



Felix Plater, a Swiss physician, who, in 1614, recorded the death of an infant by suffocation from an enlarged thymus gland, an early case of thymic death.

**T**HIS is a mystery story. It is about mysteries that modern science, for all its wonder-working, has not yet unravelled, secrets that the body still keeps more or less inviolate.

Inside your body you have two organs that baffle scientists and refuse to reveal their purpose to the modern investigator, just as they mystified the ancients who studied the human body and tried to learn its secrets thousands of years ago.

The pineal gland, a pea-sized structure near the base of your brain, was once considered the seat of the soul; the thymus, a large gland located high in your chest that has been thought to shrink as you grew older, and which was once considered "the center of courage and affection;" these two have guarded their secrets closely. What they may do to stimulate or retard body processes, how they affect your growth and development, cannot now be told exactly.

Disease or disorder of each of these glands has grave results, often fatal ones. Yet the real functions of these two glands are not definitely known. Scientists are not agreed on why we have them or what they do for us. They probably are not essential to life itself, but even this has not been definitely proved.

Do they, like the other endocrine glands, secrete a powerful hormone that controls some of the body's

# Glands of Mystery— Who Knows the Use of Pineal and Thymus?

*Endocrinology*

By Jane Stafford

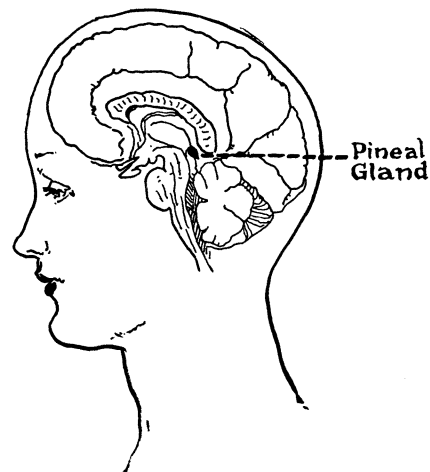
processes? Scientists are not sure. No such hormone has ever been discovered for either of these two glands. Experiments with glandular extracts have not proved anything conclusively.

An apparently healthy baby was found dead in its crib. No previous sign of any illness had existed. No cry, no struggle had warned the frantic parents. Death had struck silently and suddenly. A post-mortem examination revealed that the child's thymus gland had become enlarged to such an extent that it had pressed on the baby's windpipe and so cut off the baby's supply of air. The infant actually had been strangled to death, as surely as though his little throat had been crushed by cord or fingers.

Occasionally a child dies while under an anesthetic given for some operation, such as removal of tonsils or correction of some defect. The same amount and kind of anesthetic may have been given, in just the same way, to hundreds of other children with no untoward results. But this unfortunate child had a large thymus which had perhaps already been making it difficult for the child to breathe, and the added strain made by the anesthetic, was more than could be tolerated by the body.

This danger of strangulation or suffocation by an enlarged thymus is particularly grave in infants and small children, for the thymus is a large organ at birth, and grows smaller as the individual approaches maturity. At one time it was thought that the thymus disappeared completely by the time a man was fully grown. For this reason it was sup-

Showing the location of the pineal gland, a tiny, cone-shaped structure in the brain, which once was called the seat of the soul.



posed to have some connection with growth. This theory had a distinct set-back by some observations made on healthy people who died of violence and not disease. Examination of some German soldiers showed that they all had large, well-developed thymus glands.

A more modern theory about the thymus credits this gland with power to protect us against disease, or to help our bodies fight disease germs and overcome them. This theory is based on the fact that the thymus contains a great many lymphocytic cells. These are the cells that fight the disease germs which get into the body. The lymphocytes rush to the site of an infection, surround the invading germs, and do their best to overcome them. Sometimes they succeed, but at other

times they do not. In the latter case the body cannot manufacture lymphocytes fast enough to keep up with the ever-increasing numbers of disease organisms. The thymus may be considered a sort of storehouse for lymphocytes, and it may even be concerned in their production. If this is true, it is very apparent that the thymus may be a powerful weapon in man's fight against the ubiquitous germ.

"The thymus functions as a lymphoid organ in infancy and childhood when a large number of lymphoid cells and leucocytes are needed to combat infection," Dr. E. R. Hoskins has written.

But even this is only theory, and beyond the fact that the thymus contains large numbers of lymphocytes, we do not possess certain knowledge that the thymus does act to protect us from disease.

One of the earliest scientists to record observations on the mysterious thymus gland was Felix Plater. In 1614 he made a post-mortem examination of a five months' infant who had died suddenly and mysteriously, apparently from suffocation. Plater discovered that the child had a greatly enlarged thymus gland. To this condition he attributed the child's sudden and otherwise inexplicable death. His observation was the first of its kind and is all the more remarkable because of the prejudices then existing which made post-mortem examinations extremely difficult to perform.

If the thymus can cause such tragedies, we have, fortunately, in the X-ray and radium a means of preventing them, in the opinion of a number of modern physicians and surgeons. X-ray pictures show the outlines of the thymus gland where it lies just above the heart in the chest cavity. If these pictures show the gland to be enlarged, radium treatment will reduce it to a safe size.

In this way, X-rays and radium are daily saving the lives of many babies who have enlarged thymus glands, according to a report made to the Radiological Society of North America by Dr. Howard P. Doub of the Henry Ford Hospital, in Detroit,

and Dr. H. B. Podlasky of Milwaukee.

"When a baby strangles or becomes blue or has a hoarseness or a cough, it may have an enlarged thymus," they said. "The thymus gland may become a dangerous organ and cause abnormality or death due to asphyxiation if it develops into an abnormally large thymus. This is especially dangerous to children and frequently causes death. It may also cause a fatality during operative treatment while the child is under anesthesia. The gland, however, may be reduced and made harmless by the use of X-ray and radium treatment."

A number of physicians are now making it a practice to have X-ray pictures taken of the chests of all babies under their care. If an enlarged thymus is discovered, a course of treatment is then instituted. Surgeons also are taking the precaution of discovering, if possible, whether a child has an enlarged thymus, before they undertake an operation on the child.

Other scientists, however, do not feel that X-ray treatments of thymus glands are always justified. In the first place, it may even be natural for the child to have an enlarged thymus, for the normal size of this gland cannot be stated definitely yet. Then, the enlargement of the thymus may be the result of other conditions, and in such a case may be harmless and may be reduced spontaneously when the other conditions are relieved. For example, climatic conditions may possibly affect the size of the gland, Dr. Douglas D. Martin of Tampa, Florida, observed at a recent meeting of the Southern Surgical Association. The enlargement of the thymus may also be the result of conditions such as respiratory infections and not of glandular disease itself.

Infants and small children are not the only ones who may suffer from disorder of the thymus glands. Some people are born with a definite inherited type of disease which is

known by the long name of *status thymicolymphaticus*. At birth such persons have enlarged thymus glands. As a rule their skin is extremely fine and smooth and they have beautiful pink complexions. They are apt to have attacks of cyanosis in which the skin turns blue. Sometimes the cyanosis is so severe as to cause unconsciousness, convulsions and not infrequently sudden death. Some persons who have a particularly large thymus are apt to have attacks of what is known as thymic asthma. They have sensations of pressure in the middle of the chest, probably due to an enlarged thymus gland. Prompt treatment with X-ray may relieve this condition.

Until recently, the condition known as *status thymicolymphaticus* was not recognized until after death, when post-mortem examination showed the condition of the thymus that had caused death. The condition was generally connected with quick and sudden death. However, better methods of diagnosis, including the X-ray, have now shown that most of the people suffering from this condition do not die, because certain changes take place in the body by which other organs compensate for the abnormal condition of the thymus, according to the theory of Dr. Walter Timme, eminent neurologist who has investigated the subject.

Children who have this condition mature very slowly, Dr. Timme has observed. These children and also the adults suffering from the condition, have low blood pressure and flabby muscles. They tire easily and have but slight resistance to infections.

"In behavior they remain children. They follow the path of least resistance, shirk responsibility, and lack the ability to concentrate. Consequently they are apt to feel inadequate and inferior," Dr. Timme wrote in a description of this type of individual.

Dr. Timme thinks the body automatically at- (Turn to page 174)

**A blue goose and her eggs. Perhaps the goose that laid the golden eggs had a superfine thymus gland, since a diseased or missing thymus causes birds to lay imperfectly formed eggs.**



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## Glands of Mystery—Continued

tempts to overcome this condition, chiefly through increased stimulation by increased functions of the adrenal glands. In some of these patients, the adrenals are easily able to meet the extra strain. In others they are not, and then in time of emergency, when they would ordinarily be able to save the patient's life, they have not the extra bit of necessary power, and death occurs.

Whatever the functions and meaning of the thymus may be in man, it plays an indispensable part in the life of the lower vertebrate animals. Dr. Oscar Riddle of the Carnegie Institution found that in some pigeons which had formerly produced normal eggs the thymus became very much smaller, after which the pigeons laid eggs in which the egg-envelopes were only partially or very imperfectly formed. The shells were thin and the albumen was greatly reduced in amount and modified chemically. When these pigeons were fed on extract of ox thymus, they again laid eggs in which all the egg envelopes were perfectly normal. Curiously, however, the removal of the thymus in young birds did not prevent these birds from producing normal eggs when they grew up.

Dr. Riddle has suggested that the thymus may in reality be a sort of "mother to the race" because the higher animals, including man, could not have come into existence without it. While our remote ancestors lived in the water, Dr. Riddle explained, their thymus glands made possible the production of perfect egg envelopes in which the young were cradled and protected until they were ready for an independent life.

While the thymus remains a mystery, probably even less is known about the pineal gland.

It is a tiny structure, generally said to be about the size of a pea. It gets its name from its cone-like shape. Like the thymus, it is larger in children than in adults. It is also larger in the female than in the male. At one time this mysterious little gland was called the seat of the soul.

It is interesting to know that its structure is the same as that of the eye of reptiles and in fact, the pineal was once considered a third eye, and may possibly have been so in the reptilian stage of evolution. However, in no form of animal living at present does the pineal retain an ocular function of high order.

The color reactions of certain animals such as tadpoles and chameleons depend on the eye. Some investigators have found that feeding pineal substance to tadpoles causes contraction of the pigment cells of these tiny creatures, even when no change in environment has taken place.

Tumors of the pineal gland have been associated with sexual precocity. When a little boy grows rapidly, so that he becomes very large for his age, with arms and legs particularly long and out of proportion, and when he appears very precocious, both mentally and sexually, and also suffers from headache, vomiting and visual disorders, he is probably the victim of a pineal tumor.

Curiously enough, this condition is confined to the male sex. Tumors of the pineal in little girls do not have this same effect. The mental precocity is usually surprising as well as the advanced sexual development, which is both structural and functional. The intelligence quotient is sometimes as high as 140 in these youths. The condition almost always ends fatally. It is practically impossible to remove the tumor. Treatment with X-rays is sometimes resorted to. Pineal tumor, because of pressure on other structures of the brain, also sometimes causes the condition known as hydrocephalus, or water on the brain. The very large head and prominent forehead are characteristic signs of this condition.

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