

of a duplex system in which the relative development of lipoidal and idiosomic substances may undergo considerable variation.

Having established a probability in favour of the essential homology between secretory granules and the acrosome of the animal sperm, Dr. Bowen suggests that the relationship between the Golgi apparatus and the secretory granules is homologous to that existing between the Golgi apparatus and the acrosome, and that our more complete understanding of the latter phenomenon can be used as a basis for interpreting the much more obscure phenomena in the gland cell. He adds that the establishment of the views developed in his paper must depend finally upon further critical evidence from favourable material bearing upon the exact relation which exists between the individual secretory granule and the Golgi complex.

Dr. Bowen holds that no cytological evidence of the origin of secretory products from the nucleus receives any acceptance at the present time. The nucleus can be considered as the source of secretions only in the indirect sense that it may possibly exercise some control over the process as a whole, or may collaborate with other parts of the cell-system in preparing materials for the synthetic operations of the Golgi apparatus.

When a cell is divided into a nucleated and a non-nucleated portion, the latter is able to carry on synthetic activities for a brief period only; meanwhile the nucleated part regenerates and appears none the worse for the operation. Hence it was concluded that the nucleus is the centre of synthetic operations, and particularly of the formation of those intracellular enzymes upon which living activity is now supposed to depend. But it is at least equally possible that the nucleated piece alone continues capable of constructive metabolism because it possesses the complete cell-system, while in the non-nucleated piece the system is disrupted. Dr. Bowen remarks that if the Golgi apparatus could be eliminated, the cell would doubtless be fatally affected. While secretion is an activity in which the cell-system as a whole is probably involved, and over which the nucleus exercises some controlling influence, the actual synthetic centre for the differentiation of secretory granules is the Golgi apparatus. That this source of the visible secretory granules "is likewise the source of the invisible, intra-cellular enzymes . . . cannot at present be doubted, but our scanty knowledge of these things makes any hypothesis whatever almost pure speculation."

Forestry in Illinois and Great Britain.

IT is common knowledge that the drain upon the world's resources of coniferous timber is very heavy, and that in some countries the outlook is regarded with increasing disquietude. In the "Third Report on a Forest Survey of Illinois," by C. J. Telford, the position of the State is explained with great clarity, and the parallel to the state of affairs existing in Great Britain is depicted. The present forests of the United States contain an estimated total of 481,800 million cubic feet of standing timber, the annual cut is 25,000 million cubic feet and the annual growth 6039 million cubic feet. "The virgin forests," the report says, "will carry us another 25 years, after which we shall probably be wholly dependent upon growth from cut-over lands. By utilising the entire 470 million acres of forest lands at prevailing rates of growth these cut-over lands can supply us with an estimated annual yield of 14,000 million cubic feet—a little more than half our present requirements. The conviction that satisfactory substitutes for wood will be found is untenable when the enormous amount of wood required is appreciated. This drain of 25,000 million cubic feet of standing timber a year means that for every hundred pounds of coal, iron, cement, petroleum and copper consumed the forests supply 67 pounds of wood, and the crop lands supply 44 pounds of all forms of crops, including cereals, seeds, clover, hay, forage, cotton, potatoes, sugar, fruit, and nuts. It is obvious that a satisfactory substitution for a commodity representing by weight two-thirds of virtually all the minerals consumed, or one and a half times all crops raised in the United States, is impossible. A timber famine will be more disastrous to Illinois than to any other State. Its manufacturing establishments employ 11.6 per cent. more hands than agriculture, transportation, and

mining combined, and thirty per cent. of all persons employed in manufacture are in industries dependent upon wood. In the single item of lumber, Illinois consumes one-thirtieth the total lumber-cut of the world."

The process of forest destruction is far advanced in Illinois. Virgin timber has practically disappeared, and the present drain on the cut-over forests and second growth stands, unchecked, will, it is held, result in an early disappearance of all forests in the State. There was an increase in unforested waste land of 250,000 acres in the ten years from 1910 to 1920, and Illinois now has a total of 1,577,663 acres in this class. The 3,021,650 acres now forested are on lands unsuited to ordinary farming, and if cleared will generally revert to waste land. The state of affairs thus briefly delineated is sufficiently alarming from the industrial outlook alone and renders the more interesting the following comparison with the position of Great Britain.

"There is a striking parallel between Illinois and Great Britain in the total wood consumption and in the total area forested. Each annually consumes approximately the same quantity of wood—560,720,000 cubic feet for Illinois and 600,000,000 cubic feet for Great Britain; each has about the same area forested—3,021,650 for Illinois and about 3,000,000 acres for Great Britain. But Great Britain, despite a population of 437.5 to the square mile as compared with 115.7 in Illinois, and the consequent pressure for land, has deliberately undertaken to replant 1,770,000 acres, and this planting is being done at the rate of 20,000 acres a year. Illinois has never planted 200 acres of publicly owned forests, her farm woodlands are decreasing at the rate of 4500 acres a year, and the unimproved and waste land on farms is increasing at the rate of 25,000 acres a year."

Bird Flight.

IN the *Transactions of the Royal Society of South Australia*, vol. i., 1926, an interesting contribution is made by Prof. F. Wood Jones on the flight of sea-birds. It has long been observed that many sea-birds spend protracted periods, sometimes soaring, sometimes gliding, and at any rate to the novice, apparently without a visible tremor of the

wing. Their flight appears to be merely an ability to slide ahead with no other power than their own weight and a presumably instantaneous ability to readjust their planes and alter their cant and poise apparently largely by movements of the head.

As a result of close study and observation extending over many years, Hankin maintains that in the