***C*HROMOSOMES .**

**THEY PLAY A BIG PART IN SEX LINKAGE**

**T**here are numerous variations of protoplasm according to certain differences in the chemical constitution. Complex chemical interchanges take place within a mass of protoplasm from so called food stuffs. It can select materials for building up its own substance and numerous other substances including the various alkaloids. Its own chemical activities can be modified by many substances and this accounts for the activities of the various drugs and either their beneficent or poisonous effects on health. Protoplasm consists of about 75% water and the bulk of the remainder is made up of the complex nitrogenous compounds (we know them as proteins) with small percentages of lipoids, mineral salts and the chlorides of phosphates of calcium, sodium and potassium.

**I**nside the protoplasm, also enclosed within a membrane, we find the nucleus. It consists of the more solid elements known as the nuclear reticulum and the more liquid parts the nuclear lymph. Inside the nucleus there is a tiny rounded object known as the nucliolous. The membrane reticulum and nueliolous contain a substance which takes on certain stains and is therefore known as chromatin. Germ cells multiply by dividing, sometimes a simple process, but nearly always a complicated proceedure known as karyokinesis. Here there is a definite rearranging of the chromatin filaments and then a division through these. Inside of all of this we find the chromosomes which are formed during cell division and they house the unit hereditary factors known as genes.

**T**here are three types of chromosomes. In a normal variety such as a light green or a sky blue, we have what I prefer to call a normal chromosome and the duties of the normal chromosome is to determine size, shape and sex.. Working in harmony with the normal chromosome we have the second type of chromosome . To avoid confusion with the normal chromosome it is termed the autosome, and it is within the autosome that the colour genes are situated and they are responsible for the determination of colour. In a sex-linked variety we find the third type of chromosome, known as the sex chromosome . It is the duties of the sex chromosome to determine size, shape, sex and colour, all at the same time, so when we say that a bird is sex-linked we really mean that the factors that govern and control colour are linked with the factors that govern and control sex.

**I**f the factors for good points from one parent meet up with the factors for good points from the other parent we can produce a good bird. If factors for good points from one parent meet up with factors for bad points from the other parent, we produce a bird that is no good. That is of course speaking from an exhibition point of view.

**S**o much for the hereditary character.We turn now to the mechanism of reproduction and the sex determining mechanism. The sex-linked cock bird is termed **XX.** That is, a bird carrying two similar chromosomes, whilst the sex-linked hen is termed **XY,** or a bird carrying two dissimilar chromosomes. When an X bearing "sperm" meets up with an X bearing egg we produce an **XX**bird. In other words, a sex-linked cock. When an X bearing "sperm" meets up with a Y bearing egg we produce an **Xy**bird, or a sex-linked hen.

**B**earing this in mind we find that the factor passes from father to daughter and from mother to son. It goes to show that an X bearing egg from the hen can only turn out to be a cock and a Y bearing egg can only be a hen, and proves beyond doubt that the hen bird is the sex determiner. This knowledge allows us to forecast accurately the expectations from any given sex-linked mating and it also tells us that no hen can be split for sex-linkage. A hen bird is either a sex-linked variety or she is not. There are two factors that allow the hereditary character to obtain visible expression, and they are good environment and good husbandry. Good environment is good housing. No doubt the housing that we are able to provide is largely governed by the size of our pockets or our ability with tools and materials. The housing provided should be free from draughts and also allow the penetration of the direct rays of the sun. Good husbandry is good feeding and if we can afford to keep budgerigars then we should be able to feed them properly. Some people will have us believe that we should feed a correct diet, but I do not subscribe to this view for I do not think that there is any such thing as a correct diet.For example, "What is your correct diet, can you eat cucumbers and enjoy them, or do they give you indigestion?" I would prefer to suggest that what our birds need is a balanced diet and the main essentials of a balanced diet is that they should provide for growth and the replacement of waste, that they should furnish the heat and the energy that is required and that they should also furnish a measure of stimulationto the metabolism of the body and to the functions of the alimentary tract. Here I think that some explanation is necessary.

**T**he alimentary tract is the mouth and its appendages and the modified tube that runs through the body, together with the associated glands. It is sometimes called the digestive system but its activities are not limited to the mere digestion of food. The metabolism could perhaps be best explained by saying that living tissues assimilate food stuffs and builds them into its own substance, a process described as anabolism or building up. For the exercise of its functions a certain disintegration of its substance is required. This process is known as katabolism or breaking down. The combined sum of these activities is known as metabolism as building up must keep pace with breaking down, at any rate in health.

**C**arbonic acid gas, the commonest compound of carbon and oxygen, formed by the combustion that goes on within the tissues, is a product of katabolism and the amount breathed out is a measure of metabolic activity. Basal metabolism means the amount of tissue change necessary simply to carry on life. The tissues that we refer to can be described as being the external layers of organic substances. A considerable amount of tissues go to the make up of the body and they can be divided into four main groups, namely, nervous tissue, muscular tissue, epithelium tissue, and corrective tissue.

**E**ssentially all tissues consist of a cell with an inter-cellular substance, though the character and the relative proportion of each of these may vary. For example, epithelium tissue consists of a cell with very little inter-cellular substance, whilst in some types of corrective tissue it is the direct opposite. There are numerous types of corrective tissue and these include jelly-like tissue, fibrous tissue, cartlage, bone and blood. In these the cells and the inter-cellular tissue differ in character. In blood the latter is constituted by the plasma. In jelly- like tissue which occurs in the umbilical cord and forms the vitreous humour of the eye, a clear, soft substance forms the great bulk of the tissue, while in fibrous tissue most of the bulk consists of white fibres which have been laid down in a homogeneous matrix or ground substance.

**C**artilage or gristle consists of a ground substance in which numerous cells and sometimes fibres, white or yellow elastic are disposed.

A type of corrective tissue known as areolast tissue which occurs in subcutaneous tissue, in the sheaths of organs, nerves, blood vessels and elsewhere, consists of cells ground substance and fibres both white and yellow. Adipose or fatty tissue consists of areolar tissue in which cells have become swollen with fat. In the developing embryo there are three primitive layers an outer one known as the epiblast, an inner layer known as the hypoblast and a centre layer known as the mesoblast. The outside layer or epiblast is responsible for the epithelium and nervous tissues, the inner layer or hypoblastfor most of the epithelial lining of the alimentary and respiratory tracts, whilst the centre layer or mesoblast for both the muscular and corrective tissues.

By F.H.BROWN