John Joseph Bittner, for nineteen years George Christian Professor of Cancer Research and Director of the Division of Cancer Biology at the University of Minnesota, died at Minneapolis on December 14, 1961 at an age of 57 years.

His interest in a research career had really begun on his graduation from Saint Stephens College in New York in 1925. It was formalized by his entrance into the Graduate School of Arts and Sciences at the University of Michigan in 1927 and by his receipt of the Ph. D. degree from that institution in 1930. The title of his thesis was “A Genetic Study of the Transplantation of Tumors Arising in Hybrid Mice”.

As a graduate student Bittner was a younger member of a group of mammalian geneticists especially interested in the bearing of that discipline on the origin and on the transplantation of mouse tumors. Also among this group was his brother-in-law, Dr. Leonell C. Strong, who had an all-important role in arousing Bittner’s interest in biology in general and in the field of cancer genetics in particular.

In 1929, this whole group moved from Michigan to the newlybuilt Roscoe B. Jackson Memorial Laboratory at Bar Harbor, Maine, an institution founded specifically for research in mammalian genetics with special reference to cancer.

Here for twelve years as a research associate, until his going to Minnesota, Dr. Bittner devoted himself with great enthusiasm and industry to his chosen field of investigation. In that period (1930-42) there are no less than fifty-seven titles of publications in which Dr. Bittner was the author or co-author.
This remarkable degree of productivity in published results was maintained by Dr. Bittner until his death. In the total of thirty-one years which spanned the period of his active research, the bibliographic titles number 242 – an average of slightly under eight per year. The subjects of experimentation covered in the course of this active period were, of course, many and diverse. They do, however, seem to indicate three major fields of concentration and interest. These may be designated in chronological order as:

- Genetic phenomena of transplanted tumors.
- Genetic phenomena of spontaneous tumor incidence.
- Discovery of and development of research on the transmissible agent, known as the mammary tumor agent (Bittner’s virus).

A brief review of what seem to be some of the high points in each of these phases of Dr. Bittner’s activities may help to outline their scope and bearing on the field of cancer genetics as a whole.

The genetic theory of transplantation, which recognizes the fundamental importance of the genetic constitution of the host in determining its reaction to tissue transplants from donors of various genetic types, was already being actively investigated when Bittner began his experimental work. Evidence supporting the validity and general applicability of this theory was accumulating rapidly. To this evidence he contributed at least two pieces of work that seem worthy of particular note.

The first of these contributions (1931) was the genetic analysis, by transplantation in controlled genetic populations, of tumors which originated in Fx generation hybrids between two inbred isogenic strains. In this way the genetic contribution made to the hybrid tumor by each parent strain could be estimated in the number of genes involved, with a high degree of accuracy. Analysis of the genetic composition of the hybrid tumor clinched the hypothesis that its failure to grow in either parent strain was a result of its more complex genetic constitution.

A number of independent investigators in Great Britain and in the United States believed in the early 1930’s that there were changes in virulence of a tumor during its serial transplantation. They believed that this resulted in «growth rhythms» reflected in the percentage of inoculated animals which grew the tumor.

Doctor Bittner, in 1933, disproved this theory by selecting, before they received the implant of a single tumor, different numbers of host animals of different known genetic composition. This he did in the relative proportion needed to reproduce exactly the complex serial curves of percentages of tumor “takes”, obtained without control or predictability by the previous investigators. This was the second contribution of great importance referred to above.

Research dealing with the genetics of spontaneous tumor incidence was still in its very early stages of development in the early 1930’s when Dr. Bittner began his work in that field. Tumor incidence in relation to age and sex within the basic inbred strains of mice then most frequently being used was still being studied at the Jackson Laboratory where most of these strains were located.

In 1935, Dr. Bittner published on the breeding behavior and tumor incidence on two inbred strains of mice – A and C3H – which had been developed by Dr. Strong. Dr. Bittner recorded carefully and compared the incidence of the mammary tumors
and of the lung tumors in the former strain, and showed that the latter type of tumor occurred in
virgin females and in males with approximately equal frequency. This sort of study was essential
foundation work of real importance in the early days of recording and characterizing the
oncogenic activities of the various basic inbred strains of mice which still form the baseline of
animal experimentation in genetic influence on the origin and development of cancer.
In 1933, Dr. Bittner had contributed data to the cooperative staff publication by the Jackson
Laboratory of evidence that showed a strong, non-chromosomal maternal influence on the
incidence of mammary tumors in mice.
The method or methods of transmitting this influence immediately became a major interest of a
number of investigators including Dr. Bittner. In 1936, he published in Science a short note
showing that the mother’s milk was at least one vehicle for this transmission. This opened the
doors to expanded investigation on the biological and biochemical nature of the influence so
transmitted and was perhaps the most important milestone in Dr. Bittner’s career.
Not long after this, he accepted an appointment at the University of Minnesota where the
opportunity was offered for him to collaborate with scientists skilled in many disciplines other
than genetics.
This was a natural and constructive step for he had already recognized and published evidence
that genetic and hormonal factors had roles in the production of mammary tumors in mice, as
well as did the agent or agents transmitted by the milk.
At Minnesota the cooperative analysis of these three categories of oncogenic influence was
carried on in a vigorous and prolific manner. From 1942 to 1949, twenty co-authors appear with
Dr. Bittner on titles of published work and from 1950-1961, fifty-two others are so recorded.
This is extraordinary and impressive evidence of what wide and active interest was engendered
by the availability of the filterable agent to which the name Bittner virus has been given.
Much work remains to be done before the identification, analysis and complete characterization
of that agent will be accomplished but progress is increasing in tempo and in extent.
In recognition of Dr. Bittner’s contributions he received the Alvarenga Medal in 1941, and the
Crookshank Award in 1951. He also received the Bertner Award. He was given the honorary
degree of Sc. D. by Bard College in 1950 and of M. D. by the University of Perugia in 1957.
As a young man, Bittner was a natural athlete with an extraordinary degree of neuro-muscular
coordination. He loved competition and possessed the capacity to throw himself whole-heartedly
into each and every effort. These abilities he transferred to his professional work.
By his almost tireless energy, enthusiasm and careful and accurate observation, Dr. Bittner’s
career set an example of full utilization of opportunities and in purposeful effort that will be hard
to match.
C. C. Little, Ellsworth, Maine