

# **THE ROAD**

*By*

HILAIRE BELLOC

Profit, Conveniency, and Pleasure,  
to the whole Nation.

Being a short Rational Discourse, lately  
presented to His Majesty,  
Concerning the

High-ways of ENGLAND:

Their *Badness*, the *Causes* thereof, the *Reasons*  
of those *Causes*, the impossibility of ever having  
them *Well-mended* according to  
the *Old way* of *mending*.

But may most certainly be done, and for ever so  
maintained (according to *This New way*)  
substantially, and with very much *Ease*.

And so,

That in the very depth of *Winter* there shall not  
be much *Dirt*, no *Deep-Cart-rutts*, or *High-ridges*; no  
*Holes*, or *Uneven Places*; nor so much as a *loose stone*  
(the very Worst of Evils both to Man and Horse) in  
any of the *Horse-Tracts*.

Nor shall any Person have cause to be once put out of  
his way in any hundred of miles Riding.

*To mend High-ways, loe Here the way is shewn,  
No better way than This, shall e're be known:  
A Firm and Certain way, of no great Cost,  
In all wayes else their Labour's wholly lost.  
The Old way ne're could do't, 'twas meer Deceit,  
As may be prov'd, it was a very Cheat.*

Printed for a Publick good in the Year 1675.

AN OLD TITLE PAGE showing the antiquity of the Road Problem

# THE ROAD

*By*

HILAIRE BELLOC

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## AUTHOR'S INTRODUCTION

*We are arrived at a chief turning-point in the history of the English highway. New instruments of locomotion, a greater volume of traffic, a greater weight in loads, and vastly increased rapidity in road travel have between them brought us to an issue: either some very considerable and immediate change in the character of the Road, or a serious and increasing handicap in our rivalry with other nations through the strain and expense of an out-worn system.*

*The moment therefore calls for some examination of the Road, its theory and history. That need has prompted me to write this essay; but I must say at the outset that I approach my task with no expert qualification. My only equipment for the general sketch I intend is historical reading and the experience acquired in the writing of certain monographs upon the topography of the Road in the past. I can do no more than suggest lines of thought which, if they lead to practice, need a detailed science I do not possess.*

*The Road is one of the great fundamental institutions of mankind. We forget this because we take it for granted. It seems to be so necessary and natural a part of all human life that we forget that it ever had an origin or development, or that it is as much the creation of man as the city and the laws. Not only is the Road one of the great human institutions because it is fundamental to social existence, but also because its varied effect appears in every department of the State. It is the Road which determines the sites of many cities and the growth and nourishment of all. It is the Road which controls the development of strategics and fixes the sites of battles. It is the Road that gives its frame-work to all economic development. It is the Road which is the channel of all trade and, what is more important, of all ideas. In its most humble function it is a necessary guide without which progress from place to place would be a ceaseless experiment; it is a sustenance without which organized society would be impossible; thus, and with those other characters I have mentioned, the Road moves and controls all history.*

*A road system, once established, develops at its points of concentration the nerve centres of the society it serves; and we remark that the material rise and decline of a state are better measured by the condition of its communications—that is, of its roads—than by any other criterion.*

*The construction, the trace, and the whole character of the Road change with new social needs and habits, with the facilities of natural science, their rise and decline. But this perpetual change, which affects the Road as it does architecture and every other work of man, is specially marked by certain critical phases, one of which, as I said at the opening of this, we have now entered. There are moments in the history of the Road in any society where the whole use of it, the construction of it, and its character have to be transformed. One such moment, for instance, was when the wheeled vehicle first appeared: another when there first appeared large organized armies. It occurred whenever some new method of progression succeeded the old. It occurred at similar critical turning-points in the history of the Road not only when any of these things arose, but also when they declined or disappeared. The appearance of great cities, their sudden expansion or their decay, or the new needs of a new type of commerce—and its disappearance—bring a whole road system to one of these revolutionary points. We have had (as I shall develop in more detail) five great moments of this kind in the history of the English road system: the moment when the British trackway was superseded by the Roman military road; the moment when the latter declined in the Dark Ages; the moment when the mediaeval system of local roads grew up on the basis of the old Roman trunk roads and around them; the moment when this in its turn declined in the later sixteenth and seventeenth centuries; and the re-casting of the road system by the turnpikes of the eighteenth and early nineteenth centuries. To-day the sixth great change is upon us.*

*It is incumbent upon us then to-day to get ourselves clear upon the theory and the history of the Road, and I propose in this essay to take them in two sections: first, the Road in general; next, that special institution the English Road.*

## A PREFACE

The British Reinforced Concrete Engineering Co. Ltd. recently became acquainted with the fact that Mr. Hilaire Belloc was engaged in the production of an essay on the history of British Roads. In numerous writings Mr. Belloc has treated various aspects of Road history, and his learning on the subject and his method of communicating it are in high repute among wide circles of readers. He is, in fact, an outstanding literary authority on the topic. It therefore seemed to the Company that if they could acquire the copyright of the work, in which Mr. Belloc was treating the whole subject not indirectly, but directly and systematically, and if they could issue this work to people who are professionally engaged in the construction of roads, a very considerable service would be done to the cause of road development in the country. The future always becomes a little clearer if we thoroughly understand the past, and the Company feel that everybody who is giving much of his mind and life to road problems will be glad to have in his possession a book which brings out the historical and social, not to say the romantic, interest which lies beneath the surface of the English highway. Mr. Belloc was accordingly approached on the subject and agreed to sell the publishing rights of his work to the British Reinforced Concrete Engineering Co. Ltd., who now have great pleasure in issuing it to the surveying and civil engineering profession, believing that it will at once assist and beguile the work of those to whose hands the future of the English Roads, and with it much of the economic and social prosperity of the country, is largely entrusted.



# THE ROAD

§ I

THE ROAD IN GENERAL

# CHAPTER I

## THE ORIGIN OF ROADS

*How Did the Road Come Into Existence: The Experimental or the Scientific Method: The Haphazard Road: The Case for Design in Road Construction.*

### i

In order to understand any matter, especially if we have to understand it for a practical end, we must begin by the theory of the thing: we must begin by thinking out why and how it has come into existence, what its function is, and how best it can fulfil that function. Next we must note its effect, once it is formed, and the results of the fulfilment of its function.

What then, to begin with, is the origin of the Road? Why did this human institution come into existence, and how does it tend to develop? How may it best be designed to fulfil its function?

When we have decided that we can go on to the next point, which is: how does the Road, once formed, react upon its environment; what physical and (much more important) political results flow from its existence?

The answer to the first question, “How did that human institution, the Road, come into existence, and why?” is simple, and will be given in much the same terms by anyone to whom it is addressed. The Road is an instrument to facilitate the movement of man between two points upon the earth’s surface.

If the surface of the earth were uniform in quality and in gradient—that is, if it were of the same stuff everywhere, of the same degree of moisture everywhere, and everywhere level—the Road between any two points would clearly be a straight line (to be accurate, the arc of a great circle) joining those two points. For when we say that the Road exists “in order to facilitate” travel over the surface of the earth from one point to another the word “facilitate” includes, of course, rapidity in progression, and the straight line is the shortest line between any two points.

But the surface of the earth is highly diversified in quality as in gradient. Therefore the *trajectory* or *course* of the Road is not in practice, and should not be in theory, a straight line from point to point. That straight line has to be modified if we are to give to the Road an ultimate form such that it shall best serve its end; and when we come to look into the problem we shall see that it is one of very great complexity indeed. That is where the study of the theory even in its most elementary form becomes of such value to the execution in practice. We discover by studying the theory of the Road how many and how varied are the elements of the formula we have to establish. We become prepared in that study for the discovery, in each new particular problem, of any number of novel modifications not present in problems previously attacked.

So true is this that the whole history of progress in road-making is a history of discovering methods for dealing with obstacles either novel in character or only appreciated after lengthy use. Let us begin at the beginning, with the very elements of the affair.

*The first element in the theory of the Road may be put thus: To find a formula of minimum expense in energy for communication between two given geographical points under given conditions of travel and carriage.*

The diversity of geographical circumstance moulds the formula into its final shape through balanced modifications of the direct line.

The most obvious modifications to a direct trajectory arise from the two primary circumstances of surface and gradient. It is easier to go over one kind of soil than another; easier to go over one kind of surface in summer and another in winter; easier to go over one kind of surface in wet, and another in dry weather; easier to go over one kind of surface with a heavy load and another with a light load; over one with sumpter animals, over another on wheels, and so on.

Again, it is for all kinds of travel easier to go upon the flat than uphill, and this element of gradient is much more complicated than at first it would appear. Thus travel of one kind—travel on foot, for instance—can take a sharp gradient for the sake of a short trajectory more easily than can traffic with burdens; and traffic with burdens carried by animals can take a sharper gradient with advantage than can wheeled traffic; and wheeled traffic differs according to the character of the vehicle in this respect.

Again, a road of diverse use must strike a compromise in its formula between the various needs subserved. If the great bulk of its use is to provide for rapid military advance by

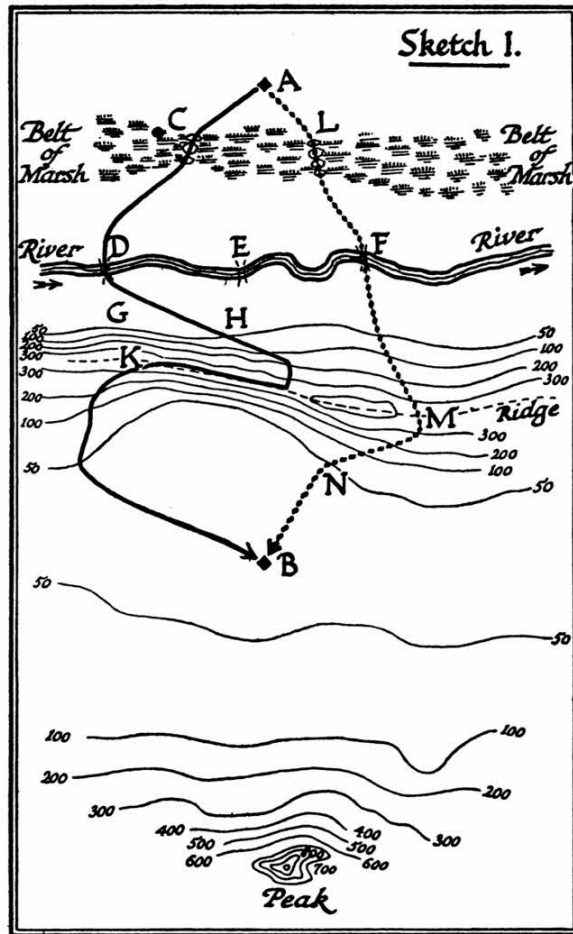
marches, you must sacrifice to shortness some of the easier gradients which would be demanded for traffic mainly civilian, yet if of three main users even the least important is incapable of more than a given gradient, your formula can never exceed that gradient, and so forth. So we have even in this simplest and most primary of all analyses of the Road considerable elements of complexity appearing.

As the study progresses an indefinite series of further complexities arises, and one soon reaches that *crux* in the theory of the Road which has led to so much discussion and which some still call unsolved: whether the formula of the Road is best left to the unconscious or half-conscious action of experiment, which in time should lead to an exact minimum of expense in energy, or whether it is best to arrive at it by a fully conscious, exact, and (as we say to-day) “scientific” examination of all the conditions and a deliberate and immediate conclusion upon them.

Should the road *grow* or should it be *planned*? The discussion is not idle. The clash of opinion upon it is at the root of the contrast between national systems, and a right answer will make all the difference between success and failure in our approach to a new road system such as is now upon us.

## ii

I maintain that of the two theories the second is just: that a gradual experimental growth in its roads, a method coincident with local caprice, burdens with imperfect communication the society adopting it; that conscious design is essential to efficiency. And this [I propose to illustrate by a single example](#). Take two points A and B, such that a line joining them must lead across a marsh, a river, and a range of hills. Let some primitive wanderer make his way from A to B, knowing, when he is at A, the direction of B by, let us say, a distant peak overtopping the range between. That primitive wanderer would first of all skirt about the marsh and, finding its narrowest place at C, would set to work and make his causeway there. Having crossed it, he would come to the river. He must either swim or ford it. Supposing him to prefer, through the necessity of a pack or what not, to ford it, he casts about for a ford. He finds one at D, and perhaps he also, if he takes time to look about him, finds another deeper one at E and another at F, but as his causeway is near D he takes that ford.



Sketch I.

Then he has to make for the hills. We will suppose that the peak directing him from beyond B is still visible. He takes his new direction from it and looks towards the base of the hills at G. There, in the direct line to the peak, the contours are so steep that the trouble of getting up would more than counterbalance the shortness of the cut. He casts about for a better chance, and at last finds a gradient just worth his while at H. He climbs up that; but though the gradient is easy on the A side at H on the far side it is very difficult, so he turns along the ridge to K, where he finds an easier down gradient: a spur

leads him on by its gentle slope, and from the bottom of the spur he makes straight for B, which is now right in front of him and plain sailing.

Now, look at that track as established by our primitive wanderer and see how lengthy and inconvenient it is, how ill fulfilling the object of the traveller compared with what would have been established by even a moderately intelligent and cursory survey of the ground as a whole and the making of a plan. To begin with, it would have paid our traveller to take a little more trouble in crossing the rather wider gap in the marsh at L and the rather deeper ford at F, because he would have gained very much in time and space with comparatively slight extra effort had he surveyed the whole ground and thought things out. He was only led on to the ford at D because it was suggested by the crossing of the marsh at C. The first opportunity made the second. But to continue the plan: F is nearly opposite the easier up gradients of the hills, but, having surveyed that bad steep on the far side, he slightly modifies his road, crossing the ridge at M behind a summit which hid this way from the first traveller. Then he goes down the practicable, though steep, slope at N, and so reaches B. The first road produced haphazard by successive chances gives the lengthy and roundabout trajectory A—C, D, H, K—B. The second, with very little extra labour, gives him the far shorter and better trajectory A—L, F, M, N—B.

We see from this elementary example how the thinking out of the theory of the Road is of advantage in practice. It may be urged that the discovery of advantages as time goes on gradually improves the Road, and in this way half-conscious development will always give you the best road in the long run without studying its theory. But history is against that view. Europe is full of roads thus established haphazard, confirming themselves by use and by expenditure, and for centuries neglecting opportunities which would have been present to the eye of the most cursory and moderately intelligent survey.

This conflict of principle between *growth* and *design* in the creation of the Road is at the root of half our modern crises in road-making. The real issue is between those who would gradually add to or develop from custom and those who would radically impose new plans, and on a right decision the economic future of this country may well depend.

When we come to consider even the first of succeeding modifications we see still more clearly the complexity of any road-formulæ and the corresponding advantage of plan over habit. The marsh, the river, and the hill are but the beginning of the affair. There is a modification due to the fact that the marsh may not be permanent, nor the depth of the river; that the Road may be of special use at moments when the river is shallow or flooded, when the marsh is dry or, exceptionally, impassable. There is the modification of

surface. Clay, for instance, is fairly good going in dry weather, but the worst in wet. There is the modification due to vegetation: the balancing of the effort involved in going round a dense scrub against that of cutting through it and of maintaining the cutting when it is established. There is the modification introduced by the instruments and science available for construction and for cutting. In one stage of development it will pay to take a road by a bridge across a deep river where in earlier stages of development it would have been necessary to seek a ford. In one stage of development it would pay to make a cutting through a scar too steep to climb where, in a lower civilization, it would have paid to go round it. The whole formula increases in complexity the more we examine it. It is a formula for the discovery of a minimum of effort. But in the establishment of that minimum you have to consider not only a very great number of factors, but the respective value of each to the whole, and your success in establishing the Road depends upon the accuracy of your judgment both as to the presence and as to the comparative value of all those factors.

## CHAPTER II

### THE CROSSING OF MARSH AND WATER

*Physical Factors Modifying the Formula of the Road: Marsh as the Chief Obstacle to Travel: The Political Results of Marshes: The Crossing of Water Courses: The Origin of the Bridge: The Effect of Bridges upon Roads: The Creation of a Nodal Point: The Function of the Nodal Point in History.*

#### i

So much for the first principle of all: that the Road, like all other human institutions, is best made with brains, and for that second immensely valuable, but too often forgotten, political principle: that if you begin by making your thing wrong it is likely to take root and to remain wrong.

A catalogue of the more important physical factors modifying the formula of the Road (I will come to the political and economic in a moment) is as follows:

*Marsh to be traversed; water courses to be traversed; differences of surface other than marsh and water courses; gradients to be dealt with; the obstacle of vegetation to be dealt with.*

To these five one may add a factor common to all, and to the making of every road, even in its most primitive stages: (6) the proximity of material (meaning by "proximity" the congeries of all the factors which make for the cheapness of material, for the advantage of using it in a particular place).

Let us take these physical points in their order.

#### ii

MARSH. It is not always appreciated that the chief obstacle to travel from the beginning of time has been and still remains marsh, which may be defined as soil too sodden for travel, as distinguished from the lands which are boggy in wet weather but passable. Marsh is less striking to the eye, especially to the modern eye, than a stretch of water, much less striking than the apparent obstacle of the sea, or of a bold hill range: it is



nevertheless the chief problem presented to the making of a road, because of all natural obstacles *it is the only one wholly untraversable by unaided man*. Man unaided can climb hills, swim water, work his way through dense undergrowth. But marsh is *impassable* to him: it is the great original obstacle to progress. If this has not been recognized in the past, and is still little recognized, it is not only because marsh is less striking to the eye than water or hills, but still more because, the original roads established by man in forming his cities, markets, and all the rest of it, being compelled to avoid marsh, we do not often come across the problem even to-day. Partly, also, because very extensive marsh is a rare phenomenon, especially in Western Europe.

But if we look at the map and at history we shall see what that obstacle means. It was marsh which cut off Lancashire from the South of England, and left Lancashire the stronghold of old institutions, especially after the Reformation. It was the marsh of the Lower Thames estuary, now upon the right, now upon the left bank of the river, which forbade a crossing below London. It was marsh which protected the growth of Venice at the earliest and most dangerous moment of its existence. It was marsh which cut off the Western (Polish) civilization from the Eastern (Russian) civilization, and was the main geographical cause of that sharp division in culture which has affected the whole of later European history. We may say that the Russian Orthodox Church and the last Revolution would neither have been, save for the Pinsk Marshes. To take lesser examples, we can see to-day the way in which even our modern ways avoid marsh. The large district of Gargano in Southern Italy has remained largely isolated through marsh upon its flanks.

You may see all over Europe, and even in this well-drained country, primitive roads deflected through marsh as they are not by any other obstacle, and this deflection stamps our road system to this day, in spite of our enormously increased opportunities of road construction. We shall see on a later page the way in which marsh deflected in the dark ages Roman roads at the river crossings in this island.

If a special example be required of a road having grown up and remained on an uneconomic trajectory on account of marsh moulding its earlier history, [one of the best in England is that of the Arundel road south of Pulborough](#). Seawards from Pulborough (a landing and crossing-place on the upper River Arun of great antiquity) the next considerable inhabited spot was the port and fortified spur of Arundel. The distance as the crow flies is a short day's march or less, some ten miles. Now, the road could have been taken in a fairly direct line and everywhere upon the level had it not been for marsh. The marshes bordering the Arun prevented such a construction in early times: the road

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