myosuroides, cannot always be easily or cheaply eradicated by either cultural or chemical methods. Some new herbicides were discussed for the first time in Britain; but new effective methods are being devised using old products.

Among the specialist sessions, that on aquatic weed control showed that any treatments proposed had to be based on ecological principles and determined by the intended uses of the watercourse concerned. In a more physiological session, the intriguing story of the mode of action of the bipyridyl herbicides was taken a stage further, with a reoxidation of the bipyridylium-free radicals giving rise to hydrogen peroxide more clearly implicated. Another paper presented elegantly the evidence that auxin-induced defoliation results from enhanced biosynthesis of ethylene in the leaf.

The practice of direct drilling without soil tillage after application of herbicides was shown to give variable results with the existing technology. In general, the best results have been obtained on lighter soils. More basic information is required on crop growth in relation to soil environment. The duration of winter temperatures seems to influence results, as shown by experience in Sweden and West Germany.

The introduction of a tropical session was very successful. There were several delegates from tropical and sub-tropical countries and many others with tropical experience. The different approaches required for highly organized plantations on the one hand, and peasant farming on the other, were well appreciated. Peasant farmers do not usually consider the problem of weeds to be as urgent as that of pests and diseases, even though it is the impossibility of keeping weeded what has been sown that often limits the size of their plots.

A preoccupation with herbicides did not preclude consideration of biological control of weeds. Although complete eradication is rarely possible by this method, success in suppressing introduced species continues to encourage considerable research. In Europe, at present, this is principally directed towards discovering the natural enemies of European species which have become weeds overseas, such as *Chondrilla juncea* in Australia.

CELL BIOLOGY

Nucleic Acids and Genes

from a Correspondent

THE eighth annual meeting of the American Society of Cell Biology was held in Boston from November 11 to 13. The first symposium of the conference was on nucleic acid replication, transcription and translation in mitochondria and chloroplasts. D. R. Wostenholme of Kansas State University compared the form and structure of mitochondrial DNA from plant and animal cells. The mitochondrial DNAs from rat and *Xenopus laevis* have the same buoyant density and renaturation curve and probably have considerable sequence homologies. Plants (yeast) and ciliates (*Tetrahymena pyriformis*) differ from animal cells (rat liver) in having mitochondrial DNA with different densities and longer lengths. The former have linear DNA with cohesive ends which readily form circles. *Phaseolus vulgaris* (broad bean) mitochondrial DNA contains ten times the information of the rat liver DNA. Evidence suggests that mitochondrial DNA is synthesized *in situ*.

The mitochondrial ribosomes of *Neurospora crassa* were discussed by R. Rifkin and D. Luck from the Rockefeller University (New York). Unlike cytoplasmic ribosomes these are 70*S* and dissociate in the presence of 2 mM magnesium. They also have RNA of different base composition with a 25*S* to 15*S* ratio of 2 to 1 and different ribosomal proteins. Mitochondrial ribosomes are sensitive to chloramphenicol. The bulk of the mitochondrial proteins are synthesized in the cytoplasm and are therefore not inhibited by the antibiotic. Ribosomal proteins, and possibly a protein needed to integrate the cytochromes into the membrane, are coded for by mitochondrial DNA. Hybridization and renaturation have suggested that the mitochondrial DNA is degenerate and has sufficient information to code for the ribosomal proteins, but few others.

The ribosomes of the chloroplast were described by S. Wildman (University College of Los Angeles). There are two types, those with 80*S* monomers found in the mobile phase of the chloroplast and the others which resemble bacterial ribosomes (70*S*) and are coded for by chloroplast DNA and synthesize membrane proteins.

The topic of the second symposium was regulation of gene expression. M. Ptashne (Harvard University) described the isolation of the lac and λ repressors. The latter has a molecular weight of 30,000 and is monomeric whereas the former has a molecular weight of 160,000 and consists of four subunits. The λ repressor binds to the immunity region of the λ phage DNA, for no binding occurs in a strain of bacteria with this region deleted. By using strains with different deletions it has been shown that there are two sites where the repressor binds.

B. McCarthy (University of Washington, Seattle) reported his investigations into the regulation of RNA synthesis and translation in animal cells. Using liver cells it was found that cytoplasmic factors could regulate nucleic acid synthesis. There are separate factors for the regulation of RNA and DNA synthesis and both are small dialysable molecules. One of these factors acts by stimulating DNA polymerase activity. By using a modification of the DNA/RNA hybridization technique it can be shown that the transcription of RNA *in vivo* is different from that *in vitro*. Similarly, treatment with oestradiol will change the RNA synthesized. In regenerating liver increased transcription is found, resulting in different RNAs in the cytoplasm. Transcription is therefore able to respond to physiological conditions.

MATERIALS SCIENCE

Sputtering

from our Materials Science Correspondent

IF an ion is directed at a crystal and strikes it at the right angle of incidence, it tends to follow low index crystal directions or crystal planes. This phenomenon, known as channelling, was discussed in this column last week (*Nature*, **220**, 960; 1968). When the ion is not channelled, however, a sequence of collisions takes place between it and ions of the metal lattice, and some of these sequences rotate the original momentum through more than 90°, so that some metal atoms