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EDITORIAL NOTES.

The Secretary of the Society and the Editor of the JOURNAL is tired, very tired. He has been ordered away to take a complete rest and to think as little as possible about the Society, its work or its JOURNAL. The Council has granted him a leave of absence for some months and the Publication Committee has kindly undertaken to look after the publication of the JOURNAL, under temporary editorship of Dr. D'Arcy Power. The work of building up and conducting the Society's affairs, while it has been at times hard and has involved a good deal of worry during the lean years, has also been most pleasant; to see something of real value grow from almost nothing has been a keen pleasure. Therefore, it is not without a distinct feeling of sadness that the Secretary-Editor obeys the instructions of his physician, closes his desk and leaves his office, to take the first real vacation in twenty years. To every member of the Society who has helped—and many have helped more than they know—the Secretary-Editor wishes to extend his thanks. To every member who feels that at any time he has been slighted or unkindly used, the Secretary-Editor wishes to extend his sincerest expressions of regret that such occurrences should be, and to offer the assurance that everything that has been done by him has been done for the good of the Society, as he saw it, and never for personal reasons. To the Publication Committee, and to Dr. Bering, who will act as Secretary pro tem., the Secretary-Editor wishes to extend his thanks, in advance, for their kindness and consideration in taking upon their shoulders this work.

It is nearly a year since Drs. Carrell and Barrow published an account of their remarkable studies of

TISSUE GROWTH IN VITRO.

the growth of animal tissues in vitro. To the imagination the results suggested startling possibilities which the lay press has duly appreciated, and already our patients are enquiring whether liver and bacon grown in a jar is really as delectable as the same article abstracted from its owner. The value of a discovery is sometimes overlooked in the reaction against extravagant anticipations, and this may easily happen in this case. Let us glance for a moment at the facts and the reasonable possibilities. The experimenters using frogs, cats and dogs, found it possible to grow most of the tissues and the parenchyma of many of the glands of these animals in vitro. That is, excised fragments were placed in plasma in a warm stage under the microscope and the growth of the new tissue watched and recorded. They all grew, at different rates, according to their nature. The rate and mode of growth is most suggestive and important. There seems to be a relation between the onset of cell proliferation and the age of the animal from which the tissue is taken. Thus a gland tissue from an adult dog may require forty-eight hours to commence growth, but from a young puppy it will grow in twelve hours. Secondly, the rate of growth increases as new cells are formed. Thirdly, if the new cells are transplanted to fresh plasma the rate of growth is still further increased. Fourthly, as the rate of proliferation increases the cells assume embryonic characteristics, while there is thus exhibited a tendency to reversion; there is also manifest a very distinct retention of type. The experimenters state that in all cases the first produced new cells are spindle cells of the connective tissue type and to these are later added the characteristic cells of the tissue, which may even grow in histologic relationship; thus in the case of the kidney, new tubules grew out free from the excised tissue into the surrounding plasma. Since the publication of the original monograph further research has shown that even more active cell growth is possible in artificial media unrelated to plasma.

The reflections and possibilities opened up by this work are many. It is apparent that the changes occurring in the transition from the old to the new cell growth are very similar to those proper to tumor formations, the same acceleration of rate of growth, embryonic reversion, and yet a rough maintenance of type, nor is it possible in this connection to forget Weigert's generalization that such growth "only occurs when from any cause there is disturbance of the reciprocal normal equilibrium of the tissue, and tissue elements, and when the physiological restraint is removed which one tissue element exercises upon another." The word "only" may go beyond the facts, but these extra corporeal growths are laboratory demonstrations of Weigert's theory. In the same way we may expect light on many other physiological and pathological questions. On the side of direct practice, it seems already possible to make direct use of artificially grown epithelial

cells as a substitute for skin grafting, while the growth of specific secreting cells in large quantities is still conditioned by the difficulty of providing suitable media and the removal of the metabolites. Yet there is nothing in the problem more difficult than many that have been overcome, and the possibility of ultimately producing the internal secretions in quantity and of superior purity is not unreasonable. Furthermore, the ability to regulate and exactly determine the physical and chemical environment of such cells foreshadows a development of cellular chemistry that would solve many of our most serious problems. H. D'A. P.

It has been frequently true that great advances in medicine have, in a manner of speaking, sidled into the world creating no great contemporary stir. Subsequent generations, however, point to them as landmarks and often note with pity the times in which they were born and which failed to recognize the gems in their own midst.

This may not be so true of our own age, for surely we have been generous in recognizing the colossal achievements of some of our contemporaries. Ehrlich, Flexner and Koch have reaped fulsome reward of genius and Sir A. E. Wright, Ronald Ross, Harvey Cushing, Wm. Osler, the Mayos and other intellects of the day cannot complain of a world cold to their attainments. Even have we been too prone to acceptance of new ideas and oft have we, especially in this State of California, turned to strange gods and false medicine men with bacterial soups and noxious emulsions of malignant growths.

In the midst of all this has crept into our literature with a modesty characteristic of the investigators, the epoch-making discovery of auricular fibrillation. Workers along cardio-vascular lines have overloaded the journals and transactions with voluminous reports,—some well founded, some full of imagination. The pathological physiology of the heart has been examined, mauled, twisted and handled by myriads of investigators. It has been at the mercy of many a fantastic laboratory man and clinician, but here and there from out the turmoil flashed a light which was to culminate in a brilliant beacon. His and Kent laid the way with the torch of the auriculo-ventricular bundle. James Mackenzie guarded the path with the signposts his application of the graphic methods of pulses afforded. Einthoven transported us further when he gave the electro-cardiogram, and then, as is usually the case, one man collected all that had gone before and brought forth a new truth. Using all these stepping-stones in a series of epoch-making and indubitably proved experiments, Thomas Lewis, working in the University College, London, laid bare the phenomenon of auricular fibrillation.

His work is to be found detailed in "Heart," for 1910, and repays many-fold the assiduous reading it entails. He began by enquiring further into the so-called nodal rhythm which was the term Mackenzie had given to the venous pulse in which all sign of auricular contraction was lacking. This pulse was

to be found in nearly all of the cases of "broken compensation" and was accompanied by an arterial pulse to which the Germans gave the excellently descriptive title of *pulsus irregularis perpetuus*. All signs of auricular contraction being absent in the venous pulse, Mackenzie argued that the auricular wave must occur simultaneously with the ventricular wave and that the latter covered up the former. For auricle and ventricle to be contracting simultaneously the rhythm of the heart must be altered and the impulse instead of beginning at the sinus must be pathological and originate in these cases at the auriculo-ventricular node. Therefore the term nodal rhythm. This was a matter however, of speculation and the conclusion was reached by negative arguing. It was a source of grief to Mackenzie and to those who worked along similar lines that positive proof of this theory had never been attained.

The electro-cardiogram becoming available, Lewis turned his attention to the experimental and laboratory side. Working with animals he found that it was easy by stimulating the auricles with electrodes sewn into those chambers, and by regulating the strength of current, to reduce the auricles to a state of fibrillation lasting a longer or shorter time depending on various circumstances. Taking electro-cardiograms of these animals with their auricles fibrillating, a certain photograph was obtained. This photograph clinically and electro-cardiographically corresponded exactly with that given by patients having the so-called *pulsus irregularis perpetuus*.

This illuminated at once the course of events in these cases which are by far the greatest number of heart cases with which a clinician has to deal. Impulses from single auricular beats are not coming to the ventricle but instead the auricle in these cases showers impulses on the auriculo-ventricular bundle by the thousand. This easily exhausts the conducting power of the bundle with the result that very few impulses get through and the ventricle assumes a rhythm influenced by whatever stimuli can get through the bundle from the auricle.

As a theory this would be most enticing but the proof and manner of proof was exquisite. The importance of this work can hardly be overestimated for it led to therapeutic investigations which resulted in further glory to our old standby digitalis. Cushny and Mackenzie took up the thread where Lewis left it off and soon showed that the efficiency of digitalis was not only in increasing the force of ventricular contractions but by reducing the conductivity of the bundle, thus lessening the number of auricular impulses that could get through. This explained beautifully why we get such striking results in cases of "broken compensation" with an extremely irregular pulse. Turnbull on Digitalis in the British American Journal, Cushny in the American Journal of Medical Sciences, and Mackenzie in his Oliver-Sharpey Lectures have written brilliantly on this subject and to them readers along these lines are urgently referred.

These advances would not have been possible had not the graphic method of the study of heart disease been used, and after all it is to Mackenzie, who, personally interested himself in Lewis' work as well as providing a stimulus to it that the lion's share of our