The Bauhaus of Nature

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In 1937 the biologist and ecologist Julian Huxley hosted a sumptuous farewell dinner party for Walter Gropius upon the occasion of his departure from London to become Chair of the Harvard School of Design. This major event took place at the fashionable Trocadero, Oxford Street, with a guest list that reads as a Who’s Who in the English scene of modernist design.\(^1\) Strangely, among the guests one also finds—besides Huxley—prominent ecological scientists and environmentalists, which raises the question of why they were invited to the festivity. After all, ecologists seem to be odd guests at a party in honor of a Bauhaus architect. Social gatherings are often telling indications of an intellectual climate, as Gropius’ farewell dinner will illustrate. What brought Bauhaus designers and ecologists together, this article argues, was a shared belief that the human household should be modeled on the household of nature.

The importance of science to Bauhaus design hardly dominates the historical studies of the school.\(^2\) What significance had the sciences in general and ecology in particular to modernist architecture? Rightly labeled by one of their contemporaries as “scientific architects,” the following pages argue that Bauhaus designers saw science as a key vehicle for design development.\(^3\) Though some Bauhaus designers were inspired by biology while the school was active in Germany, this article holds that the fusion of biological reasoning in Bauhaus design took place during the process of trying to reestablish the school in London after its expulsion from Nazi Germany. This London interlude is often ignored by historians.\(^4\) The period was important for the school’s development in terms of ecological reasoning. This article will first lay out where and how Bauhaus designers and scientists in-

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teracted in London. The next section will point to the importance of ecology to László Moholy-Nagy. The third section will discuss the Bauhaus design at the London Zoo, showing that the Zoo keepers thought the human household should be modeled upon the household of nature, as this was understood in their research. Finally, the last section of the article will explain how ecological sciences and Bauhaus design merged in H. G. Wells’ utopian visions for a society in harmony with nature’s economy.

1. The London Bauhaus

The arrival of former Bauhaus faculty members in London energized the city’s designers and intellectuals. After fleeing from Nazi harassment, Walter Gropius (who arrived in 1934 and left in 1937), Marcel Breuer, and László Moholy-Nagy (who both stayed between 1935 and 1937) were able to meet regularly again as a group. They set forth to reestablish the Bauhaus school in London. The guest list at Gropius’ farewell dinner indicates who responded favorably to their ambition. This party may be labeled “The London Bauhaus,” and the following pages will explain who they were. What brought the interdisciplinary group of designers, town-planners, and environmentalists together was a shared belief that Bauhaus design could solve social as well as environmental ills.

The former Bauhaus faculty settled in the Hampstead section of London which at the time was a community of avant-garde designers, intellectuals, and artists. They moved into a brand new apartment complex, the Lawn Road Flats, which was the first modernist residence in London. Designed by Wells Coates, the building featured a common room (which Breuer redesigned into the Isobar Club in 1937), as well as laundry, cleaning, meal, and garage services. From his window Moholy-Nagy could enjoy overlooking a garden of “only trees, which is very peaceful, especially in London.” The list of carefully selected tenants included a host of left-leaning intellectuals and designers enjoying what Gropius described as “an exciting housing laboratory, both socially and technically.” Technically, the building was to be a true machine for living with state-of-the-art furniture and novelties like built-in cooking and washing facilities. Socially, the apartment complex was to promote collective life and liberate the tenants from the burden of personal possessions. Both Moholy-Nagy and Gropius suffered from the language barrier (the latter only spoke “three words of English”). Yet they were able to overcome the obstacle thanks to the communal spirit of the Flats. The tenants were encouraged to nurture a fellowship modelled on the Bauhaus workshop, and the recruiting of the school’s faculty as tenants was to secure the intellectual climate for what, in effect, was a socialist architectural experiment. The building was to function like a park where people could come and go, and it quickly became a hub for promotion of Bauhaus design. As the building’s architect, Coates was in the midst of gatherings that soon evolved into the Modern Architecture Research Group or MARS. This group included notable designers such as Maxwell Fry (who collaborated with Gropius on several projects), Morton Shand, John Gloag, and the Russian émigré
Berthold Lubetkin (who arrived in London in 1930). The young Danish engineer, Ove Arup, was also among the frequent visitors of Lawn Road Flats.

One of the chief points of debate was the role of biology in reshaping society. The MARS group became advocates of environmental sensitivity: "There must be no antagonism between architecture and its natural setting," they pointed out in their exhibition manifesto of 1938. A drawing of a tree growing through a building was to illustrate that "the architecture of the house embraces the garden. House and garden coalesce, a single unit in the landscape." This appeal reflected values and ideas promoted by environmentalists such as Clough Williams-Ellis, who thought modernist design could save Britain from ecological destruction. Later hailed by Louis Munnford as the founder of the ecological movement, Williams-Ellis became known for his England and the Octopus of 1928 where he rages against the evils of aesthetic and physical pollution of the countryside. Along with the professor of town-planning at London University, Patrick Abercrombie, Williams-Ellis was on a crusade against unregulated development of the English landscape. He had, along with his co-author John Summerson, a progressive view of history. Modern architecture with its focus on light and fresh air represented for them advancement in public health as well as a remedy that could halt environmental destructions of past developments. Bauhaus design was particularly promising since it hailed a regeneration of the craftwork Williams-Ellis associated with the traditional English cottage. This environmentalist group championed, as the historian David Matless has argued, modernist ecological order and fitness of buildings, towns, landscapes, and its people. What they feared was individualism, laissez-faire development, and rustic nostalgia for the past. They were all welcomed by the MARS group as visitors at Lawn Road Flats, and on the guest-list of Gropius' farewell party.

Another meeting place for the Bauhaus devotees was the residence of H. G. Wells, who also lived in Hampstead. As Wells also argued, the human condition should be understood from an ecological point of view. From the late 1920s and on, he used human ecology as his chief methodological tool. His home was known for what the bourgeois would call a salon, though his left-wing friends referred to them as meetings. Wells was a familiar figure in Soviet circles in London, where he engaged with Lubetkin as well as the Russian-born architect Serge Chernayef. It was through Wells' secretary Monra Budberg that Wells also came to know the Hungarian film producer Alexander Korda, who expressed a desire to make a film based on Wells's socialist ideas about architecture. One of the key debating points in their gatherings was the importance of evolutionary biology and ecology in understanding the history and future welfare of the working-class and the environment. These ideas became particularly important to Chernayef, who later in life wrote a book about ecological architecture dedicated to Gropius.

The chief source of inspiration for Wells' interest in ecology was Julian Huxley. As secretary of the Zoological Society, Huxley enjoyed a spacious residence at the London Zoo, which he had made into a showroom for modernist design. Here scientists, architects, urban planners, as well as the environmentalist circle around Williams-Ellis met for discussions. The group, also present at the Gropius farewell party, included
Charles Herbert Reilly, William G. Holford, Conrad H. Waddington, Eric L. Bird, Edward M. Nicholson, and James E. R. McDonagh. Their program for saving mankind from environmental, economic and social destruction through scientific planning found its voice through the Political and Economic Planning Organisation—known under the cheering acronym PEP. It was instituted in 1931 in response to an article by Nicholson about the urgent need for “A National Plan for Great Britain” to save the nation from economic depression. Progressive architectural design was one of its core aspects, and many architects—especially Gropius—looked at PEP with hope and admiration. As an outspoken socialist and Oxford trained ecologist, Nicholson argued that Londoners faced a serious population and slum crisis and that scientists, architects and planners offered new housing and urban designs to deal with the problem.

He economically supported a village-college in Histon designed by Gropius and Fry that aimed at moving people out of cities into small and presumable healthy country towns. This project came as a response to a manifesto on minimum housing standards signed by a series of modernist architects and published in Week-End Review, where Nicholson worked as assistant editor. It promoted new standards for room size, light, ventilation, sanitation, heating, and access to water, as well as proximity to workplace, grocery stores and childcare. The basic idea was that old-fashioned housing design reinforced an unfortunate dualism between humans and nature while the new Bauhaus architecture promised a reunion of humans with nature through healthy living. The planning of cities that could secure the evolutionary survival of the human species was the issue at stake.

2. Learning From Nature’s Workshop

The London writings of Moholy-Nagy may provide a window into debates about evolutionary survival of the human species, as this was discussed at the Lawn Road Flats. There are only sparse discussions of his biological outlook in the literature about Bauhaus, despite the fact that he stressed the importance of biology in his work and educational program. The architectural historian Reyner Banham, for example, focuses almost exclusively on the importance of mechanization to modernist design in general and to Moholy-Nagy in particular. Similarly with Moholy-Nagy’s biographer, who also argues that Moholy-Nagy’s “activities became highly disparate, even to the point of fragmentation” during his London years. What looks like fragmentation was actually a re-launching of Bauhaus as an ecologically-inspired program of design.

Moholy-Nagy, it is worth recalling, was Hungarian-born, the former professor of a metal workshop, and responsible for teaching the preliminary design course at Bauhaus, Weimar. He and Gropius had previously compiled a series of books about Bauhaus design, in which his own Von Material zu Arkitektur (1929) appeared in English under the title The New Vision in 1930. For many English speaking designers it became their first encounter with Bauhaus research methods. He advised them to use “nature as a constructive model” and always look for “prototypes in nature” to determine functionality. “Functionalism” was a key word in the book. Late in life Moholy-Nagy
would complain that the original meaning of Louis Sullivan’s motto “form follows function” had been “blurred” to a “cheap commercial slogan” so that its original meaning was lost. According to Moholy-Nagy, it should be understood in view of “phenomena occurring in nature” where every form emerges from its proper function. This was also the basic assumption in The New Vision: humans were governed by their biological nature and cultural artifacts would consequently only be functional if they confirmed to human biology. Bauhaus design was to “guarantee an organic development” and allow its users to “follow biological rhythms” so that people’s daily “lives would be less hysterical and less empty.” The task of design was to create a culture which strengthened people’s ability to function biologically, and the mean to achieve this end was to make sure design mirrored the balance of nature. “[T]echnical progress should never be the goal, but instead the means” for a healthy biological life, he argued.

The chief source of inspiration for this design program was the Hungarian biologist Raoul H. Francé (1874–1943). Though Francé is largely forgotten today, he was, in the inter-war period, a best-selling biologist and Director of the prestigious Biological Institute of the German Micrological Society in Munich. He was an outspoken defender of psychobiology: the theory that a certain vital psyche in living matter is a driving force in evolution. As one of the founders of soil ecology, he argued that the earth had a dynamic power that gave plants a psychic goal-oriented energy aiming at evolutionary harmony among living organisms. Humans could benefit from the earth’s vital powers, Francé argued, if they learned to copy nature’s inventions. (Fig. 1) Under the label “bio-technique” he founded the science of bionics to pursue this end. The aim was to study nature’s workshop to generate principles, techniques and processes that could be applied to human technologies so that human society would live in harmony with nature. The structure of plants as well as their biotic communities should serve as models for architecture and city planning, respectively. It is possible to imagine a “futuristic utopia,” he argued, “if the Doctrine of Life would become the lode-star of human institutions” and “the optimally functional form” of plants and plant communities was applied to development of new technology, design, architecture and urban planning. One merely had to learn from nature’s workshop to find out what humans should do, he claimed in Die Pflanze als Erfinder (Plants as Inventors) of 1920, a book which Moholy-Nagy would frequently quote.

It is worth noting that Moholy-Nagy was not the only modernist designer enthused by Francé’s thinking. Both Siegfried Ebeling and Ernst May used the bio-technique in their design. May, for example, pursued the method when designing housing at Frankfurt-Römerstadt (1926). Their bio-techniques and the housing project later inspired Lewis Mumford’s visions of a future urban order for human culture.

The overall aim of Moholy-Nagy’s research was to find a way of designing that would set human life in harmony with nature’s economy, as this was understood by Francé. In his artwork he investigated space relationships and functionality in relation to biological needs. He defined architecture “as an organic component of living” and argued that “[a]rchitecture will be brought to its fullest realization only when the deepest knowledge of human life in the biological whole is available.” While living in
London he drew up ambitious plans for a space-modulator (similar to his light-modulator of 1930) in the form of a kaleidoscope that could produce every possible space relationship. The aim was to research “[t]he biological bases of space experience,” so that the architect and designer could proportionally transfer the spatial order of nature into the human realm. The numerous drawings Moholy-Nagy generated from this research should thus be read as attempts to understand how human biology functions in different types of spaces.

Bauhaus design was also meant to reconcile the artificial and the natural in a way that would enhance both human life potential and create a harmonious environment. Moholy-Nagy was pursuing an indirect argument for ecological protection, namely that a well-functioning biotic community was a precondition for a well-functioning human society. “The new architecture on its highest plane will be called upon to remove the old conflict between organic and artificial, between open and closed, between country and city,” Moholy-Nagy told British architects. He was inspired by Francé’s idea that every organic object had a harmonic organization that manifested itself internally as a balanced structure, and externally in the shape of ecological communities. Moholy-Nagy developed his program of social responsibility accordingly, by providing communities with structurally sound designs that gave support to human and non-human biological needs. “[T]he thesis on which the Bauhaus was built,” he argued, pointing to Gropius’ first public lecture in London, is “that art and architecture which fail to serve for the betterment of our environment are socially destructive by aggravating instead of healing the ills of an inequitable social system.” Bauhaus design will determine “the fate of our generation and the next” if it successfully uses the biological forces of life to improve social, economic, technical and hygienic matters so that society would live in harmony with nature.
The Bauhaus educational program was based on the bio-technique Moholy-Nagy explained in a series of articles written in London which were designed to mobilize support to reestablish the school there. One of them was an article entitled "Why Bauhaus Education?" later published as a manifesto in Shelter for the New Bauhaus in Chicago. The students would have to read a substantial amount of science literature to make them aware of the fundamental biological needs of the human society. This was an effort to develop "a new type of engineer" who would use "an organic approach" in design. The new science of "bio-technique," Moholy-Nagy explained, "deals with transportation of natural forms and design into the media of human production. Nature evolves ingenious forms, often technologically useful. Every bush, every tree, can instruct us in and reveal new uses, potential apparatus, and technological inventions without number."

In his photographic art, Moholy-Nagy also tried to capture the vital life force of evolution outlined by Franço. He saw art as an expression of the dynamic forces of life in matter: one needed to "replace the static principle of classical art with the dynamic principle of universal life." In his abstract film projects such as Light-play: black-white-gray (1932), he tried to capture the dynamic life force on the screen. This was also his agenda in his commissioned photo illustrations for Eton Portrait (1937), An Oxford University Chest (1938), and for the guidebook to The Street Markets of London (1936). In these three picture books Moholy-Nagy uses a snapshot technique which captures the life of Eton and Oxford dons as well as marked dealers in action. By capturing the moment with snapshots (as opposed to posed photos), Moholy-Nagy saw himself as a scientist "providing a truthful record of objective determined fact." These facts were also evidence of a class-ridden society with images of places where the biological forces of life failed to unfold. At Oxford, for example, he would juxtapose well-to-do students and faculty members with images of the poor, as if to remind the reader that the creative energy of academic life all too often was a privilege of the rich.

Moholy-Nagy made two documentary films in London which further illustrate his biologically inspired design program. The first one was commissioned by a London documentary film company, released in 1935 as The Life of the Lobster. It is a sixteen-minute-long naturalistic documentation of the growth of the lobster from tiny 'crawfish' to old age, as well as the fisherman's struggle to search them out. What possible interest could an artist like Moholy-Nagy have had in the lifecycle of lobsters? A hint to this question can be found in an article of 1937 entitled "The New Bauhaus and Space Relationship." Using the horseshoe crab as his example, he explains that its "prehistoric animal shell is constructed in such a wonderful way that we could immediately adapt it to a fine bakelite or other molded plastic form." The horseshoe crab thus served as an example of the usefulness of natural forms as models for human artifacts. The point of the film was thus to show designers and architects alike that there was something to learn about form and function through observing the forms and life of animals like lobsters.

The second film Moholy-Nagy made in London was a fifteen minute silent documentary commissioned by Alfred Barr, the Director at the Museum of Modern Art,
about The New Architecture of the London Zoo (1936). It is an attempt to document the space relationships within a building, and it follows the space-modulator project outlined above. "I protested against such a naturalistic approach," the architect of the buildings, Lubetkin, commented, since the film apparently wanted "simply to record, and maintained that the world was full of new shapes, textures and movements." Lubetkin was clearly expecting something in the line of Moholy-Nagy's earlier use of light and shadows from his pre-London films, though the naturalistic language of the film fits well with Moholy-Nagy's project of documentation of different biological experiences of space in the human and animal world. The comment also reflected a philosophical difference, as the next section will illustrate, between the vitalist-informed design Moholy-Nagy advocated, and the geometric or mechanistic biology Lubetkin's design was based upon.

3. From Animal House to Bauhaus

In the summer of 1934 the London Zoo opened their new Penguin Pool with fanfare, the latest culmination of a series of new buildings designed according to the Bauhaus style. It was immediately recognized as a masterpiece of the avant-garde, and its famous double helix ramps have since been a pilgrimage site for admirers of modernist architecture. (Fig. 2) How did such design relate to ecology, animal welfare, and penguins? In the following pages I suggest that the zoo keepers used Bauhaus design to promote a socialist inspired view of the connection between animal and human nature. They saw a close connection between animals and humans, and consequently an evolutionary development from the animal house to Bauhaus which offered health, welfare, and peaceful relationships between humans and the natural world.

The pool was designed by the Tecton Company led by Lubetkin, with engineering support from Arup. Lubetkin was a political revolutionary who jumped at the opportunity to display modern architecture to the masses. Similar to Le Corbusier, Lubetkin believed geometric forms were fundamental building blocks of nature. Though he disagreed with Moholy-Nagy's vitalist biological outlook, he was also of the bio-technical opinion that forms of nature ought to be the model for functionalist design. Moreover, he argued that the "geometric" approach to zoo design "consists of designing architectural settings for the animals in such a way as to present them dramatically to the public, in an atmosphere comparable to that of a circus." Animals have long played an important part in the Russian circus ring, so it is not surprising that Lubetkin evoked this idea as a model for explaining human relations to animals.

The architectural historians of the London Zoo have also understood its architecture as an example of seeing nature as a circus for human entertainment. The evidence for understanding the Penguin Pool in terms of a circus is found in architectural reviews that created a lasting image of the pool as a circus for human amusement. The Architectural Review, for example, wrote about the "theatrical quality" of the pool as "a suitable setting for any latent publicity talent" among the penguins. Similarly, in Architect and Building News the reviewer marveled at how penguins with "a taste for
publicity” enjoyed themselves. The reviewer in Architect’s Journal argued that the pool was a genuine attempt “to preserve the birds from the boredom which generally overtakes all zoo inhabitants” since the birds now had an opportunity to display their social talents on the double helix ramps. These views were not taken lightly by an American zoo critic who argued that the London Zoo projects had a “flavor of a circus or a country carnival” for “pure pleasure and amusement of their owner” with the tragic result that “the educational or scientific value of an English zoo is nearly zero.”

The problem with the interpretation of the Zoo as a circus by historians today as well as reviewers of the 1930s, is that it does not explain why the keepers of the Zoo chose to house their animals in such an environment. Being trained as biologists, they fashioned themselves as serious scientists and not as managers of a zoological circus. If one looks at the Tecton buildings from these scientists’ perspective, a quite different view of the role of architecture and animals emerges. They were the ones who paid the construction bill, and as clients of Tecton, they had a significant say in how they imagined their new zoo buildings. Though they welcomed entertainment that could generate general interest in biology (and money from entrance fees), they were not willing to pursue amusement at the expense of their scientific integrity or the welfare of the animals.
It was the promotion of public health and not amusement which prompted the Zoo keepers to build modernist architecture. It is telling that when the research anatomist at the Zoological Society, Solly Zuckerman, recalls the Tecton architecture firm, his first memories are of yoghurt.42 They were a group of seven young architects in their mid-twenties struggling to find work in a sluggish economy. One of Lubetkin’s colleagues tried to make a buck selling his East-European family dairy secret, which incidentally introduced yoghurt to the English market. It was exactly such new, white, clean, and healthy dairy products that intrigued Zuckerman, who was concerned about public health. He was decidedly on the left side of the political arena and consequently sympathetic to new ideas from East-Europe. Zuckerman heard about the yoghurt news through Godfrey Samuel (son of the Liberal politician Herbert Samuel), who had recently graduated from the Architectural Association and now worked on the Tecton team. A friend of his, Philip D’Arcy Hurt, introduced Zuckerman to the young Samuel. Hurt was at the time researching the alarming distribution of tuberculosis in England. He believed modernist architecture could provide a healthier home with better air and more light for the English poor.43 Zuckerman might also have learned about Ove Arup through his father Paul Seiden Arup who was a well known veterinarian among British zoologists.44 The story of how Zuckerman met and eventually came to promote Tecton among the zoologists thus points towards issues of public health, rather than elaborate design and circus.

There was more to the new architecture than public health and yoghurt. When the Zoological Society purchased two young gorillas for its Zoo in 1932, Zuckerman became the chief source of authority on how to house them. It was with respect to this problem that he started to promote Tecton. He had just published a major piece on “The Menstrual Cycle of Primates” where he argued that the cycle was the key to understanding the sexual, and thus social life of primates.45 The importance of fresh air and stable temperatures in a gorilla house was apparently vital for regular menstruation, a fact that came to determine Tecton’s design. According to Zuckerman, the difference between human and animal behavior was “almost certainly one of degree only,” and one could consequently see the life of primates as “a crude picture of a social level from which emerged our earliest human ancestors.”46 He argued this in The Social Life of Monkeys (1932), where the life of primates serves as a model for explaining deeper sexual and social instincts in humans. Visitors at the Zoo observing the gorillas would thus also observe and reflect upon their own primitive desires. It was consequently of moral importance to place the gorillas in a model home for healthy living.

Zuckerman was the first of several scholars at the Zoo who was interested in modernist architecture. He introduced Lubetkin to the superintendent Geoffrey Vivers and to the secretary of the Zoological Society Peter Chalmers-Mitchell, who also came to promote Bauhaus design. Chalmers-Mitchell believed evolutionary biology gave support to a cooperative model of social behavior, and that antiwar and peaceful coexistence was the best strategy for evolutionary survival among animals as well as humans.47 All species could prosper in a healthy and peaceful environment, and penguins were no exception. Using penguins as an example, he argued that “the most unlikely animals
seem to thrive under what would seem the most unnatural conditions [provided that they] gain freedom from enemies, regular food and general hygiene.” The same would hold for workers and the poor who were in desperate need of being liberated from their ‘natural’ condition of criminal and filthy slums. It was thus of revolutionary importance to display thriving animals in an unnatural setting as if to prove that humans too could prosper in a new environment. Chalmers-Mitchell arranged for unemployed miners to perform a large part of the heavy work in constructing the Zoo buildings, since this allowed them to be in “good open-air conditions until they had recovered sufficiently, mentally and physically, to pass out into the ordinary labour world.” The health and welfare of people and animals were of equal concern, and the new architecture was to promote it. The Zoological Garden, he believed, should be a place where humans could have a “close up view” and reflect on their shared instincts of cooperation with other animals.

The newspapers and the popular press wrote about the new buildings in the same language of healthy environments for animals and humans alike. The Times, for example, noted that the objective of the penguin pool was to have “architectural unity and pleasing effect, and at the same time be thoroughly hygienic, give the birds what they require, and afford ample space for visitors.” Likewise, the gorilla house was praised for being a healthy and hygienic home rather than for being inventively designed. A popular history of the London Zoo of 1936 took the zoo to be a “very good indicator as regards the nation’s material, and indeed spiritual health.” Its new architecture should serve as model for the “ultra modern human dwelling-house” complete with “access to the outer air” with opportunities to have a healthy “sun-bath.” A healthy environment at the Zoo was to be a model for healthy human living in tomorrow’s society.

The cooperative view on society and evolution was based on a mechanist footing, as Chalmers-Mitchell argued in a lecture on “Logic and law in Biology” in 1932. Inspired by Marxist materialism, he thought sound social policies should be founded on logic, physics, biology and social psychology. The aesthetic language of geometric logic in Tecton's penguin pool was to Chalmers-Mitchell a visual representation of the foundation of modern biology. These ideas were inspired by new ways of understanding evolutionary biology among left leaning London scientists. Biologists had, since the rediscovery of Gregor Mendel's theories, fought over whether their research should have an evolutionary or genetic footing, and a mathematical turn in biological methodology of 1930 was seen as a revolution in the field. This evolutionary synthesis had its precursor in mechanistic views of nature promoted by John B. S. Haldane and Julian Huxley in their popular book Animal Biology of 1927. The new mechanistic and mathematical approach in biology was to Huxley a key material basis for a successful, orderly planning of the human society, through a new urban matrix of mathematically inspired Bauhaus architecture. The geometric order of the Zoo buildings became a visual representation of the promising mathematical turn in biological research models. The new Bauhaus households mirrored this new order of the household of nature.

In April 1934 the Zoological Society hired Huxley to replace Chalmers-Mitchell who retired (and subsequently went to fight on the socialist side of the Spanish Civil War).
In his new job he continued the program of Bauhaus architecture at the Zoo with a Studio of Animal Art designed by Tecton and completed in 1937. It was used daily by a group of about 200 students who came to draw live animals. Despite the success, Huxley tried in vain to convince the Council to extend the program of modernist design to a new elephant house, with two proposals designed by Fry and Lurberkin respectively. The Council rejected them both for financial, aesthetic, and political reasons.

Huxley was hired by the Council chiefly due to the public success of his nature film *The Private Life of the Gannet* (1934), directed by Alexander Korda. As soon as he got the job he published one of his most high-profile socialist books tellingly entitled *If I Were Dictator* (1934). It did not go over well with the conservative dons at the Council. It is filled with grandiose socialist ideas for “the remodelling of the life of a nation” steered by a scientific elite elected not on democratic but on scientific merit. His chief source of inspiration was the Tennessee Valley Authority in the United States. Huxley visited Tennessee in 1932 and came back deeply impressed by the project’s large scale architectural reorganization of nature and society. It served him as a model for how to proceed with the British Isles. He encouraged Gropius to visit the region upon his departure for the United States. The Bauhaus architecture of TVA has only recently been subject to historical analysis, thanks to a first-rate study of Christine Macy and Sarah Bonnaud. They argue that the design project aimed at establishing a communitarian utopia where economic competition and conflict were replaced by expert planning and cooperation. The project was part of the New Deal, and aimed at restoring a landscape suffering from environmental degradation as well as helping rural farmers in adapting to a modern lifestyle. In the spirit of the old Bauhaus school, TVA promoted a culture of paternalism and ‘macho’ design solutions with respect to gender and the role of women. The chief architect of the project, the Hungarian émigré Roland Wank, evoked the bio-technique methodology of his compatriot Moholy-Nagy by using nature’s energy as a model when designing buildings, dams, highways, landscapes, and recreational parks.

In Huxley’s many public appearances, he fashioned himself in the image of the TVA Director and architect conducting “major experiments in social planning” on the British Isles. As master builder of the nation he would offer a New Deal for the Brits that abandoned private ownership, cleared slums, and built new housing communities, all in the interest of the needy. In reality, though, Huxley was not a director of his country, but only secretary of the London Zoological Society. In this job he was free to project his grand visions into the animal kingdom by making sure that the animal’s housing and living conditions served as a model for how to organize tomorrow’s human world.

4. Things to Come in the New Bauhaus of Nature

H. G. Wells was a frequent visitor at the Zoo. As a collaborator with Huxley, he was involved in debates among urban planners, Bauhaus architects, and ecologists about the future welfare of the human and natural world. This section will discuss the TVA-inspired vision for remodeling the British Isles that appears at the end of his science
fiction film *Things to Come* (1936). Film historians have described in detail its socialist agenda, its creative use of new design and filming techniques, and its popularity. Yet, the same historians have failed to discuss how the science of ecological engineering informed its entire layout and set design. The final scenes of the movie summarize what the London Bauhaus was all about.

Wells’ collaboration with Huxley on the book *The Science of Life* (1930) triggered his interest in ecology. It became one of the most widely read books about the life sciences in the twentieth century. In it they developed a new “Ecological Outlook” on the relationship between the economy of nature and society. This relationship was in serious trouble, they argued, due to inefficient and extensive use of nature’s matter and energy at the expense of future generations. One had to move from free market capitalism to planned economy in order to control the “breeding storm” of the human population and the impending danger of environmental havoc. They suggested taking action against smoke pollution, cleaning up the atmosphere by limited use of coal and oil, and ecologically sound ways of using fertilizers. Only progressive evolution of new machinery, architecture, and scientific discoveries would prove to solve the ecological crisis. They argued, for example that “from the point of view of Mr. Everyman’s skin,” architects should make sure “to keep the air in a room fresh and stimulating” by securing ventilation and climate control.

The basic principle behind their way of ordering society was to channel nature’s energy into more efficient and thus better human use. Wells thought of this understanding of an efficiently planned economy as “a branch of ecology; it is the ecology of human species.” Through his 900-page treatise about a scientifically planned future entitled *The Work, Wealth and Happiness of Mankind* of 1931, he explains not only architecture but all economic activity in terms of how human animals learn to conquer and control the economy of nature for the benefit of a progressing civilization. Advancements in architecture were signs of evolutionary progress in Wells’ ecologically informed outline of human history. For Wells, human ecological adaptability became a guiding tool in judging the success of various human activities and policies. The latest development in modern architecture was particularly instructive as a vehicle for rebuilding a new world on the ruins of past environmental destructions. Le Corbusier’s *Urbanism*, which Wells read in its English translation as *The City of Tomorrow* (1929), was one of his sources of inspiration. Le Corbusier’s focus on the importance of air, sunlight, geometry, and orderly planning was to Wells an example of the importance of architecture in laying out a new ecological world order that would secure the evolutionary survival of humankind. The British architects appreciated the support of modern design from an influential writer like H. G. Wells. He was invited to lecture at the Royal Institute of Architecture where he argued Corbusier-style that “light was becoming a material of architecture.”

Architecture was at the heart of Wells’ visions of how people of the future would live collectively to control effectively the climate of air and light in buildings. Town and city planning based on ecological zoning of the environment was urgently needed to fix the number of people living in one place and thus get the population problem
under control. A "possible rebuilding of the world," Wells argued, should be the chief
task of "Modern Architecture," and he pointed to the work of Ronald Aver Duncan
as a promising example. Duncan, a Lecturer in the History of Architecture at the
Architectural Association in London, argued that there was a historical shift in con-
struction techniques from wet materials like mud, cement, mortar and brick to dry
materials like steel, plastic and glass. This was all due to a shift in manufacture from
skilled handicrafts to mass production. Wells, who grew up in a poor, wet, subterranean
brick basement, found Duncan's argument about the coming of an age of dry materials
compelling, because it meant more fresh air and sunlight in buildings. He saw the
movement from wet to dry and from handicraft to mass production in architecture as
a leap forward in the biological evolution of human development.

In The Shape of Things to Come of 1933 Wells predicts the rebuilding of society with
the help of the bio-technique and scientific management of the economy of nature. The
book caught interest and a theatre adaptation of the story subsequently played in
London. Wells agreed that Korda could make a film version of the book under the
unusual condition that he would be in editorial control of every aspect of the film. It
became the most costly movie of the time due to the large and complex set designs
that Wells requested as a way to illustrate the shape of the future. The result was a
saga about the downfall of industrial society caused by endless wars and environmental
problems. At the end of the movie Wells chooses to save humanity when a group of
engineers, planners, architects and ecologists mysteriously arrives in one of Norman Bell
Geddes' futuristic planes of 1932. This sequence was also inspired by Le Corbusier's
Aircraft of 1935, which focuses on the importance of aerodynamic design for future
societies. They land, and in military formation march out to save Everytown, Wells' image of anywhere on earth. The hero John Cabal forms a governing board to steer
the world's natural and social economy through enlightened ecological dictatorship.
He then tells this exclusive group of engineers, planners, architects and ecologists
that "we have ideas in common; the freemasonry of efficiency—the brotherhood of
science. We are the natural trustees of civilization when everything else has failed."
This brotherhood establishes a regime of authoritarian enlightenment founded on
principles of ecological reasoning, planning, and architecture.

The story then fast-forwards to 2054. The population problem has solved itself
quietly and mysteriously, and a new fantastic society has arisen. This sequence, which
lasts for about one-and-a-half minutes, was designed by Moholy-Nagy. It captures the
vitalist evolution of humankind from the world of the warlords to the glorious rule of
scientific design and management. Using bio-technique, the architects of the future
were able to create a better human world by capturing the vital energies of the earth.
It is a story of how engineers first built a huge mining machine which blasts its way
into the earth, building a second nature inside an enormous cave. The process of
building the cave recapitulates the development of construction techniques from wet
to dry materials (following Duncan's theory). A huge electric power plant empowers
steelworks which transform wet rocks into shining steel plates from which the new city
is being built. Indeed, Moholy-Nagy's wife Sibyl recalls that her husband tried with
"[t]he fantastic technology of the Utopian city of the future [to] eliminate solid form. Houses were no longer obstacles to, but receptacles of, man's natural life force, light." The sequence—accompanied with modern music by Arthur Bliss—holds a series of experimental images which capture the evolution of human ecology in action.\footnote{54}

The Bauhaus style cave-city had an ecological order. (Fig. 3) Originally, Wells and Korda asked Le Corbusier and his colleague Fernand Léger to design the cave-city, but both of them declined.\footnote{55} This may be due to the fact that Wells and Le Corbusier did not see eye to eye politically. As a second choice, Alexander Korda asked his younger brother Vincent to execute the job with Wells’ son Frank along with special effects director Ned Mann. Vincent Korda believed in a division of labor between the set designer and the artist,\footnote{56} and he therefore outsourced much of the architectural work of creating the cave-city to Moholy-Nagy, who for his part had argued for artistic independence.\footnote{57} Gropius served as a consultant to Vincent Korda at one point, making sure the cave would reflect Bauhaus design principles. All of them might also have been inspired by Breuer, who at the time was busy drawing up his own plan for a garden city which bears some of the same features as the cave-city in Things to Come.\footnote{58} The basic scheme of the cave, however, was Ebenezer Howard's garden city which Wells admired as the city plan of tomorrow.\footnote{59}

Wells envisioned a perfectly geometrically ordered ideal ecological society as a sort of island Eden dominated by technology which would channel nature’s energy into maximum food production without causing pollution or other environmental problems. Here people moved on flying walkways, sat on curved balconies, and were transported through transparent ducts: all emphasized the movement of people and energy in a streamlined ecological city system. Living in a cave meant full control over all life forces including light and air. Everytown was built as a closed environmental ecosystem with a perfect balance of air and light securing the best possible living conditions for everyone and thus evolutionary survival for the species. As a pleased ecologist explains in the movie: "Our light is brighter than the sunshine outside and never before has mankind breathed so sweet an air. We have got the better of nature."\footnote{60} A series of oxygen machines (trees) on the eleventh floor and the food machines (bushes) on every floor inside the cave secured daily needs. These were stacked in levels within the cave to save space, (thus anticipating current design of Winy Maas’s “Dacity-Metatown” project).\footnote{61}

Things to Come received raving reviews in the press. It became a box-office hit, but not a financial success due to the costly set designs of the movie. Though some were skeptical of the “mystic communion with machinery” in tomorrow's society, the Bauhaus design was regarded as “the real triumph” of the film.\footnote{62} The architects were also excited about the film, and located the design of the cave-city in the ongoing debate about urban planning. One architect reviewer suggested that the film pointed towards a path of horizontal rather than vertical organization of living spaces, where people could enjoy town life in the vertical cave and country life in the horizontal surface.\footnote{63} Another comment proposed that the cave design was “easily the best work” of functionalism “yet done in England.”\footnote{64} Architectural Forum published a note arguing that the underground city represented “Man’s final break with his natural environment,” a
remark which makes sense if one recalls that the cave was to be a second nature based on a new ecological order.35

The film was by no means the culmination of Wells’ ecological opinions. He would, for the rest of his life, promote the urgent need for humans to adapt to the ecological reality of life through technology.36 As Britain plunged into war he published a Guide to the New World (1941) in order to cheer up the nation. This was basically the old vision in a modified 1951 (instead of 2054) version. Reborn Britain, as he saw it, would
be “green as ever,” freed from capitalism with plenty of nature reserves and small high-tech and neatly designed villages with people living in harmony with the ecosystem. The housing will be “more of an open air camp,” due to scientific advances in air-conditioning systems. These accomplishments “will make architecture the most enviable of professions in the world ahead.” “Architecture will [in 1951] become a master art, as it was in the days of Pericles,” he argued. All slums will disappear and people will live as nomads, moving around with the energy flow of nature. The book was written at the darkest time of the war for the Allies, and Wells thought of his war effort as providing his fellow countrymen with some hope at a time of despair. Yet disillusion caught up with his utopian visions, as indicated in the title of one of his last novels, All Aboard for Ararat (1941). With Europe lapping into chaos, he now envisioned himself as Noah sailing species and scientists in his ark through rough weather to the Promised Land of Ararat, where they would lay the foundation for the new sustainable ecological world state.

In reality, Gropius and Moholy-Nagy became the Noah figures for the London Bauhaus, taking the reminiscence of their school respectively to Harvard University and The New Bauhaus School in Chicago. Gropius landed his ark on an “Ararat” next to Walden Pond where Henry Thoreau once lived. In similar fashion to the American environmental philosopher, Gropius warned against industrialism and capitalistic greed that could come to dominate human life unless architects approached design and the environment in a responsible way. Responsibility to him was a question of nurturing an “organic social structure” by designing with natural and not greedy capital forces: “Overwhelmed by the miraculous potentialities of the machine, our human greed has interfered with the biological cycle of human companionship which keeps the life of a community healthy.” A similar line of argument was pursued by Moholy-Nagy at Chicago when he envisioned “happy and organic cities of which inhabitants have the experience of being amidst gardens and vegetation daily, not on their weekend trips only.” His famous Vision in Motion (1947) was in effect “an attempt to add to the socio-political a biological bill of rights” for people to live in harmony with nature’s household.

Their visions for rebuilding America were basically a blueprint of Wells’ Everytown in Things to Come, a movie which built on ecological arguments developed by the London Bauhaus. This was in line with Gropius’ “lifelong aim,” according to Huxley, which “was to work for the reification of art and science, without which there can be no true culture.” They both saw a science-based culture as a precondition for human health and evolutionary survival. Then, as today, architects fashioned themselves as “design outlaws” inventing sustainable houses modeled on the household of nature that would safeguard the future ecological existence for the human species.

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Notes


50. ibid. 361.


70. Herbert G. Wells, What are we to do with our Lives? (Garden City: Doubleday, 1931), 17.


81. The dream of being a dictator steering the world based on biological knowledge was not foreign to H. G. Wells, see his book with the telling title *After Democracy* (London: Watts & Co., 1932), 130–133, 192–193.

