

OUR PRIZE COMPETITION.

NAME THE EXCRETING GLANDS OF THE BODY AND THE PRODUCTS OF EACH.

We have pleasure in awarding the prize this week to Miss Emily Marshall, 123, New Bond Street, London, W., for her paper on the above subject.

PRIZE PAPER.

A *Gland* is an organ whose function is that of secretion and excretion, or both combined, containing *ducts*, or vessels, for the escape of matter excreted.

Excretion is the process by which waste, useless and injurious matter is separated from the blood and thrown out of the body by excretory glands. The principal glands are the liver, kidneys, pancreas, mammary, lachrymal, sudoriparous, sebaceous, ceruminous meibomian glands, and the glands of Brunner, Reyer, and Lieberkühn.

The Liver is the largest gland in the body; its action is incessant, secreting bile and glycogen, and is therefore a constant gain and loss to the blood; it is capable of secreting 3 to 5 lb. of bile per day.

The biliary ducts, the cystic duct, and the common bile duct collect, conduct, and control the flow of bile to the gall bladder and intestines; its aid is required for digestion, chiefly of the fatty matters, by *neutralizing* the *acid* of the gastric juice. Bile consists of carbon, hydrogen, oxygen, nitrogen, and sulphur. It is a greenish fluid, bitter, and slightly alkaline.

Glycogen assists in converting starch into sugar.

Glucose is the substance formed by the action of ferments on the glycogen.

The Pancreas, a milky white gland, secretes pancreatic juice, which acts as salivary gland to the abdomen, and aids digestion.

The Kidneys.—The internal borders of the kidneys contain openings, which give entrance to the renal arteries and nerves, and exit to the renal veins and ducts. They derive from the veins *urea* secreted by the glandular epithelium, which discharge their secretion (urine) into the ureters; these convey urine to the bladder, which serves as a reservoir for retaining *urine*, the chief nitrogenous waste of the system.

The mammary glands of the breasts secrete in nursing mothers milk for nourishing their babies.

The salivary glands secrete saliva. The largest are parotid, submaxillary, and sublingual. Their ducts pour out saliva into the mouth; saliva is a thin, frothy liquid, and con-

tains *ptyalin*, which is capable of converting starch into sugar.

The lymphatic system contains the lymphatic and mesenteric glands. The chief *lymphatic glands* are cervical, axillary, lumbar, and inguinal; these glands lie in the course of the lymphatics, and discharge lymph.

Mesenteric glands are the lymphatic glands of the lacteals; they assist in elaborating the chyle.

The *Lachrymal glands* secrete fluid which moistens and lubricates the front of the eye.

Sudoriparous glands excrete the perspiration, which consists, when condensed, of a colourless, transparent, slightly acid liquid having a characteristic odour. It is constantly given off from the skin in the form of vapour. But when its escape is prevented or given off rapidly, as during exertion, it collects on the skin in the form of a liquid.

The *Sebaceous glands* secrete fatty matter. They are most numerous about the hair follicles. Their function is to keep the skin soft and flexible.

The blood is continually losing and gaining matter during its course of circulation: gaining oxygen as it passes through the lungs, waste products from the capillaries and lymphatics, sugar and white corpuscles from the liver, white corpuscles from spleen and ductless glands; losing carbonic acid, aqueous vapour, and urea by the lungs, water, urea, &c., by the kidneys, bile by the liver, and urea, aqueous vapour, and carbonic acid by the skin.

HONOURABLE MENTION.

The following competitors receive honourable mention: Miss H. Scott, Miss E. J. Townley, Miss J. J. Jackson, Miss D. F. Chapman, Miss M. Bateman, Miss P. Macgregor, Miss O'Brien, Miss J. Gilchrist.

Miss H. Scott writes concerning the lungs and kidneys:—

These excrete waste matter from the body. They are constructed upon one and the same principle, and consist of delicate tissue, one side of which is free, and lines a cavity in communication with the exterior of the body; while the other is in contact with the blood which has to be purified. Each of these organs eliminates the same products—water, urea, and carbonic acid—but in various proportions.

The lungs are composed of little cells. It is in these that the exchange between the blood and air takes place. They excrete carbonic acid and watery vapours, with a varying amount of excrementitious matter; the latter, when in excess, gives that peculiarly offensive odour to the breath, in some patients so marked.

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