

THE CITIES OF THE FUTURE.

Eugène Hénard

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Hénard (1849-1923) was the son of an architectural professor at the Ecole des Beaux-Arts in Paris where the younger Hénard earned his diploma in 1880. Two years later he began a lifetime career at the Paris office of public works. Although he designed a few buildings, including one each at the Paris expositions of 1889 and 1900, he spent much of his time studying the problems of traffic circulation in Paris and proposing solutions for the problems created by the few adequate radial thoroughfares. He also developed a series of proposals for additional parks in the city and for housing to be built along a ring road that would replace the outmoded fortifications of Paris.

He is perhaps best remembered for his diagrams of major European cities that emphasized their radial and ring road patterns. Some of these appear in early American planning reports, notably Daniel Burnham's plans for San Francisco and Chicago published during the first decade of the century. Hénard went well beyond these analytical studies to plan for the further development of Paris, and Burnham also used this design for one of the illustrations in his Chicago plan. The paper that Hénard prepared for the London conference on town planning in 1910 reveals another Hénard--a futurist enamoured by technology and the possibility of near-universal use of private aircraft.

My purpose is to inquire into the influence which the progress of modern science and industry may exercise upon the planning, and particularly upon the aspect, of the Cities of the Future.

It is not without a certain feeling of hesitation that I approach the question: my previous works on Paris have been concerned with subjects which were more clearly defined and which rested upon experimental data. To-day it is my duty to speculate upon mere hypotheses, which, though more or less justifiable, have no established foundation, a circumstance which leads necessarily to hazardous, and sometimes entirely erroneous, conclusions. Even in the most methodical inductions, the exact line of demarcation between the probable and the imaginary is very difficult to draw: nevertheless, I shall endeavour to keep my arguments within reasonable limits; although I dare not affirm that on certain points I may not, unwittingly, be carried away by so seductive a theme. I shall make a special effort to describe the considerations which must determine the form of both our houses and of our streets, as these constitute the primary elements out of which a city is built up.

Whatever form its future expansion may take, there will always remain, in every large urban community, a centre of intense activity wherein the buildings will always be placed close together, as they are in our cities of the present day. It is a portion of such a centre that we are about to examine.

On one side I have given a drawing of a house dating from the last century, and opposite to it I have placed one of modern construction.

I shall not stop to criticise the former; the arrangements are inconvenient, and the sanitary provisions deplorable. I have reproduced it here solely for the purpose of exhibiting the contrast between it and an up-to-date dwelling-house, and to emphasise the great progress that has been made. Yet even the latter leaves very much to be desired. True, the modern house is furnished with lift, water, gas, electricity, telephone, bathrooms, and a complete system of drainage; but at the same time we find that it includes ridiculous chimneystacks which

discharge volumes of unwholesome smoke over the town. The removal of ashes and of every sort of refuse is carried out in a most barbarian fashion by means of filthy bins, which are deposited every night along the pavements and in the morning are emptied by the dust-carts. As to the actual cleansing of the dwellings, it is of a still more rudimentary character. The process consists of opening the casements, sweeping the floors, and then beating and shaking the mats out of the windows, so that all the dust, and all the germs, are liberally scattered through the atmosphere which is being inhaled by the passers-by.

Of these units, the house and the street, the latter has received the smaller number of those improvements which might have been effected at once. The modern street is the ultimate form of the old country lane, formerly a track-way in the natural soil, subsequently paved and bordered with footpaths.

Underneath the roadway, in the soil itself, a sewer was constructed, its original function being to carry off the rain and waste waters; but later on it was used for a variety of other purposes for which it was never intended. The first of these was the laying of mains for pure and river waters. Then tubes for pneumatically conveyed messages were added, with pipes for compressed air. Finally this sewer, or passage way, was employed for the telephone and telegraph wires, a system which grew daily more extensive and more complicated. Such a conduit, already too much congested, was incapable of receiving the cables for the supply of electric light, and it became necessary to form other conduits beneath the footways to receive the wires, these conduits being placed deeper in the soil where otherwise they would be in close proximity to the gas mains. All these pipes and tubes are located above or beside one another, without order or method. When they have to be repaired, each system, whether it belongs to a private company or to one of the departments of the Administration, has to be dealt with separately, without any co-operative plan, and as occasion arises. It is because of this that, for the last ten years (I am speaking of Paris) the city has been in a constant state of upheaval, and vehicular and pedestrian traffic has become more and more difficult.

These works have all been attended with the most unfortunate results with regard to the street itself. The continual disturbance of the soil has had a detrimental effect upon its compactness, and it therefore becomes necessary to lay down a temporary pavement and to wait several weeks until the soil has settled sufficiently to permit the relaying of the permanent paving-- unless, in the meantime, a new branch of the Metropolitan Railway necessitates a new upheaval from top to bottom.

The most serious drawback in this system is that it renders it very difficult, not to say impossible, for any industrial concern to introduce any new element conducive to the health and comfort of the inhabitants: and yet we may already easily foresee what some of these elements are likely to be. It is pretty certain, for instance, that vacuum cleaning will become general, and that a system of pneumatic pipes will soon be required for the extraction and destruction of dust, to the incalculable benefit of the public health. These conduits, which must necessarily be very extensive, cannot be placed in the sewers.

The conveyance of letters by pneumatic tubes, larger but otherwise similar to those now used for despatching messages, will also become necessary, from the standpoint of both economy and speedy transmission.

The services to which refrigeration is put are multiplying, and there is nothing absurd in prophesying the necessity for a network of pipes for liquid air. Coal is a fuel suitable for

factories only, for it is both cumbersome and dirty. We can therefore assume that, in the future, petrol will be supplied from house to house through pipes, thus conveying everywhere, and without dirt, a more convenient fuel.

Oxygen combined with petroleum would supply an intense heat, without smoke, for steam heating bakers' ovens, &c.

We may also imagine other special mains for the distribution of sea-water and pure air, conveyed either from an islet near the coast or from the top of a mountain. As such air may only have to be supplied to congested districts, or to special inhalation-rooms, my view may appear somewhat overdrawn; but, nevertheless, I wish to mention it by way of illustration and to show the possible development of installations of this kind which further scientific discoveries may call into existence.

In order to render such progress possible the streets would have to be constantly and periodically interfered with, at a cost that would be prohibitive to the companies undertaking the work.

If we wish to find a remedy for such a state of things we must approach the problem in all its bearings, and ascertain what would be the best plan to adopt in laying out a new city, or at any rate a new quarter, which is to be constructed in accordance with a general scheme. We shall see later on how it would be possible to apply our conclusions to the transformation of cities already in existence.

All the evil arises from the old traditional idea that "*the bottom of the road must be on a level with the ground in its original condition.*" But there is nothing to justify such an erroneous view. As a matter of fact, if we were to establish as a first principle the idea that "the pavement and carriage-way must be artificially constructed at a sufficient height to allow thereunder a space capable of containing all the installations needed for the service of the road," the difficulties I have just pointed out would disappear altogether. This, of course, implies an additional floor underground for the neighbouring houses, inasmuch as the ground floor would thus be raised to the level of the street.

The illustration [fig. 2], shows the plan and section of a road constructed in accordance with this new conception. This view brings out clearly the advantages thus obtained. In the first place the pavement and the carriage-way would be constructed once for all like a bridge roadway, and ought never to be interfered with in any way except for the purpose of upkeep and repairs. The paving, either of wood or any other elastic material, would cover a monolithic platform of armoured-concrete. This platform, constructed at a height of 5 metres above the ground proper, would rest laterally upon two walls of masonry, parallel with the walls of the buildings fronting the road, from which they would be separated by a small space. Between the lateral walls the platform would be supported by several rows of pillars, with spaces between them of about 4 or 5 metres.

Immediately below the bridge roadway would be suspended the whole system of pipes required for the purposes we have just enumerated--viz. vacuum cleaning, supply of compressed air, river water, sterilized pure water, petrol and liquid air; conveyance of letters;

supply of pure air, &c.; together with all the network of electric cables (telegraph, telephone, light, power, high-frequency currents, &c.

Underneath the said systems, which would all be easily accessible and controllable, a space of 2.25 metres in height would be left entirely free and extending down to the ground-level. Four lines of railway would then be laid, one metre apart, upon which would run trains of small trucks for the removal of all rubbish and refuse, as and when required, for the conveyance of all heavy and cumbersome materials, and to clear the rubbish from building or repairing yards.

The two central lines would serve for long-distance transports, whilst the two lateral lines would be used for making up the trains; they would be connected by turn-tables to the private lines leading into the houses. Each opening through which the trucks would enter the cellars would be closed by two independent doors or iron gratings in such manner that any communication between the house and the service road would be impossible without the simultaneous permission of both the owner's agent and the representative of the administrative authorities.

This underground street would be lit permanently by incandescent lamps and glass plates on a level with the pavement. Natural ventilation, assisted by electric fans, would be ensured by high chimneys located at given intervals in the party-walls between the houses.

Each frontage would, at the base-line, be separated from the next by a regulation recess of 2 metres by 1, within which would be located the ventilation flue. This arrangement would greatly improve the architectural aspect of the frontages, which would thus be sharply divided from one another.

Below the natural level of the service road would be laid, as now, the sewer, but its dimensions could be reduced, inasmuch as it would be exclusively used for the carrying of the water: drainage by gravitation could perhaps be replaced by large watertight mains to receive the waste water, which might either be forced out or sucked up without regard to the level of the ground.

Finally, in the centre of the service road a large fireproof main would be laid underground for the conveyance of smoke, assuming that the old-fashioned method of heating with wood or coal were still in use in a few houses, although it is to be hoped that smoke producing chimneys will then be prohibited and replaced by oxygen stoves, permitting complete combustion.

In any case, this main could be retained for exhausting the gases emitted by kitchen stoves.

To sum up: this arrangement really means that the present street would be made into two streets: one above in the open air, solely intended for the passage of light vehicular and pedestrian traffic, and the other located below, on a level with the ground and underneath the former, which would serve as a conduit for all the pipe systems, the removal of house refuse, and the transport of heavy materials and goods.

We may mention the traffic tunnels in Chicago between the railway stations and from private depots as being somewhat of this nature: but these subways are attended with the twofold drawback of being located at too great a depth and of being much narrower than the street. A

flat platform occupying the whole width of the street is far preferable, notwithstanding its many points of support, to a vaulted subway, because it utilises all the space available.

Supposing even that the requirements of new installations should call for more room, or that the construction of a new line of transport should become necessary, it would be possible to dig deeper to obtain the space required, underpinning the points of support; and any number of subterranean floors could be provided without in any way touching, congesting, or interfering with the traffic of the upper roadway.

By the expansion of such a plan we are led to conceive of a city in which all the streets with heavy traffic would have--according to the frequency of the traffic--three or four superimposed platforms. The first platform would be for pedestrians and carriages, the second for the tramways, the third for the various mains and pipes required for the removal of refuse, and the fourth for the transport of goods, &c. We should thus have a many-storied street, as we have a many storied house; and the general problem of traffic could be solved, however heavy it might be [fig. 3]. It is probable, however, that the duplicate streets I have just described would suffice, at least for a very long time, under the present conditions of urban life.