Figure 2 **The structured tails of histones. This view of the structure of the complete histone octamer in the absence of DNA was created by removing the DNA from the nucleosome core image (Fig. 1 on pages 252–253). The view is down the superhelix axis, and the different histones are colour-coded as in Fig. 1. (Courtesy of Tim Richmond.)**

transcriptional activity, and underacetylation has been linked with repression[10]. The discovery that both acetyltransferases and deacetylases form complexes with certain transcription factors, provides a mechanism by which the appropriate region of chromatin can be targeted for 'remodelling'[11]. The prevailing view in the literature is that the reduction in net charge offered by acetylation releases the histone tails from the surface of the nucleosome, leading to a conformational change in the nucleosome itself[12]. But the structure of the nucleosome core particle — in which the amino-terminal tails make nucleosome–nucleosome interactions — puts this interpretation into question. Instead, it suggests that acetylation promotes the disruption of the higher-order structure of chromatin, consistent with experimental data[13]. Furthermore, because histone tails contain many targets for acetylation, the disruption can be controlled by the acetylation of certain specific residues but not others[10].

The structure reported by Luger and colleagues also gives an insight into transcriptional repression of telomeres. The region of the H4 amino-terminal tail that is required for repression is the binding site for the silencing factor SIR3 (ref. 14). In the structure, this region interacts with the H2A–H2B dimer in an adjacent nucleosome. This suggests that binding of SIR3 would require the disruption of nucleosome–nucleosome interactions.

Why did it take so long to solve the high-resolution crystal structure of the nucleosome core, given that it was first crystallized in 1977[15], and that the 7-Å structure was solved seven years later[3]? To obtain crystals that diffracted to high resolution, Luger *et al.* reconstituted the nucleosome core using a suitable defined-sequence DNA, and assembling a histone octamer from recombinant proteins. This is a real *tour de force* of biochemistry. Furthermore, the crystals diffracted weakly, so data collection had to wait for developments in crystallographic techniques, such as intense X-ray synchrotron sources and cooling of crystals to the temperature of liquid nitrogen, to reduce radiation damage.

Now, the high-resolution nucleosome core structure provides a much-needed basis for the interpretation of genetic and biochemical data, and it will undoubtedly help us in designing better experiments to study chromatin 'remodelling'. The stage is set for the next challenge — understanding how a string of nucleosomes folds into a higher-order structure of chromatin, and what the role of histone H1 might be. □

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NATURE

100 YEARS AGO

The energetic Secretary of the Society for the Protection of Birds has issued another letter of protest against the wanton destruction of birds to supply ladies with wings and feathers and stuffed skins for their bonnets. The Society is unceasing in its efforts to open the eyes of the gentler sex to the cruelty often practised in procuring plumes, and to the gradual extermination of many beautiful and beneficial birds. We regret to think, however, that such trifling matters do not disturb the minds of the majority of women when they choose their millinery. Present effect is to them the sole criterion of the value of a bonnet, and how the effect is produced they complacently leave others to inquire.

From *Nature* 16 September 1897.

50 YEARS AGO

'Gas-Turbine Propulsion in a Naval Vessel' – Messrs. Metropolitan-Vickers Electrical Co., Ltd., Trafford Park, Manchester, have installed gas-turbine propulsion equipment in the experimental naval craft, *M.G.B.* 2009, the trials of which will take place in the near future. The Company claims that this is the first naval vessel ever to be propelled by a gas-turbine. The characteristics of the simple-cycle gas-turbine include low overall specific weight and size with rapid starting, and these qualities make it very suitable for light vessels where high speeds may be required for limited periods and at short notice. In *M.G.B.* 2009, normal cruising and astern power is provided by two 1,250 B.H.P. 2,400 r.p.m. Packard internal combustion reciprocating engines, each engine driving its own propeller through a reduction gear. Maximum ahead power is obtained by bringing into operation a completely independent Metropolitan-Vickers gas-turbine of 2,500 B.H.P., which drives a third propeller through speed-reduction gearing to supplement the power of the reciprocating engines.

From *Nature* 20 September 1947.

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