parts of the endoplasmic reticulum." The latter were found to be continuous with the granule-studded membranes; "the two varieties of profiles represent local differentiation within a common system." The authors confirm the finding of Rouiller (*18*) and Novikoff *et al.* (*7*) of the dense bodies adjacent to the bile canaliculi and describe their presence in the microsome fraction as a "minor component."

References and Notes

1. A. B. Novikoff *et al.*, *J. Histochem. and Cytochem.* 1, 27 (1953).
2. A. B. Novikoff and E. F. Noe, *J. Morphol.* 96, 189 (1955).
3. G. E. Palade, personal communication.
4. ——— and P. Siekevitz, *Federation Proc.* 14, 262 (1955).
5. A. B. Novikoff, in *Proc. Third Intl. Cong. Biochemistry, Brussels, 1955,* C. Liébecq, Ed. (Academic Press, New York, 1956), p. 315.
6. ———, *Symposia Soc. Exptl. Biol.*, in press.
7. ——— *et al.*, *J. Biophys. and Biochem. Cytol.*, 2, 179 (1956).
8. A. B. Novikoff, *ibid.* 2, 65 (1956).
9. W. Bernhard *et al.*, *Exptl. Cell Research* 9, 88 (1955); E. Borysko and F. B. Bang, *Bull. Johns Hopkins Hosp.* 89, 468 (1951).
10. G. E. Palade, *J. Exptl. Med.* 95, 285 (1952).
11. D. W. Fawcett, *J. Natl. Cancer Inst.* 15, 1475 (1955).
12. M. L. Watson, *J. Biophys. and Biochem. Cytol.* 1, 257 (1955).
13. G. F. Bahr and W. Biermann, *Exptl. Cell Research* 6, 519 (1954); A. W. Pollister, M. Gettner, R. Ward, *Science* 120, 789 (1954).
14. P. Harris and T. W. James, *Experientia* 8, 384 (1952).
15. B. A. Afzelius, *Exptl. Cell Research* 8, 147 (1955).
16. J. Kautz and Q. B. de Marsh, *ibid.* 8, 394 (1955).
17. A. W. Pollister and C. Leuchtenberger, *Proc. Natl. Acad. Sci. U.S.* 35, 66 (1949).
18. C. Rouiller, *Compt. rend. soc. biol. Paris* 148, 2008 (1954).
19. R. R. Bensley and N. Hoerr, *Anat. Record* 60, 449 (1934).
20. A. Claude, *Cold Spring Harbor Symposia Quant. Biol.* 9, 263 (1941).
21. ———, *Science* 97, 451 (1943).
22. ———, *Biol. Symposia* 10, 111 (1943).
23. ———, *J. Exptl. Med.* 80, 19 (1944); *AAAS Research Conference on Cancer* (1945), p. 223; *J. Exptl. Med.* 84, 51, 61 (1946).
24. N. L. Hoerr, *Biol. Symposia* 10, 185 (1943).
25. G. Hogeboom, W. C. Schneider, G. E. Palade, *J. Biol. Chem.* 172, 619 (1948).
26. G. E. Palade, *Anat. Record* 114, 427 (1952); F. S. Sjöstrand, *Nature,* 171, 30 (1953).
27. G. E. Palade, *J. Histochem. and Cytochem.* 1, 188 (1953).
28. J. Rhodin, thesis, Karolinska Institutet, Stockholm, Sweden (1954).
29. R. F. Witter, M. L. Watson, M. A. Cottone, *J. Biophys. and Biochem. Cytol.* 1, 127 (1955).
30. The marked shrinkage ascribed by these authors to *hypertonic* sucrose appears to me rather to be due to the manner of processing the fraction for electron microscopy (*6*). In our hands, faithful preservation of isolated mitochondria requires fixation of a small amount of material (small flecks to sediment, or, where representative sampling is more important, extremely small sediments) at *p*H 7.
31. A. K. Laird *et al.*, *Exptl. Cell Research* 5, 147 (1953).
32. J. M. Weiss, *J. Exptl. Med.* 102, 783 (1955).
33. C. Oberling *et al.*, *Bull. assoc. franç. étude cancer* 37, 15 (1950); C. Oberling *et al.*, *Rev. hématol.* 6, 395 (1951).
34. J. Harel and C. Oberling, *Brit. J. Cancer* 8, 353 (1954).
35. A. B. Novikoff *et al.*, unpublished.
36. J. M. Weiss, *J. Exptl. Med.* 98, 607 (1953).
37. G. E. Palade, *J. Biophys. and Biochem. Cytol.* 1, 59 (1955).
38. W. Bernhard, A. Gautier, C. Rouiller, *Arch. anat. microscop. et morphol. exptl.* 43, 236 (1954).
39. A. J. Dalton, *Symposia Exptl. Biol.*, in press.
40. K. R. Porter, *J. Exptl. Med.* 97, 727 (1953); G. E. Palade and K. R. Porter, *J. Exptl. Med.* 100, 641 (1954).
41. K. R. Porter, *J. Histochem. and Cytochem.* 2, 346 (1954).
42. G. E. Palade, *J. Biophys. and Biochem. Cytol.* 1, 567 (1955).
43. C. Garnier, *Thèse méd.*, Nancy (1899).
44. K. R. Porter, *Harvey Lectures,* in press.
45. Bernhard *et al.* (*38*) earlier arrived at the conclusion that the microsomes do not correspond to any distinct cytologic entity, but this was before thin sections showed the granule-studded membranes in the fraction. They employed shadowed whole mounts, which could not be expected to reveal the cytologic character of the microsomes. Furthermore, the emphasis these authors placed on the observation that small spheres develop in the cytoplasm of living leucocytes kept in cold saline or sucrose solutions may be misleading until it is established that such degenerative changes also occur in liver homogenates. It may be, for example, that cell particles containing hydrolytic enzymes break down in the leucocytes but not in homogenized liver.
46. This is especially important in order to resolve the apparent differences between Palade and Siekevitz (*4*) and Littlefield *et al.* [*J. Biol. Chem.* 217, 111 (1955)] on the one hand, and Hogeboom and Kuff [*Federation Proc.* 14, 633 (1955)] and Dalton (*39*) on the other. The former authors have found ribonucleic acid to be localized in the small granular component of the basophilic material, and the latter authors consider ribonucleic acid to be present also in some granule-free membranes, possibly those of the Golgi apparatus.
47. W. C. Schneider *et al.*, *Nature* 172, 161 (1953); W. C. Schneider and E. L. Kuff, *Am. J. Anat.* 94, 209 (1954).
48. A. J. Dalton, *Nature* 168, 244 (1951); *Z. Zellforsch. u. mikroskop. Anat.* 36, 522 (1952).
49. ——— and M. D. Felix, *Am. J. Anat.* 92, 277 (1953); 94, 171 (1954).
50. F. S. Sjöstrand and V. Hanzon, *Exptl. Cell Research* 7, 415 (1954).
51. F. Haguenau and W. Bernhard, *Arch. anat. microscop. et morphol. exptl.* 44, 27 (1955).
52. J. F. Rinehart and M. G. Farquhar, *J. Histochem. and Cytochem.* 1, 93 (1953); C. E. Challice and D. Lacy, *Nature* 174, 1150 (1954); J. M. Weiss, *J. Exptl. Med.* 101, 213 (1955); M. H. Burgos and D. W. Fawcett, *J. Biophys. and Biochem. Cytol.* 1, 287 (1955).
53. J. M. Weiss, *J. Exptl. Med.* 102, 775 (1955).
54. J. R. Baker, *Symposia Soc. Exptl. Biol.*, in press.
55. J. B. Gatenby, *Nature* 167, 185 (1951); J. B. Gatenby and T. A. A. Moussa, *La Cellule* 54, 51 (1951).
56. C. De Duve, *Symposia Soc. Exptl. Biol.*, in press.
57. ——— and J. Berthet, *Intern. Rev. Cytol.* 3, 225 (1954); F. Appelmans, R. Wattiaux, C. De Duve, *Biochem. J. (London)* 59, 438 (1955); C. De Duve *et al.*, *Biochem. J. (London)* 60, 604 (1955).
58. S. J. Holt, *Proc. Roy. Soc. London* B142, 160 (1954).
59. F. S. Sjöstrand, *Symposia Soc. Exptl. Biol.*, in press.
60. G. E. Palade and P. Siekevitz, *J. Biophys. and Biochem. Cytol.* 2, 171 (1956).

R. R. Bensley, Cytologist

On 11 June Robert Russell Bensley died, aged 88 years. His was a full and enjoyable life. He was born on a farm near Hamilton, Ontario, on 13 November 1867 of an English-Canadian father and an Irish mother. Dr. Bensley liked to think of himself as Irish and, in truth, his cheerfulness—one might almost say buoyancy—generosity, and insight in character reading were remarkable. Probably his early family environment, supplemented by his training in English and the classics at school and the University of Toronto, contributed to his mastery of the English language and the clearness of his speeches and his writings.

In his third year of college he suffered a severe gunshot wound of the leg. He saved his life by promptly applying a tourniquet. Amputation was performed on the dining room table of the farm. Gangrene set in. There was another amputation high up in the thigh. Thrombophlebitis, septicemia, and bacterial endocarditis developed. There was much pain. The physician left the young patient to die with a pound of opium. But Bensley overcame the craving induced. During a long year of convalescence he read widely and studied all the farm animals and plants, with the help of a microscope bought for him by his father.

The year 1892 was another eventful one for Bensley. He graduated from Toronto in medicine, married Cariella May, and began the practice of medicine but continued to teach in the department of biology. His home for the rest of his life was a happy one, presided over by a devoted wife and blessed with children and eventually grandchildren.

Beginning in 1901 Bensley served in the department of anatomy of the University of Chicago, first as assistant professor and later as head, until his retirement in 1933. His life was bounded

by his home, his laboratory, and his summer place in the Go Home Bay Area of Ontario. He was in no hurry to record his achievements in published papers, and after publication he did not seem to care about the credit received. He discovered many keys to scientific treasure. These keys were improved or entirely new techniques. But the techniques themselves were useless unless used, just like door keys, he used to say. His distinction between the islets and acini of the pancreas by their staining reactions with supravital dyes and in other ways was fundamental to the preparation of insulin by Banting and Best.

But it was his investigations on mitochondria which are perhaps most illustrative of the man. As a penetrating reader of old German books he saw much of interest in Altmann's publications about "Elementarorganismen." He separated fact from fiction in Altmann's work and recognized among these elementary microorganisms what are now called mitochondria. He considered these to be "as characteristic of the cytoplasm as chromatin is of the nucleus," a conclusion that was received at the time with much skepticism.

Bensley, again delving in forgotten literature, found a report by Michaelis that bodies like mitochondria could be revealed in still living cells by staining with Janus green. Being a chemist, he realized that only Janus green of exactly the composition specified by Michaelis was effective. By introducing the right kind of Janus green, he made available an easy way to color mitochondria in living cells now employed by cytological laboratories the world over.

It was at this time (1909) that I commenced my training under Bensley. He gave the mitochondria problem to me complete without reservations. He himself kept away from it so that I would have a clear field. I made but little progress, so he returned to the attack 25 years later and in a very original way. The main issue was to find a way to make direct chemical analyses of mitochondria. He and his student, N. L. Hoerr (1934), broke living cells up and separated out the mitochondria by centrifugation. The mitochondria collected in this way were washed and analyzed. Not only did these two investigators supply the first facts relative to the chemical composition of mitochondria, but in doing so they devised a technique by which many other cellular constituents have since been collected and analyzed. This has thrown more light on the chemical structure of cells than any other procedure and was deserving of a Nobel prize.

Another advance of the first magnitude, and there were many, was made in Bensley's laboratory by his student, I. Gersh. It utilized and improved Altmann's long-ignored freezing and drying method. By this technique, fresh tissues are quickly frozen, dehydrated while still frozen, imbedded and sectioned without the use of any fixative. The elimination of the complications inseparable from the use of fixatives and the retention of chemical substances in the position they occupied during life have proved of the greatest service in studies on cytochemistry.

On 6 April 1953 in Chicago, Bensley, then 85 years of age, made the opening address of a symposium on the "Structure and biochemistry of mitochondria." The grand old man was in fine shape, his eyes sparkled, his voice was excellent, and the whole audience rose to honor him. His pioneer researches in cytochemistry are his monument, and his students, who loved him, will remember him thankfully as long as they live. (I am especially grateful for details to Dr. Bensley's former students: N. L. Hoerr, A. Lazarow, M. H. Knisely, and E. J. Stieglitz.)

E. V. Cowdry
Wernse Cancer Research Laboratory, Washington University Medical School, St. Louis, Missouri

News of Science

International Atomic Energy Agency

With the signing of the statute of the new International Atomic Energy Agency, the conference which began at United Nations Headquarters on 20 Sept. concluded its work on 26 Oct. Seventy of the 81 governments that had participated in the conference's preparation of the 23-article statute have signed the document. The statute will be open for signature for 90 days and will enter into force when ratified by 18 states. Those countries whose representatives attended the conference but have not yet signed the statute are the following: Afghanistan, Burma, Iraq, Italy, Jordan, Mexico, Morocco, Nicaragua, Saudi Arabia, Tunisia, and Yemen.

At the closing of the meeting, Lewis L. Strauss, chairman of the United States Atomic Energy Commission, delivered a message from President Eisenhower. The message promised the President's support for United States official ratification of the agency's statute, an initial U.S. contribution of 5000 kilograms of uranium-235, and continued contributions of nuclear materials to match in amount the sum of all quantities made available by all other members of the agency for the period between its establishment and 1 July 1960.

The statute sets out plans for an international agency which "shall seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world." It provides that the agency shall insure, so far as possible, "that assistance provided by it or at its request or under its supervision or control is not used in such a way as to further any military purpose."

Besides completing the statute, the conference endorsed Vienna as the site for headquarters of the new agency and chose six elective members of the Preparatory Commission for the agency. This commission is composed of the 12 governments which, before the conference met, had been negotiating toward creation of the agency (Australia, Belgium, Brazil, Canada, Czechoslovakia, France, India, Portugal, the Union of South Africa, the U.S.S.R., the United Kingdom, and the United States), plus the six members elected by the conference (Argentina, Egypt, Indonesia, Japan, Pakistan, and Peru).

The Preparatory Commission will, among other things, make arrangements for the first session of the agency's General Conference, to be composed of all members of the agency; make designations for membership of the first Board of Governors; consider the recommendation of Vienna as the agency's headquarters; and enter into negotiations with the United Nations regarding the relationship of the two organizations.

The U.N. conference that has just