Kuhn, T. S. (1970). The structure of scientific revolutions. Chicago, University of Chicago Press.

Overview: In this book, Kuhn contrasts the conventional (historical) view of science with a revolutionary view. The conventional view holds that science involves steady process over time towards the current understanding. The revolutionary view is that the crises that develop in the process of normal scientific work lead to revolutions in which the existing paradigm is overthrown, and a new one introduced. These revolutions are difficult to see because the conventional textbook view is historical.

Development process:

1. Pre-paradigmatic: Various different themes competing, no common basis or method.
2. Normal Science: A paradigm
   a) provides the basis for future explanation (common ground and methods),
   b) allows for focus on smaller areas (specialization),
   c)restricts publication to the group, and
   d)identifies unexplained phenomena.
3. Revolutions: New paradigms compete with the old; acceptance is based on a
   a)whether the new one predicts the old phenomena,
   b)which solves the problems that led to the crisis,
   c)which predicts new phenomena, and
   d)which is simpler.

Chapter blurbs:

I.Role for History:

To discover past paradigms and thus transform the image of science.

II.Route to Normal Science:

Paradigm is introduced that
1)attracted adherents, and
2)left questions open

III. Nature of Normal Science:

Object for articulation and speculation under new/more stringent conditions. 3 foci for investigation:
1)Class of facts that are revealing (increasing scope and accuracy - e.g. wavelengths)
2)Facts predicted by theory (e.g. neutrinos)
3)Resolving ambiguities (more precise paradigm - e.g. value of G)

IV. Normal Science as puzzle-solving:

Achieving is anticipated in a new way (incremental). Paradigm -> problems, solutions.

V.Priority of Paradigms:

Can identify a paradigm -- may not agree on interpretation of rationalization of it. Legitimate methods, problems, standards of solution, found in text books, lectures, etc.

VI. Anomaly and the Emergence of Scientific Discoveries:

1)awareness of anomaly
2)exploration of anomaly
3)adjuct paradigm

It is only because of the precision of a paradigm that anomalies can be noticed (you have to know what's wrong!)

VII. Crisis & Emergence of Scientific Theories:

Pronounced failure in normal science -> new paradigm.

VIII. Response to Crisis:

Can't reject a paradigm without acceptance of another. Crisis leads to either
1)handling of crisis within paradigm,
2)put off until later, or
3)a new paradigm.

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IX. Nature and Necessity of Scientific Revolutions:

Why revolutions? Because the "existing institutions have ceased adequately to meet the problems posed by an environment that they have in part created." (p.92 2nd ed.) "no supra-institutional framework for the adjudication of revolutionary difference…must finally resort to the techniques of mass persuasion, often including force." (p.93) Not evolutionary - otherwise, replace ignorance instead of create another knowledge. Phenomena about which a new theory might be developed:

1)already well explained
2)details through theory articulation
3)recognized anomalies

Old theories are not just "special cases" of new theories (e.g. Einstein -> Newton), since the "special case" is not the same epistemologically as the old theory.

X. Revolution as Changes in World View:

Shifts make scientists look at the world differently - a paradigm is a prerequisite to perception (e.g. discovery of Uranus)

XI. Invisibility of Revolutions:

Disguised because the winners rewrite the history.

XII. Resolution of Revolutions:

Conflict - neither side admits to all of their non-empirical assumptions, nor agrees on common problems. Often resolved because opponents die. Criteria for selection:

1)Solve the crisis (but usually based on a future promise)
2)More quantitative
3)Prediction
4)Elegant.

XIII. Progress through Revolution:

1)Need paradigm to do normal science and make progress
2)Need revolutions to make big leaps and make progress

NB: Prohibit appeals to authority.