search Foundation, wrote:

> ***In a recent article in the* British Medical Journal, *Lord Platt maintains that clinical investigation has failed. Particularly, he indicts the heavily financed clinical investigation of America, and he states that this discipline has contributed little to the great progress in treatment and cure of disease. Instead he attributes all progress to either basic medical sciences or the pharmaceutical industry. In his audacious statement, he cites numerous examples to which he attributes* no *significant role to clinical investigation. Time permitted me to research only a few of his examples, and I am afraid my bias for clinical investigation insists I express a divergent view. I will cite but a single example from Platt's own material and from that argue what I believe is the ridiculousness of his position. Platt contends that insulin was discovered in a department of basic physiology and, thus, gives this discovery to the basic sciences. What was the real story? It was known from the expatiative studies of Von Mering and Minkowski that removal of the pancreas produces an increase of blood sugar. Excitement engendered by this discovery led to numerous attempts to extract an active principle to no avail. In 1920, Banting, a young physician, recently returned from an army post after World War I, and, apparently still having time to read, was perusing the clinical journal,* Surgery, Gynecology and Obstetrics. *He happened upon a paper written by Barron of Minneapolis. The focal point of Barron's paper was a single case which he as a young clinical investigator had studied at autopsy. The patient had had an apparent congenital absence of Santorini's duct and had developed a calculus in Wirsung's duct in the head of the pancreas. Behind the stone, presumably from secretory pressure, the acinar tissue had been completely destroyed, but the islets remained intact. The admonition from this experiment of nature was clear and the "eureka experience" of Banting was so compelling that he rushed to Macleod's department of physiology in Toronto and, with great enthusiasm, presented the experimental approach to Macleod. Only then, together with the medical student Best, did he in a department of physiology proceed to execute the critical experiment. He tied off both pancreatic ducts, destroyed selectively the acinar pancreas, leaving islets intact, and extracted in simple aqueous solution the internal secretion of the pancreas so much sought in numerous basic science laboratories of the time. The control of pernicious anemia at about the same time was also the triumph of clinical investigation.*[11]

[11]*Good, R. A. "Keystones,"* The Journal of Clinical Investigation, *47:1466-1471, 1968.*

So even if one considers Banting and Best's dog experiments to have been a critical element in the discovery of insulin, it is clear that the dog experiments were inspired entirely by clinical observations. In fact, the dog studies were not so much experiments as they were the application of a new technique for removing a substance from the animal body. The dogs were being used in the same way that plants are used in medicine: as a source of potentially valuable chemicals for treatment of human disease.

Despite the rather heated controversy over the discovery of insulin that continues to this day, the events that constituted critical components of the *scientific* process leading to the discovery of insulin are simple and straightforward: 1) The association of diabetes mellitus with disease of the pancreas was first demonstrated by Thomas Crawley in 1788.[12] He performed an autopsy on a patient who had died from the disease and discovered multiple calculi in the organ. From Crawley's observation until the early 1900s, dozens of autopsy studies connected damage to the pancreas with diabetes mellitus. In fact, it was clearly shown that patients with extensively damaged pancreases almost always had diabetes.[13] Based upon this extensive autopsy evidence, scientists hypothesized that a substance in the pancreas controls the level of sugar in the blood. Without the substance, diabetes mellitus ensues. Thus, the first critical part of the scientific process, *the development of a testable hypothesis*, grew out of direct observations of patients.

2) Researchers around the world attempted to extract a substance from the pancreas of various animals to attempt to isolate the mysterious substance that controls blood sugar. It was not until the Toronto team biochemist, Dr. J. B. Collip, developed a variety of new ways of extracting insulin from ox pancreas that an effective form of insulin was finally discovered.

3) The various pancreatic extracts produced by Collip were then tested on diabetic patients until an extract was finally found that did, in fact, effectively cure certain cases of diabetes mellitus in human patients. Thus, *the proof of the hypothesis* that the pancreas contains insulin was achieved in the only way that it could be achieved: by direct observations of diabetics. Clearly, the

[12]***Opie, E. Disease of the Pancreas, Philadelphia, 1910.***

[13]***Ibid.***