di pensare discendeva dalla cultura generale, allora imperante; che era quella emanata dalla Bibbia e dal sapere della antica Grecia.

Il Sacro libro dei cristiani dice che Dio creò le piante il terzo giorno e gli animali il sesto; e questi sono stati creati maschi e femmine.

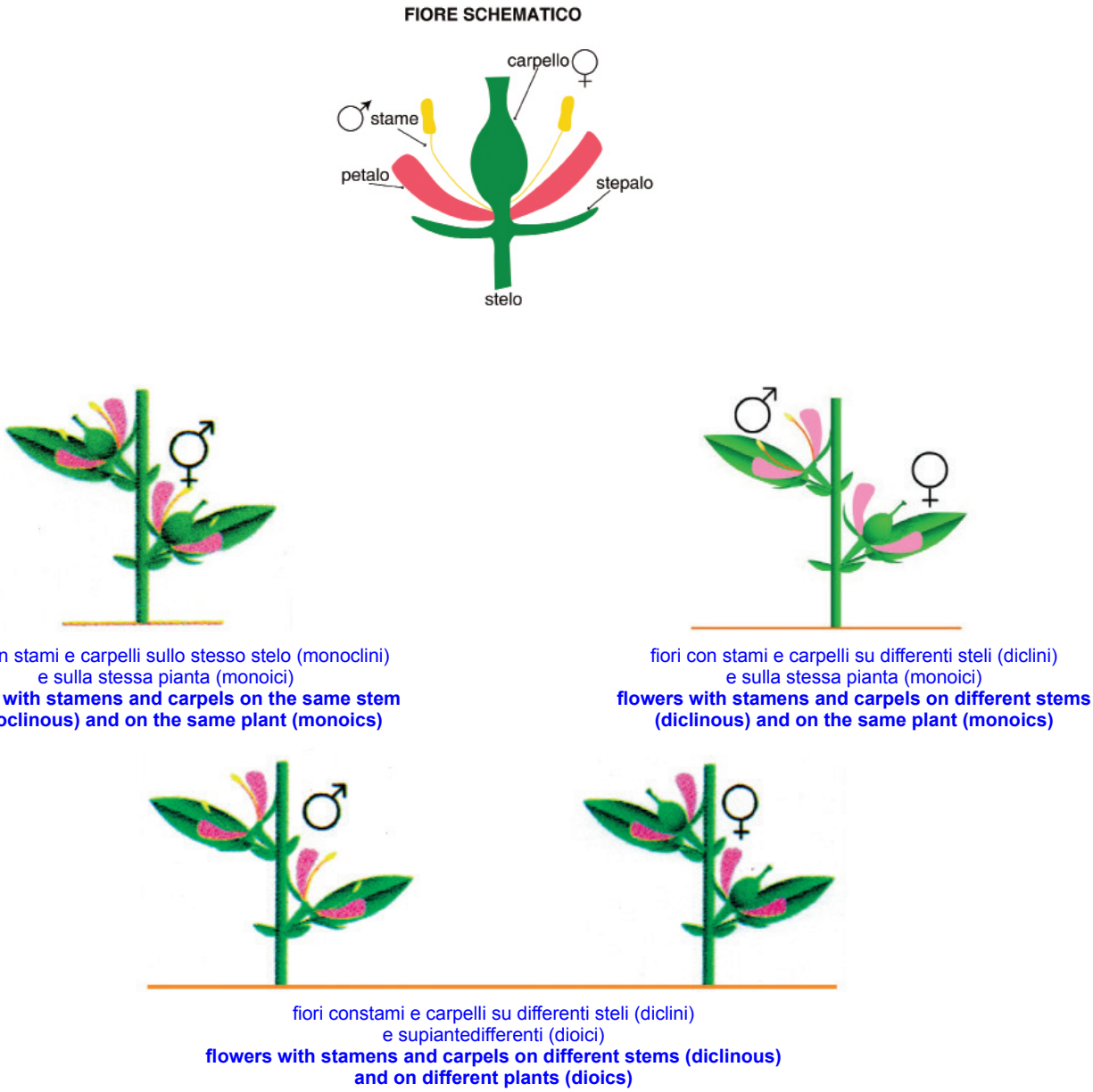
Dunque per le piante resta escluso ogni cenno di sessualità. Anche il sommo filosofo greco –Aristotele– aveva sostenuto che le piante, essendo prive di movimento, non hanno la possibilità di accoppiarsi.

Dunque, a quei tempi, parlare di sesso nelle piante era inconcepibile e cercare in loro particolari organi riproduttivi, era un'assurdità. Le autoritàreligiose e culturali ne avevanonegatol'esistenza.

E ifiori? I fiori, colorati e profumati, erano stati creati per il godimento visivo ed olfattivo dell'uomo. Nessuno avrebbe potuto accostare una peccaminosa sessualità a queste creature.

Essi erano considerati il simbolo della illibatezza e della purezza (si pensi alla innocenza del candido Giglio); tant'è che, ancor oggi, di una donna che ha perso la verginità si dice che è stata "deflorata".

Siffatta visione sessuofobica dei fiori cominciò ad incrinarsi nel XVII secolo, quando la rivoluzione scientifica indusse gli uomini a pensare con la propria testa.



fiori con stami e carpelli sullo stesso stelo (monoclini)
e sulla stessa pianta (monoici)
flowers with stamens and carpels on the same stem (monoclinous) and on the same plant (monoics)

fiori con stami e carpelli su differenti steli (diclini)
e sulla stessa pianta (monoici)
flowers with stamens and carpels on different stems (diclinous) and on the same plant (monoics)

fiori constami e carpelli su differenti steli (diclini)
e supiantedifferenti (dioici)
flowers with stamens and carpels on different stems (diclinous) and on different plants (dioics)

Fig.1- Varia sessualità fra le piante a fiori (tavola).

Against these attitudesthere were many disagreements because they dared contradicting the Bible and Aristotle's authority. The agreement on these rumours was nearly unanimous since the scientists didn't have any evidence supporting their theories.

This confirm arrived quickly, when, in 1694, the German botanist – *Rudolf Camerarius* – experimented to check and verify the Italian-English theory. In his – *De Sexu Plantarum* – he reported about some plant species that reproduced themselves with *diclinousmonoic* and *dioic* flowers; let's say in the first case, flowers with only stamens (males) and only carpels (females) put on different stems, but planted on the same plant (such as black mulberry, maize, and so on)

L'invenzione del microscopio portò alla esplorazione minuziosa della anatomia delle piante. Alcuni medici-botanici: Marcello Malpighi (italiano), Nehemiah Grew e Thomas Millington (ambedue inglesi) avanzarono l'ardita ipotesi che gli organi riproduttori sessuali delle piante fossero proprio i fiori. In particolare supposero che l'organo maschile fosse lo stame (contenente il polline) e quello femminile fosse il carpello (contenete l'ovulo). Inoltre prospettarono come dalla fecondazione fra polline ed ovulo sortisse il seme.Contro queste inaudite affermazioni si alzarono, da più parti, voci indignate di disapprovazione e di dileggio; in quanto esse ardivano porre in discussione sia la Sacra Scrittura che l'autorità di Aristotele.

Fig.2- Rudolf Camerarius
(from Wikipedia; the free encyclopedia).

and, in the second case, that have different sex flowers planted on different plants (such as Pistachio, *Mercurialisannua*, and so on).

Using these special plants, he succeeded in transferring artificially the pollen, produced by a male flower, to a carpel from a female flower. In this way the fertilization of the ovum, turned into seeds, even if it wasn't easy to use herbaceous plants – like *Mercurialisannua* – where male and female parts of the plants could be manipulated without problem.So, the testing with plants having male flowers separated from the female ones had been used to establish fundamental vegetable physiology tract, the one of the sexual reproduction. But it overcome the specific research field, it shows intact the experimental testing were used to erase apodictic statements, based on speculation, only.So, we can see the discovery of the sexuality of the plants is comparable to other important and fundamental conquests of the knowledge occurred in the XVII century like, for example, the new world framework by Galileo Galilei and Francesco Redi's denying of the spontaneous generation.

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Voci, queste, che ebbero il quasi unanime consenso, poiché i succitati scienziati non avevano esibito alcuna prova a conferma delle loro rivoluzionarie proposte.

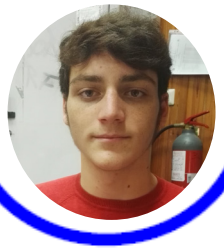
Ma questa conferma arrivò da lì a poco quando, nel 1694, il botanico tedesco – Rudolf Camerarius – imbastì una serie esperimenti atti a verificare quanto supposto dai ricercatori italo-britannici. Nella sua opera – De sexuplantarum – adoperò alcune specie di piante che si riproducono con fiori diclini monoici e soprattutto con fiori diclini dioici; cioè, nel primo caso, che hanno fiori con soli stami (maschili) e soli carpelli (femminili) posti su steli diversi, ma impiantati sulla stessa pianta (ad esempio: Gelso nero, Mais, eccetera); e, nel secondo caso, che hanno fiori di sesso diverso impiantati addirittura su piante diverse (ad esempio: Pistacchio, Mercorella, eccetera).

Adoperando questi particolare soggetti egli poté trasferire artificialmente il polline, prodotto da un fiore maschile, al carpello di un fiore femminile. Così facendo, attuò la fecondazione degli ovuli, che tosto si trasformarono in semi. Certo, non fu facile operare con piante arboree; ma egli trasse vantaggio dall'impiego di piante erbacee - come la Mercorella - con le quali gli individui maschili e femminili potevano essere manipolati senza difficoltà.

Dunque, la sperimentazione con piante aventi fiori maschili separati da quelli femminili è stata lo strumento per stabilire un fondamentale tratto della fisiologia vegetale, che è quello della riproduzione sessuata.

Ma essa travalica l'ambito della ricercaspecifica; dimostra infatti come le verifiche sperimentali siano servite a cancellare affermazioni apodittiche, basate sulla sola speculazione.

A questo punto possiamo ben dire come la scoperta della sessualità nelle piante sia assimilabile ad altre importanti e fondamentali conquiste del sapere, avvenute nel fervente clima del diciassettesimo secolo quali, ad esempio, li nuovo assetto del mondo di Galileo Galilei e la negazione della generazione spontanea di Francesco Redi.



New elements, new nomenclature

Found for you by Edoardo Lo Presti
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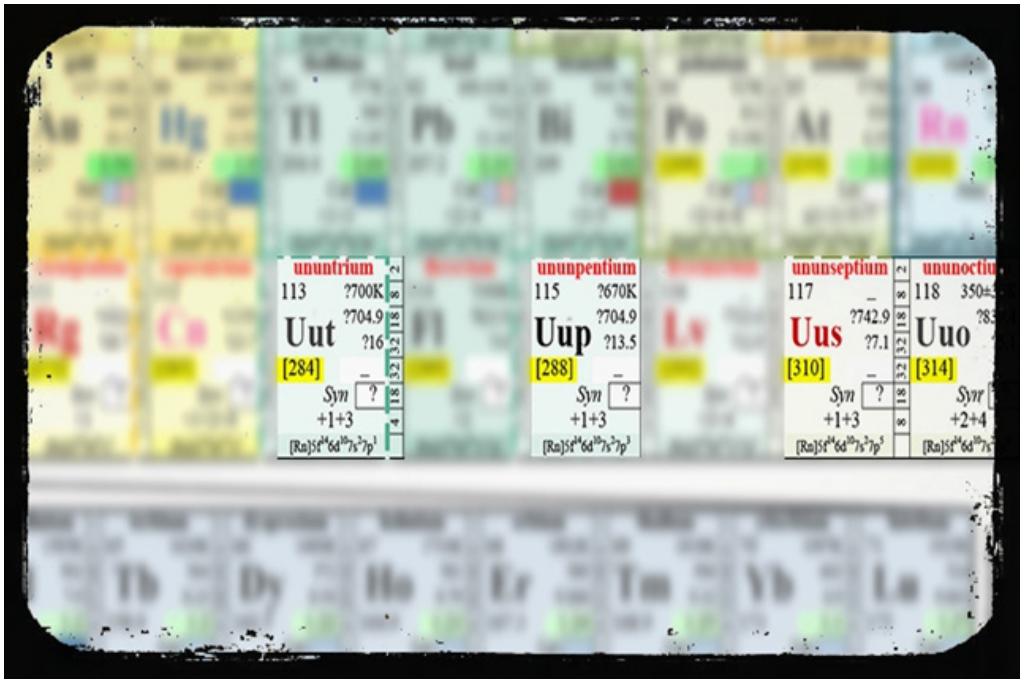
Catania, Italy.

New elements have been recently discovered; this is a fundamental information for Science and in particularly for Chemistry. The last discovered element, before newcomers, was the element 114 that has been discovered in 2011. In 2016 Joint Institute for Nuclear Research of Dubna, in Russia and the Lawrence Livermore National Laboratory, in California, worked jointly to discover new elements. After months of work, they found elements 113, 115, 117 and 118. Such elements have very short life because they almost immediately turn into other elements due to the radioactive decay. Anyway, the adding of this element to the Periodic Table is a historical news.

After discovery, the name of these four element has not been decided yet. They temporarily are called Ununtrium (Uut), Uniumpentium (Uup", Uniunseptium (Uus) and Ununoctium (Uuo). The IUPAC might decide giving them the name of a researcher, the name of region (or Nation) where the elements are discovered, or whatever.



New discovered elements in the periodic table

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Oleo Sponge: An environment's friend

Found for you by Edoardo Lo Presti
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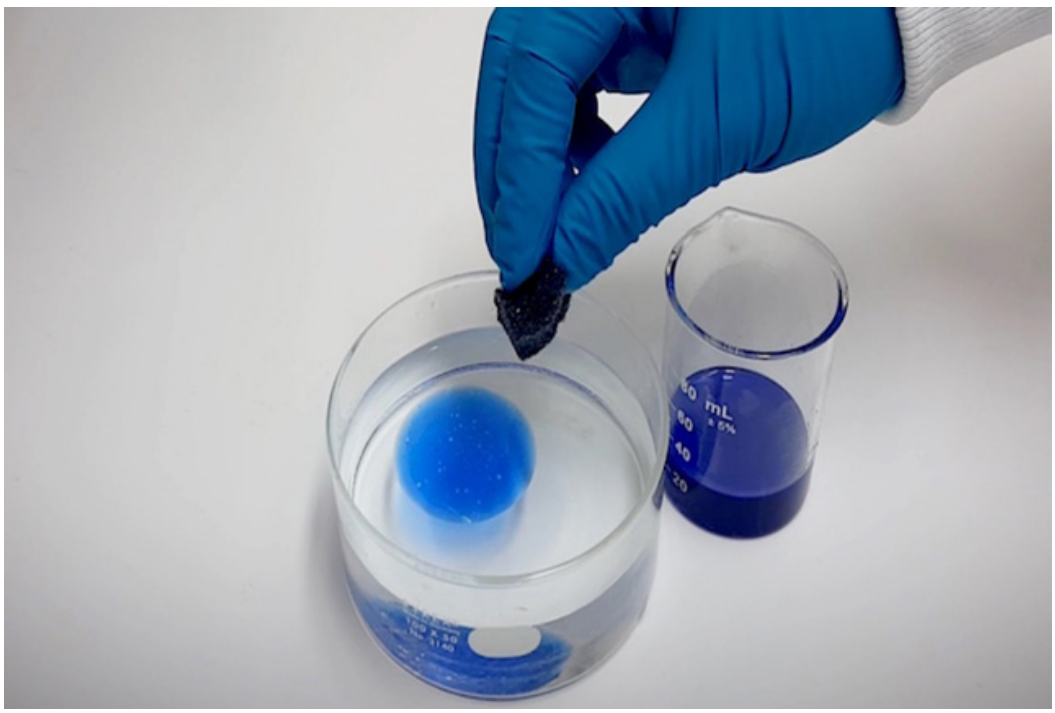
An environmental problem has always been the dispersion of carburant and petroleum in the seas. This problem has not been resolved until today because to remove of these polluting substances, they are burned and in this way the environment is anyway damaged. For this reason, Argonne National Laboratory, an American research center, studied a solutions for this problem. American researchers created a sort sponge able to absorb carburant in the water; it is named Oleo Sponge. It has been tested and created in order to draw petroleum and oils without to absorb water. To carry out this project, researchers used Polyurethane, an effective absorbent material, but Oleo Sponge is not formed by Polyurethane, only. Another material that was necessary is a metal oxide, able to separate oils molecules by water ones and then to catch oils molecules. A spectacular Oleo Sponge skill is the ability to permit the absorbed Hydrocarbons completely usable.

In conclusion, Oleo Sponge have important qualities, like to clear the seas, to collect water-free petroleum, and let it be completely re-usable. In this way this magic sponge save the environment in many way.



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Chemotherapy side effects

Found for you by Simone Giusti
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Chemotherapy is the cure for cancer but it has many odd side effects. It has been discovered that lower doses of drugs get the same results but limiting the side effects.

The side effects are:

- Fatigue.
- Nausea and vomit.
- Anemia and infection.
- Hair loss.
- Infertility.

The fatigue is felt during the chemotherapy, thus you need a lot of rest to face the lack of sleep.

More than a few drugs cause digestive disorders. These substances are causing problems for one-two days. Often, the vomiting does not allow to drink and it is unstoppable.

Chemotherapy does not allow the renewal of cells; therefore a drop in white blood cells causing the reduction of infection resistance. Moreover, the reduction of red blood cells causes anemia, thus the feel of fatigue. The decrease of platelets results in bruising.

Hair loss is the characteristic side effect of chemotherapy, but once finished treatment, in about four months, there is a re-growth of hair. To avoid the hair loss, it could be useful, for a sort of prevention, to use a cold hair headphone during the drag treatment. It does not allow the intensification blood with drugs in the scalp.

chemotherapy during pregnancy might cause fetal harm one of concern for patients is infertility like widespread side effect.

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The Black Death (Bubonic Plague)

Story

The first appearance of the Plague was around 542a.D., when Justinian was the Emperor of the Byzantine Empire.The consequence was that about 50 million people died back then, which was half of the European population of the 6th Century.

The Black Death began appearing around 1347 a.D.to people living near the Black Sea. The Black Death arrived in Europe by sea in October 1347a.D when 12 Genoese trading ships docked at the Sicilian port of Messina after a long journey through the Black Sea. Many people of the crew were dead and those alive were seriously ill.

The residents named the disease “Black Death” because of the black boils appearing on the body of the contaminated patients. Even if the contaminated sailors remained on the ship the disease was transferred by the rats and the fleas. The rats would swim to the coast, carrying the fleas with them. As soon as the fleas reached the coast, they jumped on nearby people, biting them and infecting them. It was too late. Over the next five years, the mysterious Black Death would kill more than 20 million people in Europe, almost one-third of the continent’s population. The bodies would pile up the streets.

Even before the “death ships” pulled into port at Messina, many Europeans had heard rumors about a “Great Pestilence” that was carving a deadly path across the trade routes of the Near and Far East. (Early in the 1340s, the disease had struck China, India, Persia, Syria and Egypt.)

Ο Μαύρος Θάνατος (Βουβωνική Πανόλη)

Ιστορικά

Η πρώτη εμφάνιση της Πανώλη χρονολογείται περίπου στο 542 μ.Χ., όταν ο Ιουστινιανός ήταν ο αυτοκράτορας της Βυζαντινής Αυτοκρατορίας. Το αποτέλεσμα ήταν να πεθάνουν περίπου 50 εκατ. άνθρωποι, δηλαδή ο μισός πληθυσμός της Ευρώπης κατά τον 6ο αιώνα.

Ο Μαύρος Θάνατος εμφανίστηκε για πρώτη φορά περίπου το 1347 μ.Χ. σε ανθρώπους που ζούσαν κοντά στη Μαύρη Θάλασσα. Ο Μαύρος Θάνατος έφτασε στην Ευρώπη μέσω της θαλάσσης τον Οκτώβριο του 1347 μ.Χ. όταν 12 γενουάτικα εμπορικά πλοία έφτασαν στο Σικελικό λιμάνι της Μεσσίνας , έπειτα από ένα μακρύ ταξίδι μέσω της Μαύρης Θάλασσας. Πολλοί από τους ναύτες ήταν νεκροί και όσοι ζούσαν ακόμη ήταν βαριά άρρωστοι.

Οι κάτοικοι ονόμασαν την ασθένεια «Μαύρο Θάνατο» λόγω των μαύρων λεκέδων που εμφανίζονταν στο σώμα των μολυσμένων ασθενών. Ακόμη και αν οι μολυσμένοι ναύτες παρέμεναν στο πλοίο τους η ασθένεια μεταφέρονταν από τους αρουραίους και τους ψύλλους. Οι αρουραίοι θα κολυμπούσαν μέχρι την ακτή, κουβαλώντας μαζί τους τους ψύλλους. Μόλις οι ψύλλοι έφταναν στην ακτή, πηδούσαν πάνω στους ανθρώπους, δαγκώνοντάς τους και μολύνοντάς τους. Ήταν πλέον πολύ αργά. Μέσα στα επόμενα πέντε χρόνια, ο μυστηριώδης Μαύρος Θάνατος θα σκότωνε περισσότερους από 20 εκατ. ανθρώπους στην Ευρώπη, περίπου το 1/3 του πληθυσμού ολόκληρης της ηπείρου. Τα άψυχα σώματα θα στοιβάζονταν στους δρόμους.

Ακόμη και πριν τα «Πλοία του Θανάτου» φτάσουν στην Μεσσίνα, πολλοί Ευρωπαίοι είχαν ακούσει φήμες για ένα «Μεγάλο Λοιμό» ο οποίος χάραζε ένα

However, they were scarcely equipped for the horrible reality of the Black Death.

Causes

The first impression for the plague was that it was caused by demons and witches, an impression very common for everything strange and unexplainable in the medieval times. Nowadays, it's known that the real cause for the disease is a bite from a flea or rat infected by the Plague. In rare cases, bacteria from a piece of contaminated clothing or other material used by a person with plague, enter the body through an opening in the skin. Bubonic plague is rarely spread from person to person.

Symptoms, prevention and treatment

Bubonic plague affects the lymph nodes. Within 3 to 7 days of exposure to plague bacteria, you will develop flu-like symptoms such as fever, headache, chills, weakness, and swollen, tender lymph glands (called buboes-so is the name bubonic).

For prevention of the Plague, eliminate nesting places of rodents. Avoid touching animals that are dead. Reportany dead animals to the local health department. Do not let your pets sleep on your bed with you. This increases the risk of getting plague, due to the fleas they might have. There is also the Plague vaccine (Haffkine's Vaccine).

People with the plague need immediate treatment. If treatment is not received within 1-2 daysof the first symptoms, death may result. Antibiotics are used to treat Plague. Also, oxygen support is usually needed. Patients infected by the plague need complete rest. Hot fomentations of Mercuric or Phenol Chloride need to be placed on the buboes. The buboes must not be opened before pus is actually formed, because there is a fear of general infection.

θανατηφόρο μονοπάτι στους εμπορικούς δρόμους της Εγγύς και μακρινής Ανατολής. (Νωρίτερα περί το 1340, η ασθένεια είχε «χτυπήσει» την Κίνα, την Ινδία, την Περσία, τη Συρία και την Αίγυπτο.) Παρ' όλα αυτά, δεν ήταν προετοιμασμένοι για την τρομακτική πραγματικότητα του Μαύρου Θανάτου.

Αίτια

Η πρώτη εντύπωση για την Πανώλη ήταν πως προκαλούνταν από δαίμονες και μάγισσες, μια εντύπωση πολύ συνηθισμένη για οτιδήποτε παράξενο το οποίο δεν μπορούσαν να εξηγήσουν οι άνθρωποι τον Μεσαίωνα. Σήμερα, γνωρίζουμε πως η πραγματική αιτία για την ασθένεια είναι το δάγκωμα από έναν ψύλλο ή αρουραίο μολυσμένο από την Πανώλη. Σε σπάνιες περιπτώσεις, βακτήρια από ένα μολυσμένο κομμάτι υφάσματος ή άλλου υλικού που χρησιμοποιήθηκε από άτομο, μολυσμένο από την Πανώλη, εισάγονται στο σώμα διαμέσου μιας ανοιχτής πληγής ή οποιουδήποτε ανοίγματος στο δέρμα. Η Βουβωνική Πανώλη σπάνια μεταδίδεται από άνθρωπο σε άνθρωπο.

Συμπτώματα, πρόληψη και θεραπεία

Η Βουβωνική Πανώλη επηρεάζει τους λεμφαδένες. Μέσα σε διάστημα 3 έως 7 ημερών έκθεσης σε βακτήρια της Πανώλης, θα διαμορφωθούν συμπτώματα παρόμοια με αυτά του κρυολογήματος, όπως πυρετός, πονοκέφαλος, ρίγος, αδυναμία και πρησμένοι, ερεθισμένοι λεμφαδένες.

Για πρόληψη από την ασθένεια, μπορείτε να περιορίσετε τα μέρη στα οποία μπορούν να κάνουν τις φωλιές τους διάφορα τρωκτικά. Να αποφεύγετε να αγγίζετε νεκρά ζώα. Να αναφέρετε τα νεκρά ζώα στις τοπικές αρχές υγιεινής. Να μην αφήνετε τα κατοικίδιά σας να κοιμούνται στο κρεβάτι μαζί σας. Αυτό αυξάνει τις πιθανότητές σας να κολλήσετε Βουβωνική Πανώλη, λόγω των ψύλλων που μπορεί να έχουν. Υπάρχει επίσης το εμβόλιο για την Πανώλη (Εμβόλιο του Haffkine).

Οι ασθενείς χρήζουν άμεσης θεραπείας. Εάν η θεραπεία δεν ληφθεί εντός 1-2 ημερών, από την εμφάνιση των πρώτων συμπτωμάτων, μπορεί να οδηγήσει σε θάνατο. Αντιβιοτικά χρησιμοποιούνται για τη θεραπεία της Πανώλης. Επίσης, συνήθως είναι απαραίτητη η υποστήριξη οξυγόνου. Οι ασθενείς χρειάζο-

Individuals with the Plague tend to die within 2-7 days if they are not medically treated.

Even today, the Bubonic Plague is considered 30%-60% lethal and people around the world still die, usually in places with lack of hygiene technologies.

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νται πλήρη ηρεμία και ξεκούραση.

Ζεστές κομπρέσες Χλωριδίου Φαινόλης ή Χλωριδίου Υδραργύρου πρέπει να τοποθετηθούν πάνω στα εξογκώματα.

Τα εξογκώματα δεν πρέπει να ανοίγονται προτού διαμορφωθούν πλήρως, καθώς υπάρχει φόβος γενικής μόλυνσης. Άτομα με Πανώλη τείνουν να πεθαίνουν εντός 2-7 ημερών, εάν δεν λάβουν ιατρική βοήθεια εγκαίρως. Ακόμη και σήμερα, η Βουβωνική Πανώλη θεωρείται 30%-60% θανατηφόρα και άνθρωποι σε ολόκληρο τον κόσμο, ακόμη πεθαίνουν, συνήθως σε περιοχές με έλλειψη τεχνολογιών υγιεινής.

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Did Ebola kill Pericles?

Some researchers consider that the modern virus Ebola existed much earlier than we believe.

At the same time, there is also the theory that the virus that decimated Athens' society in the era of Pericles is the same with the modern virus Ebola. However, neither the validity nor the falsity of this opinion has been proved.

Almost 2400 years ago ancient Athens was devastated by a fatal pestilence. Within 5 years more than one fourth of the ancient city-state's population, which was sieged by Sparta at the time, was eliminated. The population of Athens was led to atrocious death by thousands. The patients firstly dealt with exhausting fever, rampant bleeding of the eyes, vomiting and continuous bleeding as well as rash and diarrhea.

Thus, this horrible scourge that brought about an unprecedented mortality rate led to the unexpected end of the "golden century". Cultural and financial flourishing of that whole century gave away significantly and the glory of Athens never returned. Pericles, the charismatic leader that initiated the era of Athens' growth, was one of the thousand dead people whom the epidemic left behind.

Οι Αρχαίοι Αθηναίοι πέθαιναν κατά εκατοντάδες από το λοιμό.

History has never seen such a pandemic ever again. Or has it?

With the passage of time researchers attempted to identify this virus with modern diseases, e.g. malaria, cholera, smallpox, bubonic plague etc.

Ο Έμπολα σκότωσε τον Περικλή;

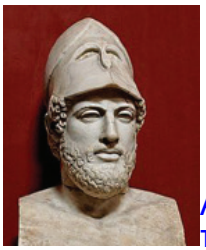
Ορισμένοι ερευνητές θεωρούν ότι ο σύγχρονος ιός Έμπολα αριθμεί περισσότερα χρόνια ύπαρξης απ' όσα πιστεύουμε..

Ταυτόχρονα υπάρχει και η θεωρία ότι ο ιός που αποδεκάτισε την αθηναϊκή κοινωνία της εποχής του Περικλή είναι ίδιος με το συγχρονο ιό Έμπολα.

Ωστόσο δεν έχει αποδειχθεί ούτε η εγκυρότητα ούτε η αναλήθεια αυτής της άποψης.

Περίπου 2.400 χρόνια πριν, η αρχαία Αθήνα σαρώθηκε από έναν θανατηφόρο λοιμό. Μέσα σε μόλις πέντε χρόνια εξοντώθηκε πάνω από το ένα τέταρτο του πληθυσμού της αρχαίας πόλης-κράτους, η οποία εκείνο το διάστημα πολιορκούνταν από τη Σπάρτη.Οι Αθηναίοι έβρισκαν κατά χιλιάδες, φρικτό θάνατο. Οι ασθενείς αντιμετώπιζαν αρχικά εξαντλητικό πυρετό, ακατάσχετη αιμορραγία των ματιών, εμετό και συνέχεια της αιμορραγίας, καθώς και εξανθήματα και διάρροια.

Έτσι, αυτή η εφιαλτική μάστιγα, που επέφερε πρωτοφανή θνησιμότητα, οδήγησε στο απροσδόκητο τέλος του χρυσού αιώνα. Η πολιτιστική και οικονομική άνθηση όλου εκείνου του αιώνα υποχώρησε σημαντικά, και τα μεγαλεία της Αθήνας δεν επέστρεψαν ποτέ. Ο Περικλής, ο χαρισματικός ηγέτης που ξεκίνησε την εποχή άνθισης της Αθήνας, υπήρξε ένας από τους χιλιάδες νεκρούς που άφησε πίσω της η επιδημία.



Αναφέρεται ότι ο Περικλής πέθανε από το λοιμό.

Η ιστορία δεν έχει δει ποτέ ξανά τέτοια πανδημία. Ή έχει;

Με την πάροδο των χρόνων, μελετητές προσπάθησαν να ταυτίσουν αυτόν τον ιό με σύγχρονες ασθένειες, όπως χολέρα, ελονοσία, ευλογιά, βουβωνική πανώλη κτλ. Παρ'όλα αυτά, μόνο τρεις ερευνητές ιατρικής και ένας καθηγητής κλασσικών σπουδών θεωρούν ότι ο λοιμός των Αθηνών ήταν μια επίθεση του ιού Έμπολα.

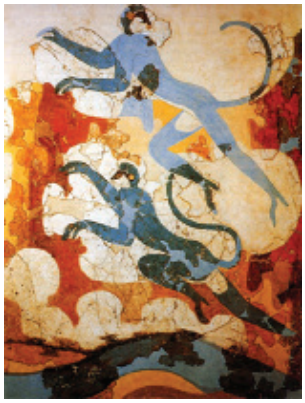
Nevertheless, only three medicine researchers and a professor of Classical Studies deem that the pestilence of Athens was an attack of Ebola virus. Dr Patrick Olson, epidemiologist in Navy Medical Center of San Diego and his colleagues published their own opinion in the newspaper “Emerging Infectious Diseases”.

They claimed that the symptoms of Ebola virus are similar with the ancient Greek pestilence in Thucydides’ creation “History of the Peloponnesian war”.

They highlighted that most victims in both cases
lost their life within seven to nine days.

Athenian healers became ill just like the contemporary ones, whereas Spartians who had already started siege a bit further, survived. This goes out to show that the ancient disease, like Ebola virus, was contracted through blood, saliva or physical contact and not through the air.

Furthermore, Thucydides claimed that the disease originated from Africa’s coasts, southern of Ethiopia. It is known that Ebola virus has also got African roots, while it is confirmed that trips were made (mural of blue monkeys in Santorini).



Τοιχογραφία κυανοπιθήκων.
Ανήκει στην ώριμη υστεροκυκλαδική περίοδο.

Undoubtedly, there are many who raise objections relevant to the validity of Thucydides’ clues, a historian with lack of medical knowledge. They exhibit doubts regarding the possibility of existence of a host and the fact that there was no other case in the time between.

Despite the clash of opinions, the complete identification of the virus is unlikely to be accomplished.

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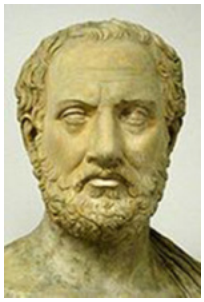
θεωρούν ότι ο λοιμός των Αθηνών ήταν μια επίθεση του ιού Έμπολα.

Ο Dr. Patrick Olson, επιδημιολόγος στο Navy Medical Center στο San Diego και οι συνάδελφοί του δημοσίευσαν τη δική τους άποψη στην εφημερίδα «Emerging Infectious Diseases».

Υποστήριξαν ότι τα συμπτώματα του ιού Έμπολα είναι όμοια με του αρχαίου ελληνικού λοιμού, στο έργο του Θουκυδίδη «Ιστορία του Πελοποννησιακού πολέμου».

Επεσήμαναν ότι τα περισσότερα θύματα και στις δύο περιπτώσεις έχασαν τη ζωή τους μέσα σε επτά με εννέα ημέρες. Οι Αθηναίοι θεραπευτές αρρώστησαν όπως και οι σημερινοί, ενώ οι Σπαρτιάτες που είχαν στήσει πολιορκία λίγο μακρύτερα, επιβίωσαν. Αυτό δείχνει ότι η αρχαία ασθένεια, όπως και ο ιός Έμπολα, μεταδιδόταν από αίμα, σάλιο ή επαφή και όχι μέσω του αέρα.



Ο Θουκυδίδης ως αυτόπτης μάρτυρας είναι η κύρια πηγή για τα χαρακτηριστικά του λοιμού.

Επίσης, ο Θουκυδίδης υποστήριξε ότι η ασθένεια καταγόταν από τις ακτές της Αφρικής, νότια της Αιθιοπίας. Γνωρίζουμε ότι ο ιός Έμπολα έχει κι αυτός αφρικανικές ρίζες, ενώ είναι επιβεβαιωμένο ότι γίνονταν ταξίδια στην Αφρική (τοιχογραφία κυανοπιθήκων από τον προϊστορικό οικισμό του Ακρωτηρίου στη Σαντορίνη).

Υπάρχουν βέβαια πολλοί που φέρνουν αντιρρήσεις σε σχέση με την εγκυρότητα των στοιχείων του Θουκυδίδη, ενός ιστορικού με έλλειψη ιατρικών γνώσεων. Αμφιβάλλουν σχετικά με την πιθανότητα να υπήρχε ξενιστής και με το γεγονός ότι δεν υπήρξε άλλο κρούσμα στο διάστημα που μεσολάβησε.

Παρ’ ότι όμως οι γνώμες διίστανται, η απόλυτη ταύτηση του ιού δεν θα είναι πότε δυνατή.

Διαβάστε όλο το άρθρο:
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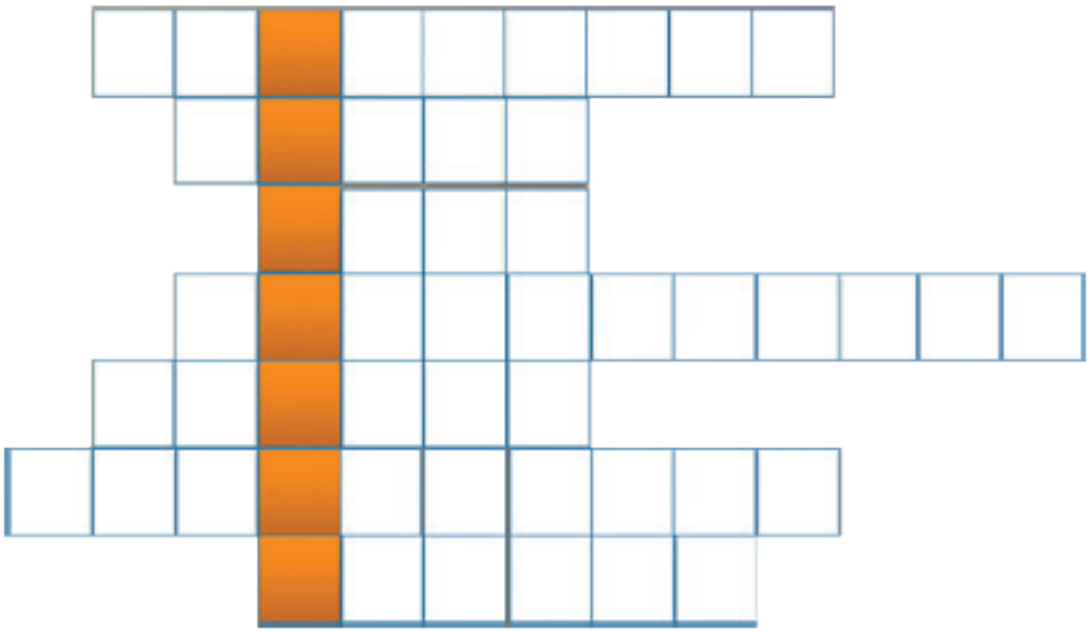
FUN PAGE

Science Crossword

Find the answer and complete it to the crossword

by Spyros Terzis - Athina Stergiannidou



1. The first person to present *PeriodicTable* was called Dmitri .....
2. Au in chemistry represents a chemical element which is called .....
3. There is a brain game that called the ..... of Rubik.
4. It is one of the three preservative forces.
5. Kinetic is a type of .....
6. The set of life-sustaining chemical transformations within the cells of living organisms is called .....
7. In classical geometry, the ..... of a circle or sphere is a the lenght of a line segment from its center to its perimeter.

Experimental School
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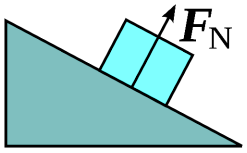
Thessaloniki, Greece

FUN PAGE

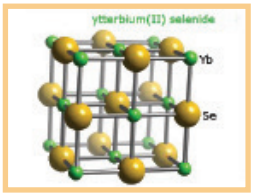
Science Quiz

Circle the right answer and complete the boxes

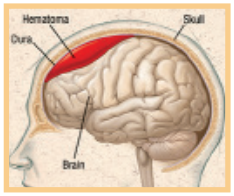
by Spyros Terzis - Athina Stergiannidou



1.Which is the measurement unit of Force (F)?
N. Kg P. N K. Atm T. N/m^2

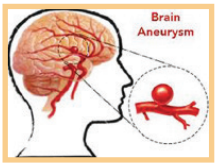


2.How do we symbolize Ytterbium?
A. Yb B. Y G. Yt T. Ym

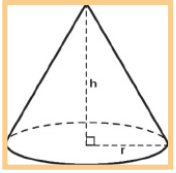


3. How is the brain hematoma located between the Dura and the brain.
W. Epidural Y. Subarachnoid E. Internal bleeding S. Subdural

4.What's the most used technique for a brain aneurism?
Q. String T. Cutting the aneurism C. Clipping it R. Removing it completely



5.Which of the following force is NOT a preservative one?
E. Gravity T. Electricity A. Magnetic B. Spring



6.If we double the radius of the base of a cone then the volume will:
L. Be double R. Be 4 time bigger K. Be the same T. Be 6 times bigger

THE MEASUREMENT UNIT OF PRESSURE

1.P, 2.A, 3.S, 4.C, 5.A, 6.L

Experimental School
of University of Macedonia

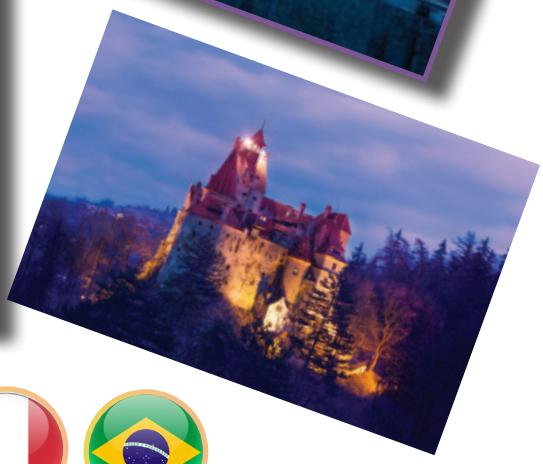
Thessaloniki, Greece

FUN PAGE

Geography Quiz

Match the flags and the names with the pictures

by Spyros Terzis - Athina Stergiannidou



a b c d e

A. Greece, Athens, Parthenon

B. Brazil, Riode Janeiro, Jesus Christ

C. Italy, Rome, Colosseum

D. China, Beijing, Great Wall

E. Romania, Bucharest, Bran Castle

A. 2-a, B. 4-e, C. 1-d, D. 3-c, E. 5-b

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Development of the Theories of Physics Particles and Technological Application

Prior knowledges

Our knowledge about particle physics is confusing enough. So, we do not have a good understanding of what is particle physics and its theories.

Objectives

With this article we want to understand the several theories of particle physics, and to understand if particle physics is only a theoretical science or if it helps technological innovations.

Materials and methods

The research has been conducted by using computer search tools.

1. In the picture, the greek philosopher Aristotle.

2. In the photo, René Descartes, founder of Cartesian geometry

Search results

The history of the particle physics is connected with the atom history. So, we start with an introduction of the history of the atom. In the first instance, Indians and Arabs were the first to suppose that the matter is composed of elementary units. Around 1500 B.C. Indian and Arabic atomism were philosophical and theological theories, and they supported that the atom was divisible.

3. In the photo, John Dalton, founder of modern chemistry.

Sviluppo delle Teorie della Fisica delle Particelle e Applicazioni Tecnologiche

Conoscenze pregresse

Le nostre conoscenze pregresse riguardo alla storia della fisica particellare e delle sue teorie sono poche e confuse, tali da non permettere di avere un'idea chiara di cosa sia la fisica delle particelle e delle varie teorie che tentano di spiegarla.

Obiettivi

Soddisfare la curiosità che spinge a condurre la ricerca, cioè soddisfare il desiderio di avere le idee più chiare per quanto riguarda la fisica delle particelle, il suo sviluppo e le varie teorie che tentano di darne una spiegazione. Inoltre, scoprire quale ricadute abbia la fisica delle particelle a livello tecnologico.

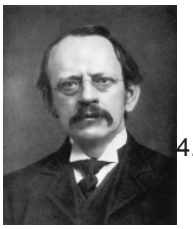
Materiali e Metodi

La ricerca è stata condotta mediante strumenti di ricerca informatici. Le informazioni trovate ne costituiscono il risultato.

Risultati della ricerca

La storia della fisica delle particelle è strettamente connessa alla storia dell'atomo. Per introdurre, quindi, la fisica delle particelle, è necessario sapere come si sviluppò la teoria atomistica. I primi a pensare che la materia fosse formata da unità elementari furono gli indiani e gli arabi, verso il 1500 a.C. L'atomismo indiano ed arabo erano permeati di idee filosofico-teologiche, anche se, comunque, sostenevano che l'atomo fosse divisibile. Più avanti, nel 400 a.C., in Grecia nacque l'atomistica con Leucippo e Democrito, ma era solo speculazione filosofica. L'atomo democriteo era l'entità ultima della materia, indivisibile ed eterno. Con Aristotele le idee di Democrito verranno poi dimenticate, e le idee aristoteliche rimarranno indiscusse fino al sedicesimo secolo circa. Esse sostenevano che l'atomo fosse divisibile e non eterno.

Instead, in the ancient Greece Leucippus and Democritus founded the Greek atomism around 400 b.C.



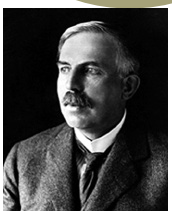
4. **In the photos, the scientist J. J. Thomson, the creator of the plum pudding model.**

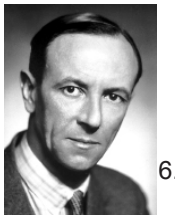
The Greek atomism was also a philosophical speculation. The atom was undivided and eternal. With Aristotle the atomistic theory was forgotten for centuries, until the XVII century.

The atomist theory revived with Descartes, even though it was still philosophy (corpuscularism), and a theological atomistic theory was born with Gassendi. In Europe, atomistic theory was expanded even thanks the "circle of Northumberland". The real scientific experiment started with Dalton, that verified with experiments the existence of the atom. Also other scientists verified its existence, as Avogadro and Mendeleev (periodic table). With him was discovered that some elements have periodic properties.

Then, new discoveries were done, as the discovery of X-rays with Roentgen, of the radioactivity phenomena with the Curie and the discovery of the electro-magnetism with Maxwell. The first discovery about the atom was the discovery of the electron with Thomson in 1899 and the discovery of the proton with Rutherford in 1901. Furthermore, Quantum Mechanic was born in the beginning of XX century, thanks to the researches of several important scientists as Einstein, Maxwell, Heisenberg, Pauli, Schroedinger, Bohr, Dirac and others. So, with Quantum Mechanic were explained the most important laws of the atom, as its stability, behavior and the nature of the light (the light is both a wave and a particle). In 1932 with Chadwick the atom was complete: even the neutron was discovered. But after this, other particles were discovered. In facts, Nobel's Prize Dirac had supposed the existence of the anti-matter in 1928,and Pauli had supposed the existence of neutrino in 1930, a particle that is produced during beta-decade, where some energy is lost. With technological innovation, as bubble chamber (an apparatus designed to make the tracks of ionizing particles visible as a row of bubbles in a liquid), and the study of cosmic rays, more other particle were discovered. And a lot of scientists asked why there are all these particles. Only with Gell-Mann and Neeman in 1961 all the particles discovered since that

5. **In the photo, Ernest Rutherford, famous for the experiment of gold foil.**



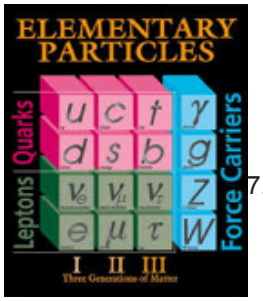


6. **In the photo, James Chadwick, discoverer of the neutron.**

La svolta nella teoria atomistica si ebbe di pari passo con la nascita del metodo sperimentale. Con Cartesio si riprese la teoria atomistica greca (da lui rinominata corpuscolarismo), e Gassendi sviluppò una teoria atomistica in chiave cristiana. La teoria atomistica si diffuse in Europa grazie anche ad un gruppo di filosofi, il Circolo del Northumberland. Solo con i progressi tecnologici si cominciò a sperimentare e verificare empiricamente tutto ciò che secoli prima fu solo dissertazione filosofica. Nell'ottocento, con Dalton si ebbe la prima verifica sperimentale dell'esistenza degli atomi. Contribuirono anche Dalton, Avogadro e Mendeleev alla teoria atomica. Ad esempio, la Tavola Periodica degli elementi di Mendeleev mostrò che gli elementi presentavano proprietà simili a intervalli regolari, in base alla massa atomica.

Le nuove scoperte e gli avanzamenti nello studio dalla fisica portarono alla scoperta dei raggi X con Rontgen, alla scoperta della radioattività con i coniugi Curie e all'elettromagnetismo con Maxwell. Quando si pensava che si conosceva quasi tutto della natura, nacquero nuovi quesiti, che portarono alla nascita della Meccanica Quantistica. Le prime scoperte della struttura atomica si ebbero con Thomson nel 1899, che scoprì l'elettrone (raggi catodici), e con Rutherford nel 1901, che scoprì il protone. Con Maxwell nel 1900 e con Einstein e il suo effetto fotoelettrico nel 1905 si delineava la Meccanica Quantistica. Si scoprì che l'energia è quantizzata, fu scoperto il fotone e l'interazione dell'atomo con la radiazione. Con Bohr si ebbe il primo modello di atomo che rispettasse la Meccanica Quantistica. Con essa si spiegarono le leggi dell'atomo, in particolare il principio di indeterminazione di Heisenberg e il principio di esclusione di Pauli (importante per spiegare la stabilità di tutta la materia). Successivamente, fu dimostrato sperimentalmente che l'elettrone si comporta sia da onda che da particella. La Meccanica Quantistica si rivelò fondamentale per comprendere la stabilità e il comportamento dell'atomo. In seguito, avvenne la scoperta del neutrone nel 1932

moments were gathered together like the elements of Periodic Table of Mendeleev. In 1964 quarks were supposed and in 1968 was formulated the Standard Model by Glashow-Weinberg-Salam. In Standard Model particles are divided into matter particle (fermions, that respect Pauli exclusion principle, with a half integer spin) and carrier force (Gauge bosons, with an integer spin). Fermions are 12 of matter and 12 of anti-matter. Six fermions are the quarks, and the other six are the leptons. Fermions are divided into generations with similar behavior. The generations are three, and only the first is present in the nature, because in it are present the most light particles, and they don't decade. In the second and third generation particles are more heavy and so decade are not present in nature. Quarks, instead, make up protons and neutrons, according to a particular property, the color charge. Quarks cannot be alone but must be paired in pairs of three, so that color charge is neutral. After fermions there are Gauge bosons, or carriers forces. They are four: the photon, for the electromagnetic force; the gluon, for the strong nuclear force;



7. **A graphical representation of the Standard Model. della lamina d'oro.**

the W+, W-, Z0 bosons for the weak nuclear force, and the graviton for the gravity force (so far it does not discovered).

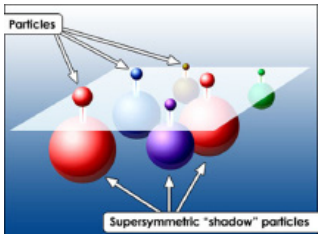
Forces have two properties: the intensity and the range of action. The range is the maximum distance in which the force acts, and the intensity is the strength of the force. For example, gravity has an infinite range of action but a very small intensity.

Therefore, Standard Model explains three of the four forces, and explains also decays and annihilations of the particles. Standard Model is the product of increasingly rigorous mathematical theories.

Standard Model comes from by electromagnetic unification of Maxwell, by the theory of Einstein's general relativity, by the theory of Dirac's quantum field, by the theory of Feynman's quantum electrodynamics and by electroweak unification of Salam-Weinberg-Rubbia.

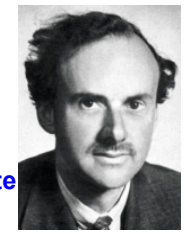
con Chadwick, e si ebbe una visione completa dell'atomo. Nonostante ciò, poco dopo fu osservata una delle prime particelle fuori dall'atomo, il neutrino. Esso fu ipotizzato da Pauli (1930) e studiato da Fermi (1934), e fu dedotto dall'osservazione del decadimento Beta, in cui parte dell'energia si perdeva. Quell'energia che si perdeva era proprio il neutrino, particella con massa piccolissima e con velocità relativistiche, che, secondo la relatività generale, possiede molta energia (quella mancante nel decadimento Beta). Un'altra particella ipotizzata e, poi, osservata nel 1932 fu il positrone (antimateria; opposto all'elettrone, e ipotizzato da Dirac nel 1928).Negli anni successivi, grazie alle innovazioni tecnologiche, come la Camera a Bolle (rilevatore di particelle che utilizza un liquido surriscaldato, che rivela le interazioni di ionizzazione tra le particelle), e allo studio dei raggi cosmici (si scoprì, ad esempio, il muone), molte altre particelle furono scoperte. Nel 1961 Gell Mann e Ne'eman tentarono di raggruppare le varie particelle scoperte in base alle proprietà simili (un lavoro simile a quello di Mendeleev per gli elementi). Nel 1964 Geli-Mann e Zweig ipotizzarono i quarks. Nel 1968 Glashow-Weinberg-Salam formularono una delle teorie più complete delle particelle, il Modello Standard (MS).

Nel Modello Standard le particelle sono suddivise in particelle di materia (fermioni, con spin semi-intero, cioè obbediscono al Principio di esclusione di Pauli) e portatori di forze (bosoni di Gauge, con spin intero, cioè non obbediscono al principio di Pauli). I bosoni di Gauge sono le particelle che permettono l'agire delle quattro forze fondamentali (forza elettromagnetica, debole, forte e gravitazionale). I fermioni, invece, sono suddivisi in tre generazioni. Solo le particelle della prima si trovano in natura, non decadono e sono le più leggere. Le altre della seconda e terza generazione decadono subito dopo la loro formazione e sono più pesanti. Le particelle che costituiscono protoni e neutroni, invece, sono i quarks, che si uniscono in gruppi di tre, in base alla carica di "colore" (la tripletta fa sì che il colore sia neutro), in modo che non possa esistere un quark isolato. Quark e anti-quark formano i mesoni. Gli anti-quark sono esempi di antimateria, opposti alla materia solo per carica. Infatti, le altre proprietà sono identiche. I fermioni sono 12 di materia e 12 di antimateria. I bosoni di Gauge, invece, sono 4, e sono i trasportatori di forze. Il fotone per la forza elettromagnetica (agisce su tutte le particelle con carica elettrica), il gluone per la forza nucleare forte (fa reagire i quark e gli anti-quark),

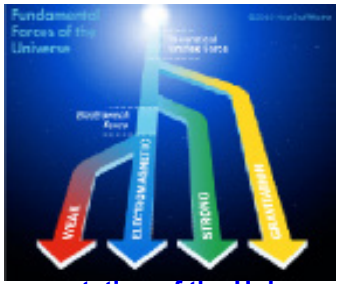


8. **A representation of supersymmetry.**

Nevertheless, Standard Model does not answer many questions as: why the Universe is made of matter instead of anti-matter (bariogenesis), or what dark matter is, or what the gravity is and how it is connected to the other force, and much more. Then, now physics are trying to formulate a Theory of Everything, which can answer to fundamental question as dark matter and bariogenesis. A candidate for a Theory of Everything is Supersymmetry. This theory expected that at the beginning of the Universe the four forces were united in only one force. This force is formulated under a Supersymmetry. In this theory every particle has a more massive counterparts, the supersymmetric particles. This theory could explain dark matter. Another theory is the Grand Unification Theory, that expected magnetic monopolies and mini black holes. Another is the Superstring theory. It was born between the union of Supersymmetry and String theory (formulated by Veneziano in 1968).



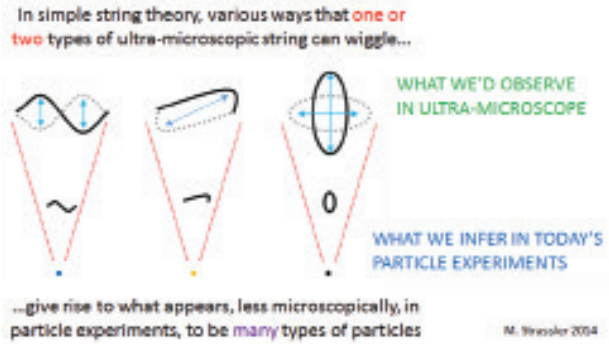
9. **In the picture, the Nobel laureate Paul Dirac theory of antimatter.**



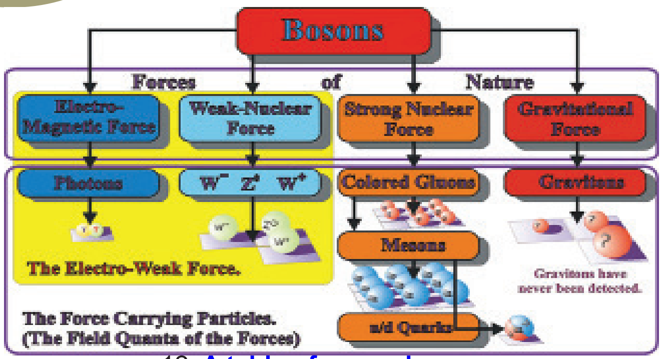
10. **A representation of the Universe forces.**

The theory explains fermions and bosons through the vibrations of the strings. Strings are narrow filaments of infinite length, that can vibrate or oscillate, and able to open or close themselves. According to their oscillation particles will have certain properties of the particles. Superstring Theory is a great candidate for a possible Theory of Everything. Also Superstring Theory can explain quantum gravity (the relativistic mass in agreement with quantum mechanics), but the theory provides no perceptible dimensions.

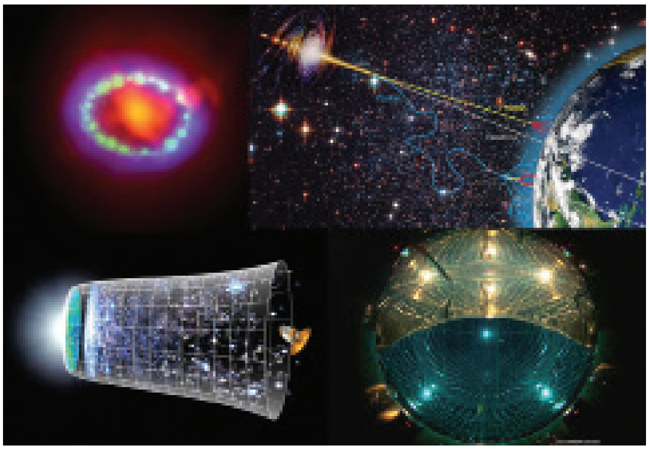
i bosoni vettoriali W+, W-, Z0 per la forze nucleare debole (decadimenti radioattivi, agiscono con tutte le particelle a raggio piccolissimo), e il gravitone per la forza di gravità (non ancora scoperto e non presente nel MS, dovrebbe agire con tutte le particelle con raggio infinito). Le forze hanno due proprietà: il raggio d'azione e l'intensità. Esse sono, in ordine, la distanza massima in cui la forza influisce e la forza con cui agisce (ad esempio, la gravità ha raggio d'azione infinito ma intensità debolissima, mentre la forza forte ha la maggiore intensità in un raggio piccolissimo). Il MS spiega, quindi, tre delle quattro forze (non include la gravità) e le interazioni con le particelle, che includono i decadimenti e le annichilazioni che potrebbero subire le particelle. E' importante considerare che a portare a teorie sempre più evolute furono modelli matematici sempre più rigorosi, il cui culmine è stato il MS. Infatti, esso è derivato dall'unificazione elettromagnetica di Maxwell, dalla relatività generale di Einstein, dalla teoria quantistica dei campi di Dirac, dall'elettrodinamica quantistica di Feynman, e dall'unificazione elettrodebole di Salam-Weinberg-Rubbia. Tuttavia, molte questioni rimangono aperte con il MS. In particolare, si è alla ricerca di una Teoria del Tutto (Theory of Everything), che spieghi le quattro interazioni fondamentali, includendo la gravità, e che dia una risposta a quesiti come: cos'è la materia oscura, perché l'Universo è fatto di materia e non di antimateria (bariogenesi), perché il MS ha tre generazioni, come si collega la gravità alle altre forze, e altre ancora. Una possibile teoria del tutto è la Teoria della Supersimmetria. La teoria prevede che nei primissimi istanti dell'Universo le quattro forze erano unite in un'unica superforza. La superforza si ipotizza in virtù di una supersimmetria. Essa prevede che le particelle, fermioni e bosoni, abbiano delle controparti, le particelle supersimmetriche, molto più massicce. La supersimmetria è una teoria che potrebbe funzionare bene, e che potrebbe spiegare la materia oscura.



11. A representation of superstrings.

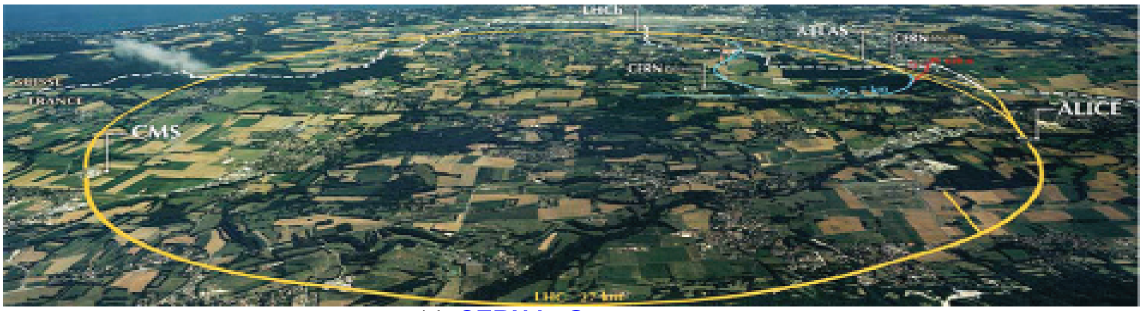


12. **A table of gauge bosons.**



13. **Ratio between particle physics and cosmology.**

Inoltre, i risultati sono simili alla teoria di grande unificazione, cioè un unificazione delle forze. Un altra teoria, la Teoria di Grande Unificazione (GUT), prevede l'esistenza di mini-buchi neri e monopoli magnetici. La teoria delle superstringhe, invece, è l'unione di supersimmetria e teoria delle stringhe (nata nel 1968 con Veneziano), in grado di spiegare sia i fermioni che i bosoni per mezzo delle vibrazioni delle stringhe. Le stringhe compongono tutte le particelle, e sono strettissimi filamenti di lunghezza infinita, capaci di vibrare e oscillare, in grado di aprirsi o chiudersi, e possono fondersi tra loro. In base alla loro vibrazione si avranno le proprietà di una determinata particella. La teoria delle stringhe è un'ottima candidata per una possibile teoria del tutto. Infatti, riesce a spiegare anche la gravità quantistica (la massa relativistica in accordo con la meccanica quantistica). Tuttavia, la teoria prevede sei o sette dimensioni extra non percepibili. Infine, la fisica delle particelle non suddivide solo le particelle subatomiche per poterle catalogare, ma studia le interazioni che avvengono tra le particelle, per poter spiegare l'intero funzionamento dell'Universo. Infatti, la fisica delle particelle è strettamente connessa alla cosmologia, di cui



14. **CERN in Geneva**.

Only experimental evidence could confirm Superstring Theory.

In the end, particle physics does not study particles only for categorizing them, but it studies the interactions between particles also for explaining how Universe works. When a Theory of Everything will formulate, particle physics will help Cosmology and its theories about the born of the Universe and its future. So, particle physics is also very important for technology, that will leverage the discoveries of particle physic. Some example are PET (that leverage positron), Limac (treatment of tumors), nuclear magnetic resonance, WWW (that was born at CERN), quantum computer and databases, maglev trains, new materials as superconductors, and also in biomedicine, with the study of proteins for more efficient drugs.

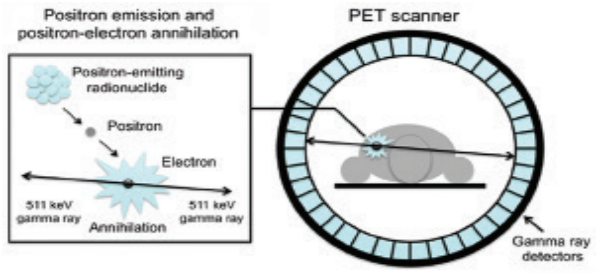
Conclusions

Particle physics has had a continuous devel-

può dare conferme o smentite riguardo le varie teorie. Quando si riuscirà a formulare una teoria del tutto si spiegherà l'origine dell'Universo, il suo funzionamento e il suo destino. In conclusione, la fisica delle particelle è utile anche dal punto di vista tecnologico. Ad esempio, in campo medico è stato sviluppato il PET (che utilizza positroni), trattamenti contro il cancro (come il Limac), o la risonanza magnetica nucleare; in informatica è al CERN che è nato il WWW, e oggi si studia per costruire computer e database quantistici; nel campo industriale si progettano nuovi trasporti, come i treni a levitazione magnetica, o in biomedicina si studiano le proteine con fasci di particelle per creare farmaci più efficienti, o per nuovi materiali come i superconduttori.

Conclusioni

Fin dall'antichità l'uomo si pose il problema della natura della materia e di che cosa fosse composta. Solo dopo secoli, quando la



15. **PET (Positron Emission Transmettiotor).**

16. **The first quantum computer, D-Wave 2X.**

opment of theories and mathematical models and verification experiments. Our idea is that particle physics is well under way, and that future discoveries could revolutionize the way we see and understand the Universe. It is amazing how the study of the infinitely small has the evidence even in the infinitely large study, in the study of the Universe, and our lives. The technology of the future could be based on many future discoveries in particle physics. It is important, therefore, that we continue to invest on the studies and on the particle physics experiments. In the field of scientific research it is important that no scientist is excluded, and that no scientific theory is ignored, as unfortunately happened many times in the history of science.

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tecnologia permise lo studio dell'infinitamente piccolo, molte risposte sono state trovate. Lo sviluppo della fisica delle particelle è stato un continuo sviluppo di teorie e modelli matematici e di esperimenti di verifica. La nostra idea è che la fisica delle particelle sia a buon punto, e che le future scoperte potrebbero rivoluzionare il nostro modo di vedere e capire l'Universo. È sorprendente come lo studio dell'infinitamente piccolo abbia dei riscontri anche nello studio dell'infinitamente grande, nello studio dell'Universo, e nelle nostre vite. La tecnologia del futuro potrebbe basarsi su molte scoperte future nel campo della fisica particellare. È importante, quindi, che si continui a investire sugli studi e sugli esperimenti della fisica delle particelle. Nel campo della ricerca scientifica è importante che nessun scienziato sia escluso, e che nessuna teoria scientifica venga ignorata, come purtroppo è accaduto molte volte nella storia della scienza.

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Particle Accelerators and Nikola Tesla's Teleforce

1. Introduction

The main goal of this article is to present the basic structure and the functions of particle accelerators and to illustrate the invention of one of the greatest minds in the history of technology, Nikola Tesla, and the possibility to accelerate microscopic particles via electric fields.

2. Particle accelerators – Structure, function and expectations

A particle accelerator is a complex system which produces and accelerates a particle beam with specific energy. In most cases, the "projectiles" are protons (ions) or electrons while the "targets" are crystals, living tissue or atomic nuclei, elemental particles, etc. Because the acceleration is caused by an electric field, the particles need, first of all, to have electric charge in order to interact with the field (that is why there is nothing like neutron or atom acceleration.)

The particles are produced in a separate source and are accelerated by a specific combination of electro-magnetic fields. The energy of the obtained particles may vary from a few electron-volts (eV) to a few Terra-Electron Volts (TeV).

In an electrostatic linear apparatus the particles are accelerated by an electrostatic field

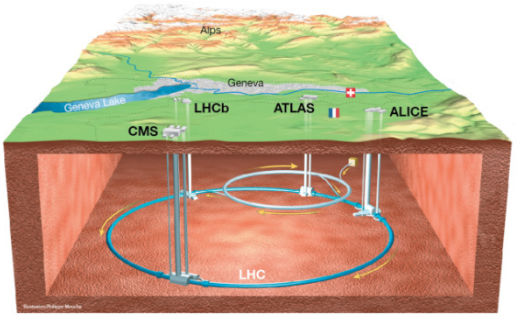

Fig.2 **Circular particle accelerator**
Acceleraror circular de particule

Acceleratorul de particule şi teleforta lui Nikola Tesla

1. Introducere

In acest articol sunt prezentate structura şi funcţiunile acceleratoarelor de particule şi se face o analiză asupra invenţiei marelui inventator Nikola Tesla legată de posibilitatea accelerării particulelor microscopice utilizând forţele electrice.

2. Acceleratorul de particule - Structură, funcţii şi perspective

Un accelerator de particule este un sistem complex care produce şi accelerează un fascicul de particule elementare cu o anumită cantitate de energie. De cele mai multe ori "proiectilele" folosite sunt protoni (ioni) sau electroni iar "ţintele" sunt cristale, ţesuturi, atomi, nuclee, particule elementare etc. Intrucât accelerarea este produsă de un câmp electric, particulele trebuie, pentru a putea interacţiona cu câmpul electric, să fie înărcate cu sarcini electrice (de aceea nu se poate vorbi despre accelerarea neutronilor sau a atomilor).

Particulele sunt produse într-o sursă separată şi sunt accelerate cu o combinaţie specifică de câmpuri electromagnetice. Energia particulelor obţinute poate varia de la câţiva electroni-volţi (eV) până la terra electroni-volţi (TeV).

Într-un dispozitiv electrostatic linear particulele sunt accelerate de un câmp electric static în care particulele sunt energizate, prin conectarea unei serii de câmpuri aplicate pe o traiectorie liniară. Accelerarea particulelor este obţinută prin oscilaţia constantă a câmpurilor electrice.

Fig.1 **Linear particle accelerator**
Acceleraror linear de particule

The most significant circular accelerators are the cyclotrons and the synchrotrons; the only difference to the linear ones is that the particle beam travels through the accelerating part multiple times. The particles remain on the same circular trajectory with the help of magnetic fields produced by large electromagnets, which function in a superconductivity state and are maintained cold at 2K (-271.3oC). They are cooled with a system based on liquid helium, in order to sustain currents up to the kilo amps. However, of energy is lost due to the circular trajectory and the centrifugal forces acting on the particle beam, especially in the case of electrons which, compared to protons, have a much lower stable energy state. This is a limitation of circular accelerators. As a result, in order to achieve a high energy level electron beam, a much larger linear type accelerator is needed [1], [2].

The synchrotron is an accelerator in which the particles accumulate kinetic energy as the oscillating frequency of the electric field is amplified and are kept on track by intensifying magnetic fields.

For example, although the Geneva - LHC (Large Hadron Collider), covers over 27 kilometers, the actual particle acceleration is approx. 2 meters long.

The first particle accelerators were built exclusively to investigate the structure of atoms nuclei (nuclear physics). Later, they were used in many other research fileds [1]:

- Physics of atoms and crystalline structures (better understanding of collisions between atoms in solid or gaseous state).
- Biochemistry (interaction between living tissue and particles with electric charge).
- Materials technology (analysis and change in materials properties).
- Medicine (diagnosis and healing therapy).

With the help of LHD, scientists experimentally proved the existence of a new elementary particle - the Higgs boson. It is this discovery which allowed Peter W. Higgs and François Englert to win the Nobel Prize in Physics in 2013 [2].

3. Tesla's Teleforce

In an article that was published in 1934, Nikola Tesla (1856-1943) describes what he called the teleforce: "My apparatus projects particles which may be relatively large or of microscopic dimensions, enabling us to convey to a

Cele mai importante dispozitive circulare sunt ciclotronul și sincrotronul, singura diferenţă faţă de cele liniare este că fasciculul de particule trece de mai multe ori prin aceeaşi componentă acceleratoare aflându-se pe o traiectorie circulară. Particulele sunt menţinute pe aceasta traiectorie de către câmpurile magnetice produse de electromagneţi care funcţionează în regim de supraconducţie. Aceştia sunt răciţi până la o temperatura de 2 K (- 271.3°C) cu ajutorul unui sistem bazat pe heliu lichid pentru a putea conduce curenţii de ordinul kiloamperilor. Traiectoria circulară aduce cu ea şi pierderi de energie din cauza forţelor centrifugale care acţionează asupra fasciculului, în special în cazul electronilor care, în comparaţie cu protonii, cedează mult mai uşor energie pentru a ajunge la un nivel de energie mai stabil. Aceasta este limitarea acceleratoarelor circulare: pentru a putea accelera electronii la un nivel înalt de energie sunt necesare acceleratoare lineare de dimensiuni mari [1], [2].

Sincrotronul este un accelerator în care particulele acumulează energie cinetică prin mărirea frecvenţei de oscilaţie a câmpului electric şi sunt menţinute pe traiectorie prin intensificarea câmpului magnetic.

De exemplu, deşi acceleratorul de particule de la Geneva - LHC (Large Hadron Collider) se întinde pe o lungime de 27 de kilometri, are o portiune de accelerare propriu-zisă a particulelor de doar cca. 2 metri.

Primele acceleratoare au fost folosite exclusiv pentru studiul structurii nucleului (fizică nucleară). Mai târziu, utilitatea lor a fost extinsă și în alte domenii [1]:

- fizica atomică și a structurilor cristaline (inţelegerea coliziunilor atomice în stări gazoase sau solide);
- biochimie (interacţiunea între ţesuturile vii și particulele încărcate electric);
- tehnologia materialelor (modificarea și analiza proprietăţilor materialelor);
- medicină (diagnosticare și terapie). [1].

Cu ajutorul LHC savanţii au demonstrat experimental existenţa unei noi particule elementare - bozonul Higgs. Este descoperirea care a adus oamenilor de știință Peter W. Higgs și François Englert premiul Nobel în fizică în anul 2013 [2].

3. Teleforta lui Tesla

Nikola Tesla (1856-1943) și-a descris invenţia legată de teleforţa într-un articol în anul 1934 : "Aparatul meu lansează particule relativ mari sau de dimensiuni microscopice care ne permit să transmitem la distanţă foarte mare,

small area at a great distance trillions of times more energy than is possible with rays of any kind.

Many thousands of horsepower can thus be transmitted by a stream thinner than a hair, so that nothing can resist…" [4].

His concept of particle accelerators may be expressed as following [4], [5]:

- Tesla claims that energy may be transmitted through free air, not through a controlled medium (vacuum tubes).
- Tesla imagines an enormous force generating weapon based on the repulsive force acting on particles with the same electrical charge.
- Tesla thought that there is a way to intensify and amplify energy at the same time with an auxiliary device.

In 1937 he published the technical plans and a number of sketches which described his invention called "The New Art of Projecting Concentrated Non-dispersive Energy through the Natural Media". This was the first definition of what we call today electrically charged particle beam or laser (Fig. 3).

pe o suprafaţă mai mică decât diametrul firului de păr, o energie de miliarde de ori mai mare decât ne-ar permite orice alt tip de rază. Nimic nu poate rezista acestui fascicul de o energie echivalentă cu mii de cai putere..." [1], [2].

O analiză a ideii lui Tesla privind posibilitatea accelerării particulelor microscopice poate fi sintetizată astfel [4], [5]:

- Aparatul propus de Tesla consideră că energia se transmite în aerul înconjurător şi nu într-un mediu controlat (exemplu, tuburile cu vid);
- Tesla imaginează un dispozitiv care generează o forţă electrică enormă, pe principiul respingerii sarcinilor electrice de acelaşi sens. Acesta este principiul invenţiei proiectilului său;
- Tesla consideră că există un mijloc de intensificare și amplificare a energiei cu un aparat auxiliar.

În anul 1937 Tesla a publicat planurile tehnice și mai multe schiţe care descriau invenţia sub titlul "O nouă metodă de propagare nedispersivă a energiei concentrate prin mediu natural". Era prima descriere tehnică a ceea ce numim noi astăzi „armă cu fascicul de particule încărcate electric" (Fig. 3).

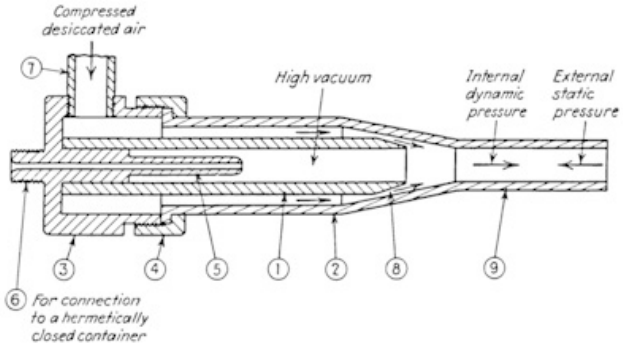

Fig.3 **Sketch of Tesla's weapon**
Schiţa armei proiectate de Tesla

Tesla worked on this invention from the beginning of the 1900s until his death [4], [5].

In 1937 Tesla explained „...But it is not an experiment... I have built, demonstrated and used it. Only a little time will pass before I can give it to the world." [3].

Two years later, in 1939, the first stage of his invention was experimentally tested in the USSR and Tesla received a cheque of 25,000$. If his apparatus has ever been completely built remains a mystery, but most of the experts agree that his machine is unlikely to function as designed. Nevertheless, the "Death Ray" machine is one of his numerous patents [4]-[6].

La această invenţie, Nikola Tesla a lucrat încă de la începutul anilor 1900, până la moartea sa [4], [5].

În 1937 Tesla afirma "… Dar nu este un experiment... L-am construit, l-am demonstrat și l-am folosit. Mai este nevoie doar de puţin timp până îl voi putea oferi lumii" [3].

Doi animai târziu, în 1939, prima etapă a construcţiei a fost experimentată în URSS, Tesla primind un cec de $25,000. Dacă invenţia lui a fost terminată vreodată, rămâne un mister, totuși majoritatea experţilor o consideră irealizabilă. Deşi maşina „Raza morţii" se numără printre numeroasele patente ale lui Tesla [4]-[6].

4. Conclusion

Summing-up the presented arguments, we can conclude that Nikola Tesla was one of the greatest visionary minds in the history of technology and, despite his extravagance, he intuitively anticipated the importance of molecular and sub-molecular physics.

With almost no knowledge of what we call today elementary particle physics, Tesla tried to harness and to use a field which still remains only partially known even after more than a hundred years of research.

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4. Concluzii

Însumând argumentele prezentate în prezenta lucrare, putem concluziona că Nikola Tesla a fost un mare vizionar care în ciuda extravaganţei lui a intuit importanţa fizicii submoleculare.

Cu cunoștiinţe aproape nule despre ceea ce numim astăzi fizica particulelor elementare, Tesla a încercat prin invenţiile lui să stăpânească și să dea utilitate practică unui domeniu care rămâne doar cvasi-înţeles și după mai mult de o sută de ani de cercetări.

Iconography

Fig.1 Linear particle accelerator at: https://www.linearcollider.org/ILC/What-is-the-ILC/The-project, A revolution has begun in the way we see the universe, Operating at tempera tures just above absolute zero, supercon ducting cavities accelerate bunches of electrons and positrons toward the detectors. Image: Fermilab, 2013

Fig.2 Circular particle accelerator at: http://www.swissinfo.ch/eng/the-big-bang-machine-is-back_what-s-next-for-cern-s-large-hadron-collider-/41337172, Simon Bradley, What's next for Cern's Large Hadron Collider?, swissinfo.ch, 2015

Fig.3 Schiţa armei proiectate de Tesla at: http://www.teslaradio.com/pages/teleforce.htm, THE NEW ART OF PROJECTING CONCENTRATED NON-DISPERSIVE ENERGY THROUGH NATURAL MEDIA, FIG. 1 ILLUSTRATING OPEN VACUUM TUBE, ca. May 16, 1935

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Nikola Tesla and Electrostatic Generators

1. Introduction

Nikola Tesla (1856-1943) is one of the greatest inventors of all time. Apart from more than 100 patented inventions in the USA, the famous inventor (Fig. 1)

helped improve the performance of electrostatic generators.

Nikola Tesla şi Generatoarele Electrostatice

1. Introducere

Nikola Tesla (1856-1943) este unul din cei mai mari inventatori ai omenirii. Alături de cele peste 100 de invenţii patentate în USA, celebrul inventator (Fig. 1) a adus contribuţii la îmbunătăţirea performanţelor generatoarelor electrostatice .

Fig. 1 **Nikola Tesla in his New York office (1916)**
Nikola Tesla în biroul său din New York (1916)

In this paper an analysis of key moments in the history of electrostatic generators and Nikola Tesla's contribution to the development of these static machines are presented.

2. The history of electrostatic generators

Power generators needed to be built for people to be able to use electricity. The first power type of electric generators was the electrostatic generator.

The electrostatic generator or the electrostatic machine is a device that produces static electricity at high voltage and direct low-intensity current by converting mechanical energy through friction of two bodies into electricity.

Throughout history, there have been many physicists who built and improved electrostatic machines, all based on the principle of generating electricity by friction of bodies.

In the 1660 German physicist Otto von Guericke (1602-1686) built a sulphur globe "to study the forces of the universe" (Fig. 2). He observeds that friction caused the electrostatic forces of attraction and rejection repulsion to appear at on bodies objects that were electrostatically charged electrostatic. This achievement is considered to be the first "electric machine".

În această lucrare se face o analiză asupra principalelor momente din istoria generatoarelor electrostatice şi se pune în evidenţă contribuţia lui Nikola Tesla la dezvoltarea acestor maşini statice.

2. Istoricul generatoarelor electrostatice

Pentru a se putea folosi electricitatea a fost nevoie să se construiască generatoare electrice. Primele generatoare de energie electrică au fost generatoarele electrostatice.

Generatorul electrostatic, sau maşina electrostatică, este un dispozitiv care produce electricitate statică, la tensiune înaltă şi în curent continuu de mică intensitate, prin transformarea energiei mecanice de frecare a două corpuri în energie electrică.

De-a lungul istoriei generatoarelor, există mulţi fizicieni care au realizat şi îmbunătăţit maşini electrostatice, toate bazate pe principiul generării de electricitate prin frecarea corpurilor.

În secolul XVII în 1660, fizicianul german Otto von Guericke (1602-1686) a construit un glob de sulf "pentru a studia forţele universului". Prin frecare, observă fapul că apar forţe electrostatice de atracţie şi de respingere la corpurile încărcate electrostatic. Acesta realizare este considerată a fi prima "maşină electrică".

Cette gravure du XIXe siècle, historiquement erronée et anachronique, représente des gentilshommes en train d'utiliser la sphère en soufre de Otto von Guericke comme machine électrostatique. En réalité von Guericke utilisait son globe électrisé, non comme générateur, mais pour illustrer son modèle des forces de l'univers.
L. Figuier, Les Merveilles de la science, t. 1, 1867.

Fig. 2. **Sulphur globe made by Otto von Guericke**
Globul de sulf realizat de Otto von Guericke

In 1705 Francis Hauksbee (c. 1666 -1713) used an electrostatic generator for a series of experiments relating to the electric discharge and the spark effect (Fig. 3). Hauksbee useds the electrostatic machine invented by Otto von Guericke, and introduced some improvements: a glass globe in which is mercury is rotated manually and becomes electrostatically charged through friction by hand which produced the phenomenon of mercury-vapour electroluminescence. This discovery can be considered to be a forerunner of the neon lamp.

Un generator electrostatic este utilizat în anul 1705 de către Francis Hauksbee (c. 1666 -1713) pentru o serie de experienţe legate de descărcarea electrică şi efectul luminescent al scânteii (Fig. 3). Hauksbee utilizează maşina electrostatică inventată de Otto von Guericke, căreia îi aduce unele îmbunătăţiri: cu un glob de sticlă în care se află mercur, rotit manual şi încărcat electrostatic prin frecare cu mâna, el pune în evidenţă fenomenul de electroluminiscenţă a vaporilor de mercur. Această descoperire poate fi considerată a fi precursoare lămpii cu neon.

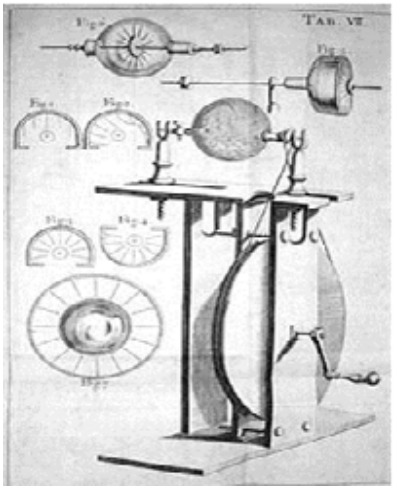


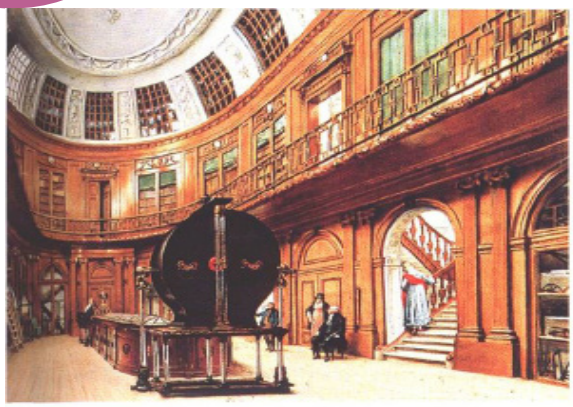
Fig. 3. **Hauksbee's electrostatic generator with glass globe**
Generatorul electrostatic al lui Hauksbee

Fig. 4. **Ramsden's electrostatic machine with disk**
Maşina electrostatică cu disc de sticlă realizată de Ramsden

In 1755 Jesse Ramsden (1735-1800) builds built another generator, the disk machine. His iImprovements consisted of several components that were simultaneously using like used as friction-producing elements (Fig. 4). It is was during that period, when that they begin to make detailed studies about the influence of electricity on the human body, animals and plants was first studied in detail.

În 1755 Jesse Ramsden (1735-1800) construieşte un alt generator, maşina disc. Îmbunătăţirile aduse constau în utilizarea mai multor părţi componente simultan ca elementele de frecare (Fig.4).

Este perioada când încep să se facă studii detaliate legate de influenţa electricităţii asupra corpului uman, animalelor şi plantelor.



Dans cette salle du Teylers Museum, à Haarlem (Pays-Bas), on voit au premier plan la grande machine électrostatique de Van Marum, dont les disques en verre étaient protégés par des boîtes en bois semi-circulaires. Wybrand Hendricks, La pièce ovale du Teylers Museum, vers 1810.

Fig. 5. **Von Marus' disk machine in Museum Teylers, Netherlands**
Mașina Von Marus cu disc de sticlă în Muzeul Teylers, Olanda

Fig. 6. **Von Marus' generator connected with a big Leyd jar (it generates 300 kV high voltage)**
Generatorul, conectat cu un sistem de butelii de Leyda, generează o tensiune de 300 kV

In 1784 Martinus Van Marus built a high-power, high-voltage electrostatic generator, which is on display in the Teylers Museum in Harlem, Netherlands (Fig. 5). The invention of the Leydena jar in 1745 allowed the development of electricity storage systems which were connected to generators (Fig. 6).

Electrostatic generators inevitably led to the development of electroscopes as instruments that measured the amount of electric charges.

After 1898 the period of modern generators began. Thus, in 1929 the American physicist Robert J. Van de Graaff invented the electrostatic generator that bears his name

. Later, in 1931, he built an improved generator.

The operating principle of this generator

În 1784, Martinus Van Marus realizează un generator electrostatic de mare putere şi tensiune înaltă, care se află în Muzeul Teylers din Harlem, Olanda. Inventarea buteliei de Leyda (în fapt, un condensator electric) în 1745, a permis realizarea de sisteme de stocare a energiei, precum și conectarea acestora la generatoare (Fig. 6) .Evoluţia generatoarelor electrostatice a dus inevitabil la dezvoltarea electroscoapelor, ca instrumente pentru măsurarea cantităţii de sarcină electrică .

După anul 1898, se deschide perioada generatoarelor moderne. Astfel, în 1929 fizicianul american Robert J. Van de Graaff inventează un generator electrostatic care îi poartă numele. Ulterior, în 1931 este construit un generator îmbunătățit.

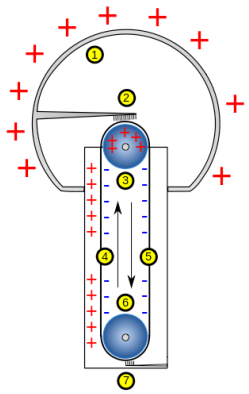


Fig. 7. **Figure explaining the operation of Van de Graaff's generator**
Figură explicativă pentru principiul de funcționare a generatorului Van de Graaff

(Fig. 7) is based on the electrostatic charge produced through rubbing. A conveyor belt made of an electroinsulating material runs over two rollers of different materials. One end is inserted into a metal sphere.

Both, the top and bottom of the belt are in contact with two brush-shaped electrodes. The end of the brush in the sphere is in direct contact with the metallic walls. The end of the bottom brush is grounded.

This generator led to the construction and patenting of a particle generator in 1960.

3. Nikola Tesla- about Van de Graaff's generator

In 1934, Nikola Tesla wrote an article for the "Scientific American" where he examined and evaluated Van de Graaff's generator from an engineering perspective, examining its parameters, size, efficiency and applicability.

a. Regarding the parameters of the generator, Tesla stated that "… from his tower in Long Island he can reach voltages up to 30 MV compared to only 5 MV produced by Van de Graaff's generator."

b. Tesla highlighted the disadvantages of using the Van de Graaff generators: to produce very high voltages the generator should be very high, as tall as the Empire State Building. In addition, this colossal structure cannot generate more energy than the energy accumulated by the electroinsulated band and the improvement of such a construction is almost impossible. He also suggested that the radius of the metal sphere should be smaller.

c. Regarding the efficiency of Van de Graaff's generator, Tesla estimated losses that can reach up to 99.33%, thus demonstrating the ineffectiveness of this device. According to his calculations, Tesla showed that such a generator "cannot supply even a 25-watt incandescent lamp" because it would require a much higher current.

d. Tesla appreciated the operating conditions of the Van de Graaff generator: electrical discharges occur more easily in the atmosphere with low humidity.

All these observations served to improve the Van de Graff generator and in 1935 a new series of generators is proposed and built.

Principiul de funcționare al acestui generator (Fig. 7) este bazat pe încărcarea electrostatică produsă tribologic.

Astfel, o bandă transportoare din material izolant rulează peste doi cilindri din materiale diferite. Unul din cilindri este introdus într-o sferă metalică. Atât pe partea superioară cât şi în partea inferioară a benzii sunt în contact cu doi electrozi în formă de perie. În sferă coada periei intră în contact direct cu pereţii metalici, iar în partea inferioară coada periei este legată la pământ.

3. Nikola Tesla- despre generatorul lui Van de Graaff

În anul 1934, Nikola Tesla scrie un articol în „Scientific American" în care analizează, din perspectivă inginerească, şi evaluează parametrii, dimensiunile, randamentul şi aplicabilitatea generatorului Van de Graaff.

a) Legat de parametrii generatorului, Tesla afirmă că „la turnul său din Long Island poate atinge tensiuni până la 30 MV faţă de doar 5 MV produşi de generatorul Van de Graaff" .

b) Tesla evidenţiază şi dezavantajul utilizării generatoarelor Van de Graaff care, pentru a atinge tensiuni mari ar trebui să fie foarte înalte, asemănând înălţimea stâlpilor cu Empire State Building. Structura colosală nu poate acumula mai multă energie decât energia transmisă cu banda neelectrizată, iar îmbunătăţirea unei astfel de construcţii este aproape imposibilă. De asemenea, sugerează că raza sferei metalice ar trebui să fie mai mică.

c) Referitor la randamentul generatorului Van de Graaff, Tesla evaluează pierderile, care pot ajunge până la 99,33 %, demonstrând astfel ineficienţa dispozitivului. Din calculele sale reiese că un astfel de generator „nu poate alimenta nici măcar o lampă incandescentă de 25 de waţi", deoarece aceasta ar necesita un curent de valoare mult mai mare.

d) Tesla apreciază condițiile de funcţionare a generatorului Van de Graaff: descărcările se produc mult mai uşor în atmosfera cu umiditate scăzută.

Toate aceste observaţii au servit la perfecţionarea generatorului Van de Graff: în 1935 o nouă structură de generator este propusă şi construită.

Acest tip de generator a stat la baza construirii şi patentării în anul 1960 a unui generator pentru studiul particulelor elementare.

4. Conclusion

Towards the end of the sixteenth century, experimental research in the field of electricity led to the development of the first machines which generated electricity.

The development of electrostatic generators based on the conversion of mechanical energy into electricity by friction has enabled advances in the understanding of electrical phenomena and their application in electrical engineering and other fields, such as medicine or radioactivity.

I believe that Nikola Tesla's criticism on the performance of the Van de Graaff generator which appeared in the "Scientific American" article that was published in 1934 has contributed to the improvement of the performance of electrostatic generators.

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4. Concluzii

Sper sfârşitul secolului al XVI-lea, cercetările experimentale în domeniul electricităţii au dus la dezvoltarea primelor maşini care au generat energie electrică.

Dezvoltarea generatoarelor electrostatice, bazate pe conversia energiei mecanice de frecare în energie electrică, a permis progrese în înţelegerea fenomenelor electrice şi aplicarea lor în electrotehnică precum şi în alte domenii precum medicină sau radioactivitate.

Consider că Nikola Tesla, prin critica sa despre performantelor generatorului Van de Graaff făcută în articolul publicat în 1934 în "Scientific American", a contribuit la îmbunătăţirea performanţelor generatoarelor electrostatice.

Iconography

Fig. 1: https://www.pinterest.com/pin/297659856600350790/

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Fig. 3: https://www.awesomestories.com/asset/view/Hauksbee-Electrostatic-Generator

Fig. 4:Mardiguian M., Electrostatic discharge. Understand, Simulate and Fix ESD problems, third edition, IEEE, John Wiley & Sons, Inc. Hoboken, New Jersey, 2009. pp. 312.

Fig.5: https://upload.wikimedia.org/wikipedia/commons/4/48/Wybrand_Hendriks,_De_Ovale_Zaal_van_Teylers_Museum,_c._1800-1820..jpg

Fig. 6: https://s-media-cache-ak0.pinimg.com/originals/8a/66/0f/8a660feec1e8c9a3faec9060410eb4ff.jpg

Fig. 7: http://www.accelerators-for-society.org/about-accelerators/index.php?id=21

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