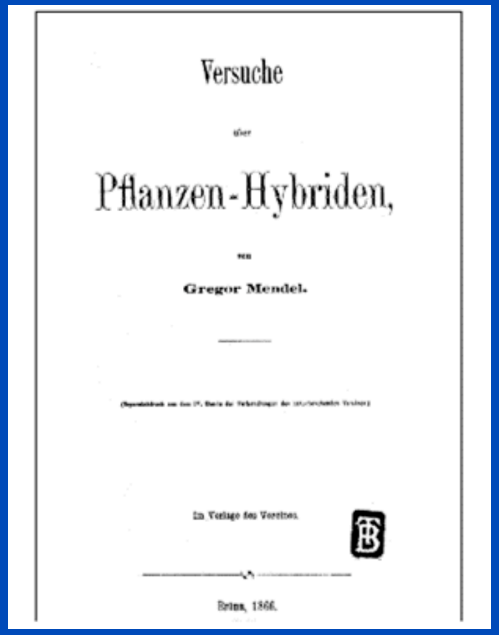
Creating Electronic Public Libraries of Scientific Knowledge



Versuche

über

Pflanzen-Hybriden,

von

Gregor Mendel.

(Separatabdruck aus den Verhandlungen des naturforschenden Vereines)

Im Verlage des Vereines.

Brünn, 1866.

990 SCIENCE (N. S. Vol. XXXVII. No. 963

characterize as truly Gallic dogmatism. In regard to the relative importance of humoral and phagocytic factors in immunity statements of the most sweeping nature are made. So we read on page 205: "Are the opsonins substances or properties new and unknown before Wright's researches? Numerous experiments ascribe to the opsonins of normal serum the same properties as characterize the complement. They are products of the leucocytes." And again on page 227: "There are only two 'theories,' that of Ehrlich and that of Bordet, which, with their conjectures, their uncertainty, their attempts at explanation, and their continual state of incompleteness, are striving to round off the positive doctrine, the expression of undoubted facts, namely, phagocytosis." "It is no way of recognizing the capital importance of phagocytosis to admit that anti bodies and other humoral properties are produced by the phagocytes. The essential fact is the destruction of the microbes by incorporation and digestion. Extraphagocytic destruction is so much an exceptional case that it can not even be brought in as opposition."

The illustrations are for the most part crude line drawings of the type found only in French texts. The English translation is somewhat unfortunate, stemming in constructions like the following (from p. 171): "To prepare an anti-endotoxin, as in the preparation of an antitoxin, it is necessary to inject several times into an animal, for example, the horse, the toxic substance, in this case the bacterial bodies, entire or broken up"; so that the reader is almost reminded of the fate of the famous jumping frog after his translation into French and back again.

C.-E. A. Winslow

SPECIAL ARTICLES

A THIRD GROUP OF LINKED GENES IN DROSOPHILA ANPLOPHILA

THE existence of a group of sex-linked genes in *Drosophila ampelophila* which are linked to each other in different degrees has been demonstrated by Morgan in numerous papers ('10, '11, '12) and by Sturtevant ('13). The fact that the black and vestigial factors, which are not sex-linked, are linked to each other, was reported by Morgan and Lynch ('12) and by Morgan ('12), and these genes were considered as lying in the "second chromosome." The present paper presents evidence showing the existence of still another group of genes, which are located in the "third chromosome."

The pink-eyed fly, first described by Morgan ('11), has been shown (Morgan, '11, '12) to behave as an ordinary Mendelian recessive to the normal red. That this factor is independent of those in the second chromosome is shown by the following experiments:

No. 4356 April 25, 1953 NATURE 737

equipment, and to Dr. G. E. R. Deacon and the captain and officers of R.R.S. *Discovery II* for their part in making the observations.

MOLECULAR STRUCTURE OF NUCLEIC ACIDS

A Structure for Deoxyribose Nucleic Acid

We wish to suggest a structure for the salt of deoxyribose nucleic acid (D.N.A.). This structure has novel features which are of considerable biological interest.

A structure for nucleic acid has already been proposed by Pauling and Corey. They kindly made their manuscript available to us in advance of publication. Their model consists of three interwined chains, with the phosphates near the fibre axis, and the bases on the outside. In our opinion, this structure is unsatisfactory for two reasons: (1) We believe that the material which gives the X-ray diagrams is the salt, not the free acid. Without the acidic hydrogen atoms it is not clear what forces would hold the structure together, especially as the negatively charged phosphates near the axis will repel each other. (2) Some of the van der Waals distances appear to be too small.

Another three-chain structure has also been suggested by Fraser (in the press). In his model the phosphates are on the outside and the bases on the inside, linked together by hydrogen bonds. This structure as described is rather ill-defined, and for this reason we shall not comment on it.

We wish to put forward a radically different structure for the salt of deoxyribose nucleic acid. This structure has two helical chains each coiled round the same axis (see diagram). We have made the usual chemical assumptions, namely, that each chain consists of phosphate diester groups joining β-D-deoxyribofuranose residues with 3′,5′ linkages. The two chains (but not their bases) are related by a dyad perpendicular to the fibre axis. Both chains follow right-handed helices, but owing to the dyad the sequences of the atoms in the two chains run in opposite directions. Each chain loosely resembles Furberg's[2] model No. 1; that is, the bases are on the outside of the helix and the phosphates on the outside. The configuration of the sugar and the atoms near it is close to Furberg's 'standard configuration', the sugar being roughly perpendicular to the attached base. There is a residue on each chain every 3·4 A. in the z-direction. We have assumed an angle of 36° between adjacent residues in the same chain, so that the structure repeats after 10 residues on each chain, that is, after 34 A. The distance of a phosphorus atom from the fibre axis is 10 A. As the phosphates are on the outside, cations have easy access to them.

The structure is an open one, and its water content is rather high. At lower water contents we would expect the bases to tilt so that the structure could become more compact.

The novel feature of the structure is the manner in which the two chains are held together by the purine and pyrimidine bases. The planes of the bases are perpendicular to the fibre axis. They are joined together in pairs, a single base from one chain being hydrogen-bonded to a single base from the other chain, so that the two lie side by side with identical z-co-ordinates. One of the pair must be a purine and the other a pyrimidine for bonding to occur. The hydrogen bonds are made as follows: purine position 1 to pyrimidine position 1; purine position 6 to pyrimidine position 6.

If it is assumed that the bases only occur in the structure in the most plausible tautomeric forms (that is, with the keto rather than the enol configurations) it is found that only specific pairs of bases can bond together. These pairs are: adenine (purine) with thymine (pyrimidine), and guanine (purine) with cytosine (pyrimidine).

In other words, if an adenine forms one member of a pair, on either chain, then on these assumptions the other member must be thymine; similarly for guanine and cytosine. The sequence of bases on a single chain does not appear to be restricted in any way. However, if only specific pairs of bases can be formed, it follows that if the sequence of bases on one chain is given, then the sequence on the other chain is automatically determined.

It has been found experimentally[3,4] that the ratio of the amounts of adenine to thymine, and the ratio of guanine to cytosine, are always very close to unity for deoxyribose nucleic acid.

It is probably impossible to build this structure with a sugar in plain of the deoxyribose, as the extra oxygen atoms would make too close a van der Waals contact.

The previously published X-ray data[5,6] on deoxyribose nucleic acid are insufficient for a rigorous test of our structure. So far as we can tell, it is roughly compatible with the experimental data, but it must be regarded as unproved until it has been checked against more exact results. Some of these are given in the following communications. We were not aware of the details of the results presented there when we devised our structure, which rests mainly though not entirely on published experimental data and stereochemical arguments.

It has not escaped our notice that the specific pairing we have postulated immediately suggests a possible copying mechanism for the genetic material.

Full details of the structure, including the conditions assumed in building it, together with a set of co-ordinates for the atoms, will be published elsewhere.

We are much indebted to Dr. Jerry Donohue for constant advice and criticism, especially on interatomic distances. We have also been stimulated by a knowledge of the general nature of the unpublished experimental results and ideas of Dr. M. H. F. Wilkins, Dr. R. E. Franklin and their co-workers at

articles

Initial sequencing and analysis of the human genome

International Human Genome Sequencing Consortium*

* A partial list of authors appears on the opposite page. Affiliations are listed at the end of the paper.

The human genome holds an extraordinary trove of information about human development, physiology, medicine and evolution. Here we report the results of an international collaboration to produce and make freely available a draft sequence of the human genome. We also present an initial analysis of the data, describing some of the insights that can be gleaned from the sequence.

The US government spends close to $50 billion every year on scientific research (other governments and public institutions across the world more than double this figure), and hundreds of thousands of bright and dedicated scientists devote their careers to carrying out biological and medical research

The goal of this tremendous investment in basic research is to improve health, economic productivity, and the quality of life – both material and intellectual – of citizens of this country and the world

The product of this research – what this $50 billion buys us - is a treasury of knowledge - new discoveries and new understanding of our bodies and the world around us, and new ways to improve our health and to prevent and treat diseases

The primary repository of this knowledge is the published, peer-reviewed scientific literature - the only permanent, public record of our ideas, results and conclusions and those of our colleagues and predecessors

Impact of the Internet

The rise of the internet and the advent of electronic publishing have tremendous potential transform the way we communicate and use scientific knowledge - to make this fantastically rich but extremely fragmented and unsystematic information contained in the scientific literature far more accessible and useful

Public Libraries of Science:

GenBanks of the Scientific Literature

It is now possible to imagine the creation of electronic "Public Libraries of Science", open repositories containing the full-text of every scientific paper ever written in a common, structured format, freely available for access, downloading and use by anyone, anywhere

Important decisions are being made today that will determine whether such a vision is reality and will shape the future of our interaction with the scientific literature

It is absolutely critical that we – the scientific community – actively engage in this process to ensure that the future shape of scientific publishing best serves

Overview of Talk

- Present a vision of a free and open scientific literatu
- Discuss the the ways in which this can improve the w
we communicate and conduct scientific research
- Contrast with current practice
- Contrast with where scientific publishing is heading
- What we have done and what we can/should/must do

Open Access Scientific Literature

Successful creation of public libraries of science requires that the full-text of published scientific manuscripts be, for all intensive purposes, in the public domain

This means that anyone can read, download, search, include in databases, redistribute or otherwise use the full-text subject only to the restriction that proper citations be maintained

Benefits of Open Literature

The first, and most obvious, benefit of an open scientific literature will be unfettered access to the complete scientific literature for anyone, anywhere in the world

Benefits of Open Literature

Currently, comprehensive access to the literature is available only to researchers at large, well-funded academic or research institutes in the developed world

Benefits of Open Literature

Public libraries of science would enable researchers in poorer countries, or at smaller/poorer institutions in the developed world to have the same level of access to the scientific literature as a research at Stanford, Harvard or Cambridge

Benefits of Open Literature

However, better access is only the beginning of the benefits an open scientific literature could provide to the scientific community and the world

Benefits of Open Literature

Public libraries of science would enable creative researchers around the world to begin to tackle the challenge of building tools to better search and connect the treasury of information in the scientific literature, to link this information to other forms of knowledge (such as sequences), etc…

Lessons from GenBank

The impact that GenBank has had on research involving sequences provides a useful example, as GenBank (and other similar databases) are in essence public libraries of sequence information

Lessons from GenBank

The transformation of the life sciences by DNA sequences and the rise of genomics was absolutely dependent upon free and open access and unrestricted use of published DNA sequences - upon the ability to copy and use and transform and redistribute the information without any real restrictions imposed by producers or journals in which the sequences were published

Lessons from GenBank

As sure as GenBank enabled and inspired the creation of methods and tools for sequence analysis upon which we and most of the scientific community are now dependent, robust public libraries of scientific knowledge would set off a boom in ideas and tools for accessing and using this information

Lessons from GenBank

However, as sensible and natural as GenBank seems, it is critical to realize that the distribution of sequence information need not have followed this model

Lessons from GenBank

Imagine how much of the scientific progress of the past decade would have been sacrificed if the publishers had treated DNA sequences as they do all other published information.

Lessons from GenBank

Many publishers undoubtedly now wish they had claimed copyrights on the sequences they published. They would have been a lot richer now, but science (not to mention the biotechnology and pharmaceutical companies for whom the public sequences, and the tools and discoveries that have sprung from them, are the critical resource) would have been a lot poorer.

Lessons from GenBank

Now consider the possibility that we may be sacrificing at least as much progress as was and is enabled by GenBank, by allowing publishers to prevent any similar creative use of all other published information – a much larger and richer body of information than the sequences in GenBank

Will Public Libraries of Science become a reality?

The major obstacle to the creation of public libraries of science are scientific journals who persist in claiming ownership – through copyright and other means – of the scientific literature and who exercise this control to restrict access and use

Will Public Libraries of Science become a reality?

The infrastructure for comprehensive archives of the scientific literature already exists and is constantly expanding and being improved, and virtually all scientific literature is produced in electronic form suitable for submission to archives (SGML/XML is heavily used in production)

The problem is that only a tiny, tiny fraction of this literature is going into the archives

Ownership of Scientific Literature

Certainly, by no reasonable standard can journals claim to have earned the right to exercise such ownership over the scientific literature

Their contribution, as important as it is, pales in comparison to that of the intellectual and physical input from people who did the work and the financial support of the public and private bodies that supported them

Ownership of Scientific Literature

The only question to ask is whether journal ownership and control is a necessary evil

History of Scientific Publishing

History of Scientific Publishing

Scientist have historically relied on paper publication as the most efficient and practical means for wide distribution and promotion of their work, and printed scientific periodicals have been the major means of carrying out this practice

History of Scientific Publishing

Since the major costs in this system are printing and distribution, with each copy produced and distributed involving an expense for the publisher, a standard business model evolved in which scientific journals derived their income from selling periodical subscriptions to individuals and institutions interested in the topics covered by the journal

History of Scientific Publishing

Since the production of a printed journal involved a significant investment on the part of a publisher, it was reasonable for them to seek to protect this investment by asking authors to assign them copyright on published works

History of Scientific Publishing

This transfer of copyright to journals facilitated the publication process and came at a limited cost to individual scientists and the scientific community

History of Scientific Publishing

The distribution of an author's work was not limited by copyright, but rather by the cost of printing and distributing copies and readers' or their institutions' ability to pay the legitimate cost of those copies

History of Scientific Publishing

The ability to find information in the huge body of published scientific work, or to map and record connections between bits of information published in separate works, in separate journals, was also not limited by the business model or by copyright, but rather was inherently limited by the physical nature of the paper literature – serial publications in physically dispersed volumes.

History of Scientific Publishing

Although this system was not perfectly fair - individuals and institutions who could not afford subscriptions were cut off from the latest scientific knowledge - given the inherent limitations of printed matter for distribution and organization of information, this system was arguably the most rational and efficient possible, and it served scientific authors, their readers and society well

Scientific Publishing Today

In the digital age, none of the sound premises of this system remain valid, and the business model that served science so well in the era of printed journals has become a major impediment to progress.

Scientific Publishing Today

Today, the costs involved in scientific publishing today are almost entirely in the preparation of the original edited electronic document – the original is as expensive to produce as ever, but the costs to produce and distribute each additional copy are now infinitesimal.

Scientific Publishing Today

A business model that charges readers for each copy of a work is economically irrational and inefficient, and perversely thwarts that goals of authors, readers and the funders of the work by charging a high price for copies that cost nothing to produce or distribute, thereby artificially creating a barrier to the distribution of information

Scientific Publishing Today

Of course, the remaining costs of publishing - organizing and maintaining an editorial board, managing peer-review, and turning submitted manuscripts into edited, marked up, formatted documents - still must be paid

Scientific Publishing Today

However, since these costs all scale largely with the number of manuscripts submitted and published, it makes far more sense for the scientific community to pay these costs at the time of publication and to place the finished product in the public domain

Scientific Publishing Today

THe public and private agencies that support scientific research should view these costs for communicating the results of the research they funded as a final, indispensable part of the research process, to be paid upfront so that the knowledge produced by this research can be freely available to all

Scientific Publishing Today

There is plenty of money to go around – these same institutions (governments, universities, foundations, companies) already fund the publishing process – they just do it indirectly through overhead or other money that goes to libraries to pay for subscriptions

Scientific Publishing Today

Many billions of dollars are spent every year on scientific journals – more than $10,000 per published article.

Doesn't it seem eminently reasonable to demand that in exchange for giving them the content for free, voluntarily providing most of the essential labor in this process and transfering an immense amount of money to thejournals, that the finished product belong to the public rather than to them?

In the end, no one can reasonably argue that science or the public interest is better served by limiting access to the information voluntarily published in scientific and scholarly journals, or restricting the ways it can be used

Who Benefits from an Open Scientific Literature

Everyone – scientists both as authors and readers/users of the literature, the institutions that fund their research, biotech and other research companies and the public would all benefit materially from a world where all scientific literature is in the public domain

Who Benefits from an Open Scientific Literature

Scientists as Readers/Users

The most immediate beneficiary of an open scientific literature will scientists in our role as readers and users of the literature.

Think of all the things you could do if you could access, download and use the full text of every scientific article in a structured format.

Who Benefits from an Open Scientific Literature

Scientists as Authors

We are already giving away this work for free, and all we want in return is for our colleagues to know about our work and for us to receive proper credit (or glory!) for what we have done.

Clearly, removing barriers to access and use of our work can only help increase its dissemination and the likelihood that someone will take an interest in, and be able to read, what we have written

Who Benefits from an Open Scientific Literature

Funding Agencies/Institutions

Public and private agencies that fund research are interested in creating knowledge, and disseminating this knowledge to anyone who will be able to use it – for this purpose, the production of open literature clearly is preferable to a closed literature

Payment of the complete costs of publishing at the time and point of publication is also economically far more efficient and will, in the long run, save money.

Who Benefits from an Open Scientific Literature

Companies

Biotech companies do not have the institutional buying power to subscribe to many journals – an open literature would give them free access to any article they might need or want. They already paid for it once (though taxes); why should they have to pay for it again?

Will also create huge opportunities to develop commercial tools to help users navigate the open access literature.

Who Benefits from an Open Scientific Literature

The Public

Although most scientific research is paid for by the public – through taxes – most people can not currently read articles describing research they paid for.

For example, today, a sick patient interested in reading about the latest research on their disease has to pay for access to each article. In most cases, this is also true for their family physician, most of whom subscribe to and have access to only one or two specialty journals.

Who Does Not Benefit from an Open Scientific Literature?

Existing Publishers

Many journals are immensely profitable, and even most non-profit publishers have become dependent on the revenues from these journals

The Future: Costs of Complacency

Most scientists support the general idea of an open scientific literature, and see the likely benefits public libraries of the scientific literature could have on their work and on science, but there is a fairly common attitude of "well, the current system isn't perfect, but its pretty good".

The Future: Costs of Complacency

To some extent, this is true. Electronic publishing as it exists today has made things much easier for many of us.

For example, from my computer in Berkeley, I can fairly rapidly find and access almost any article I want.

The Future: Costs of Complacency

But I'm lucky. UC has subscriptions to virtually everything. Many people – including many of you probably – are not that lucky.

Furthermore the system is economically unstable. Journal costs are rising rapidly, and even wealthy universities are being forced to cancel subscriptions to many journals, imperiling our ability to comprehensively access the literature.

The Future: Costs of Complacency

However, far darker scenarios are on the horizon. The trend amongst scientific publishers is towards content aggregation. We have ScienceDirect and HighWire Press and others collecting huge amounts of the scientific literature in private archives.

The Future: Costs of Complacency

This aggregation is a prelude to a major planned shift in how we will access – and pay for access – to these articles. The plans are all for a sophisticated system of authentication – where every scientist has a digital ID, and every time you read or access an article you will pay a small fee, which will, presumably, be paid by your grants or institution

The Future: Costs of Complacency

This might not sound so horrible at first glance (so long as you work for someone who can afford the charges) – no more passwords, and no more paying for articles that noone reads.

The Future: Costs of Complacency

However, there are many reasons to fear this future. First, it will still be a virtual monopoly. If you want to read an article published in a HighWire journal, you will still have to access it though HighWire – you will have to pay whatever they want you to pay and you will be utterly dependent on the tools they provide to access the literature. It will be impossible for academic researchers to build tools to access and use the literature. There is no reason to suspect that Elsevier, Wiley, HW and others will provide the tools we want. For example, until as recently as a last year, people at HW were questioning whether scientists

The Future: Costs of Complacency

The potential problems go further. Today, I can use Berkeley's electronic library to read essentially any scientific (or for that matter and academic) article. However, the move away from institutional subscriptions to accessibility based tolls will likely end this liberty.

The Future: Costs of Complacency

Consider, for example, a researcher who studies mouse development who is funded by a grant from the NIH. They will likely put a line on the grant to cover the costs of their literature access. The NIH could quite easily – and in all likelihood would – approve, but would not be willing to pay for the scientist to read irrelevant articles.

This won't just restrict your ability to read art history, but quite possibly your ability to read articles in ecology, computer science, or other things that are not directly "relevant" to your grant, but which we all know are critical to performing the best science.

The Future: Costs of Complacency

The key thing here is that private ownership of the literature + the developing internet architecture of authentication and control creates a highly regulable system, in which many of the essential characteristics of the scientific process may no longer be available

The Future: Costs of Complacency

You may all thing I'm chicken little here, and screaming that the sky is falling, but this is the kind of thing about which publishers talk openly. Obviously, science is strong and this would not be the death of science, but think about all that we would lose if this became reality. Again, think about what sequence analysis would be like if similar rules applied there

The Future: Costs of Complacency

I hope that none of you want this world to become reality. However, there is often an immensely fatalistic tendency in how we think about journals. We view journals like some mysterious, all-powerful, unalterable force, that decides how significant our work is, where we are going to get jobs and whether we will get tenure, and we are reluctant to mess with this force lest it punish us in unspeakable ways.

We Control the Future

But we have to remember that we – the scientific community – hold all the power here. We do the research. We write the papers. We choose where to submit them. We do the reviewing. We pay the costs. We are members of the scientific societies that publish many of the best journals. If we decided to change the system, we could do it immediately.

PubMedCentral

"If you build it, they will come"

PubMedCentral

"It was built, and they (mostly) didn't come"

Notable exceptions:

PNAS

BioMed Central

Home

Open Letter
- Read
- Sign
- See Signatures
- What Next?

Journal Policies

PLoS Journals
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Links to articles about PLoS, and related sites

Frequently Asked Questions

The Public Library of Science is a non-profit organizatio committed to making the world's scientific and medical accessible to scientists and to the public around the w scientific progress, education and the public good.

We are working for the establishment of international o science that will archive and distribute the complete cc scientific articles, and foster the development of new v and integrate the information that is currently partition separate reports and segregated into thousands of diff with its own restrictions on access.

As a step toward these goals, scientists around the wc circulating an open letter urging publishers to allow the have appeared in their journals to be distributed freely public libraries of science. The response from the interr community to this initiative has been remarkable, and o The open letter has now been signed by **29367** of your countries. Our initiative has prompted some significant many scientific publishers towards freer access to publi general these steps have fallen short of the reasonable advocated. We will make every effort to publish our wo support to, those journals that have adopted the policy letter.

PLoS Open Letter

We support the establishment of an online public library that would provide the full contents of the published record of research and scholarly discourse in medicine and the life sciences in a freely accessible, fully searchable, interlinked form. Establishment of this public library would vastly increase the accessibility and utility of the scientific literature, enhance scientific productivity, and catalyze integration of the disparate communities of knowledge and ideas in biomedical sciences.

We recognize that the publishers of our scientific journals have a legitimate right to a fair financial return for their role in scientific communication. We believe, however, that the permanent, archival record of scientific research and ideas should neither be owned nor controlled by publishers, but should belong to the public, and should be freely available through an international online public library.

To encourage the publishers of our journals to support this endeavor, we pledge that, beginning in September, 2001, we will publish in, edit or review for, and personally subscribe to, only those scholarly and scientific journals that have agreed to grant unrestricted free distribution rights to any and all original research reports that they have published, through PubMed Central and similar online public resources, within 6 months of their initial publication date.

Response to PLoS Open Letter

Signed by over 30,000 scientists

A few journals responded positively (NAR, Bioinformatics, ASM), but by and large, the response from established journals ranged from dismissive to hostile

Response to PLoS Open Letter

Many journals have taken a tiny step, namely they make their back-content available for free access at their website

It is important to note that there is a fundamental and critical difference between this and open access

Consider if DNA sequences were only accessible at the website of the sequencing center that produced it, available for download one at a time, and searchable only through tools provided by the producer

PLoS: Doing it ourselves

The warm response from the scientific community has convinced us that scientists want to publish in open-access journals

It is also clear that they largely believe (correctly or incorrectly) that their careers will be harmed by publishing their best work in extant open-access journals

PLoS: Doing it ourselves

Since extant publishers have been largely unwilling to provide open access journals to the community, PLoS has decided that the only way for the scientific community to produce successful high quality, open access journals will be to create them ourselves

PLoS Publications

Therefore, PLoS has decided to launch a publishing endeavor devoted to the open-access publication of scientific research according to a "pay upfront" business model.

Our primary goal is to provide a venue for people to publish their work and place it in the public domain.

Our secondary goal is to demonstrate the feasibility of our business model, with the hope that other journals will emulate our success and that we will reach comprehensive open access publishing as soon as possible.

PLoS Publications

We will begin with two journals devoted to works of "significance" - PLoS Biology and PLoS Medicine - to be followed by journals devoted to publishing any scientifically rigorous work.

We have been aggressively trying to raise money from foundations to launch these journals with sufficient quality, integrity and financial stability to ensure their success, and should be running by January 1, 2003.

The PLoS Model

Publishing process like existing journals (i.e. works will be peer-reviewed)

All costs will be covered by up-front charges ($500-$1000 and decreasing over time)

Published works will be made available under PLoS license at the moment of publication as HTML, PDF and XML, places into any database that wants content and made available for individual or bulk download

PLoS License

Unlimited right to access, use, redistribute in whole or in part, subject only to the constraint that the original citation be maintained

Related Activities

Raising money to obtain rights to and digitize all of the previously published scientific literature

Fostering efforts to develop tools to use the open access literature

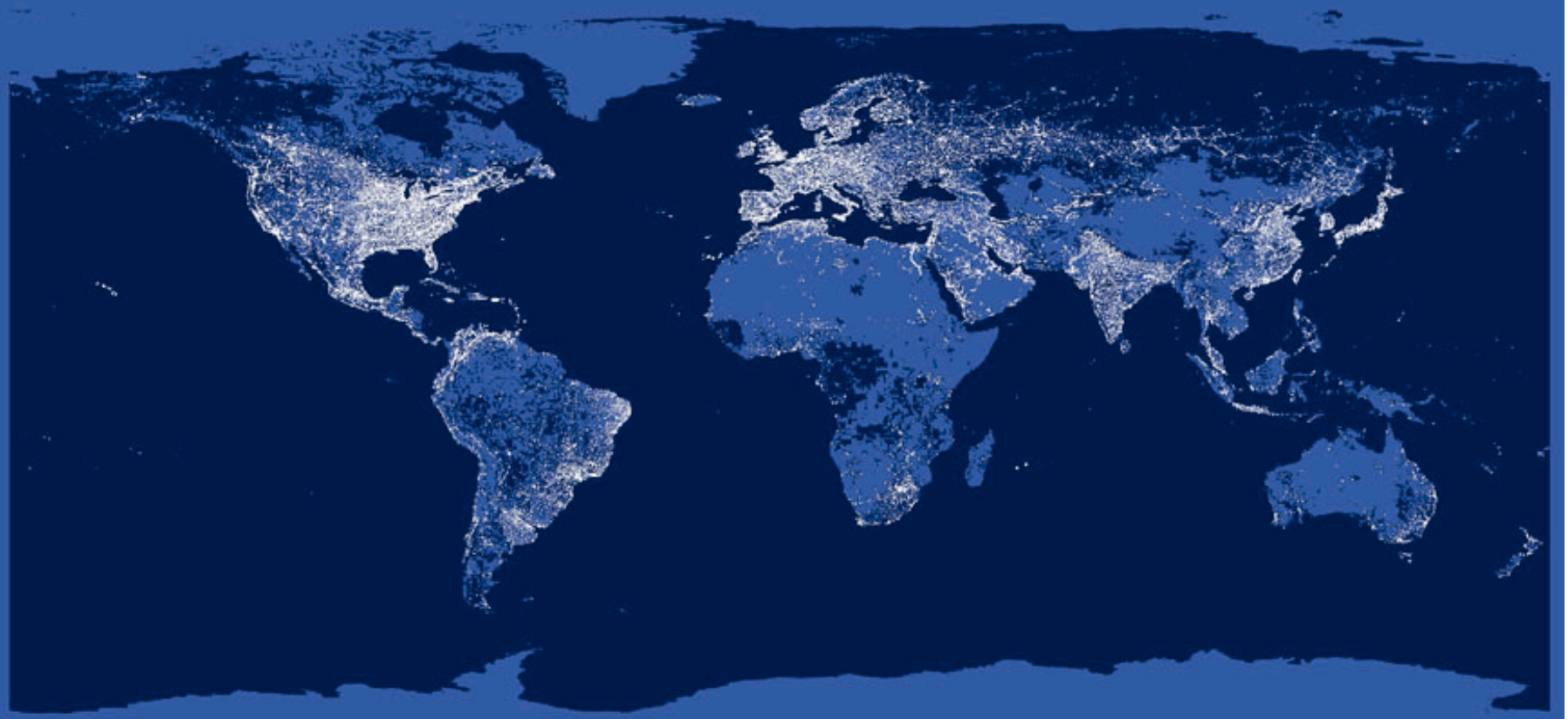
We Need Your Help

Just as we believe that the scientific literature belongs to the scientific community and the world, these journals too will belong to the scientific community

To make them successful, we need your support and help. We need editors. We need reviewers. We need open-source software to manage peer-review and document production.

Most of all we need your best papers

Oppose Private Control of Scientific Literature



Public Library of Science

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