Both of these were claimed by P. C. Riedi (University of St. Andrews) to have been observed by nuclear magnetic resonance measurements. A. J. Freeman (Northwestern University, Evanston) reported a wealth of calculations of neutron magnetic form factors and related quantities in metals.

Other magnetic materials whose properties may be discussed on the basis of an itinerant electron model include amorphous metals and alloys which were described by G. S. Cargill (IBM, Yorktown Heights) and M. J. Zuckermann (University of Paris, Orsay). R. D. Lowde (Harwell) and W. Young (Queen Mary College, London) gave a theoretical account of antiferromagnetic metals whose properties under stress were described by R. Griessen (Free University, Amsterdam) and E. Fawcett (University of Toronto), concentrating on chromium. More involved results on such materials, involving conductivity transitions, were described by J. M. D. Coey (CNRS, Grenoble).

Whereas the Hubbard Hamiltonian, discussed in its simpler aspects by M. Cyrot (CNRS, Grenoble) is a very useful tool for describing the interactions between the itinerant electrons which are fundamental to the whole range of observed phenomena, an equally basic *sine qua non* are the energy bands themselves, both in pure metals and in alloys. New energy band calculations in nickel and iron were described by J. Callaway (Louisiana State University, Baton Rouge) who was able to estimate the parameter of the Hubbard Hamiltonian. Similar results were also obtained by O. K. Andersen (Technical University, Lyngby) and O. Gunnarsson (Institute of Theoretical Physics, Gothenburg). The approaches of these three talks present a new era of accuracy in band calculations as relevant to the magnetism of metals. J. Kanamori (University of Osaka), on the other hand, summarised the results of the coherent potential approximation in alloy calculations.

In the introduction to the Conference mention was made of the giants of the subject who were unable to be present. One of these, J. C. Slater, had only recently died and the Conference remembered his pioneering work with humility. □

Non-histone proteins

from Carol K. Klukas

THE complex composition of chromatin and the intricate interactions of DNA with histones and non-histone proteins (NHPs) which define its structure are of great interest to many biochemists today because these interactions are centrally involved in the system of control of eukaryotic genome expression. The innate complexity of chromatin structure has necessitated division of the general problem into smaller and more approachable segments. Isolated histones, for example, have been studied at great length including the sequencing of the individual proteins and more recently the analysis of the interactions of histones with each other and with DNA to form nucleosomes. Because the number of different histones is quite small and because their sequences have been highly conserved through evolution, the analysis of histones has been a relatively straightforward and manageable task. The non-histone proteins contained in chromatin, however, include many more individual species, which are each present in much lower quantities than the histones, and which, moreover, probably differ considerably with species and with tissue. From numerous *in vitro* transcription and reconstitution experiments it seems quite clear that the function of at least one or a few of the non-histone proteins is to direct exactly which of the genes are to be transcribed from the DNA in a particular tissue at a specific time. The elucidation of how they interact with each other and with the histones and DNA to accomplish this task will be very difficult to be sure; however work in this direction has already begun as illustrated by a recent paper in *Biochemistry* (Gadski and Chae, *Biochemistry*, **15**, 3812; 1976).

In this paper Gadski and Chae present their studies of erythrocyte and reticulocyte chromatin dissociated in 2 M NaCl–5 M urea. The resultant reconstituted chromatin was analysed on acid-urea-polyacrylamide gels to determine which histones had bound to the DNA, as well as on SDS-polyacrylamide gels to determine which of the NHPs had bound. Using this assay system Gadski and Chae have found that at least one major high molecular weight NHP and two minor smaller molecular weight proteins remain associated with DNA in the 2 M NaCl–5 M urea dissociation conditions. Various other NHPs associate with DNA before, during and after the association of histones with DNA as the NaCl concentration is dropped. This indicates that the NHPs include protein species with a wide range of binding characteristics.

In similar experiments in which NHPs and DNA bound to cellulose were allowed to reassociate in the absence of histone, it was found that only 50% of reticulocyte NHPs bind to DNA in the absence of histone and NaCl, suggesting that some NHPs require histones for complete reassociation. While of the 50% of the NHPs which do bind in the absence of histone, the majority elute at 0.15 M NaCl, a significant fraction elutes only at lower NaCl concentrations at which the bulk of the histones do not bind to DNA. In general the NHPs which bind to free DNA have low molecular weights and do not show species specificity when compared to NHPs from Ehrlich ascites tumour chromatin.

Thus Gadski and Chae have begun to survey a range of characteristics of the individual proteins which comprise the NHPs of chromatin. Knowing the number of individual NHP species, their molecular weights, their relative concentrations and the conditions under which they will bind to DNA and/or to a DNA–histone complex will give clues as to the function of specific NHPs. Comparison of binding patterns such as presented here with those of the NHPs of other species might suggest which of the DNA-binding classes of NHPs are species specific and which thus might be likely candidates for key roles in the regulation of transcription. Obviously the type of experiment which Gadski and Chae present offers little information as to the specific

A hundred years ago

IN the very interesting Address delivered by Sir C. Wyville Thomson, at Glasgow, on the *Challenger* expedition, while referring to the "red clay" deposit so general over the deepest parts of the Atlantic and North Pacific, the remarkable fact is mentioned that the clay contains numerous nodules of peroxide of manganese, which in some places are found in great quantity. The Address goes on to say: —"This is a phenomenon which we are as yet unable to explain, and I do not know that there is any analogous instance in any of the older formations" (NATURE, vol. xiv, p. 494).

A GERMAN paper describes a dreadful fight between two Polar bears, male and female, in the Cologne Zoological Gardens. After a fierce struggle the female became exhausted, and was dragged by the male into the water basin in the den, and held down till life was quite extinct. He then pulled her out and dragged the body for a considerable time round the den.

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