perspective from which to study this important topic.
The work supported by NSF grant 76-13134 and by a
grant from the Harry Oscar Wood Fund.

REFERENCES

ENSLEV, R. A., 1980, The magnetostratigraphy of the
upper Castalc and Ridge Route Formations, Ridge Ba-
sin, southern California [unpub. Ph.D. thesis]: Davis,
Univ. Calif., 221 p.

ENSLEV, R. A., AND VEROSUB, K. L., in press, A mag-
netostratigraphic study of the sediments of the Ridge
Basin, southern California, and its tectonic and sedi-

GRArtAu, J. W., 1949, The stability and significance of
v. 54, p. 131-167.

IRVING, E., 1957, Origin of the paleomagnetism of the
Torridonian sandstones of north-west Scotland: Phil.

LOWE, D. R., 1975, Water escape structures in coarse-

PAYNE, M. A., AND VEROSUB, K. L., 1982, The acqui-
sition of post-depositional detrital remanent magneti-
zation in a variety of natural sediments: Geophys.
Jour., v. 68, p. 625-642.

SMALE, T. G., 1978, Soft sediment deformation in south-
er Ridge Basin, central Transverse Ranges, California
[unpub. Master thesis]: Santa Barbara, Univ. Calif.,
178 p.

VEROSUB, K. L., ENSLEV, R. A., AND ULRIICK, J. S., 1979,
The role of water content in the magnetization of sed-

Visher, G. S., AND CUNNINGHAM, R. D., 1981, Convolute
laminations—a theoretical analysis: example of a Penn-
sylvania sandstone: Sed. Geology, v. 28, p. 175-188.

A SIMPLIFIED METHOD FOR IMPREGNATION OF SOILS AND SIMILAR CLAY-RICH
SEDIMENTS

JOHN S. CONWAY

Department of Biochemistry and Soil Science
University College of North Wales
Bangor, North Wales
United Kingdom

INTRODUCTION

Impregnation of incoherent materials prior to thin-sec-
tion production is one of the most fundamental techniques
of sample preparation in both sedimentology and pedol-
ogy. Over the years a wide range of materials and meth-
ods have been tried: materials ranging from thermal set-
ting resins (araldite, bakelite, and canada balsam) to cold
setting polyester resins and water-miscible waxes (e.g.,
polyethylene glycol); methods ranging from high pressure
to high vacuum. Pressure techniques seem to be restricted
to geology, whereas pedologists have preferred vacuum
impregnation using cold setting polyester resin as the
norm (e.g., Altemuller, 1962, and review by Cent and
Brewer, 1971).

DISADVANTAGES OF EXISTING METHODS

Standard methods of impregnation require first that the
sample be oven dried to remove all moisture, and then
impregnated with a polyester resin under high vacuum
(0.2 mm Hg).

The disadvantages of this system are several. First, due
to the necessity of drying the sample, contraction of up
to 50 percent may be induced, especially in organic-rich
materials, causing disruption of the soil structure and pore
system. A range of methods has been suggested to over-
come problems, including freeze-drying (Stephan, 1969),
critical point drying (Gillot, 1974), and replacement of
moisture with a resin-miscible liquid such as methanol,
ethyl-methyl ketone, or acetone.

Second, resins are fairly viscous, and some technique
for overcoming this viscosity is necessary so that the resin
can penetrate the soil pores. The conventional method
utilizes a vacuum system to remove air from the soil po-
res; release of the vacuum after the resin has been poured
over the sample induces a pressure of one atmosphere.
Vacuum methods are often awkward and time consuming
to set up effectively and require specialized equipment.
The use of heat is undesirable because of the thermal
stresses induced in the resin and also because of their
effect on the soil structure. Dilution is another possibility,
and the use of monostyrene is recommended by Bascomb
and Bullock (1974), although Bajwa (1977) reported very
mixed results with fine-textured soils. More suitable di-
lutants, such as acetone, cannot be used in conjunction
with vacuum methods because of their high vapor pres-
Sure.

The use of epoxy resin as an alternative to polystyrene
resin has been advocated, but in addition to the problems
mentioned above, these are also naturally fluorescent un-
der ultraviolet light. Although this may be useful for cer-
tain studies, for instance of pore systems, it precludes the
study of autofluorescence of various soil components, for
instance organic material, phosphates, carbonates, etc.,
(Jenkins, 1970) or the use of ultraviolet fluorescent dyes
(Bajwa, 1977).

An alternative system is reported in the literature using