A Hundred Years of Evolution.
The centenary of the publication of the Origin of Species has led to the preparation of a considerable number of symposia and individual books undertaken to reevaluate, after the passage of one hundred years, the theory of evolution and the role of natural selection in evolutionary processes. Carter's volume was one of the first to appear. It is clearly a competent, straightforward contribution that will be valuable to the general biological reader for just the purpose intended. At the same time, one cannot say that it is strikingly original in content or point of view. In one respect, it suffers from having been among the first such volumes, since that has prevented it from profiting by some of the new light thrown on the genesis of Darwin's own thought in recent publications, particularly the essay of Loren Eiseley on the development of the theory of natural

Gregor Mendel und das Schicksal seiner Vererbungsgesetze.
This little book forms the twenty-second of a series of short biographies of great men of biology. Although in the description of Mendel's life the author closely follows the account given by Hugo Ditis, this volume is not a mere condensation of the latter but includes some reinterpretations of the story of Mendel's work.

In the introductory chapter Krumbiegel chooses Leeuwenhoek (1632) as one of the greatest fore-runners of modern genetic thought. Not many geneticists know that Leeuwenhoek noticed that in Belgian rabbits a single gray sire crossed en masse with dams of various colors would always produce some gray offspring which also lacked the long ears and tameness of the solid-colored or white mothers.
Krumbiegel points out that this first attempt to observe the inheritance of separate characteristics, if continued, might have made Leuwenhoek more famous than his microscopical studies. But Leuwenhoek did not make paired matings and was concerned with the erroneous question of the importance of maternal vs. paternal inheritance.

The remainder of the first chapter is devoted to a brief review of fundamental genetic principles. The author discusses Mendel's Laws of Segregation and Random Assortment and the cytological bases underlying these principles. There follows a brief account of the problem of dominance and its variation, of sex determination and sex chromosomes, genes, mutation, and chromosome maps. Obviously such a survey must be brief, given mainly to show the lack of knowledge with which Mendel and his predecessors had to work. It is surprising to find here the statement that heteromorphic sex chromosomes have been found only in lower plants (p. 19) when actually these have for many years been figured in over fifty species of angiosperms. Frogs are said to possess male heterogamety (p. 19), whereas the work of several authors in the nineteen-thirties has shown the claim by an earlier author of distinct X and Y chromosomes in frogs to be incorrect. The author's statement that "as to how the sex chromosomes work we can until now only express conjectures" (p. 20) would seem to have been written prior to the past two decades. Although space for discussion is necessarily limited in so short a volume, both students and workers outside the field of genetics will receive an erroneous impression upon reading that we still lack an explanation of how either spontaneous mutation or mutation under the influence of X-radiation takes place (p. 22). Nor, in the light of the essentially random nature of mutation in experimental work, can one agree with the author's statement that "we know now... the tendency of a species to mutate in a definite direction in numerous individuals" (p. 23).

In the second chapter the author shows that genetic experiments in plants became possible following the establishment of sexuality in plants by John Ray (1683) and Camerarius (1694). Kolreuter (1733), the great pre-mendelistent, is said to have made the first crosses with plants, but failed to record exact numbers of the progeny. A significant predecessor of Mendel was Seton, who in 1821 crossed green and white peas and recovered segregants in the F2. Krumbiegel likewise mentions Naudin's work immediately preceding that of Mendel. Naudin recognized the uniformity of the hybrid and the purity of gametes of hybrids (essentially Mendel's First Law).

The author points out that both Naudin and Gärtner (whose works were known to Mendel) did not count and classify a sufficient number of progeny of their crosses. Here also might have been mentioned Vilmorin (1856), whose methods of observing the offspring of each individual plant were closely similar to Mendel's, although neither worker knew of the other.

In the third chapter Krumbiegel considers Mendel's personality, life, and botanical work. The story of Mendel's forebears, his early life as the son of hard-working farming parents, aptitude at school, and entrance into the Augustinian monastery closely follows Itti's biography. Krumbiegel considers fortunate Mendel's coming into the monastery, since his education was thereby furthered. The author takes exception to Itti's suggestion that Mendel may have suppressed his genetical studies of mice in order not to offend the church authorities. There was, he thinks, complete freedom of endeavor at that time within the monastery. The author believes that Mendel chose peas as his major object of research partly because of his childhood love of plant work with his father and also because of his deep interest in Darwin's work, which led him to think that there was still something to be discovered in the plant hybridization problem. Mendel's botanical work is known to us chiefly through his own famous paper on peas, his paper on Hieracium hybrids, and his letters to the well-known Professor Carl von Nägeli, found and published by Correns, a former student of Nägeli and a rediscoverer of Mendel's laws. Unfortunately, only fragments of Nägeli's letters in reply to Mendel have survived. Krumbiegel quotes a portion of Nägeli's reply to Mendel's first letter. This correspondence shows the chief cause of the failure of Mendel's discovery to be communicated to the scientific world for the next forty years. As the author points out, Nägeli rejected Mendel's deductions on philosophical grounds, questioned the general applicability of the pea results, and clearly disbelieved that homoygotes could be extracted from hybrids. The last objection is corroborated by Nägeli's marginal note on Mendel's paper, according to Correns. Krumbiegel and Itti, following Correns, have concluded that the initial failure of Mendel's work to be appreciated by biologists came from the failure of his contact with Nägeli. Weinstein has recently challenged the view that Nägeli did not understand Mendel's work. If not, Nägeli certainly refused to accept it. Krumbiegel attributes Nägeli's negative reaction to his own engrossment in a number of other problems of biology. The author stresses Nägeli's influence over Mendel with respect to the Hieracium hybridization experiments. Mendel's inability to duplicate his pea results in Hieracium, owing to apogamy in the latter, led him, according to Krumbiegel, to doubt the general applicability of his earlier findings. This self-doubt, the author believes, was a major cause for Mendel's discoveries lying unnoticed, for the major responsibility for spreading ideas lies with the originator.
of them. On the other hand, Mendel, in discussing
the problem of general applicability in his original
paper, gives the verification of his laws in Phaseolus.
He also mentions several cases of constant hybrids
studied by Gärtner and Wichura. In his Hieracium
paper Mendel concluded that the behavior of Hier-
acium is similar to the latter. Hence I am not con-
vinced that a failure to find a similarity in peas and
Hieracium discouraged Mendel as to the general ap-
PLICABILITY of his laws of heredity. He may have re-
garded these “constant hybrids” as the special cases
which they do indeed represent.

Two factors other than the lack of agreement be-
tween the pea and Hieracium experiments may have
had an important influence in keeping Mendel from
pressing his well-substantiated conclusions. First, in
his letter of December 21, 1866 to Nägeli, Mendel
mentions the necessity of giving up the pea experi-
ments because of the devastation caused by the pea
beetle, Bruchus pisi. Were it not for this misfortune,
Mendel would certainly have continued publication
on peas, corroborating and extending his observations,
and referring to his original paper. As the
Natural History Society of Brünn is known to have
exchanged reprints with foreign societies, there
would then have been a greater chance of recogni-
tion of his work. Secondly, studies of plant hy-
bridization at the time Mendel was working became
associated with Darwin’s ideas on the origin of
species. After the publication of The Descent of
Man in 1871, there was a conflict between science
and the Church. Although Mendel was most in-
terested in Darwin’s theories, the latter never knew
of Mendel. It is an ironic thought that Haeckel,
by his aggressive championship of Darwin against
religion in Germany, may have created a situation
which prevented Mendel, out of loyalty to the
Church, from trying to make further contacts with
biologists in his field.

Krumbeigl emphasizes the fact that added duties
after Mendel became a prelate, as well as his strug-
gle over the cloister tax, hampered Mendel’s ex-
perimental work. Mendel himself, in a letter to
Nägeli, complained that his duties kept him from
his experiments. According to this biography, the
disappointments of Mendel’s later years, together
with his chronic kidney ailment, led to a general
nervous breakdown, but this is in disagreement with
this view. A final chapter covers the fascinating
story of the rediscovery of Mendel’s work in 1900.

This stimulating little volume should prove of
interest not only to those who feel that a historical
development of a subject is of great service in teach-
ing genetics, but also to people interested in the
history of biological thought for its own sake. Al-
though no index is supplied, a special list of men
who were living during Mendel’s time and are men-
tioned in the text, with a thumb-nail sketch of each,