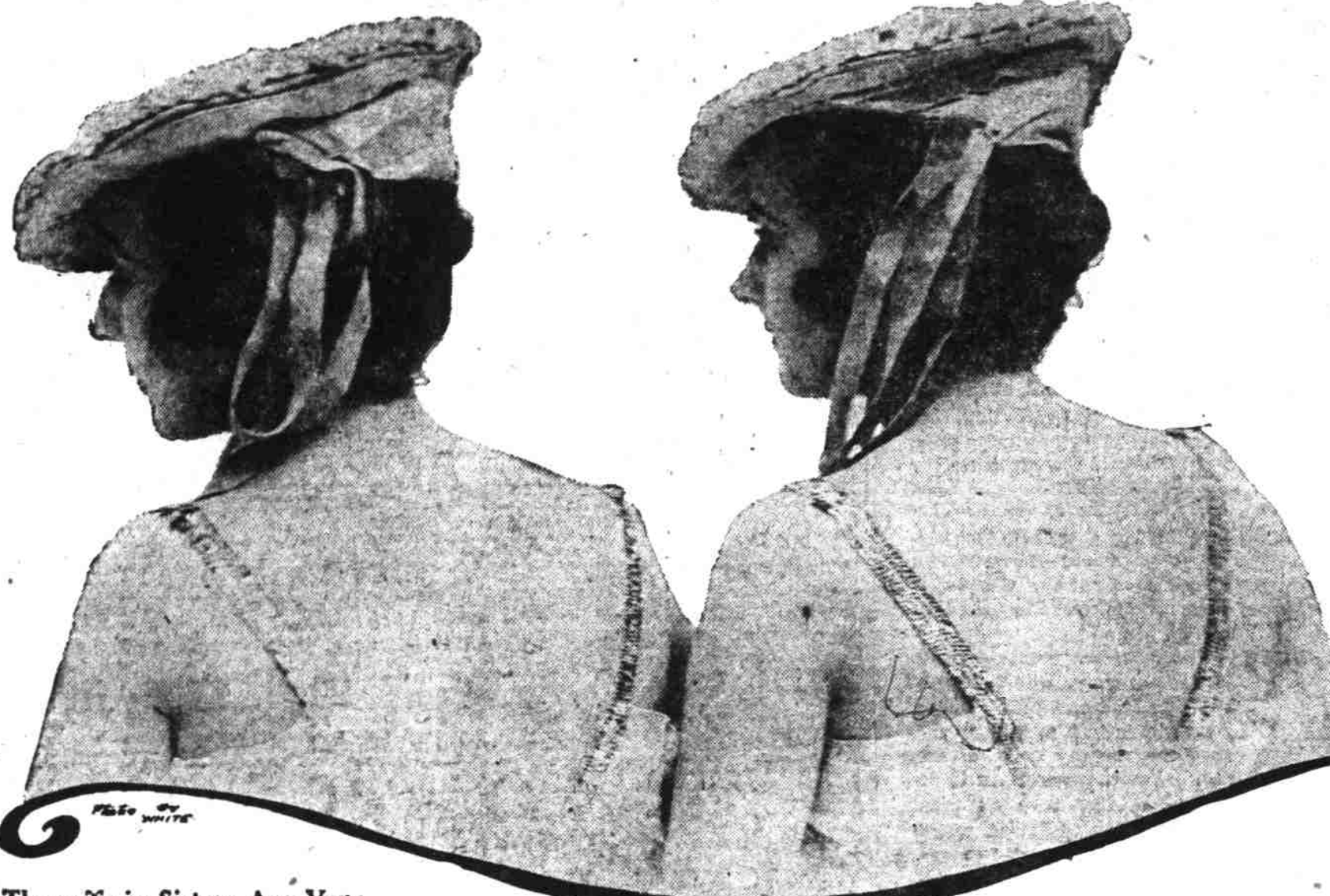


Science's Newest Discoveries About Twins

Not Necessarily Lacking in Mental or Physical Vigor---Never Absolutely Identical in Looks or Actions---Often No More Alike Than Brothers and Sisters Born Many Years Apart



These Twin Sisters Are Very Much Alike, but Science Finds That a Great Many Brothers and Sisters Born Years Apart Would Show Just as Close a Resemblance If They Could Be Viewed Side by Side at the Same Ages.



An American Mother and Her Two Pairs of Twins Who Were Among Those Weighed, Measured and Carefully Studied by the Scientists in Making the Discoveries Explained on This Page.

SCIENCE has recently made some very interesting and important discoveries about twins, and as a result of these we now know that a great many ideas on this subject which have long been accepted as true are entirely incorrect. Twins are not necessarily lacking in mental or physical vigor; they are never absolutely identical in the way they look or act; they often differ from one another as widely as brothers and sisters born many years apart; the body of a twin is likely to be more symmetrical than that of one not a twin—these are just a few of the things which are pretty well established by the recent scientific investigation.

This investigation was begun over a year ago by the American Genetic Association, an organization devoted to study of the laws of heredity and their application to the improvement of plants, animals and human racial stocks. Appeals were sent to all parts of the world for detailed information concerning twins, together with photographs of them at various ages. Responses were received from more than 600 pairs of twins and their parents, and with them came 160 photographs of twins. With this mass of life histories and pictures at their disposal the scientists connected with the association have been able to make a more exhaustive study of the whole subject of twins than has ever before been attempted.

From time immemorial many parents have felt serious regrets over the arrival of twins owing to the popular belief that such children were less vigorous than others—not likely to be long lived and not so well equipped for success in life. It was long supposed that there was strong scientific basis for this belief, particularly in the case of what are known as identical twins.

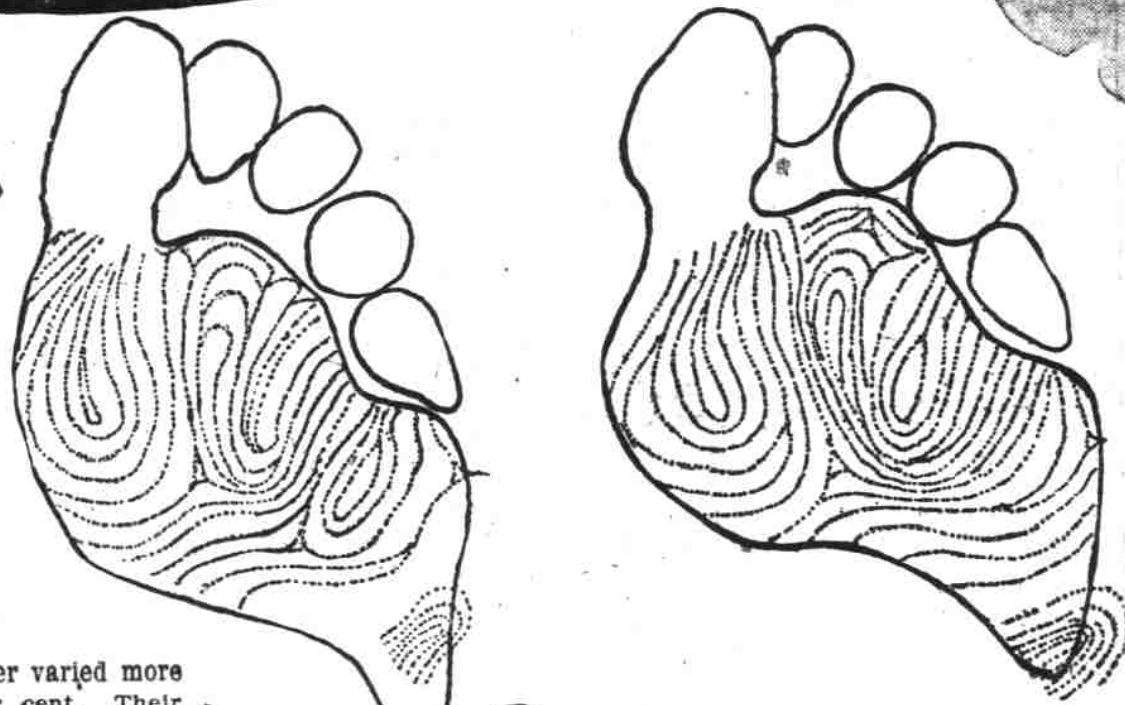
These are children sprung from a single parent cell instead of being the product of two unions of two different mother and father cells as what are called fraternal twins are. Many scientists thought it quite reasonable to suppose that a baby having only half a cell from which to draw its heredity would be less vigorous than one springing from a whole cell.

But the recent investigation by the genetic experts leaves no ground for believing any such thing. On the contrary it presents a great deal of evidence which seems to show that it is a highly fortunate thing for a child to be born a twin.

The record of the Grosvenor twins—Gilbert and Edwin Grosvenor—would of itself be almost sufficient to shatter the theory that identical twins are naturally ill fitted for success in life. As students at Amherst College these twin brothers divided highest honors in the class room and on the tennis court. After graduation one, as builder and director of the National Geographic Society, and the other as assistant attorney-general and partner in one of the country's greatest law firms, have demonstrated their abilities as leaders.

During their whole lives the two have never varied more than a pound in weight.

Prints of the Left Soles of Twin Brothers, Showing Great Similarity in the General Plan of the Lines But Many Differences in the Minor Details. Similar Differences Prevail Throughout the Mental and Physical Make-Up of Twins and Prevent Their Being Absolutely Identical.



In college their grades never varied more than one-tenth of one per cent. Their tailor says that one of the twins has a short left arm and the other a short right arm. Although absolutely dependent upon glasses, each can wear the other's.

Their illnesses have often coincided. They have always been devoted friends, and frequently their letters cross. Most of their tastes are similar, but there is one striking exception—they have never agreed when it came to girls!

"They look enough alike to be twins," is an expression one often hears, but it is a statement which has no good scientific basis. As a matter of fact, while certain twins show profound resemblances in both mental and physical traits, others show no such unusual similarity. Twins that look and act alike attract our attention more than the dissimilar ones and this is what has given rise to the idea that all twins are very much like one another.

Of the 600 pairs of twins studied by the American Genetic Association a large number showed a remarkable degree of resemblance, but on the other hand many showed the most surprising dissimilarity. And it is believed that the average resemblance of all the twins in the world is considerably lower even than it was found to be in this somewhat selected group.

Exact correspondence in the height of twins is not at all unusual, and a difference of a quarter of an inch more or less is common.

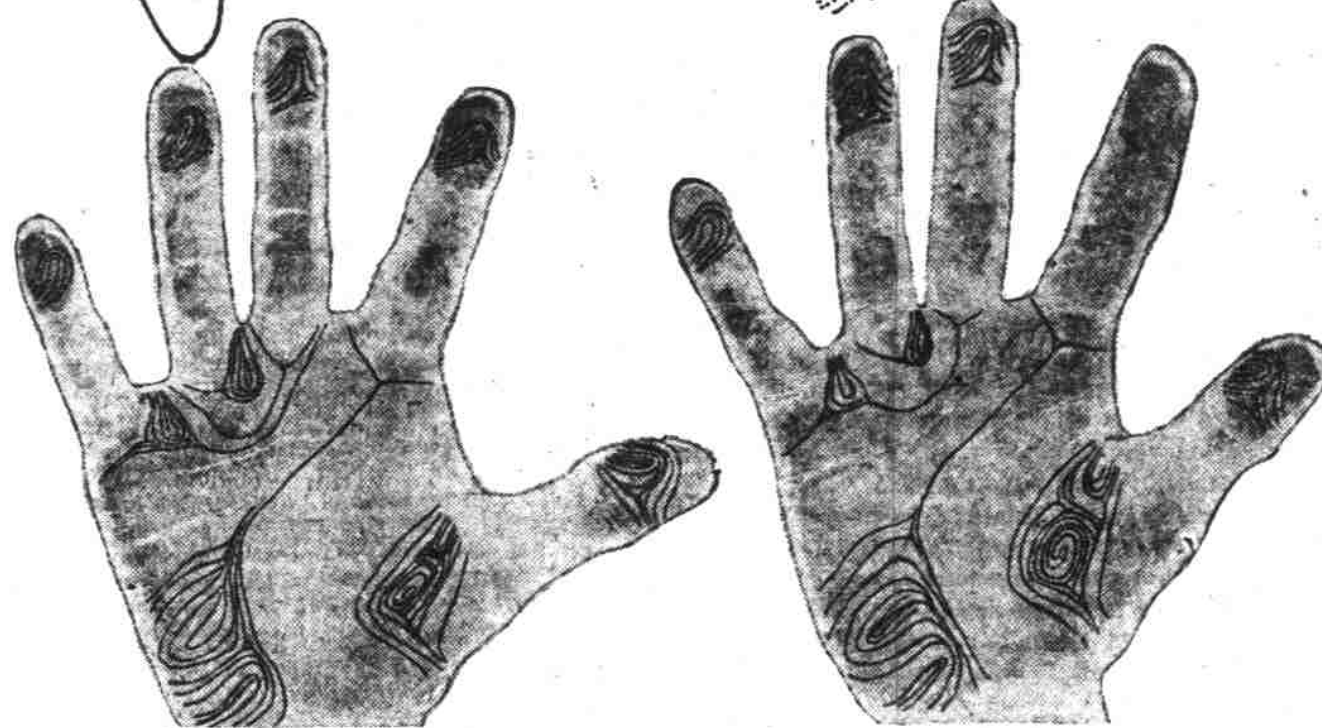
Yet variations of several inches sometimes occur, and considerable differences are sometimes found between twins otherwise very similar.

Complete identity in weight, or a difference of only a pound or two, is common. The changes in weight of many twins, as in the case of the Grosvenor brothers, are always parallel, so that they never differ from each other by more than a small amount.

Perfect uniformity in color of hair and eyes is the rule with twins. But, on the other hand, twins one of whom has dark eyes and the other light are rather frequent.

In general, similarity with reference to one trait is correlated with reference to most other traits. Rarely are there only a few points in common. In other words, either twins look very much alike or else they show a wide difference in appearance.

The same general laws hold good for gait, tone of voice, reaction to foods and



The Palm Prints of Twins Showing, as in the Case of the Soles, a Similarity in General Pattern, but a Great Difference in the Way the Details Are Worked Out.

susceptibility to disease, as well as for mental capacities, intellectual tastes and likes and dislikes. One pair of twins state that bananas make "both very sick." Two little acrobats who are familiar figures in the motion pictures always get hungry and sleepy at exactly the same time.

Over and over again the two twins of a pair are found to have virtually the same preferences and aversions in their studies. One twin and her sister commonly dream about the same persons at the same time, even when sleeping in widely separated places. And not only that—they actually dream the same things about these persons!

Rather a surprising number of the hundreds of pairs of twins studied were composed of one right and one left handed individual. It has been suggested that perhaps one twin is frequently the "mirror image" of the other, left handed and with heart and other organs reversed in their symmetry. A further investigation is now under way to determine if this is true.

Some who believe that right or left handedness is an acquired characteristic and not hereditary have still another explanation to offer.

Twin babies generally face each other in their beds, and if care is not taken to change them about frequently their heads become asymmetrical on opposite sides. This, it is suggested, may possibly affect

the hemispheres of their brains differently, and thus influence the amount of use that is made of the left hand in one infant and the right in the other.

Do twins like one another better than anybody else? Yes, says science, as a general rule they do. But it is noticeable that this fondness is usually strongest between twins who are not only of the same sex, but otherwise very similar.

Right here it should be mentioned that statistics based on thousands of cases show that about one pair of twins in every three born consists of a boy and a girl. Yet of 160 pairs of twins whose pictures were submitted to the genetic experts only 22 were of both sexes. This small percentage is accounted for by the fact that twins of different sexes—"pigeon" twins—are rarely as fond of one another as those of the same sex and, therefore, often drift apart early in life.

Are twins ever so much alike that "even their own mother can't tell them apart"? No, says science, the resemblance between similar pairs of individuals is never quite complete, and practically every pair is found to differ more or less widely in at least one respect. Although marked similarity is, with rare exception, the rule, absolute identity is not attained.

Science believes that the resemblances found in identical twins—twins derived from a single parent cell—are not super-

ficial, but pervade their whole being. A few dissections of identical twins which have been made reveal remarkable similarity in the configuration of the brain and in the structure of the muscles and blood vessels. The tendency of such twins is always to absolute identity, but they never quite attain it.

The explanation of the fact that twins are never actually identical is probably to be found in the same causes which produce variations between the two sides of the body in a single individual. But Professor H. H. Wilder holds that while the variation between two twins may be as great or greater than it is between the two sides of an ordinary individual's body, it is far less in the body of each twin. In other words the body of a twin generally shows greater symmetry than that of the ordinary individual.

Fraternal twins—those derived from two unions of two different mother and father cells—are never so much alike as those of the identical variety. In fact their resemblance to each other is only about equal to the average for all children of the same family. Brothers and sisters born many years apart would doubtless look as much alike as fraternal twins, if it were possible to see them together at the same ages. Of course, the resemblance between fraternal twins tends to increase if they grow up together, owing to their being subjected to the same environmental influences.

But the most interesting question in connection with the study of twins is whether a degree of difference similar to that which keeps twins from being absolutely identical and often makes them quite unlike in mental and physical traits can also manifest itself in their moral natures.

Is it possible for one twin to become the worst of criminals while the other becomes an honest, useful member of society? Can we have in a single pair of twins individuals as different in character as Dr. Jekyll and Mr. Hyde?

twins shows that while the lines tend to be closely similar in their general pattern there are always numerous minor points of difference.

Similar small points of difference in the development of the brain cells might easily result in moral natures that would be as different as right is from wrong.

Environment also plays an important part in making the moral as well as the mental and physical natures of twins alike or unlike. Twins living together under precisely similar conditions naturally tend to become more and more alike, but wide differences in them would probably result if they were separated and forced to live under conditions not at all the same.

Take the case of two middle-aged twins whose life histories were among those studied by the genetic experts. In height, weight, tastes, dispositions and talent these men are the same. They have lived and worked together continuously for twenty-five years, and have never been separated. Nine persons out of ten cannot tell them apart.

How far could different environments have forced these men apart in character? Supposing that one had grown up in China, speaking only Chinese, and the other in Spain, speaking only Spanish, would they still look as much alike as they do, and when we came to know them would they seem as much alike? Is it not possible that if one had been subjected for years to evil influences and the other only to good they would have become quite different in character?

These questions are most interesting, and it is hoped that further study of twins will enable science to answer them.

The importance of twins in furnishing science with evidence of the limitations of environment cannot be exaggerated. Identical twins are the only human beings in the world who have exactly the same heredity. If we can find out the characteristic ways in which they remain the same throughout life, the qualities and habits and mannerisms which persist unchanged in them both, in spite of their living in entirely different surroundings, we shall know much more than we do at present about what attributes are hereditary and fixed and what are those which we can hope to modify by environment and education.

Any exact knowledge we can gain by a study of two identical twins who were separated from each other as babies and brought up in different towns under entirely different circumstances, scarcely knowing each other, will give us a clearer idea than we appear to have now of what changes in our bodies, and, perhaps, too, in some of our mental and moral characters, are clearly due to the things we eat, the exercise we take, the associations we make, and the work we do—to our environment, as it is called—and what changes, or failures to change, can be correctly traced to the very beginnings of our lives.