

## CHAPTER IV

### THE RIDDLE OF THE RAW MATERIAL OF MAN

THE great race problems on the good ship *Earth* have always grown out of the moving of those great cliques of passengers called nations or tribes from one part of the dry decks to another, and jostling other peoples about, throwing them overboard, putting them to death, enslaving and otherwise exterminating them.

In the future why should these movements take place? Are they likely to be necessary? And if so, what will make them necessary? Come to the bank of the river—the nearest river—and I will show you one reason why we may have to move sometime.

If it be after a rain, the river—any river almost—will be roily. If it be the Missouri, the Tennessee, the Ohio, the Red, the Platte, the Arkansas, the Sacramento, the Alabama,

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the Lower Mississippi, or any one of a hundred others, it will be found turbid with earth, whether one looks just after a rain or not. And in this fact lies one of the greatest dangers to our part of the ship.

What is it which discolours the rivers? It is soil. What is soil? I might give you a long and learned definition, but the plain English of it is, "Soil is the looser earth, spread over the surface, and in which plants can grow." It is an essential part of the raw material of man—and woman.

It is the dust which has gathered on the decks of the good ship *Earth* by the trampling of the feet of the rain and hail, the grinding hoofs of the ice, the crushing and prying lever of the frost, the wearing sand-blast of wind-blown particles and the washing of the waters. Until soil appeared on the ship, there were decks clean as cement sidewalks, or sterile as piles of building stone—but no place for the green rash breaking out on the decks which we call vegetation. And until vegetation came, there were no animals;

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because they must have the raw earth worked over in plants or other animals before they can assimilate it.

It took more centuries than you have hairs in your head to make a good soil. In the millenniums which have passed there has been a race between the accumulation of vegetable matter and the earth-dust made by the elements and the forces carrying it away, in which the deposits of soil have managed to keep just a little ahead of the natural wastage by blowing, washing and other erosion. Maybe on a square foot, there would be a teaspoonful more of good soil at the end of a century than at the beginning. Increasing at the rate of a teaspoonful a century, given centuries enough, and the soil is eight inches deep, though the average soil is shallower than that.

In his action on the soil, man has shown most strikingly that he (and he only of all animals) has been clothed with power to destroy the globe from which he has emerged, as far as habitability is concerned. He finds a new continent covered with trees. Beetles,

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scale-insects, moths, funguses and bacteria do the same thing; and they kill trees; but man is the only living being who can keep them killed. Beavers can cut them down; but man alone keeps them cut down. He found the American continent covered with trees, in large part, and that just at the era when tree-cutting machinery had been or was about to be perfected, and he proceeded to destroy forests over an area half as large as Europe. He has been obliged to do this in order that he might found states, build a nation and extend civilization. He has destroyed the splendid forests which were the fruition of hundreds of years of growth; but it is hardly just to blame him, or to condemn the destruction as waste.

It was unavoidable destruction, and in the main justifiable. If the Pilgrim Fathers could have landed at Kansas City instead of Plymouth Rock, it would have been immensely better. The first settlers would have had prairie land quite ready for the plow on which to live. The colonies would have spread over the Mississippi Valley, with their

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cattle ranges in the semi-arid Great Plains. As more land became a necessity, they would have worked their way into the forests of Indiana, Missouri, Wisconsin and Minnesota—and finally, after densely peopling the prairies of Iowa, Nebraska, Kansas and the Dakotas, and rich forest plains of Indiana, Kentucky, Ohio, Oklahoma, Missouri, Arkansas and Tennessee, the black lands of Mississippi and Alabama, the fertile Mississippi Delta from Cairo to the Gulf, and the coastal plain of Texas, the frontier states of the Atlantic Coast would have been reached by the lumbermen and pioneers. New England would not yet have been opened to settlement. The Appalachian Mountain region would still be a forest. And the Ohio, the Cumberland, the Upper Mississippi, the Tennessee and the Mobile would not flow as they do, thick with the liquid soil from the fields of their valleys. But coming in, as the settlers did, from the east, they were forced to lay waste the forests.

By the destruction of the forests we have bared the soil in the very regions which should

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have been left forested. We have stripped the deck of our air-ship to the action of the moving elements, so that the dust of life is being swept off into the ocean where it may do good to some living creatures, after man has disappeared, but can never again be useful to the present passengers of the ship, or their children. The Bible says that we are made of the dust of the earth. So we are. We can exist only so long as the supply of dust lasts. If we have descendants they must be formed of it. And we see it wasting off into the oceans as if it did not concern us at all!

The wastage of soil in the streams of the United States is 610,000,000 cubic yards a year. A cubic yard is a wagon-load. If we were wickedly throwing this mother-stuff of men into the sea as rapidly as we are letting it wash in, and had a year's loss loaded on wagons waiting to dump at the pier-head, allowing one team to the rod, the string of teams waiting to unload would reach seventy-six times around the world! So fast are we allowing to be undone the thing which it took

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all the cosmic forces millions of years to do. Not all erosion is waste. Slow erosion is necessary. But the destructive erosion of which we are speaking is a peril to the nations.

There are great nations which have so cultivated their lands, that no such waste occurs. They are nations which have kept up the fertility of great areas through four thousand years of constant extraction of food and clothing and shelter for man. And those nations only which can do this, are fit for the ownership of the ship on which we sail. All others are mere ruiners and cumberers of the *Earth*. Is it not time for us to begin if we are to qualify as passengers on the good ship *Earth*? God will surely throw us overboard if we do not meet the demands.

These nations—the Oriental peoples of which the Chinese and Japanese are the best examples—are quartered on those portions of the decks of the good ship *Earth* where human beings are most numerous. Some Europeans are almost as good husbandmen, and live as parts of dense populations, too. We

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have had only a hundred years or so in which to prove our unfitness for the ownership of fertile lands; and we have gone far to prove it by ruining large areas of good soil—and the ruin is going on faster now than ever before.

We have had several periods of public apprehensiveness on account of the immigration of Asiatics into this country. We have adopted the policy of keeping them out. The smuggling trade used to be confined to the importation of goods; but now men are smuggled in. The smuggling of Chinamen is a regular trade among the lawless of our Pacific Coast and along the Canadian and Mexican frontiers. The Japanese, too, have shown evidences of a desire to come to this country in large numbers. Koreans, Hindus, Chinese and Japanese are knocking at the gates of all the sparsely settled countries and asking to be let in. The yellow peril is a reality to our Pacific states, to Western Canada, to Australasia and South Africa. The Asiatics wish to move from lands which seem to be overpopulated to lands



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which are rich in plant food, have good climates and not too many inhabitants. The deepest thinkers are of the opinion that this tendency on the part of large populations to move is no less important, no less fateful, now than it was when the same tendencies on the part of the same peoples hurled wave after wave of war on Rome and destroyed her. Will Asiatic-exclusion laws always protect against these movements? Before considering these most vital things more in detail, let us see what there is in a soil which makes it able to support dense populations. If it is a property which remains forever, then these nations may be able to stay where they are, and leave the rest of us in peace. But if it is something which is taken from the soil by use, then these massed millions may sometime have to move or starve.

It is this property and this only which now concerns us—the fitness of the soil to furnish food for plants—in order that the plants may in turn furnish food for animals. Life is the vapor that distends for the moment the bubble

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called an animal or a vegetable or a man; and good soil is a soil from which that vapor can freely emanate. Protoplasm is the only thing that lives; and good soil is the soil that can furnish to the protoplasm of the plants the food from which the protoplasm can build up animals.

It is possible to tell just what the things are that the plants need. They are ten substances, all of which are found in any good soil—carbon, hydrogen, oxygen, phosphorus, potassium, nitrogen, sulphur, calcium, iron and magnesium. Most of these you can see in some form in any drug-store, or about the house. Soot is carbon; illuminating gas is mostly hydrogen; oxygen is the vital principle of the air, and is given as a gas to some patients by physicians; phosphorus is what glows in the dark when you rub a damp match on your hand; potassium is a soft metal which gives the name to common potash; nitrogen is a gas, hard to obtain pure, but which forms the bulk of the air, and is important in compounds the names of which begin with “ni-

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trous", "nitric", or "nitro"; sulphur everybody knows about; calcium is a brilliant, lustrous, light-yellow element, which combined with oxygen forms ordinary quicklime, and with carbon is the carbide of the acetylene lamp; iron we all know, but rarely see chemically pure; and magnesium is the chief element in common magnesia, but is not often seen pure outside of chemical laboratories.

Doctor Cyril Hopkins, of the University of Illinois, is a great authority on soils, and students of agriculture under him have made of his name a rigmarole by which to remember these necessary elements of plant food. This formula is made up of the chemical symbols for the elements.

"C Hopk'ns CaFe Mg" is the rigmarole. The boys say it means "C. Hopkins, Café, mighty good." The only mysterious thing about the rigmarole to the ordinary reader will be the meaning of the letters which are not the initials of the English names of the elements for which they stand. "C", "H", "O" and "P" are easy. "K" is potassium. All the

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rest are easy until we come to "Fe" which means iron. These are the things which the spirit of time put into the soil so that plants might grow. When any one of them is absent the land is a desert. And when the deck becomes a desert, the passengers have to move or starve.

Only four of these elements give the farmer any trouble on account of their scarcity—nitrogen, phosphorus, sulphur and potassium. All the rest are found in plenty. And the passengers on the good ship *Earth* have chosen their quarters on her broad decks with reference to the presence in the deck-dust—called soil—of these four things—nitrogen, phosphorus, sulphur and potassium. Each presents a wonderful world problem—a problem in our future peace, as well as our future plenty—great enough for a book—a library of books.