

nitrate, an oxide or some other compound. With Mr. Richardson's technique this is possible, for the width and brightness of the line that reveal the presence of a metal can also be made to divulge the negative radical, the element with which it is associated in the compound.

The addition of the time dimension also enables the scientist to identify minute traces of an element which would escape detection under ordinary methods, and also to determine more accurately than by other methods, the amount of a substance present in the material under investigation.

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PSYCHOLOGY

## Boys and Girls Go Through Similar Stages of Growing Up

By PROF. PAUL HANLY FURFEY,  
Department of Sociology, The Catholic  
University of America

**A** YOUNG human being is a very complicated creature. He is growing in mind and body and personality toward maturity, all at once, but perhaps at different rates.

We are interested in finding out how behavior becomes more mature. The little boy grows out of the stage where he is thrilled by a sandpile, to the stage in which he plays Indian, then on up to baseball days, and his first dress suit, and manhood. For want of a better name, I have called this side of personality, as it unfolds, a child's developmental age.

### Age of Make-Believe

Young children up to about ten years of age are individualists—rugged individualists. They enjoy playing together, but they are too young for most games played by teams. It is a great age for make-believe, and the boys dramatize themselves as cowboys, G-men, storekeepers, and all the other grown-up roles that look attractive and important.

At six, the greatest sport in the world is tag, in one form or another. I have seen six-year-olds cheering a game of tag from the sidelines, with all the excitement of fans at a major league ball game.

These young individualists are not ashamed to play with girls. Four out of five think nothing of it until the sixth year, perhaps later. Then, they begin to shut girls out of one sport after another. They are growing toward a new stage of development—the gang age.

Gang age sounds wild and inelegant, but the term does express the wave of devotion that a boy of ten begins to feel for his chosen—gang. He is no longer satisfied to toss a ball in any sort of

simple ball game. He wants to belong to a team. Remarkable clubs are formed, with secret passwords, and a clubhouse. The boy is eager to join the Boy Scouts.

The girl too has her age of rugged individualism, but she is not likely to get into as many fist fights as her brother. Her make-believe is concerned with different things. In a study of 35 six-year-old girls and 35 eight-year-olds, we found that every last child had her doll. Four years later this sort of thing has pretty well disappeared.

### Girls Have Gangs, Too

The girl has her gang age, too, but not many gangs. That is, the girls show the same get-together spirit as the boys, but it takes different forms, such as informal parties at one another's houses. Both sexes are "joiners" at this age.

The last stage of growing up is adolescence, which begins during high school years and carries the boy or girl into maturity. It is rather curious that this last stage is the least understood of the three—curious, because no age of development has been so much discussed.

Adolescent boys take less interest in affairs of the heart than magazine fiction would make us think. Up to 16 years, less than half the boys we have studied had fallen in love.

More characteristic of the boy nearing manhood is his attitude toward authority. A younger lad is apt to obey any one who speaks authoritatively. An adult has learned to obey and play his part in an ordered universe. But the adolescent is apt to resent commands. He is not yet sure enough of himself to submit gracefully, and the struggle may lead him into trouble at home and at school, or even with the law.

Boys of this age are more apt to be assertive and conceited than shy and retiring. About one boy in five, among

younger lads, is bashful. But the older boy is ready to be a man, even before society is ready to accept him in that role.

Girls show some of the same trends at this age. Those we studied took themselves more seriously, showed more poise, took better care of their clothes, and began to be interested in the opposite sex.

The best method we have found for measuring a child's advancement into maturity is to ask which of two items he would prefer.

For instance, we might ask whether he would rather play soldiers or pitch horseshoes; whether he would rather chew gum or go out with a girl; whether he would rather work with tools or play tennis.

### "What Do You Read?"

After quizzing him on a long list of such preferences, we get a good cross-section view of his ideas of amusement, and his level of development along that line.

In the same way we check up on the sort of books he would rather read. And we find out whether he thinks it more fun to have certain things than others. For example: Would he rather have a magic lantern or a saxophone, an electric train or a book of detective stories.

We have prepared a number of these lists for both sexes. To find out one preference would mean nothing, unless it was very abnormal. But if you study a list of preferences given by a single child, you can learn a good deal about his personality, and how mature or immature he is.

A boy may be eight according to his birthday record, and very intelligent, and yet only six years old in his personality.

We believe that knowing what is normal maturity for different ages of childhood will be helpful in dealing with problem children, who are out of step with life and miserable over it. Part of their trouble may be simply that they are maturing at a different pace from their friends, or at a widely different pace from their own mental and physical growth.

It is important to take into account this angle of a child's development. To leave out consideration of his maturity is like ignoring something vital. His developmental age is part of him, and he cannot be expected to read books or enjoy games that require a maturity still beyond him.

Wealth or poverty alone do not seem to be responsible for hastening or retarding maturity. But we do find this:



#### RECORD-BREAKING "IVY STALK"

The photograph shows the discoverer, Jim Shelton, right, and Wesley Ogle, left.

Mothers and fathers who are over-solicitous about their children and take too much care of them, may hinder their development. On the other hand, there are homes in which the children "just grow" like Topsy. If they roam the streets in a poor neighborhood, such children may attain a hard maturity beyond their years.

The popular belief that city boys are more grown-up than country boys is confirmed by tests which we made with nearly 200 boys aged 11 to 13 years.

We found that, at 11 years, the city boy is apt to be a year and a third ahead of the country boy in his ambitions, ideas, sports, and so on. At 12, the city boy is apt to be fully two years more grown up than the country boy. But—this is rather curious—when the boys reach 13 years, there is not so much difference. The country boy has almost caught up with his city cousin, and there is only a third of a year difference between them.

If this is true, then we should not try to fit urban and rural boys into the same mould. Recreational programs should not be taken over bodily from the city and applied to country boys without making allowance for urban precocity. Books written for parents should take account of these differences.

Altogether, modern social science is making a determined effort to treat the child as an individual. To do this intelligently, we need to know what is

normal and what leads to favorable or unfavorable results.

This does not mean that we shall ever reduce a human being to a mathematical formula; but it does mean that a discreet use of tests and measurements can be very helpful.

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#### PLANT PATHOLOGY

### Tropical Tobaccos In "Health" Contest

NOT all the health contests are for bouncing babies. Government scientists, seeking tobaccos that will resist disease, have planted seed from over 600 samples of tobacco gathered in tropical America.

Among the diseases that now cause huge loss to the tobacco crop each year are included wildfire, blackfire, mosaic, mildew, stem rot, wilt, black shank, root knot, and black root rot.

The region where the seed was collected, in Mexico, Central America and northern South America, is undoubtedly the native home of the tobacco plant, declares Dr. E. E. Clayton, tobacco disease specialist of the U. S. Department of Agriculture. But this is the first systematic effort to collect and test some of the innumerable types and varieties that have existed there for centuries.

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#### BOTANY

### Giant Mountain Laurel Found in Great Smokies

"WHEN bigger mountain laurels are grown, the Smokies will grow 'em," declared Dr. H. M. Jennison, of the University of Tennessee, following his verification of the find of a veritable giant laurel in the Great Smoky Mountains National Park. The butt of the giant laurel measures 82 inches in diameter—quite a find, considering that the largest laurel previously listed in the Great Smokies Park was 21.6 inches in diameter. One limb of the plant was found to be 31 inches in diameter, measured through its base.

There is a confusion of names for shrubs, in the Great Smokies. What is locally called laurel is really rhododendron; the great "laurel slicks" on the mountainsides are dense jungles of rhododendron bushes. The true mountain laurel is known only as ivy in the Smokies. One mountaineer remarked to Professor Jennison, as two men examined the giant mountain laurel bush, "I don't reckon many people hain't never saw the ivy stalk!"

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#### ZOOLOGY

### Bears Follow the Grub 50 Miles Over Mountain

BEARS, like hoboes, seem to have an uncanny knack of finding out where the hand-outs grow.

When Yellowstone National Park opened up for the tourist season last spring, the bear "cafeteria" at Old Faithful, where the Bruins have for years been regaling themselves nightly on hotel and camp table scraps, was shut down in accordance with the Park Service policy of making the bears rustle for their own grub. Only the "cafeteria" at the Grand Canyon of the Yellowstone, about fifty miles away, was kept open for business this season.

Now, Ranger Wayne Replogle, who got to know a lot of the bears at sight during several seasons on "bear ground" duty at Old Faithful, has recognized quite a number of his old friends in the new locality.

It looks as though an old song will have to be revised:

"The bears went over the mountain, to see what they could see—  
"Free grub by the side of the Canyon was all they cared to see!"

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